frontiers | Research Topics

Quality of sexual and reproductive health care: strengths, gaps, and challenges for midwifery care

Edited by
Ramon Escuriet, Lorena Binfa and Loreto Pantoja

Published in
Frontiers in Global Women's Health
Frontiers in Medicine

ISSN 1664-8714
ISBN 978-2-8325-6020-4
DOI 10.3389/978-2-8325-6020-4

About Frontiers

Frontiers is more than just an open access publisher of scholarly articles: it is a pioneering approach to the world of academia, radically improving the way scholarly research is managed. The grand vision of Frontiers is a world where all people have an equal opportunity to seek, share and generate knowledge. Frontiers provides immediate and permanent online open access to all its publications, but this alone is not enough to realize our grand goals.

Frontiers journal series

The Frontiers journal series is a multi-tier and interdisciplinary set of open-access, online journals, promising a paradigm shift from the current review, selection and dissemination processes in academic publishing. All Frontiers journals are driven by researchers for researchers; therefore, they constitute a service to the scholarly community. At the same time, the *Frontiers journal series* operates on a revolutionary invention, the tiered publishing system, initially addressing specific communities of scholars, and gradually climbing up to broader public understanding, thus serving the interests of the lay society, too.

Dedication to quality

Each Frontiers article is a landmark of the highest quality, thanks to genuinely collaborative interactions between authors and review editors, who include some of the world's best academicians. Research must be certified by peers before entering a stream of knowledge that may eventually reach the public - and shape society; therefore, Frontiers only applies the most rigorous and unbiased reviews. Frontiers revolutionizes research publishing by freely delivering the most outstanding research, evaluated with no bias from both the academic and social point of view. By applying the most advanced information technologies, Frontiers is catapulting scholarly publishing into a new generation.

What are Frontiers Research Topics?

Frontiers Research Topics are very popular trademarks of the *Frontiers journals series*: they are collections of at least ten articles, all centered on a particular subject. With their unique mix of varied contributions from Original Research to Review Articles, Frontiers Research Topics unify the most influential researchers, the latest key findings and historical advances in a hot research area.

Find out more on how to host your own Frontiers Research Topic or contribute to one as an author by contacting the Frontiers editorial office: frontiersin.org/about/contact

Quality of sexual and reproductive health care: strengths, gaps, and challenges for midwifery care

Topic editors

Ramon Escuriet — Blanquerna Ramon Llull University, Spain
Lorena Binfa — University of Chile, Chile
Loreto Pantoja — University of Chile, Chile

Citation

Escuriet, R., Binfa, L., Pantoja, L., eds. (2025). *Quality of sexual and reproductive health care: strengths, gaps, and challenges for midwifery care*.
Lausanne: Frontiers Media SA. doi: 10.3389/978-2-8325-6020-4

Table of contents

frontiers | Frontiers in Global Women's Health

TYPE Editorial
PUBLISHED 06 February 2025
DOI 10.3389/fgwh.2025.1546264

OPEN ACCESS

EDITED AND REVIEWED BY
Tabassum Firoz,
Yale New Haven Health System, United States

*CORRESPONDENCE
Lorena Binfa
✉ lbinfa@uchile.cl

RECEIVED 16 December 2024
ACCEPTED 22 January 2025
PUBLISHED 06 February 2025

CITATION
Binfa L, Pantoja L and Escuriet R (2025) Editorial: Quality of sexual and reproductive health care: strengths, gaps, and challenges for midwifery care.
Front. Glob. Womens Health 6:1546264.
doi: 10.3389/fgwh.2025.1546264

Editorial: Quality of sexual and reproductive health care: strengths, gaps, and challenges for midwifery care

Lorena Binfa[1]*, Loreto Pantoja[1] and Ramon Escuriet[2]

[1]Faculty of Medicine, Department of Women's and Newborn Health, University of Chile, Santiago, Chile, [2]GHenderS Research Group, Blanquerna School of Health Sciences, University Ramon Llull, Barcelona, Spain

KEYWORDS

sexual and reproductive health, midwifery, quality of care, training and education, maternal and newborn care

Editorial on the Research Topic
Quality of sexual and reproductive health care: strengths, gaps, and challenges for midwifery care

1 Introduction

Sexual and Reproductive Health (SRH) extends beyond traditional biological and medical approaches to encompass a broader range of human needs to achieve comprehensive sexual and reproductive well-being. Such well-being is attained when individuals demand and exercise their rights (1). The concept of SRH addresses the entire life cycle of all individuals, with emphasis on critical periods such as birth, adolescence, and reproductive age, along with the influence of sex and gender. Its impact is particularly profound in low- and middle-income countries (LMICs), where women often face heightened discrimination and challenges in accessing SRH care. Vulnerable groups include adolescents, single women, immigrants, refugees, ethnic or religious minorities, those living in poverty, those in camps or humanitarian crises, individuals with disabilities or HIV, and those affected by inequalities. Delivering high-quality sexual and reproductive care (SRC) requires humanized, integrated, efficient, and effective services with a strong focus on quality from both a technical and a user experience perspective (2–4).

Despite commitments made by countries at international conferences, such as the International Conference on Population Development (ICPD) in Cairo (1994), the Fourth World Conference on Women in Beijing (1995), and ICPD25 in Nairobi (2019), inequities in SRC access and quality persist. These efforts align with the commitments outlined in the 2030 Agenda for Sustainable Development. In 2021, the Generation Equality Forum further emphasized the aim of achieving gender equality by 2030 (Goal 5). Recent World State of Population Reports (WSoPR) have underscored these gaps, calling for action to address inequalities in sexual and reproductive health and rights across countries (5–9). Additionally, there is a growing need for research aimed

at improving the quality of SRC, implementing models of care that enhance well-being and safety, optimizing physiological processes during childbirth, and validating outcome measures. This editorial proposes to address these needs as a central focus.

In total, 15 studies were selected for this Research topic, encompassing research conducted in North and South America, Africa, and Asia. These studies primarily focused on 4 of the 11 proposed themes.

1.1 Safe and respectful maternal and newborn care

Six articles addressed this theme, highlighting disparities between immigrant populations and native residents, high rates of cesarean sections (C-sections), and inadequate preparedness for the COVID-19 pandemic. The overuse of episiotomies, insufficiently trained professionals in the prevention of obstetric fistulas, non-consensual treatment, disrespect and abuse, poor antenatal education and monitoring, and women's lack of awareness regarding their own rights were recurring concerns (a, g, j, k, m, o). These studies, primarily conducted in the African Region and Latin America, align with findings from global research indicating that no country has consistently provided high-quality maternal and newborn care (2), particularly in Latin America (10). In 2024, the WHO released its position paper on transitioning to midwifery models of care, described as a "process of reorienting health systems away from the currently prevalent fragmented and risk-oriented model of care to a midwifery model of care in which women and newborns, starting from pre-pregnancy and continuing through the postnatal period, receive equitable, person-centered, respectful, integrated, and high-quality care, provided and coordinated by midwives working within collaborative interdisciplinary teams" (11). This initiative aims to encourage governments to value the contribution of midwives to improving the quality of SRC and to integrate them fully into health services in order to utilize their competencies effectively.

1.2 Key or targeted populations (refugees, migrants, adolescents, and sexual diversity)

Four articles explored this theme. They emphasized the complexity of health-seeking behaviors among Indigenous communities and the importance of addressing structural barriers and designing culturally appropriate programs. Similar recommendations were made for preventing miscarriages among Latina women living in the United States, with calls for further research on intimate partner violence, acculturation, and self-rated health perceptions. These measures aim to reduce disparities among immigrant populations and establish new regulations to safeguard their reproductive rights (b, c, f, g). These findings are consistent with those presented at the last UNFPA WSoPR (5–9). This theme underscores the critical role of midwives in resource-limited areas or settings with barriers to accessing health services. Midwives, when educated to international standards, integrated into health systems, and functioning as part of multidisciplinary teams, can significantly improve health outcomes. It is estimated that midwifery interventions could prevent 67% of maternal deaths, 64% of neonatal deaths, and 65% of stillbirths in 88 LMICs, where the majority of these deaths occur (12).

1.3 Promotion of SRH in the community

Nine articles addressed this topic, highlighting the importance of strengthening community-based education and tailoring counseling to meet not only women's needs but also family engagement. Additionally, the articles emphasized the significance of self-care options and mechanisms for supporting self-care users with information, counseling, and linkages to care (a, b, c, d, e, f, g, i , j, n). The inclusion of trained midwives can provide approximately 90% of primary health care for women and newborns. This includes family planning, perinatal mental health care, prevention of sexually transmitted diseases, and overall promotion of sexual and reproductive health-related well-being (13).

1.4 Midwifery education and training

All articles on this Research topic underscored the pivotal role of midwifery professionals in improving SRC quality. Strengthening midwifery education, providing regular in-service training, facilitating career transitions for newly qualified midwives, and improving continuing education were identified as critical. Sustained funding for midwifery education and strengthening of health systems are essential to ensure that midwives can effectively apply their skills (a, h, l, o). High-quality midwifery care necessitates evidence-based education and training. Evidence suggests that implementing the full scope of midwifery improves the majority of SRH outcomes, with 56 specific outcomes identified (14, 15). Training programs obtaining an academic degree positively impact patient outcomes and support the call for standardizing midwifery education at the bachelor's level. Advanced education enables midwives and nurses to assume broader roles, including leadership, research, and teaching in both clinical and academic settings (16–21). In 2019, Member States launched the WHO-UNFPA-UNICEF-BWI Joint Framework for Action at the World Health Assembly to strengthen quality midwifery education and achieve universal health coverage. This framework presents the latest global evidence, a consensus for action, and a seven-step action plan for quality midwifery education (14).

2 Conclusion

The recurrence of certain themes suggests potential for further exploration. Lessons learned by midwives and their contributions to improving SRH should be incorporated into future strategies. Evidence highlights the urgent need for transformative approaches to midwifery training, ensuring that midwives and other healthcare professionals (nurses, doctors, and community health workers) integrate elements of midwifery care into their practice. This approach enhances women's capabilities, fosters critical thinking, supports decision-making, prevents unnecessary interventions, and facilitates appropriate responses to emergencies. The studies included in this research topic are consistent with evidence indicating persistent gaps in SRH and rights. Addressing these gaps requires improving midwifery education and research, strengthening postgraduate studies, scaling up midwifery services, and advancing continuous education for midwives.

Author contributions

LB: Writing – original draft. LP: Writing – review & editing. RE: Writing – review & editing.

Acknowledgments

We would like to thank Editage (https://www.editage.com) for English language editing.

Conflict of interest

The authors declare that the research topic was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Generative AI was used in the creation of this manuscript.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

1. United Nations. Report of the international conference on population and development, Cairo; September 1994; New York: United Nations (1994).

2. Miller S, Abalos E, Chamillard M, Ciapponi A, Colaci D, Comandé D, et al. Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide. *Lancet*. (2016) 388:2176–92. doi: 10.1016/S0140-6736(16)31472-6

3. United Nations Group for Development of LAC. *Commitments and Roadmap for a Planet 50–50 by 2030*. New York: UNFPA (2017).

4. United Nations Population Fund (UNFPA). *State of World Population 2017: Worlds Apart: Reproductive Health and Rights in an Age of Inequality*. New York: UNFPA (2017).

5. United Nations Population Fund (UNFPA). *State of World Population 2020: Against my Will—Defying the Practices that Harm Women and Girls and Undermine Equality*. New York: UNFPA (2020).

6. United Nations Population Fund (UNFPA). *State of World Population 2021: My Body is my Own: Claiming the Right to Autonomy and Self-Determination*. New York: UNFPA (2021).

7. United Nations Population Fund (UNFPA). *State of World Population 2022: Seeing the Unseen: The Case for Action in the Neglected Crisis of Unintended Pregnancy*. New York: UNFPA (2022).

8. United Nations Population Fund (UNFPA). *State of World Population 2023: 8 Billion Lives, Infinite Possibilities—the Case for Rights and Choices*. New York: UNFPA (2023).

9. United Nations Population Fund (UNFPA). *State of World Population 2024: Interwoven Lives, Threads of Hope*. New York: UNFPA (2024).

10. Binfa L, Pantoja L, Ortiz J, Cavada G, Schindler P, Burgos RY, et al. Midwifery practice and maternity services: a multisite descriptive study in Latin America and the Caribbean. *Midwifery*. (2016) 40:218–25. doi: 10.1016/j.midw.2016.07.010

11. World Health Organization (WHO). *Transitioning to Midwifery Models of Care: A Global Position Paper*. Geneva: WHO (2024). Available online at: https://creativecommons.org/licenses/by-nc-sa/3.0/igo

12. Nove A, Friberg IK, de Bernis L, McConville F, Moran AC, Najjemba M, et al. The potential impact of midwives in preventing and reducing maternal and neonatal mortality and stillbirths: a lives saved tool modelling study. *Lancet Glob Health*. (2020) 8:e1370–9. doi: 10.1016/S2214-109X(20)30364-8

13. United Nations Population Fund (UNFPA). *The State of the World's Midwifery (SoWMy) 2014: A Universal Pathway. A Woman's Right to Health*. New York: UNFPA (2014).

14. World Health Organization (WHO). *Framework for Action: Strengthening Quality Midwifery Education for Universal Health Coverage 2030*. Geneva: WHO (2019).

15. Renfrew MJ, McFadden A, Bastos MH, Campbell J, Channon AA, Cheung NF, et al. Midwifery and quality care: findings from a new evidence-informed framework for maternal and newborn care. *Lancet*. (2014) 384:1129–45. doi: 10.1016/S0140-6736(14)60789-3

16. World Health Organization (WHO). *State of the World's Nursing 2020: Investing in Education, Jobs and Leadership*. Geneva: WHO (2020).

17. Castro Lopes S, Michel-Schuldt M, Gallos I, Marley CS, Tunçalp Ö, Vogel JP, et al. A descriptive analysis of midwifery education, regulation and association in 73 countries: the baseline for a post-2015 pathway. *Hum Resour Health*. (2016) 14:37. doi: 10.1186/s12960-016-0134-7

18. Hermansson E, Mårtensson LB. The evolution of midwifery education at the master's level: a study of Swedish midwifery education programmes after the implementation of the Bologna process. *Nurse Educ Today*. (2013) 33:866–72. doi: 10.1016/j.nedt.2012.09.015

19. Kumakech E, Achora S, Berggren V. Graduate midwifery education in Uganda aiming to improve maternal and newborn health outcomes. *Ann Glob Health*. (2020) 86:52. doi: 10.5334/aogh.2804

20. Bogren M, Doraiswamy S, Erlandsson K. Building a new generation of midwifery faculty members in Bangladesh. *J Asian Midwives*. (2017) 4:52–8.

21. Lakhani A, Jan R, Baig M, Mubeen K, Ali SA, Shahid S, et al. Experiences of the graduates of the first baccalaureate midwifery programme in Pakistan: a descriptive exploratory study. *Midwifery*. (2018) 59:94–9. doi: 10.1016/j.midw.2018.01.008

frontiers | Frontiers in Global Women's Health

TYPE Original Research
PUBLISHED 26 April 2023
DOI 10.3389/fgwh.2023.1127695

OPEN ACCESS

EDITED BY
Lorena Binfa,
University of Chile, Chile

REVIEWED BY
Kornelia Zareba,
United Arab Emirates University,
United Arab Emirates
Gehan Sallam,
United Arab Emirates University,
United Arab Emirates

*CORRESPONDENCE
Madeline Fernandez-Pineda
✉ Fernandezm21@ecu.edu

RECEIVED 19 December 2022
ACCEPTED 10 April 2023
PUBLISHED 26 April 2023

CITATION
Fernandez-Pineda M, McCabe BE, Cianelli R, Villegas N, Ferrer L and Peragallo Montano N (2023) Assessment of miscarriage factors among Latinas who live in the U.S.: a cross-sectional study.
Front. Glob. Womens Health 4:1127695.
doi: 10.3389/fgwh.2023.1127695

Assessment of miscarriage factors among Latinas who live in the U.S.: a cross-sectional study

Madeline Fernandez-Pineda[1]*, Brian E. McCabe[2], Rosina Cianelli[3,4], Natalia Villegas[5], Lilian Ferrer[4] and Nilda Peragallo Montano[5]

[1]Department of Nursing Science, College of Nursing, East Carolina University, Greenville, NC, United States, [2]Department of Special Education, Rehabilitation, and Counseling (SERC), College of Education, Auburn University, Auburn, AL, United States, [3]School of Nursing and Health Studies, University of Miami, Coral Gables, FL, United States, [4]Pontificia Universidad Catolica de Chile, Escuela de Enfermeria, Santiago, Chile, [5]School of Nursing, University of North Carolina at Chapel Hill, Chapel Hill, NC, United States

Introduction: Latinas in the US are underrepresented in miscarriage research, yet face several risk factors for having a miscarriage, including intimate partner violence, and increasing maternal age. Increased acculturation is associated to increased risk of intimate partner violence and adverse pregnancy outcomes among Latinas yet is also understudied in the realm of miscarriage. Thus, this study aimed to analyze and compare sociodemographic characteristics, health-related factors, intimate partner violence, and acculturation among Latinas with and without a history of miscarriage.

Methods: This study utilizes a cross-sectional design to analyze baseline data from a randomized clinical trial on the effectiveness of "Salud/Health, Educación/Education, Promoción/Promotion, y/and Autocuidado/Self-care" (SEPA), a human immunodeficiency virus risk reduction intervention for Latinas. Survey interviews were conducted in a private room at the University of Miami Hospital. Survey data analyzed include demographics, a bi-dimensional acculturation scale, a health and sexual health survey, and the hurt, insult, threaten, and scream tool. This study's sample was 296 Latinas, 18 to 50 years old, with and without a history of miscarriage. Data analyses included descriptive statistics, *t*-tests for continuous variables, negative binomial for counts, and chi-square for dichotomous or categorical variables.

Results: Most Latinas were Cuban (53%), lived in the U.S. an average of 8.4 years, had 13.7 years of education, and a monthly family income of $1,683.56. Latinas with history of miscarriage were significantly older, had more children, more pregnancies, and poorer self-rated health than Latinas without history of miscarriage. Although not significant, a high percentage of intimate partner violence (40%) and low levels of acculturation were reported.

Discussion: This study contributes new data about different characteristics of Latinas who have and have not experienced a miscarriage. Results can help identify Latinas at risk for miscarriage or its adverse-related outcomes and help develop public health policies focusing on preventing and managing miscarriage among Latinas. Further research is warranted to determine the role of intimate partner violence, acculturation, and self-rated health perceptions among Latinas who experience miscarriage. Certified nurse midwives are encouraged to provide Latinas with culturally tailored education on the importance of early prenatal care for optimal pregnancy outcomes.

KEYWORDS

Hispanic/Latinas, miscarriage, pregnancy loss, acculturation, intimate partner violence, sociodemographic, midwifery care

Introduction

In the United States (U.S.), an estimated 30%–40% of all pregnancies and 15%–20% of clinically recognized pregnancies end in *miscarriage*, or the loss of a pregnancy before 20 weeks gestation (1, 2). It is estimated that miscarriage is the most common form of pregnancy loss, with 80% of early pregnancy loss occurring in the first trimester of gestation (3). The risk is multivariate and while there are risk factors (e.g., maternal age, prior obstetrical history, and maternal comorbidities), it is difficult to establish predictors of future pregnancy loss (3).

Latinas, a vulnerable and marginalized population, are often underrepresented in research studies on women who experience miscarriage. Yet, U.S. Latinas face several risk factors for

having a miscarriage when compared to non-Latina White women, including, for example, more severe phenotypes of polycystic ovarian syndrome (4), and higher cases of Chlamydia [524.2 vs. 274.7 per 100,000; (5)] and Gonorrhea infections [88 vs. 65.5 per 100,000; (6)]. Additionally, age of first pregnancy has increased from 2000 to 2014 among Latinas of Cuban (26.5 to 27 years) and Central and South American descent (24.8 to 26.5 years) and are comparable to the age of first pregnancy among non-Latina Whites [which increased from 25.9 to 27 years; (7)]. Most miscarriages (about 60%) occur randomly due to a genetic problem which becomes even more common in women of increased reproductive age (8).

Several studies have also identified an association between miscarriage and intimate partner violence [IPV; (9, 10)], an issue that is quite prevalent in the Latino community (11, 12). Immigration and acculturation to a new culture have been cited as risk factors for IPV due to changes in existing gender roles within Latino families. Acculturation has also been associated with increases in alcohol abuse, unemployment, and socioeconomic issues all of which predict IPV (13). Furthermore, higher levels of acculturation have been associated to increased risk of IPV and adverse pregnancy outcomes including preterm births, preeclampsia or eclampsia, and gestational hypertension (13, 14). Nonetheless, IPV and acculturation have been scarcely studied among Latinas within the realm of miscarriage. Limited data on Latinas who have experienced a miscarriage means that certified nurse midwives have little evidence to guide and tailor their practice to provide adequate care to these women. Thus, this study aimed to analyze and compare sociodemographic characteristics, health-related factors, intimate partner violence, and acculturation among Latina women with and without a history of miscarriage.

Materials and methods

Design

This study uses a descriptive cross-sectional study design to examine the variables of interest with baseline data of a larger randomized trial on the effectiveness of Salud/Health, Educación/Education, Promoción/Promotion, y/and Autocuidado/Self-care (SEPA), a culturally specific and theoretically based group intervention for Latinas (15). The Florida Department of Health Institutional Review Board approved this study.

Setting and participants

Eligibility criteria for the parent study included participants being 18 to 50 years old, self-identifying as a Latina, and sexually active within six months prior to study participation. Participants were recruited using convenience and snowball sampling from the Miami Refugee Center, Florida Department of Health, and public locations, including grocery stores, churches, and community organizations. Of women assessed for eligibility, the parent study had a response rate of 59%. After participants read and signed the informed consent form, the survey interviews were conducted in a private room at the University of Miami Hospital. A total of 320 surveys were conducted by trained bilingual female researchers in the participants' preferred language (Spanish or English) utilizing a standardized protocol on a secure web-based software (e-Velos). Of those 320, a sub-sample of 296 Latinas provided information on their miscarriage history, making up the sample for this study ($n = 89$ who reported experiencing at least one miscarriage and $n = 207$ who did not have any miscarriage).

Measures

Participant sociodemographic characteristics were collected using an 18-item standardized demographic intake form (15). Eleven items, age, years living in the U.S., preferred language, monthly family income, relationship status, educational level, employment status, health insurance status, religious service attendance, religious identity, and religious strength influencing life were examined for this study.

Acculturation was assessed with the bidimensional acculturation scale [BAS; (16)] to measure participant's acculturation level. It consists of 24 items to assess Latino's level of acculturation to the U.S. culture (*Americanism; 12 items*) and to their culture of origin (*Hispanicism; 12 items*). Items are based on language proficiency and frequency of use for speaking, reading, and media consumption. The range of scores for each cultural dimension is 1–4. A score of 2.5 or higher either dimension (i.e., Hispanic or U.S.) indicates a high level of acculturation to that dimension. At baseline in this sample, both the Hispanicism and Americanism subscales had high internal consistency ($\alpha = .82$ and.96, respectively).

Health-related factors, such as the number of pregnancies, miscarriages, and live children in addition to if they had a regular healthcare provider, their perceived health status, and history of sexually transmitted infections (STIs) were assessed with items from the health and sexual health 8-item survey (17). Self-rated health status used a 4-point Likert (i.e., very good, good, poor, very poor) and was coded as *good* if participants

chose either "Very good" or "good" answer choices and *poor* if they chose "Very poor" or "poor" answer choices. History of STIs was coded as "yes" if any were reported and "no" if none were reported.

Intimate partner violence (IPV) in the last month was assessed using the hurt, insult, threaten, and scream [HITS; (18)] tool which measures four types of IPV. Response choices are on a 5-point Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = fairly often, and 5 = frequently). IPV responses were counted as "yes" if participants reported any type of IPV (i.e., options 2–5). The tool had a $\alpha = .91$ of internal consistency (see **Supplementary Appendix** for all measures used in this study).

Statistical analysis

IBM SPSS 27 was used for all analyses. Sociodemographic characteristics shown with descriptive statistics. Then, we tested whether several variables were different between Latinas with or without a miscarriage using *t*-tests for continuous variables, negative binomial for counts, and chi-square (χ^2) for dichotomous or categorical variables. **Table 1** shows Spearman rank correlations between all study variables.

Results

Sociodemographic characteristics

Most Latinas in this study were born in Cuba (53%), followed by Nicaragua (10%), Honduras (9%), and Colombia (9%). Of the remaining 19%, no nationality had more than 5% and included the Dominican Republic, the U.S., Venezuela, Peru, Guatemala, El Salvador, Mexico, Panama, Argentina, Puerto Rico, Ecuador, and Bolivia. Latinas with a history of miscarriage made up 30% of the sample, of which 82% had one and 18% had two to six miscarriages. Latinas who experienced a miscarriage were significantly older ($M = 38.82$, $SD = 7.92$) $t = 5.01$, $p < .001$ than Latinas with no history of miscarriage ($M = 33.21$, $SD = 9.19$). See **Table 2** for all sample sociodemographic data and group comparisons.

Acculturation

Women with a history of miscarriage scored less than 2.5 in the Americanism ($M = 1.88$, $SD = 0.73$) component of BAS and more than 2.5 in the Hispanicism ($M = 3.50$, $SD = 0.35$). Similar results were obtained for women with a non-history of miscarriage (Americanism ($M = 2.07$, $SD = 0.80$); Hispanicism ($M = 3.47$, $SD = 0.38$). These results reflect a low level of acculturation to the American culture in both groups with no significant differences among them.

Health-Related characteristics

In this study, 30% of participants reported having a history of miscarriage and 70% did not report a history of miscarriage. As shown in **Table 3**, Latinas who experienced a miscarriage had significantly more children ($M = 1.83$, $SD = 1.36$), $b = .40$, $p < .001$ and more pregnancies ($M = 3.93$, $SD = 1.99$), $b = .74$, $p < .001$ than those who did not report miscarriages ($M = 1.87$, $SD = 1.69$). In addition, Latinas with a history of miscarriages were less likely to rate their health as good or very good (N = 66, 74%), $b = 11.18$, $p < .001$ compared with Latinas with no miscarriage history ($N = 185$, 89%). There were no significant differences in having health insurance or a regular healthcare provider. Further, although there was no significant difference identified for history of STI, the top three STI's reported by participants with a history of miscarriage were candida albicans/bacterial vaginosis (24%), genital herpes/HPV (7%), and chlamydia/urethritis/ drip (4%).

Intimate partner violence

Forty percent of the participants reported an episode of intimate partner violence. Of them, 10.9% reported being physically hurt, 47.1% reported being insulted, 12.6% reported being threatened, and 29.4% being screamed at. However, there were no significant differences in IPV between Latinas who experienced or did not experience a miscarriage.

Discussion

This study contributes new data about different characteristics of Latinas who have and have not experienced a miscarriage. In this study, 30% of Latinas experienced at least one miscarriage, which matches the estimated U.S. national rates (30%–40%) of miscarriages (1, 2). In this analysis, Latinas who experienced a miscarriage were significantly older, had more pregnancies, and more children. It is expected that as women age, they may have more pregnancies compared to younger women, thus they might have more children but also, they will have increased risk or likelihood for miscarriage since increased maternal age is a main risk factor for increased genetic malformations to occur (8).

Evidence suggests that higher Latina acculturation is associated to pregnancy complications such as preterm births and gestational hypertension but there is a paucity of research between acculturation and miscarriage (14). In this study, acculturation was not found to be significant between Latinas with and without miscarriage. However, both groups of Latinas scored higher on the Hispanicism dimension indicating a low level of acculturation to the American culture even after having lived in the US for an average of 8 years. In addition to higher Hispanicism, the similar prevalence in miscarriages among Latinas in this study compared to the estimated U.S. national rates, could be related to the "Latina paradox" which is related to the favorable birth outcomes despite social disadvantages, which are associated to cultural, social factors, and the social network that provides protective factors and a behavioral context for healthy births (19, 20). Even when these mechanisms are not completely clear, we know that they are relevant to Latinas who experience several social determinants of health that could

10.3389/fgwh.2023.1127695

TABLE 1 Spearman rank correlations between study variables.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Age, years	1																				
2. Years in US	.13*	1																			
3. Education	.20**	−.24**	1																		
4. Family Income	.13*	.22**	.12*	1																	
5. Hispanicism	.07	−.23**	.11*	.06	1																
6. Americanism	−.33**	.39**	.11	.14*	−.32**	1															
7. Spanish preferred	.24**	−.34**	.10	.02	.29**	−.41**	1														
8. Spouse/Partner	.08	−.07	.06	.10	−.09	−.17**	.01	1													
9. Employed	.01	.19**	.01	.16**	−.08	.18**	−.02	−.03	1												
10. Weekly Religious	.03	.06	−.04	−.03	.12*	.06	.13*	.08	.01	1											
11. Very Religious	.10	.05	−.03	.05	.09	−.01	.04	.02	.07	.26**	1										
12. Strong Religious	.10	.05	−.03	.05	.09	−.01	.04	.02	.07	.26**	1.00**	1									
13. Health Insurance	−.06	−.20**	.11	.03	.04	.01	−.03	−.11	−.11*	−.08	−.06	−.06	1								
14. # Children	.34**	.28**	−.21**	.13*	.04	−.14*	.06	.10	.03	.20**	.10	.10	−.02	1							
15. # Pregnancies	.44**	.08	−.07	.04	.02	−.24**	.10	.07	−.04	.06	.02	.02	.08	.73**	1						
16. Good Health	.01	−.13*	.03	.13*	.02	−.05	.16**	.02	−.05	.01	.03	.03	.06	−.08	−.18**	1					
17. Regular Provider	−.04	−.05	.03	.05	.00	.12*	−.08	−.02	−.12*	.02	−.01	−.01	.58**	.05	.11*	−.04	1				
18. Physically Hurt	−.04	.07	−.15**	.00	−.12*	−.03	−.01	−.10	.01	−.01	.00	.00	−.09	.01	.07	.04	−.04	1			
19. Insulted	.04	.16**	−.11	.08	−.01	.06	−.16**	−.04	−.01	−.01	.04	.04	−.06	.06	.05	−.05	.01	.31**	1		
20. Threatened	.01	.04	−.08	.04	.00	−.07	.01	−.07	−.02	.00	.04	.04	−.06	.06	.06	.02	−.03	.61**	.41**	1	
21. Screamed at	−.02	.24**	−.12*	.15**	−.05	.11*	−.24**	.01	.03	−.01	−.04	−.04	−.08	.09	.04	.02	.02	.46**	.65**	.45**	1

*$p < .05$.
**$p < .001$.

TABLE 2 Sociodemographic Characteristics of Latinas with a History of Miscarriage.

Characteristics	No Miscarriage ($n = 207$)		Miscarriage ($n = 89$)		t	p
	M	SD	M	SD		
Age, years	33.21	9.19	38.82	7.92	5.01	<.001
Years in US	8.41	8.14	8.71	8.92	0.28	.776
Education, years	13.75	3.21	13.98	4.00	0.51	.611
Monthly Family Income, USD	1,683.56	1,043.45	1,661.17	911.76	0.18	.861
Hispanicism	3.47	0.38	3.50	0.35	0.61	.545
Americanism	2.07	0.80	1.88	0.73	1.93	.055
	n	%	n	%	χ^2/b	p
Spanish preferred	192	93	85	96	0.79	.449
Has Spouse/Partner	158	76	63	71	1.01	.382
Employed	61	29	23	26	0.40	.576
Weekly Religious Service Attendance	51	25	23	26+	0.05	.826
Very Religious Identity	17	8	9	10	0.28	.596
Very Strong Religious Strength Influencing Life	59	29	27	30	0.12	.725
Has Health Insurance	95	46	39	44	0.11	.742

TABLE 3 Health-Related characteristics of latinas with a history of miscarriage.

Characteristics	No Miscarriage ($n = 207$)		Miscarriage ($n = 89$)		b	p
	M	SD	M	SD		
Number of children	1.22	1.13	1.83	1.36	0.40	<.001
Number of pregnancies	1.87	1.69	3.93	1.99	0.74	<.001
	n	%	n	%	χ^2/b	p
Self-rated Good Health	185	89	66	74	11.18	.001
Has Regular Healthcare Provider	66	32	28	31	0.01	.943
History of STI	73	35	27	30	0.68	.411
IPV						
Physically Hurt	8	4	5	6	0.46	.500
Insulted	39	19	17	19	0.00	.958
Threatened	9	4	6	7	0.74	.389
Screamed at	25	12	10	11	0.04	.837

decrease their access to health services and screenings to prevent or receive appropriate care if they experience a miscarriage. In this study, women had low income, few had health insurance, and the majority were Spanish speaking which could complicate their access to care when experiencing a miscarriage. Existing literature indicates that poorer patient experiences are reported among those with lower socioeconomic status (21). Future research should explore the role of certified nurse midwives and how they can contribute to reducing these disparities and potentiate protective factors among Latina women as well as on the relationship between acculturation and pregnancy loss among Latinas.

Existing evidence supports the association between intimate partner violence (IPV) and miscarriage in other populations, including minority populations (9, 22). However, in this study, there was no significance found between those with and without history of miscarriage in terms of IPV. This could be because the HITS survey asked about IPV exposure solely during the month prior to study participation and not at other time periods of the participants' life which may have increased the exposure of women to IPV. Furthermore, the prevalence of IPV was high in both groups of Latina women studied. Thus, future studies should assess the relationship between history of IPV and miscarriage and its health-related impacts on larger and varied Latina populations.

Findings from this study indicate that Latinas with history of miscarriage significantly rate their overall health as worse than those without history of miscarriage. There is existing international literature indicating that reproductive history, particularly parity and early vs. late childbearing, influences women's health and their overall self-rated perceptions of health later in life (23–26). However, self-rated health among Latinas has been largely understudied particularly within the realm of miscarriage and pregnancy loss. One study comparing self-rated

health among 5,620 White and African American women (another minority group), 50 years old or older, with childbearing history (number of children and pregnancy loss) stated that the African American women consistently reported worse physical and overall health as well as lower education and income than the White women. Furthermore, having six or more children as well as having had a pregnancy loss were both associated with poorer self-reported health for both races with the stronger association being among the African American women (27). Although the current study did not assess this relationship, it would be worthwhile to investigate since self-rated health has consistently predicted future health, functional status, and mortality across cultures and populations (27, 28). Given the scarcity of research regarding self-rated health and pregnancy loss particularly among the Latina population, warrants this type of study.

Nurses and certified nurse midwives have the opportunity to be at the forefront of conducting these needed studies that would help inform the nursing community on how to tailor their care and provide quality patient education that would improve health outcomes for Latinas who have had a miscarriage. Early pregnancy planning, prenatal counseling, and culturally tailored education for Latinas of childbearing age may promote healthy behaviors, decrease risk for miscarriage, and improve overall health status perceptions. The literature shows that patient education is crucial in miscarriage management and should be focused on maternal health, risk factors, preparing for future pregnancy if appropriate, contraception, and mental health among others (3). A caring organizational culture and supportive leadership from certified nurse midwives will ensure early consultation for pregnant Latina women and facilitate care continuity, improving Latina's health outcomes.

Limitations

We used a cross sectional design and thus cannot establish causal relationships since we did not measure the timing of the miscarriage(s). Data was self-reported by the participants. The analysis was completed with a largely homogenous sample of Latina women, making it challenging to find significant differences between the two groups. Further, most participants (53%) were of Cuban origin which limits generalizability of results to Latinas from other national origins.

Recommendations

The results of this study demonstrate many dimensions related to Latina miscarriages that require further exploration. Therefore, it will be important that certified nurse midwives who work with Latinas receive appropriate training to help better understand the Latino cultural components related to miscarriage and contribute to providing culturally sensitive care during and after a miscarriage. In addition, efforts need to be made to motivate and recruit more Latinos pursuing careers as nurses, certified nurse midwives, and terminal degrees (e.g., Doctor of Nursing Practice or Doctor of Philosophy in Nursing).

This study also highlights the lack of research on miscarriage among Latinas. Therefore, qualitative and quantitative studies on miscarriages in Latin women are urgently needed to better understand their risk factors and unique needs for post-miscarriage care. In addition, research results will help to better identify Latinas at risk for miscarriage or its adverse-related outcomes and help to develop public health policies that focus on preventing and managing miscarriage among Latinas.

Conclusion

This study is one of the few that has investigated characteristics of Latinas who have experienced a miscarriage. Certified nurse midwives are encouraged to provide Latinas with culturally tailored education on the importance of early prenatal care for optimal pregnancy outcomes. Certified nurse midwives also have an important role advocating for Latina's access to health and providing support to navigate the system and the decision-making process in cases of miscarriage. Further research is warranted to determine the role of IPV, acculturation, and overall health perceptions among Latinas who experience miscarriage.

Data availability statement

The original contributions presented in the study are included in the article/**Supplementary Materials**, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Florida Department of Health Institutional Review Board. The patients/participants provided their written informed consent to participate in this study.

Author contributions

MF-P and BEM: were involved in this secondary study design and analysis. MF-P: provided oversight and drafted the manuscript. MF-P: designed and advised on the statistical analysis. BEM: conducted statistical analyses, table preparation, and wrote statistical analysis section of manuscript. RC, NV, NPM, and LF: contributed to the article and all authors approved the submitted version.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was funded by the Center of Excellence for Health Disparities Research: El Centro, National Center on Minority Health and Health Disparities grant P60MD002266.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fgwh.2023.1127695/full#supplementary-material.

References

1. Bardos J, Hercz D, Friedenthal J, Missner SA, Williams Z. A national survey on public perceptions of miscarriage. *Obstet Gynecol*. (2015) 125(6):1313–20. doi: 10.1097/AOG.0000000000000859

2. Michels TC, Tiu AY. Second trimester pregnancy loss. *Am Fam Physician*. (2007) 76(9):1341–6. PMID: 18019878

3. Dugas C, Slane V. Miscarriage. *Statspearls*. Treasure Island (FL): StatPearls Publishing (2022). Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK532992/

4. Engmann L, Jin S, Sun F, Legro RS, Polotsky AJ, Hansen KR, et al. Racial and ethnic difference in the polycystic ovary syndrome (PCOS) metabolic phenotype. *Am J Obstet Gynecol*. (2018) 216(5):493.e1–493.e13. doi: 10.1016/j.ajog.2017.01.003

5. Centers for Disease Control and Prevention. (2021a). *Sexually Transmitted Disease Surveillance 2019: Table 11B. Chlamydia- Rates of reported Cases* by Race/Hispanic Ethnicity, Age Group, and Sex, United States*, 2019. https://www.cdc.gov/std/statistics/2019/tables/11b.htm

6. Centers for Disease Control and Prevention. (2021b). *Sexually Transmitted Disease Surveillance 2019: Table 22B. Gonorrhea- Rates of reported Cases* by Race/Hispanic Ethnicity, Age Group, and Sex, United States*, 2019. https://www.cdc.gov/std/statistics/2019/tables/22b.htm

7. Mathews TJ, Hamilton BE. *Mean age of mothers is on the rise: United States 2000–2014. Natl Center Health Stat*. (2016) 232:8. https://www.cdc.gov/nchs/data/databriefs/db232.pdf

8. The American College of Obstetricians and Gynecologists. *Repeated miscarriages*. ACOG (2020). Available at: https://www.acog.org/womens-health/faqs/repeated-miscarriages

9. Afiaz A, Biswas RK, Shamma R, Ananna N. Intimate partner violence (IPV) with miscarriages, stillbirths and abortions: identifying vulnerable households for women in Bangladesh. *PLoS One*. (2020) 15(7):e0236670. doi: 10.1371/journal.pone.0236670

10. Dhar D, McDougal L, Hay K, Atmavilas Y, Silverman J, Triplett D, et al. Associations between intimate partner violence and reproductive and maternal health outcomes in Bihar, India: a cross-sectional study. *Reprod Health*. (2018) 15(1):1–14. doi: 10.1186/s12978-018-0551-2

11. Bonomi AE, Anderson ML, Cannon EA, Slesnick N, Rodriguez MA. Intimate partner violence in Latina and non-Latina women. *Am J Prev Med*. (2009) 36(1):43–8. doi: 10.1016/j.amepre.2008.09.027

12. Cavanaugh CE, Messing JT, Amanor-Boadu Y, O'Sullivan CS, Webster D, Campbell J. Intimate partner sexual violence: a comparison of foreign-versus US-born physically abused latinas. *J Urban Health*. (2014) 91(1):122–35. doi: 10.1007/s11524-013-9817-8

13. Gonzalez-Guarda RM, Cummings AM, Becerra M, Fernandez MC, Mesa I. Needs and preferences for the prevention of intimate partner violence among hispanics: a community's Perspective. *J Prim Prev*. (2013) 34(4):221–35. doi: 10.1007/s10935-013-0312-5

14. Premkumar A, Debbink MP, Silver RM, Haas DM, Simhan HN, Wing DA, et al. Association of acculturation with adverse pregnancy outcomes. *Obstet Gynecol*. (2020) 135(2):301–9. doi: 10.1097/AOG.0000000000003659

15. Peragallo Montano N, Cianelli R, Villegas N, Gonzalez-Guarda R, Williams WO, de Tantillo L. Evaluating a culturally tailored HIV risk reduction intervention among hispanic women delivered in a real-world setting by community agency personnel. *Am J Health Promot*. (2019) 33(4):566–75. doi: 10.1177/0890117118807716

16. Marin G, Gamba RJ. A new measurement of acculturation for hispanics: the bidimensional acculturation scale for hispanics (BAS). *Hisp J Behav Sci*. (1996) 18(3):297–316. doi: 10.1177/07399863960183002

17. De Santis JP, Valdes B, Provencio-Vasquez E, Gattamorta KA. A comparison by sexual orientation of sexual health and sexual behaviors among hispanic men. *Sex Res Social Policy*. (2015) 12(1):15–23. doi: /10.1007/s13178-014-0170-9

18. Sherin KM, Sinacore JM, Li XQ, Zitter RE, Shakil A. HITS: a short domestic violence screening tool for use in a family practice setting. *Fam Med*. (1998) 30(7):508–12. PMID: 9669164

19. Flores MES, Simonsen SE, Manuck TA, Dyer JM, Turok DK. The "Latina epidemiologic paradox": contrasting patterns of adverse birth outcomes in U.S.-born and foreign-born latinas. *Women' Health Issues*. (2012) 22(5):e501–7.doi: 10.1016/j.whi.2012.07.005

20. McGlade MS, Saha S, Dahlstrom ME. The Latina paradox: an opportunity for restructuring prenatal care delivery. *Am J Public Health*. (2004) 94(12):2062–5. doi: 10.2105/ajph.94.12.2062

21. Okunrintemi V, Khera R, Spatz ES, Salami JA, Valero-Elizondo J, Warraich HJ, et al. Association of income disparities with patient-reported healthcare experience. *J Gen Intern Med*. (2019) 34(6):884–92. doi: 10.1007/s11606-019-04848-4

22. Morland LA, Leskin GA, Rebecca BC, Campbell JC, Friedman MJ. Intimate partner violence and miscarriage: examination of the role of physical and psychological abuse and posttraumatic stress disorder. *J Interpers Violence*. (2008) 23(5):652–69. doi: 10.1177/0886260507313533

23. Akın B, Ege E, Koçoğlu D, Arslan SY, Bilgili N. Reproductive history, socioeconomic status and disability in the women aged 65 years or older in Turkey. *Arch Gerontol Geriatr*. (2010) 50(1):11–5. doi: 10.1016/j.archger.2009.01.001

24. Hank K. Childbearing history, later-life health, and mortality in Germany. *Popul Stud*. (2010) 64(3):275–91. doi: 10.1080/00324728.2010.506243

25. Li X, Jiang Q, Li S, Feldman MW. Female fertility history and mid-late-life health: findings from China. *J Women Aging*. (2018) 30(1):62–74. doi: 10.1080/08952841.2016.1259445

26. Spence NJ. The long-term consequences of childbearing: physical and psychological well-being of mothers in later life. *Res Aging*. (2008) 30(6):722–51. doi: 10.1177/0164027508322575

27. Shreeniwas S, Mutran EJ, Williams IC, Suchindran C. Childbearing history and self-reported well-being in later life: contrasting older African American and white women. *Res Aging*. (2006) 28(5):599–621. doi: 10.1177/0164027506289724

28. Lorem G, Cook S, Leon DA, Emaus N, Schirmer H. Self-reported health as a predictor of mortality: a cohort study of its relation to other health measurements and observation time. *Sci Rep*. (2020) 10(4886):9. doi: 10.1038/s41598-020-61603-0

frontiers | Frontiers in Global Women's Health

TYPE Brief Research Report
PUBLISHED 08 June 2023
DOI 10.3389/fgwh.2023.1148244

OPEN ACCESS

EDITED BY
Bielka Carvajal,
University of Chile, Chile

REVIEWED BY
Loreto Villanueva,
University of Chile, Chile
Megan Christofield,
Jhpiego, United States

*CORRESPONDENCE
Annik Sorhaindo
✉ sorhaindoannik@gmail.com

†These authors have contributed equally to this work

RECEIVED 09 February 2023
ACCEPTED 26 April 2023
PUBLISHED 08 June 2023

CITATION
Sedgh G and Sorhaindo A (2023) Identifying and prioritizing evidence needs in self-care interventions for sexual and reproductive health.
Front. Glob. Womens Health 4:1148244.
doi: 10.3389/fgwh.2023.1148244

Identifying and prioritizing evidence needs in self-care interventions for sexual and reproductive health

Gilda Sedgh[1†] and Annik Sorhaindo[2*†]

[1]Independent Researcher, Philadelphia, PA, United States, [2]Independent Researcher, Mexico City, Mexico

Background: Self-care as an extension of health care systems can increase access to care. The development of programs and generation of evidence to support self-care in sexual and reproductive health (SRH) is a relatively nascent field. We undertook a study to identify and prioritize evidence gaps for SRH self-care.
Methods: We used the CHNRI methodology and administered two online surveys to stakeholders affiliated with major self-care networks. The first survey was used to identify evidence gaps, and the second to prioritize them using predetermined criteria.
Results: We received 51 responses to the first survey and 36 responses to the second. Many evidence gaps focused on awareness of and demand for self-care options and best mechanisms for supporting users of self-care with information, counseling and linkages to care.
Conclusion: A priority area of work ahead should be determining which aspects of the learning agenda reflect gaps in evidence and which reflect a need to effectively synthesize and disseminate existing evidence.

KEYWORDS

research agenda, self-managed abortion, HIV self-testing, self-injectable contraception, SRHR, self-care (MeSH)

Introduction

Self-care has the potential to transform healthcare by increasing access to information, services and support and reducing dependency on facility-based services, especially for people who currently face barriers to healthcare access. It can provide individuals with greater awareness, autonomy, and control over their own health and wellbeing. When integrated into a health system, self-care has the potential to benefit the system as a whole (1) and contribute to efforts to achieve universal health coverage (UHC) (2).

The World Health Organization (WHO) defines self-care as "the ability of individuals, families and communities to promote health, prevent disease, maintain health and cope with illness and disability with or without the support of a health care provider" (3). The WHO defines self-care interventions as tools that support self-care, including evidence-based, high-quality medications, devices, diagnostics and/or digital interventions that can be provided fully or partially outside formal health services and be used with or without a health worker.

Self-care interventions are well-suited for the delivery of sexual and reproductive health (SRH) care because individuals, especially those in low- and middle-income countries (LMICs), may lack access to affordable, accessible care or may avoid using facility-based services for fear of being stigmatized (3, 4). Self-care interventions in this space include, but are not limited to HIV self-testing, self-injection of subcutaneous injectable contraception (DMPA-SC), self-managed medical abortion, and antenatal self-care in accordance with

WHO guidelines (5–7). Self-care is not a new phenomenon, but the development of codified national and global SRH self-care guidelines and programs to support self-care as part of the health care system is still a relatively nascent field. In 2019, the WHO published its first guideline providing evidence-based recommendations for key self-care interventions in sexual and reproductive health and rights (SRHR) (3); the guidelines were most recently updated in 2022, and have been expanded to address a broader range of self-care interventions in 2022 (7).

A critical component of efforts to advance quality self-care as part of health systems is a clear understanding of the evidence that stakeholders—including policymakers, program implementers, advocates, and funders—need to advance their objectives (8). The WHO guideline included considerations for future research identified during the process of developing and updating the self-care guidelines (9). That effort focused on evidence needed to inform future guidelines and produced a set of illustrative (rather than priority) research questions. A key feature of the WHO self-care guideline development process was an intentional effort to incorporate a gender, equity, and human rights lens in the shaping of the guideline recommendations and the research agenda (9).

To our knowledge, the field has not yet generated a global self-care learning agenda that is relevant across SRH interventions and that focuses on policies and program design and implementation of self-care. The U.S. Agency for International Development -funded Research for Scalable Solutions project supported six countries to develop family planning research and learning agendas whose aims included to expand the development, adoption, and implementation of family planning approaches, at scale (10); these included but were not focused on self-care. Two scoping reviews focused on evidence related to self-managed medical abortion used systematic approaches to locate and inventory existing research and highlight gaps in available evidence, but these reviews did not include a process for identifying evidence needed by stakeholders outside the research community (11, 12). To address the gap for a stakeholder-informed learning agenda for a range of SRH self-care interventions and guide future investments in knowledge generation in the field, we undertook a systematic process to identify and prioritize evidence gaps and develop a learning agenda for SRH self-care.

It has been argued that both researchers and practitioners should be engaged in research agenda-setting processes; practitioners generate recommendations that are useful for decision-making, and researchers focus on whether questions can be answered with a well-designed study (13). A recently published framework for research utilization similarly argues the importance of employing a collaborative agenda-setting process (13). For these reasons, to develop a learning agenda in SHR self-care, we employed an adaptation of the Child Health and Nutrition Research Initiative (CHNRI). The CHNRI is a systematic and transparent priority–setting process that engages a range of stakeholders in the process of establishing and prioritizing evidence gaps (14). It has been used for setting research priorities for global child health, mental health, diabetes, adolescent health and health policy and education, among other topics (15).

We set out to identify and prioritize evidence gaps and establish a learning agenda for a range of SRH self-care interventions, through online consultation with professionals engaged in SRH self-care from different perspectives. The primary audience for this learning agenda is national and international policymakers, researchers and monitoring and evaluation specialists, program managers and civil society organizations responsible for promoting self-care interventions, and donors investing in relevant knowledge generation.

Methods

The CHNRI approach involves following specific steps to identify high priority evidence gaps. First, to generate a bank of learning questions that represent gaps in the SRH self-care evidence base on a range of perspectives, we administered a survey to stakeholders engaged in SRH self-care, asking respondents to identify evidence needs (see **Supplementary Figure S1**). The survey asked respondents to identify needs that are relevant to all SRH self-care, and, separately, evidence needs that are specific to each of four major self-care interventions: self-injectable contraception, HIV self-testing (HIVST), self-managed abortion, and self-management of antenatal care (ANC). We focused on these four interventions because they seem to have gained the most traction so far among the range of self-care interventions in SRHR. We did not provide formal definitions of self-care with respect to each of these interventions in the surveys. We circulated this survey by email in March 2022 using the Google forms platform to networks of professionals in self-care in SRH in global spaces, namely the Self-Care Trailblazers Group (SCTG) (16) (which had a membership of roughly 260 at the time of the survey), WHO's "Implementing Best Practices" (IBP) points of contact (17), and the Reproductive Health Supplies Coalition's caucus on new and emerging technologies (18). The exact numbers of recipients of this survey is not known because we were not apprised of the sizes of the latter two listservs and we expect that some people were members of more than one of these groups. In addition, we asked individuals receiving the emails to forward the survey to other professionals who may be appropriate respondents. Our interest with this sampling approach was to bring forth and gather information from experts rather than a representative sample of members of these groups and listservs. We deleted duplicate evidence gaps and responses that we could not decipher, framed the evidence gaps as learning questions, and organized the learning questions into domains that arose from the questions themselves.

To guide the prioritization of the evidence gaps identified in the first survey, we first established criteria for assessing these evidence gaps. We developed a list of five potential criteria, drawing from prior applications of the CHNRI (19). To minimize the burden on survey respondents, we used three that were most relevant to this process. These criteria were impact, feasibility, and answerability, defined as follows:

- **Impact**: Would filling this evidence gap provide knowledge that is useful to stakeholders?
- **Feasibility:** Can the evidence gap be filled with a reasonable budget and in a reasonable amount of time (<2 years)?
- **Answerability:** Is the evidence gap well-defined and is the product or endpoint well-framed?

The two criteria that we did not use were generalizability (whether the findings would be relevant to other populations) and equity (whether filling the knowledge gap would reduce inequities in access to care). We administered a second survey in May 2022, in which we asked respondents to rate the learning questions generated in the first survey against the criteria named above (see **Supplementary Figure S2**). We sought a more limited group of respondents to the second survey, with a focus on those who would likely have sufficient appreciation for research methods to be able to assess the feasibility of the learning questions and their answerability, as well as an appreciation for the potential impact of answering the learning questions. Unlike the first survey, a diversity of viewpoints was not essential for the second survey. For these reasons, we circulated this survey only to members of the SCTG's Evidence and Learning Working Group. Some individuals might have responded to just one survey, and some might have responded to both.

For each of the learning questions identified in the first survey, respondents were asked to indicate whether answering the learning question met each of the criteria above. Respondents had the options of answering yes, no, or not sure, and we converted these responses to 1.0, 0 and 0.5, respectively. For each learning question and criterion, we computed the average of all respondents' scores. We then summed the average scores across the three criteria to get a total score for each learning question. This approach gave equal weight to each criterion. In the instructions accompanying both surveys, we asked that respondents only respond to questions on topic areas in which they feel they have expertise.

We received guidance at key stages of this work from the Evidence Mapping and Prioritization Sub working Group (SWG). The SWG is comprised of seventeen members of the ELWG with relevant expertise who volunteered to provide technical guidance to this workstream. We piloted both surveys with the SWG before administering them more widely. The SWG members also weighed in on the final selection of assessment criteria above, and recommended stakeholders to whom we could administer the survey.

As with prior applications of the CHNRI methodology (20, 21), and in accordance with the institutional review board (IRB) guidelines of Population Services International (22), IRB approval was not deemed necessary for this study because the interview questions focused on the respondents' professional knowledge of a topic, rather than information about their personal experiences. Potential respondents were not pressured to participate in the survey.

Results

We received 51 responses to the first survey, in which we asked respondents to identify evidence gaps. Most (60%) of respondents reported their primary affiliation as being a non-governmental organization, 21% worked in service delivery, and the remainder represented donor agencies, academia, governments and multilateral agencies (**Table 1**). More than half (55%) of respondents reported having at least 12 years of experience in their field and another 20% said they had 8–12 years of experience. Most respondents also said they have moderate or high levels of expertise in each of the SRH self-care interventions (**Supplementary Figure S3**). The majority 61%) of respondents indicated that their work is focused on Africa, and18% indicated their work has a global or multi-regional focus. The developing region represented by the fewest respondents was Asia (4%). After cleaning the responses and merging duplicates, we identified 17–36 unique learning questions for each self-care intervention.

We received 36 responses to the second survey, in which we asked respondents to assess learning questions. Of these, 50% (18) indicated that they work primarily in sub-Saharan Africa, 11% focused on Asia, and 36% indicated that their work had a global or multi-regional focus. We classified each of the ten learning questions that earned the highest scores for each intervention in one the following four domains: (1) enabling policy and regulatory environment; (2) knowledge, attitudes and preference related to self-care; (3) support for users of self-care, including linkages to follow-up care; and (4) equitable access to care. A few questions that did not fit into any of these domains are grouped separately (**Table 2**). All of the learning questions, their average scores on each criterion and their composite scores can be found in **Supplementary Tables S1–S5**.

TABLE 1 Survey respondents' years of professional experience and region of focus.

	Survey #1	Survey #2
	n = 51	*n* = 36
	%	%
Years of experience		
1–3 years	6	3
4–7 years	14	11
8–12 years	20	17
>12 years	55	69
Not given	6	0
Region of focus		
Africa	61	50
Asia	4	11
LAC	16	3
Europe	2	0
Multiple or global	18	36
Primary affiliation		
NGO	60	–
Service delivery	21	–
Donor	6	–
Academic	4	–
Other*	8	–
	100.0	100.0

*Includes multilateral agency, government, and drug manufacturing.

TABLE 2 Self-care learning questions by intervention and domain.

Enabling policy and regulatory environment	Knowledge, attitudes and preferences related to self-care	Service delivery and support for users of self-care	Reducing inequities in access to care, including self-care	Other
HIV self-testing (HIVST)				
	What are people's reasons for seeking HIVST?	How can we make HIVST easy to use and accessible to users?	Which populations have the greatest need for HIVST?	What is the impact of HIVST on the number of people diagnosed with HIV?
	How can we drive interest in using quality-assured HIVST products?	Do users of HIVST need pre-test support?	What sub-groups are not reached with HIVST?	
		How is pre-test counselling for HIVST best implemented?		
		How can we encourage users to report HIVST results?		
		What are best ways to support clients who receive a positive result?		
		How can privacy be ensured through the HIVST process?		
Self-injectable DMPA-SC				
Which countries have policies that support and/or promote self-injection?	What proportion of women know about self-injectable contraception?	What are effective and efficient approaches to supporting provider-client SI counseling, training, and support?		How do clients store DMPA-SC at home?
	When presented the choice between provider and self-injection, how do user preferences vary by their characteristics?	What are provider perceptions about training clients to self-inject?		
	How supportive are male partners of SI users?			
	Are users of the self-injectable willing to refer others to the same method?			
	What are the barriers to self-injection from the point of view of women?			
	What are women's reasons for discontinuing self-injection?			
Self-managed abortion				
In which countries is self-managed abortion legally allowed?		How can telemedicine be effectively used to support self-managed abortion in the global south?	Which groups of women should self-managed abortion services be targeted to?	
		How can information to support self-managed abortion be delivered through digital means in legally restricted contexts?	What are promising and/or effective models for supporting access to self-managed abortion in humanitarian, fragile and legally restrictive settings?	
		How do the most effective approaches to providing women with information on sources of drugs and support for self-managed abortion vary by setting?		
		What mechanisms can be used to make post-abortion contraceptive services available to women who self-manage their abortions?		

(*Continued*)

10.3389/fgwh.2023.1148244

TABLE 2 (Continued)

Enabling policy and regulatory environment	Knowledge, attitudes and preferences related to self-care	Service delivery and support for users of self-care	Reducing inequities in access to care, including self-care	Other
		What are effective strategies for linking self-managed abortion with facility-based services, for women who need facility-based follow-up care?		
		How can we increase supportive treatment of abortion clients when women who self-manage abortions require facility-based care?		
		Are health service personnel sensitized to provide supportive, comprehensive services to vulnerable populations who use self-managed abortion?		
Self-managed antenatal care				
	What are effective ways to improve community knowledge about antenatal self-care?	What environment is required to support self-care in the antenatal period?		Which self-care behaviors during pregnancy are most critical to promote in order to optimize maternal and newborn health?
		How can we best empower women with information on why and how to use self-care interventions in the antenatal period?		Is antenatal self-care cost-effective?
		What approaches to antenatal self-care are being effectively used, and how can we learn from them?		What are the limits of antenatal self-care?
		How can women be trained to identify danger signs in pregnancy?		How do we standardize automatic blood pressure checking machines for blood pressure checks at home?
		How effective is maternal education for self-care?		
SRHR self-care—general				
What are most effective approaches to promoting self-care with policy makers?	Why and under what circumstances do people choose self-care for SRHR instead of care from a provider?	Can digital solutions be used to monitor quality of self-care?	What are the barriers and opportunities for advancing SRHR self-care in humanitarian and fragile settings?	Does self-care result in cost savings to the health care system?
What financially sustainable models can be developed to make self-care products available in procurement systems of countries?	What is the level of people's knowledge about self-care?	What can be done to make the promotion of self-care options more appealing to health care workers?		What are the key indicators for measuring self-care?
				Are there cost savings to users of self-care?

10.3389/fgwh.2023.1148244

Learning questions

Enabling policy and regulatory environment

In the category of SRH broadly, there was an interest in understanding effective approaches to promoting self-care with policy makers, and financially sustainable models for making self-care products available in procurement systems. For both self-injectable contraception and self-managed abortion, there was a perceived need to understand which countries have policies in place supporting self-care. None of the ten highest priority evidence gaps on HIV self-testing or ANC self-care pertained to the policy or regulatory enabling environment.

Knowledge, attitudes and preferences

With respect to SRH self-care in general, stakeholders cited a need for evidence on why and under what circumstances people choose self-care for SRH. Respondents noted a need for evidence on levels of awareness of self-care methods and how to raise awareness (at both the individual and the community levels), and levels of demand for self-care, together with factors that drive demand. These areas of learning arose mostly with reference to self-injectable DMPA-SC but also with reference to HIV self-testing. One of the learning questions on antenatal care also fell in this category.

Support for users of self-care

With respect to learning questions that cut across SRH interventions, two key questions pertained to how to make self-care options more appealing to health care workers and how to use digital solutions to monitor and ensure the quality of self-care. More than half of the intervention-specific priority learning questions were directed at how to support clients using self-care with information and counseling before, during and after the process of using self-care tools. This was especially an area of focus with respect to HIVST, self-managed abortion and ANC. Learning questions related to HIVST addressed the need for evidence on pre-test support and counseling; ensuring privacy during the self-testing process; and encouraging users to report their results. For self-managed abortion, questions focused on how to support women with information to help them manage their abortions, including in legally restrictive contexts; effective strategies for linking women to facility-based care as needed; and how to ensure facility-based care providers provide quality, stigma free service.

Equitable access to self-care/reaching neglected populations

For SRH self-care in general, respondents also pointed to a need to understand the barriers and opportunities for advancing self-care in humanitarian and fragile settings. Some of the learning questions on self-managed abortion and HIVST pertained to how we can expand the reach of health services with these methods. For HIVST, questions focused on identifying populations with the greatest need and the groups that have not yet been reached. Questions on self-managed abortion additionally asked how programs can support women in humanitarian, fragile and legally restrictive settings.

Discussion

To the best of our knowledge, the SRH self-care learning agenda presented here is the first of its kind, in that the learning questions were named and prioritized by a large number of stakeholders who use evidence in their work.

The domains reflected the themes that emerged from the learning questions that stakeholders named. More than half of the priority learning questions that were intervention-specific were directed at how to support clients using self-care with information and counseling before, during and after the process of using self-care. Many also focused on the need for evidence on awareness of and demand for self-care interventions. One of the promises of self-care is the potential to reach previously underserved populations, such as people living in fragile or humanitarian settings, and stakeholders also expressed a need for evidence on how to effectively reach these populations.

The WHO also explored research gaps in the process of developing SRH self-care guidelines—but the published guidelines included a set of *illustrative* research questions, and these were not intended to be a comprehensive list of topics that merit further research (4). Moreover, the WHO did not undertake a prioritization process to identify the evidence gaps that are most critical to fill. Nevertheless, it is notable that there are some common themes across the WHO's research agendas and the priority learning questions identified through this CHNRI. For example, both the WHO and this process highlighted a lack of evidence pertaining to user preferences, acceptability of self-care options and equitable access to care.

Different classifications of the learning questions could potentially help researchers and other stakeholders to develop a responsive research agenda. For example, priority areas suggested by our findings include: (1) evaluation of self-care interventions for the general population and for vulnerable populations; (2) studies of the cost-effectiveness of self-care interventions; (3) identification of barriers and facilitators to self-care interventions; (4) the testing of new tools and resources to support users of self-care interventions, and (5) the actual and potential population impacts of self-care interventions.

Our approach was subject to a few limitations. First, our findings were derived from a non-random convenience of respondents and we cannot be sure that the respondents had a clear line of sight into evidence needed to support self-care policies and programs. However, the fact that most had many years of experience in SRH and were affiliated with the professional groups to which we circulated the surveys, and that they approached their work from a range of perspectives as reflected in their organizational affiliations, suggests that the respondents were an appropriate target group for these surveys on the whole. Another limitation is that the CHNRI process did not allow for a group discussion and idea generation process in which people's inputs can build on those of their colleagues. Finally, while our respondents represented a broad range of geographies, we were not able to identify country-specific or region-specific evidence gaps, even though research priorities might be different for different countries or regions.

We were also unable to determine which of the learning questions that arose from this process represent gaps in evidence or gaps in stakeholder knowledge—that is, for some of the learning questions, it is possible that a body of evidence exists but respondents were not familiar with the evidence, for example because it had not been effectively disseminated. We conducted rapid scans of the literature on the five highest priority evidence gaps in each intervention and we did not find a large body of evidence related to them. It is nevertheless possible that the evidence exists in gray literature or that more systematic literature reviews would uncover more information relevant to some of the learning questions. Such reviews were beyond the scope of this work.

One of the potential criteria for assessing the learning questions was whether answering the question would help reduce inequities in access to health care and in health outcomes. This criterion was not ultimately used to assess the learning questions, but research aimed at answering many of the questions can and should apply an equity lens.

Going forward, one priority area of work that should be undertaken is a process for determining which of the learning questions reflect gaps in evidence or gaps in stakeholder knowledge, which reflects a need to more effectively disseminate existing evidence. This could entail scoping reviews and systematic reviews of existing literature, followed by syntheses and dissemination of existing evidence to relevant audiences where this a body of evidence already.

This learning agenda was generated through a process that was systematic, transparent, collaborative and replicable. It allowed us to reach a range of stakeholders engaged in work across low– and middle–income countries in a short time period, and ensured that various groups engaged in the agenda setting process. We hope that the learning agenda presented here will contribute to efficient investments in research that can advance policies and programs supporting the implementation of self-care.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for this study in accordance with the local legislation and institutional requirements. Written informed consent was not required for this study in accordance with the local legislation and institutional requirements.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Funding

This study was funded by the Self Care Trailblazer's Group, which is supported by the Children's Investment Fund Foundation and the Hewlett Foundation.

Acknowledgments

We are grateful to Igor Rudan and the sub-working group members of the Self-Care Trailblazer Group's Evidence and Learning Working Group who provided input and guidance at key stages of this work.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fgwh.2023.1148244/full#supplementary-material.

References

1. Narasimhan M, Allotey P, Hardon A. Self-care interventions to advance health and wellbeing: a conceptual framework to inform normative guidance. *Br Med J*. (2018) 365:l688. doi: http://dx.doi.org/10.1136/bmj.l668

2. Christofield M, Moon P, Allotey P. Navigating paradox in self-care. *BMJ Global Health*. (2021) 6:e005994. doi: 10.1136/bmjgh-2021-005994

3. World Health Organization. *WHO Consolidated guideline on self- care interventions for health: Sexual and reproductive health and rights*. Geneva: World Health Organization (2019).

4. Shahil Feroz A. Strengthening self-care agency in pregnancy: a new approach to improve maternal health outcomes in low-and middle-income countries. *Front Public Health*. (2022) 10:968375. doi: 10.3389/fpubh.2022.968375

5. Ferguson L, Fried S, Matsaseng T, Ravindran S, Gruskin S. Human rights and legal dimensions of self care interventions for sexual and reproductive health. *Br Med J*. (2019) 365:l1941. doi: 10.1136/bmj.l1941

6. Narasimhan M, Logie CH, Gauntley A, Gomez Ponce de Leon R, Gholbzouri K, Siegfried N, et al. Self-care interventions for sexual and reproductive health and rights for advancing universal health coverage. *Sex Reprod Health Matters*. (2020) 28:2. doi: 10.1080/26410397.2020.1778610

7. World Health Organization. *WHO Guideline on self-care interventions for health and wellbeing, 2022 revision*. Geneva: World Health Organization (2022).

8. Narashimhan M, de longh A, Askew I, Simpson PJ. It's time to recognize self-care as in integral component of health systems. *Br Med J*. (2019) 365:l1403. doi: http://dx.doi.org/10.1136/bmj.l1403

9. Siegfried N, Narasimhan M, Logie CH, Thomas R, Ferguson L, Moody K, et al. Prioritising gender, equity, and human rights in a GRADE-based framework to inform future research on self care for sexual and reproductive health and rights. *BMJ Glob Health*. (2020) 5(3):e002128. doi: 10.1136/bmjgh-2019-002128

10. Research for Scalable Solutions. Available at: https://research4scalablesolutions.com/resources/#research-and-learning-agendas (October 1, 2022).

11. Moseson H, Herold S, Filippa S, Barr-Walker J, Baum SE, Gerdts C. Self-managed abortion: a systematic scoping review. *Best Pract Res Clin Obstet Gynaecol*. (2020) 63:87–110. doi: 10.1016/j.bpobgyn.2019.08.002

12. Sorhaindo A, Sedgh G. Scoping review of research on self-managed medication abortion in low-income and middle-income countries. *BMJ Global Health*. (2021) 6: e004763. doi: 10.1136/bmjgh-2020-004763

13. Dey Cody J, Rego Adam I, Midwood Jonathan D, Koops Marten A. A review and meta-analysis of collaborative research prioritization studies in ecology, biodiversity conservation and environmental science. *Proc R Soc B*. (2020) 287:20200012. doi: 10.1098/rspb.2020.0012

14. Kim C, Wilcher R, Petruney T, Krueger K, Wynne L, Zan T. A research utilisation framework for informing global health and development policies and programmes. *Health Res Policy Sys*. (2018) 16:9. doi: https://doi.org/10.1186/s12961-018-0284-2

15. Rudan I, Yoshida S, Chan KY, Sridhar D, Wazny K, Nair H, et al. Setting health research priorities using the CHNRI method: vII. A review of the first 50 applications of the CHNRI method. *J Glob Health*. (2017) 7(1):011004n. doi: https://doi.org/10.7189/jogh.07.011004

16. Self-Care Trailblazers Group. Available at: https://www.psi.org/project/self-care/ (October 1, 2022).

17. World Health Organization. IBP Network (2022). Available at: https://ibpnetwork.org/

18. Reproductive Health Supplies Coalition. Available at: https://www.rhsupplies.org/ (October 25, 2022).

19. Rudan I. Setting health research priorities using the CHNRI method: iV. Key conceptual advances. *J Glob Health*. (2016) 6(1). doi: 10.7189/jogh.06.010501

20. Yoshida S, Rudan I, Cousens S. Setting health research priorities using the CHNRI method: vI. Quantitative properties of human collective opinion. *J Glob Health*. (2016) 6(1). doi: 10.7189/jogh-06-010501

21. Ko M, Cherian T, Groves HT, Klemm EJ, Qazi S. Application of the child health and nutrition research initiative (CHNRI) methodology to prioritize research to enable the implementation of ending cholera: a global roadmap to 2030. *PLoS One*. (2022) 17 (5):e0264952. doi: https://doi.org/10.1371/journal.pone.0264952

22. PSI Guidelines for Deciding Whether an Activity Requires REB Review. Available at: https://media.psi.org/wp-content/uploads/2020/02/31012150/PSI_Guidelines_For_Deciding_Whether_An_Activity_Requires_REB_Review.pdf?_ga=2.268932529.1736871692.1674150251-2095166769.1652895435 (Accessed January 19, 2023).

frontiers | Frontiers in Global Women's Health

TYPE Original Research
PUBLISHED 26 June 2023
DOI 10.3389/fgwh.2023.1082405

OPEN ACCESS

EDITED BY
Ramon Escuriet,
Blanquerna Ramon Llull University, Spain

REVIEWED BY
Diana Navarro Llobet,
Granollers General Hospital, Spain
Felipe Ojeda,
Granollers General Hospital, Spain

*CORRESPONDENCE
Muluwas Amentie Zelka
✉ muluwas12@gmail.com

RECEIVED 24 March 2023
ACCEPTED 12 June 2023
PUBLISHED 26 June 2023

CITATION
Zelka MA, Yalew AW and Debelew GT (2023) The effects of adherence to recommended antenatal services on adverse pregnancy outcomes in Northwest Ethiopia: multilevel and propensity score matching (PSM) modeling. Front. Glob. Womens Health 4:1082405. doi: 10.3389/fgwh.2023.1082405

The effects of adherence to recommended antenatal services on adverse pregnancy outcomes in Northwest Ethiopia: multilevel and propensity score matching (PSM) modeling

Muluwas Amentie Zelka[1,2]*, Alemayehu Worku Yalew[3] and Gurmesa Tura Debelew[4]

[1]Department of Public Health, College of Health Sciences, Assosa University, Assosa, Ethiopia, [2]Department of Reproductive Health and Health Services Management, School of Public Health, College of Health Sciences, Addis Ababa University, Addis Ababa, Ethiopia, [3]Department of Biostatistics and Epidemiology, School of Public Health, College of Health Sciences, Addis Ababa University, Addis Ababa, Ethiopia, [4]Department of Population and Family Health, Institute of Health, Jimma University, Jimma, Ethiopia

Introduction: Adverse pregnancy outcomes are a personal and social crisis caused by easily preventable pregnancy-related problems. Despite that, studies on the effectiveness of adherence to the continuity of antenatal care (ANC) services are scarce. Therefore, this study aims to determine the effectiveness of the continuity of ANC services and the determinants of adverse pregnancy outcomes.
Methods: A prospective follow-up study design was conducted from March 2020 to January 2021 in Northwest Ethiopia among randomly selected study subjects. Data were collected by trained data collectors using pre-tested structured questionnaires and analyzed using STATA Software version 14. A multilevel regression model was used to identify determinant factors, whereas the propensity score matching (PSM) model was used to look at the effectiveness of adherence to ANC services on adverse pregnancy outcomes.
Results: Among 2,198 study participants, 26.8% had adverse pregnancy outcomes, with 95% CI: 24.9–28.7 [abortion (6.1%; 95% CI: 5.1–7.1), low birth weight (11.5%; 95% CI: 10.2–12.9), and preterm birth (10.9; 95% CI: 9.6–12.3)]. Determinant factors were iron-folic acid supplementation (AOR = 0.52; 95% CI: 0.41, 0.68), delayed initiation of ANC visits at 4–6 months (AOR = 0.5; 95% CI: 0.32, 0.8), initiation of ANC visits after 6 months (AOR = 0.2; 95% CI: 0.06, 0.66), received four ANC visits (AOR = 0.36; 95% CI: 0.24, 0.49), an average time of rupture of the amniotic membrane of between 1 and 12 h (AOR = 0.66; 95% CI: 0.45, 0.97), and pregnancy-related problems (AOR = 1.89; 95% CI: 1.24, 2.9). As a treatment effect, completion of a continuum of visit-based ANC (ATET; $\beta = -0.1$, 95% CI: −0.15, −0.05), and continuum of care via space dimension (ATET; $\beta = -0.11$, 95% CI: −0.15, −0.07) were statistically significant on the reduction of adverse pregnancy outcomes.
Conclusion: In the study area, the rate of adverse pregnancy outcomes was high. Even though adherence to the continuity of ANC services via time and space dimensions is effective in the prevention of adverse pregnancy outcomes, programmatically important factors were also detected. Therefore, key strategies for promoting the uptake of antenatal services and strengthening iron-folic acid supplementation are strongly recommended.

KEYWORDS

abortion, Benishangul Gumuz, continuity of ANC visits, low birth weight, preterm birth

Introduction

Pregnancy is a fruitful and joyful experience in human life that results in pregnancy outcome, the final result of the fertilization event (1). One of the best strategies to ensure a healthy birth is to have a healthy pregnancy. Early antenatal care (ANC) increases the odds of a healthy pregnancy (2, 3), but despite this, pregnancy may result in adverse pregnancy outcomes (abortion, preterm birth and low birth weight) and pregnancy complications (high blood pressure, gestational diabetes, iron deficiency anemia, and severe nausea and vomiting) (4, 5). Adverse pregnancy outcomes are any pregnancy outcomes other than normal live birth, which prominently encompasses preterm birth, stillbirth, and low birth weight. These are the major causes of neonatal morbidity, mortality, and long-term physical and psychological problems, which are critical public health problems in developing and developed countries (3, 6). Similarly, adverse pregnancy outcomes including birth asphyxia and trauma, prematurity, infections, congenital malformations, and disorders related to the perinatal period are the major leading causes of early neonatal mortality and contribute to 75% of early neonatal death (7, 8). Approximately 45% of early neonatal mortality occurs within 24 h after delivery; 19% occurs on the second day, and 16% occurs on the third day. The major causes of stillbirth are infection (37%), prolonged labor (11%), antepartum hemorrhage (10%), preterm birth delivery (7%), cord complications (6%), and accidents (5%) (8).

Globally, 213 million pregnancies occurred in 2012, 89% of which were in developing countries and 11% were in developed countries (9). In 2016, pregnancy-related complications caused approximately 230,600 maternal deaths (4, 5). The common causes of maternal death are bleeding, infection, hypertensive diseases during pregnancy, obstructed labor, miscarriage, abortion, and ectopic pregnancy, which are easily preventable and treatable (4, 5).

In Ethiopia, the prevalence of adverse pregnancy outcomes is high. In 2014, an estimated 620,300 pregnant women ended up having abortions. This implies that the annual abortion rate was 28 per 1,000 pregnancies, and the abortion rate was highest in urban areas (10, 11). The low birth weight in Ethiopia was 13.2% (12), whereas the preterm birth rate was 33.3% in Amhara (13), the low birth weight rate was 27.76% in South Gondar (14) and 24% in North Wolla (15). According to EDHS 2016, the low birth weight rate was 26.2% in Afar, 22.2% in Amhara, and 9.9% in Benishangul Gumuz (12).

Besides these, a variety of factors have been found to worsen the high prevalence of adverse pregnancy outcomes in Ethiopia. Many studies have found that socio-demographic and economic factors including maternal age (13, 15, 16), educational status (13, 15), place of residence (13), marital status and gender (15), occupational status (17), and family monthly income (15) could lead to adverse pregnancy outcomes. Moreover, obstetric factors and other related factors such as short birth interval (13, 16, 18), multipara and multigravidas (15, 16), pregnancy-induced hypertension, premature rupture of membrane, emergency obstetric complications during pregnancy and labor, and a history of adverse pregnancy outcomes (abortion, stillbirth, and preterm birth) (3, 11, 13, 15, 16) could be associated with adverse birth outcomes.

Similarly, other health-related factors were found to be determinant factors of adverse pregnancy outcomes, including maternal nutrition and anemia (3, 15, 16, 18), HIV infection, urinary tract infection, vaginal discharge and malaria (13, 16), public health sectors, legal issues of abortion, abortion procedures and skills of health care providers (11), delivery without induction of labor (17), dietary counseling during ANC follow-up and family planning methods (18), alcohol use (15), women being referred from other health facilities, and multiple pregnancies (3).

However, pregnancy-related complications and adverse pregnancy outcomes could be reduced by improving ANC service utilization and dietary counseling during pregnancy (18). Some limited evidence with weak study design and analysis suggests that the completion of ANC visits reduces preterm birth and low birth weight by 52% and 46% respectively (3, 13, 16, 18, 19). Moreover, receiving recommended ANC visits has a significant impact on preventing adverse pregnancy outcomes (abortion, preterm birth, and LBW) (3, 13–15, 18, 20).

Globally and nationally, attention and priority have been given to maternal health services, specifically ANC services, which is an entry point for maternal health services. The rate of adverse pregnancy outcomes in Ethiopia, especially in the study region, is the highest in the world. Adverse pregnancy outcomes are personal and social crises caused by easily manageable and preventable pregnancy-related problems. Studies on the effectiveness of ANC visits on the prevention of adverse pregnancy outcomes (abortion, preterm birth, and low birth weight) are extremely scarce. Therefore, this study aims to determine the effect of the continuity of ANC services on adverse pregnancy outcomes and the determinant factors that affect adverse pregnancy outcomes at the individual level (*level–1*) and the community level (*level–2*). Moreover, the treatment effect of adherence to the continuity of ANC services on adverse pregnancy outcomes was determined using propensity score matching model (PSM).

Methods and materials

Study area

The study was conducted in Benishangul-Gumuz Regional State (BGRS). The region is one of the eleven regions that make up Ethiopia's Federal Democratic Republic of Ethiopia. Assosa town is the capital city of the region, located 670 km west of Addis Ababa, the capital city of Ethiopia. The region has three zones, three town administrative cities, 21 districts/*Woredas*, one special district/*Woreda*, and 475 clusters/*Kebeles* (439 rural and 36 urban clusters/*Kebeles*).

The region has an estimated area of 51,381 square kilometers, which represents approximately 4.6% of the total land area of Ethiopia, and is located between 9° 17 N–12° 06 N latitude and 34° 04 E–37° 04 E longitude (21). Based on the 2007 national

population and household census, the 2018 population projection revealed that the total population of the region was 1,127,001, consisting of 571,960 (50.75%) men and 555,041 (49.25%) women (with a men-to-women ratio of 1.03) and the total number of households was 246,570 (22); this covers 1.1% of the national population.

Study design and period

A community and health facility-linked prospective follow-up study design was conducted from March 2020 to January 2021.

Population

The source population consisted of pregnant women within the community during the time of the baseline survey who were permanent residents of the region (having lived there for more than 6 months). The study participants were all pregnant women within the selected *kebeles/ketenas,* which were selected by sampling technique.

Sample size determination

The sample size was calculated using STATA/MP 13.0 software by considering two population proportion formulas based on the following assumption. The outcome variable was adverse pregnancy outcome (abortion, low birth, and preterm birth) and the predictor variable was continuity of ANC visits. Since no study has been conducted in Ethiopia to determine the sample size, a study from other developing countries was used to determine the sample size. A study done in rural Uganda found that the proportion of adverse pregnancy outcomes ("*abortion*") among mothers who completed the recommended ANC visits was 8.2% ($P_1 = 0.082$) and the proportion of adverse pregnancy outcomes ("*abortion*") among mothers who could not access ANC services was 18% ($P_2 = 0.18$) (23). A 95% confidence level and 80% power were used to detect a 9.8% difference or a 54.4% increment among exposed and non-exposed groups. Hence, **r** = ratio of exposure to non-exposure pregnant women equal to 1:1 for the population allocation ratio; P (pooled population proportion) $= \frac{P_1+P_2}{1+r}$ was calculated (**P** = 0.13); considering a design effect 2 and a non-response rate of 10%. As a result, the final sample consisted of ***823*** pregnant women. However, this study was part of extensive research in which 2,402 pregnant women received follow-up care to determine the effects of a continuum of care in maternal health services on adverse birth outcomes (24), which was used as the final sample size for this study.

Sampling procedures and techniques

A multistage sampling technique was employed to select pregnant women for the study. This study was conducted at the regional level. Initially, two zones and one town administrative were selected by simple random sampling (SRS). Then, four districts/"*woredas*" from Assoa Zone, two districts/"*woredas*" from Metekel Zone, and two districts/"*woredas*" from the Assosa town administration were selected using simple random sampling (SRS) techniques. In the third stage, seven kebeles from each district (except the Assosa district/"*woreda*", from which 10 kebeles were selected) and five ketenas from each district/ "*woreda*" of town administration were selected and included in the study. Consequently, from the seven kebeles from each district/"*woreda*", the 10 kebeles from the Assosa district/ "*woreda*", and the five ketenas from each district/"*woreda*" of the town administration, pregnant women were enumerated via house-to-house visits, and all those registered were included in the study. All women who reported having a pregnancy of 8 weeks or above were considered eligible study subjects and enrolled in the study then followed up for 11 months. Assuming that every household that hosted pregnant women hosted at least one pregnant woman, households that hosted pregnant women were taken as a final sampling unit (*FSU*). Besides the baseline survey, all health facilities found within the catchment area were listed and considered candidates for the health facility survey. As a result, 46 health facilities (3 hospitals, 12 health centers, and 31 health posts) were found within the catchment areas and included in the study.

Data collection instruments and quality assurance

Before data collection, research instruments were formulated in English from different sources: EDHS 2016 (25), National Technical Guidance for MPDSR 2017 (26), MCH Program Indicator Survey 2013 (27), survey tools conducted in Jimma Zone, Southwest Ethiopia (28), survey tools conducted in Rural South Ethiopia (29), and other relevant literature. Then, the instruments were translated into the local language, training was provided for both data collectors and supervisors, and pre-testing was conducted to maintain the quality of the data. During data collection, supervisors and principal investigators checked the work of each of the data collectors for the completeness and relevance of the data.

Data collection process

Before the data collection process, health extension workers (HEWs) were assigned to conduct a census or enumerate pregnant women in each of the clusters/"kebeles" via home visits. Then, the data collection at the baseline as well as during the follow-up phase was conducted by agricultural extension workers, elementary teachers, and health workers (particularly Health workers (HWs) for health facility registration and confirmation of events only). During baseline registration, basic information on the pregnant women was gathered and recorded, including socioeconomic characteristics, household assets to compute

wealth index, obstetric characteristics (present and past), and medical history (present and past).

Following that, the selected pregnant women were monitored, and any event that was associated with the use of maternal health services and the outcome of pregnancy and neonatal health conditions was recorded. The data were collected via house-to-house interviews, and the recorded or registered documents were reviewed in the health facility.

Data processing and analysis

To develop skipping patterns and avoid logical mistakes, the collected data were coded and entered into Epi Info version 7.2.2.6. The data were then cleaned, edited, and analyzed using SPSS version 22 and STATA Software version 14. All variables were computed for descriptive statistics. Analyses with only one predictor variable were performed using the crude odds ratio and 95% confidence interval, which help to select candidate variables for multivariable analysis (where $p < 0.25$). At the level of significance ($p < 0.05$), a maximum likelihood estimate of the independent effects on the adverse pregnancy outcome was calculated. The Principal Component Analysis (PCA) was used to calculate and categorize the household wealth index. Before running the full model, effect modification at $p < 0.1$ and multi-collinearity effect between independent variables using variance inflation factors (VIF > 10%) were assessed. All independent variables included in the model had VIF < 10 and the coefficient of the interaction terms was $p \geq 0.1$. Thus, interaction and multi-collinearity effects did not exist. Due to cluster variability in this study, a multilevel regression model was employed to identify individual- and community-level factors of adverse pregnancy outcomes (abortion, low birth weight, and preterm birth). In this study, "*Kebeles/Ketenas*" were considered clusters, and access to the hospital was categorized as a level-2 factor. Individual-level variables, namely socio-demographic characteristics, obstetric characteristics, information on maternal health services, and newborn health services, were taken as level-1 factors. The goodness of fit for the multilevel model was assessed using the log-likelihood ratio (LR) test and intra-class correlation coefficient test. It was found to be statistically significant ($p < 0.0001$) such as dataset was fitting the multilevel regression. Finally, the average treatment of adherence to the continuity of ANC visit-based services and a continuum of care in maternal health care services via space dimension on adverse pregnancy outcomes was estimated by propensity score matching. The effect was measured by β 95% CI at $p < 0.05$.

Measurement and operational definition

Abortion: Termination of pregnancy before 28 weeks of GA or at less than 1,000 gm weight of conception.

Antenatal care: Pregnancy-related health care checkups that a pregnant woman receives at a health facility.

Content of ANC package: Pregnant women receive a minimum ANC package, which includes information on signs of danger in pregnancy, blood pressure measurement, iron and folic acid supplementation, nutritional counseling services, urine tests, blood tests, and protection against tetanus.

Preterm birth: Babies born alive before 37 weeks of gestational age.

Low birth weight: Defined by the World Health Organization (WHO) as weight at birth of <2,500 grams.

Results

The rate of adverse pregnancy outcomes and related issues

The rate of adverse pregnancy outcomes among the participants was 26.8% (95% CI: 24.9%, 28.7%). A total of 133 (6.1%) were reported as abortion with 95% CI (5.1%–7.1%), 253 (11.5%) newborns were considered low birth weight (<2.5 kg) with 95% CI (10.2%–12.9%), and 240 (10.9%) newborns were preterm birth (born before 37 weeks of GA) with 95% CI (9.6%–12.3%).

Among the abortion cases detected, there were 57 cases of spontaneous abortion (42.9%) and 39 cases of threatened abortion (29.3%) in the study area. Of them, 29 (21.8%) women had a desire to terminate the pregnancy and 10 (7.5%) had attempted to terminate the pregnancy. Around one-third (46 cases, 34.7%) were unsafe abortions that occurred in unhygienic places. The pregnancy-related problems during pregnancy before the event occurred were excessive vaginal bleeding (78 cases, 58.6%) and severe headache (58 cases, 43.6%). The most common illnesses women encountered during pregnancy before the occurrence of abortion were malaria (40 cases, 30.1%), high blood pressure (35 cases, 26.3%), and heart disease (23 cases, 17.3%) (**Table 1**). The main possible causes of abortion were disease condition of the mother (51 cases, 38.35%), falls and workload during pregnancy (42 cases, 31.58%), and unwanted pregnancy (37 cases, 27.82%) (**Figure 1**).

Determinants of adverse pregnancy outcomes

A multilevel regression model was used to identify individual- and community-level determinant factors of adverse pregnancy outcomes. Before running the full model, the ICC (ρ) for the outcome was determined in the empty model to see if the data fitted a multilevel regression model or not. Then, ICC (ρ) was calculated as a full model for the outcome to detect the variability attributed to clusters after controlling the individual level factors.

Then, ICC (ρ) was calculated in the empty model and it was found to be 0.22, indicating that 22% of the variation was contributed by cluster variations. The test of preference for log-likelihood vs. logistic regression was also statistically significant ($P < 0.0001$). Following that, the full model was run by considering both the cluster-level and individual-level variables, and the ICC (ρ) was increased to 0.30. This indicates that 30% of

TABLE 1 Rate and type of adverse pregnancy outcomes and related factors among the study subjects in Benishangul Gumuz Region, Northwestern Ethiopia, March 2020–January 2021.

Variables	Frequency	Percent
Adverse pregnancy outcome (*n = 2,198*)		
No	1,610	73.2
Yes	588	26.8
Abortion encountered		
No	2,065	93.9
Yes	133	6.1
Low birth weight (LBW)[a]		
No	1,945	88.5
Yes	253	11.5
Preterm birth		
No	1,958	89.1
Yes	240	10.9
Type of abortion (*n = 133*)		
Spontaneous abortion	57	42.9
Threatened abortion	39	29.3
Induced abortion	37	27.8
Desire to terminate pregnancy		
No	104	78.2
Yes	29	21.8
Attempt to terminate a pregnancy		
No	123	92.5
Yes	10	7.5
Illness during pregnancy (*n = 133, multiple responses*)		
Malaria	40	30.1
High blood pressure	35	26.3
Heart disease	23	17.3
Malnutrition	7	5.3
Anemia	5	3.8
Diabetic Mellitus (DM)	4	3.0
Epilepsy/Convulsion	2	1.5
Pregnancy-related problems (*n = 133, multiple responses*)		
Excessive vaginal bleeding	78	58.6
Headache	58	43.6
Severe abdominal pain	28	21.1
Blurred vision	23	17.3

[a]LBW, Low birth weight; LBW is the birth weight of a newborn less than 2,500 grams.

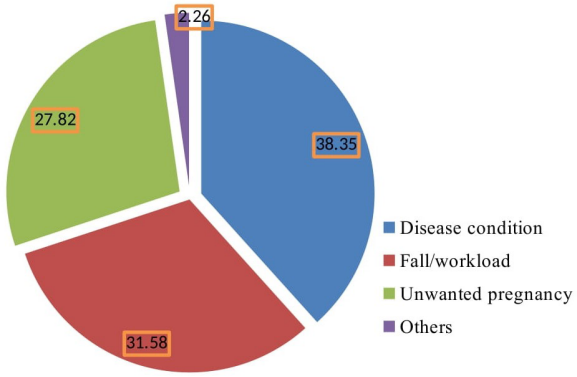


FIGURE 1
The main possible cause of abortion, Benishangul Gumuz Region, Northwest Ethiopia 2021.

the variation was attributed to cluster-level variables. The preference for log-likelihood vs logistic regression was statistically significant ($P < 0.0001$), suggesting that there was a preference for using a multilevel analysis model (Table 2).

After adjusting for a confounding effect in the final two-level mixed-effects model, cluster-level variables did not predict adverse pregnancy outcomes. The association with the expected outcomes was found to be not statistically significant. Among the lower-level variables, different factors were identified as important determinant factors of adverse pregnancy outcomes.

Besides these, the odds of having adverse pregnancy outcomes among women who started ANC after 6 months of gestational age (AOR = 0.20; 95% CI: 0.06, 0.66) and within 4–6 months of gestational age (AOR = 0.50; 95% CI: 0.32, 0.80) were, respectively, 80% and 50% lower than among women who started ANC visits within 3 months. Similarly, the odds of the occurrence of adverse pregnancy outcomes among women who received the recommended ANC visits (≥4 visits) (AOR = 0.32; 95% CI: 0.24, 0.52) and iron-folic acid supplementation during pregnancy (AOR = 0.52; 95% CI: 0.28, 0.0.93) were, respectively, 68% and 48% lower than their counterpart.

Moreover, the odds of encountering adverse pregnancy outcomes among women who had pregnancy-related problems during pregnancy (AOR = 1.89; 95% CI: 1.24, 2.90) were two times higher than among women who didn't have pregnancy-related problems. The odds of having an abortion, low birth weight, and preterm birth among women who had an average time of rupture of amniotic membranes of between 1 and 12 h before labor (AOR = 0.66; 95% CI: 0.45, 0.97) were 44% lower than among those who had an average time of rapture of amniotic membranes of less than 1 h before labor (Table 3).

The effect of the continuity of ANC packages on adverse pregnancy outcomes

Propensity score matching (PSM) approaches were used to compare women who adhered to the continuity of ANC visits and received their key intervention packages to those who discontinued ANC visits and key interventions. These models were used to limit the risk of confounding effects. Of the five different approaches to propensity score matching (PSM), one-to-one matching was used to estimate the effect of interventions on adverse pregnancy outcomes. After matching treated and controlled individuals, the effects of the continuity of ANC visits and their key interventions and the continuum of care via the space dimension on adverse pregnancy outcomes (abortion, low birth weight, and preterm birth) were determined.

The results indicate that receiving a first ANC visit (ATET; $\beta = -0.18$; 95% CI: −0.26, −0.11; $p < 0.001$); receiving a fourth ANC visit (ATET; $\beta = -0.1$; 95% CI: −0.15, −0.05; $p < 0.001$); receiving ANC services conducted by a skilled attendant (ATET; $\beta = -0.17$; 95% CI: −0.24, −0.11; $p < 0.001$); and completing the continuum of care via space dimension (ATET; $\beta = -0.11$; 95%

TABLE 2 Parameters of odds ratio and test of goodness-of-fit of the mixed-effects models, Benishangul Gumuz Region, Northwest Ethiopia, 2021.

Models	Fixed intercept - cons (95% CI)	Random effect as Level-2 variance var[-cons (95% CI)]	Intra-class Correlation Coefficient: ICC(ρ)	Log-likelihood (LR)-deviance	Significance of LR test vs. Logistic regression (P-value)
Pregnancy outcomes[a]					
Empty model	0.31 (0.23, 0.4)	0.93 (0.56, 1.56)	0.22 = 22%	−1,176.58	$P < 0.0001$
Full model	1.50 (0.24, 9.31)	1.48 (0.78, 2.81)	0.30 = 30%	−538.23	$P < 0.0001$

[a]Multilevel regression model applied to measure the effect of factors on outcome.
P-value less than 0.05 is statistically significant and the data fit for the multilevel model.

CI: −0.15, −0.07; $p < 0.001$) are associated with a significant reduction in the likelihood of adverse pregnancy outcomes (abortion, low birth weight, and preterm birth) (Table 4).

Discussion

Generally, this study aims to assess the rate of adverse pregnancy outcomes and their determinant factors and to measure the effectiveness of adherence to the continuity of ANC visit-based and content-based services on adverse pregnancy outcomes.

The rate of adverse pregnancy outcomes

Abortion, preterm birth, and low birth weight are common adverse pregnancy outcomes that are attributed to poor maternal health conditions and poor utilization of maternal health services. This study found that the rate of adverse pregnancy outcomes was 26.8%. This finding is higher than that of a study in Rural southwest Uganda (10.8%) (23) but lower than that of a study in Southwest Nigeria (37.05%) (17). This discrepancy is due to variation in socio-demographic and economic factors, cultural influences and beliefs, knowledge and attitudes of the community, and accessibility of health facilities and medical equipment.

In the year 2014, an estimated 620,300 pregnancies resulted in abortion, implying that the annual abortion rate was 28 per 1,000 pregnancies in Ethiopia (10, 11). Besides this, this study found that the rate of abortion was 6.1%, occurring in 61 per 1,000 pregnancies, which is far higher than the annual abortion rate in Ethiopia (10, 11). Despite the various efforts made in Ethiopia, including in the study areas, to improve maternal health services and strengthen family planning services, there is no reduction in the rate of abortion. However, this finding is lower than those of studies conducted in rural northwest Bangladesh (35.7%) (30), Rural Uganda (8.4%) (23), and Rural South Western Uganda (8.6%) (23). The reason might be the variability of legal issues on abortion procedures in Ethiopia and other countries worsening and/or reducing the occurrence of adverse pregnancy outcomes. However, this finding is much higher than those of studies in other countries and across the nation. This discrepancy may be because the study area is highly remote, with poor infrastructure and roads, and the community has low awareness and a lack of knowledge on the advantages of early detection and management of adverse pregnancy outcomes, particularly abortion.

In Ethiopia, unsafe abortion was the leading cause of maternal mortality and morbidity. In this study, more than one-third of the abortion cases constituted unsafe abortion, occurring in an unhygienic place. Furthermore, we found that women encountered severe vaginal bleeding and severe headache prior to the occurrence of abortion. Women also encountered illnesses during pregnancy before the occurrence of abortion, namely malaria, high blood pressure, and heart disease. However, the main possible causes of abortion were disease condition of the mother, falls, workload during pregnancy, and unwanted pregnancy.

Preterm birth can cause lifelong effects such as cerebral palsy, intellectual disability, visual and hearing impairments, growth retardation, and poor health outcomes. In line with these, this study found that the rate of preterm birth was 10.9%, which is consistent with a study in Gondar University Hospital, which reported the rate at 14.2% (31), whereas it is lower than evidence from Amhara (33.3%) (13) and Southwest Nigeria (22.08%) (17) but higher than the rate reported in Hawassa town health facility (3.6%) (32). This discrepancy may be due to the variation of socio-demographic, cultural, and custom differences and the issue of study time and design.

Low birth weight exposes newborns to a variety of negative health consequences: fetal and neonatal mortality and morbidity, stunted growth, cognitive development, and chronic disorders. In this study, the prevalence of low birth weight was 11.5%, which is consistent with evidence from Gondar University Hospital (11.2%) (31) and Hawassa town health facility (11.6%) (32). This finding is higher than the result from Bahar Dar administrative city (7.8%) (33), Tigray (7.5%) (19), and Benishangul Gumuz region (9.9%) (12) but it is lower than the findings of studies in Ethiopia (13.2%) (12), Amhara region (22.2%) (12), South Gondar (27.76%) (14); North Wolla (24%) (15), Afar (26.2%) (12), Northern Nigeria (20%) (34), Southwest Nigeria (14.98) (17), and Eastern Uganda (13.4%) (35). This discrepancy can be explained by the variability of access to health facilities, availability of medical supplies, and societal awareness of nutritional requirements during pregnancy.

Associated factors of adverse pregnancy outcomes

Early initiation and adherence to the recommended schedule of ANC visits help in the early diagnosis, prevention, and treatment of

10.3389/fgwh.2023.1082405

TABLE 3 Multilevel regression models analysis on determinants of pregnancy outcomes, Benishangul Gumuz Region, Northwest Ethiopia, 2021.

Determinant factors	Adverse pregnancy outcomes		Crud OR 95% CI	Adjusted OR 95% CI
	No	Yes		
Level-2 (Community level) variables				
Time it takes to reach the nearest hospital				
<2 h	1,201 (72.79)	449 (27.21)	1	1
≥2 h	409 (74.64)	139 (25.36)	1.46 (0.94, 2.27)	0.75 (0.39, 1.46)
Level-1 (individual level) variables: socio-demographic characteristic				
Age (Years)				
<20	115 (61.83)	71 (38.17)	1	1
20–29	1,024 (72.99)	379 (27.01)	0.53 (0.37, 0.75)	0.40 (0.10, 1.57)
≥30	471 (77.34)	138 (22.66)	0.42 (0.29, 0.63)	0.37 (0.09, 1.48)
Women's education level				
No formal education	1,041 (77.98)	294 (22.02)	1	1
Primary school	277 (65.64)	145 (34.36)	1.57 (1.18, 2.09)	1.32 (0.81, 2.15)
High School	159 (64.11)	89 (35.89)	1.82 (1.29, 2.56)	1.38 (0.71, 2.67)
Tertiary education	133 (68.91)	60 (31.09)	1.23 (0.84, 1.79)	1.48 (0.71, 3.10)
Women's occupation				
Housewife	1,294 (74.67)	439 (25.33)	1	1
Others	316 (67.96)	149 (32.04)	1.47 (1.13, 1.90)	0.89 (0.49, 1.60)
Pregnancy-related problems during a previous pregnancy				
No	1,050 (78.95)	280 (21.05)	1	1
Yes	216 (67.29)	105 (32.71)	**1.39 (1.02, 1.88)**	0.98 (0.64, 1.50)
Time of ANC initiation				
1–3 months of GA	396 (69.47)	174 (30.53)	1	1
4–6 months of GA	1,058 (79.55)	272 (20.45)	0.36 (0.26, 0.48)	**0.5 (0.32, 0.80)**
After 6 months of GA	108 (81.82)	24 (18.18)	0.41 (0.24, 0.72)	**0.2 (0.06, 0.66)**
ANC services attendant				
Unskilled provider	182 (71.65)	72 (28.35)	1	1
Skilled provider	1,380 (77.62)	398 (22.38)	0.32 (0.22, 0.49)	0.79 (0.42, 1.49)
Number of ANC visits				
<4	478 (64.16)	267 (35.84)	1	1
≥4	1,132 (77.91)	321 (22.09)	0.49 (0.38, 0.62)	**0.36 (0.24, 0.49)**
Provision of information on health facility delivery				
No	122 (41.08)	175 (58.92)	1	1
Yes	1,488 (78.27)	413 (21.73)	0.17 (0.13, 0.23)	0.86 (0.43, 11.75)
Pregnancy-related problems during the current pregnancy				
No	1,352 (77.35)	396 (22.65)	1	1
Yes	258 (57.33)	192 (42.67)	2.26 (1.76, 2.91)	**1.89 (1.24, 2.90)**
IFA during pregnancy				
No	296 (56.81)	225 (43.19)	1	1
Yes	1,314 (78.35)	363 (21.65)	0.32 (0.25, 0.42)	**0.52 (0.41, 0.68)**
TT vaccination during pregnancy				
No	388 (61.01)	248 (38.99)	1	1
Yes	1,222 (78.23)	340 (21.77)	0.40 (0.31, 0.51)	0.99 (0.60, 1.64)
Pregnancy-related problems during labor				
No	1,413 (79.88)	356 (20.12)	1	1
Yes	197 (66.78)	98 (33.22)	1.64 (1.20, 2.24)	1.26 (0.68, 2.31)
Time interval before 1st PNC visit				
Within 2 days after birth	367 (72.82)	137 (27.18)	1	1
B/n 3–7 days after birth	615 (81.56)	139)18.44)	0.49 (0.34, 0.72)	0.68 (0.43, 1.09)
B/n 8–42 days after birth	381 (78.88)	102 (21.12)	0.79 (0.49, 1.28)	0.76 (0.41, 1.39)
Time of PMRM before labor				
<1 h	587 (72.11)	227 (27.89)	1	1
1–12 h	936 (82.69)	196 (17.31)	0.78 (0.59, 1.03)	**0.66 (0.45, 0.97)**
>12 h	62 (65.96)	32 (34.04)	2.49 (1.45, 4.28)	0.75 (0.28, 1.99)

The bold value indicates a statistically significant association ($p < 0.05$).

TABLE 4 Propensity score matching analysis on the effect of adherence to the continuity of ANC services on pregnancy outcomes in Benishangul Gumuz Region, Northwest Ethiopia, March 2020–January 2021.

Interventions/treatments	Adverse pregnancy outcome		ATE		ATET	
	Yes	No	β 95% CI*	*P*-value	β 95% CI*	*P*-value
I. Adhered to the continuity of ANC visits and key intervention packages						
First ANC services						
No Received	125 (44.8)	154 (55.2)				
Received	463 (24.1)	1,456 (75.9)	−0.18 (−0.26, −0.11)	$P < 0.001$	−0.18 (−0.26, −0.11)	$P < 0.001$
Fourth ANC services						
Discontinued	267 (35.8)	478 (64.2)				
Completed care	321 (22.1)	1,132 (77.9)	−0.11 (−0.16, −0.07)	$P < 0.001$	−0.1 (−0.15, −0.05)	$P < 0.001$
ANC services attendant						
Unskilled provider	72 (28.3)	182 (71.7)				
Skilled provider	398 (22.4)	1,380 (77.6)	−0.18 (−0.26, −0.10)	$P < 0.001$	−0.17 (−0.24, −0.11)	$P < 0.001$
Continuity of key services of ANC package						
Discontinuity of key services	313 (29.6)	744 (70.4)				
Completion of key services	275 (24.1)	866 (75.9)	−0.04 (−0.08, 0.01)	$P = 0.061$	−0.02 (−0.06, 0.02)	$P = 0.25$
II. Continuity of care for maternal health services via space dimension						
Completion of maternal health services via space dimension						
Discontinuity of care	445 (32.3)	935 (67.7)				
Completion of COC	143 (17.5)	675 (82.5)	−0.1 (−0.14, −0.05)	$P < 0.001$	−0.11 (−0.15, −0.07)	$P < 0.001$

[a]Adjusted for place of residence, educational status, occupational status, household wealth index, and distance from health facilities.

pregnancy-related problems and complications, which minimize the occurrence of adverse pregnancy outcomes (36). In contrast, this study found that the odds of having adverse pregnancy outcomes among women who started ANC after 6 months of gestational age (AOR = 0.20) and within 4–6 months of gestational age (AOR = 0.50) were lower than among women who started ANC visits within 3 months. This can be explained by pregnant women attending a health facility as early as possible when they suffer pregnancy-related problems and abnormal indications being identified. The probability of the occurrence of adverse pregnancy outcomes among women who have pregnancy-related complications is high.

The World Health Organization recommends the use of ANC services that can help overcome pregnancy-related complications and avoid adverse pregnancy outcomes. In line with this, this study found that the odds of the occurrence of adverse pregnancy outcomes among women who received the recommended ANC visits were 76% lower than their counterparts. This finding is supported by studies conducted in other parts of the country, namely Northwest Ethiopia (20), South Gondar (14), Amhara region (13), and Jimma University Specialized Hospital (3), and also in other countries, such as Eastern Uganda (35), rural Uganda (23), Southwest Nigeria (17), and Northern Nigeria (34). This is because during ANC visits, any pregnancy-related problems are detected and appropriate treatments are provided to overcome complications that could increase the risk of the occurrence of abortion, premature birth, and low birth weight. The recommended ANC visits create an opportunity to receive good care during pregnancy, which is significantly important for the health of the mother and the development of the fetus within the womb, and promotes healthy behaviors that enhance the chances of good pregnancy outcomes.

Maternal nutrition and dietary counseling during pregnancy are significantly important interventions to reduce the occurrence of adverse pregnancy outcomes. Hence, this study depicts that the odds of the occurrence of adverse pregnancy outcomes among women who received iron-folic acid supplementation during pregnancy were 48% lower than among women who did not receive iron-folic acid supplementation. This finding is supported by the findings of studies in South Gondar (6) and Bahar Dar administrative city (33). This is because of the direct effect of the maternal nutritional status on placental size, the strength of the membrane, and the fetus. As a result, providing iron-folic acid supplementation and increasing the frequency of the provision of nutritional advice for pregnant women contribute to the increased birth weight of newborns and the maturity of the fetus within the womb (33).

In this study, women who had pregnancy-related problems during pregnancy were found to be two times more likely to have adverse pregnancy outcomes. This finding is consistent with a study conducted in South Gondar (6), Amhara region (13), Hawassa town HF (32), and Jimma University Hospital (3). This implies that a history of abnormal birth outcomes, pregnancy and childbirth-related complications, chronic illness, current pregnancy-related complications, and illness are risk factors for the occurrence of abnormal pregnancy outcomes in subsequent pregnancies and in the current pregnancy outcomes. This could be related to a decrease in placental blood flow caused by endothelial cell damage and blood vessel constriction. This disorder disrupts the mother-fetus interaction of nutrients and oxygen, resulting in abnormal

pregnancy outcomes, such as abortion, low birth weight, preterm birth, and stillbirth.

Effect of adherence to ANC services on adverse pregnancy outcomes

The continuity of maternal health services has been recognized as a strategy for minimizing gaps in adverse pregnancy outcomes by connecting pregnant women to health-promoting resources, avoiding the duplication of effort, improving communication between families and health providers (37), and retaining pregnant women within the pathway of maternal health services visits (38–40). In line with this, this study found that for women who received a first ANC visit; received a fourth ANC visit; received ANC services conducted by a skilled attendant; received key services of the ANC package, and completed the continuum of care via space dimension, the rate of adverse pregnancy outcomes was reduced by 18%, 11%, 18%, 4%, and 10%, respectively, compared with their counterparts. This finding is consistent with the results of prior studies in Northwest Ethiopia (20), Bahar Dar administrative city (33), Tigray (19), Hawassa town health facility (32), Ghana (41), and North Carolina (37). This implies that high-quality ANC can improve pregnancy outcomes in two dimensions: directly through preventative measures and indirectly by encouraging deliveries in healthcare settings, where difficulties can be better addressed (41). Moreover, primary health care services, particularly focusing on maternal health services and social support, reduce adverse pregnancy outcomes (2). Evidence in the UK suggests that continuity of care is a core intervention in the health system used to reduce preterm births and improve the survival of neonates (42).

Conclusion

This study found that more than a quarter of the women involved experienced adverse pregnancy outcomes. Before the occurrence of abortion, women encountered excessive vaginal bleeding and severe bleeding. The common illnesses women frequently suffered during pregnancy were malaria, blood pressure, and heart disease. Iron-folic acid supplementation during pregnancy, early ANC initiation, and completion of the recommended ANC services were found to be major protective interventions against adverse pregnancy outcomes, whereas pregnancy-related problems during pregnancy and premature rupture of the membrane were found to be determinant factors of adverse pregnancy outcomes. As a treatment effect, the completion of ANC visits and receipt of the key content of ANC services via time and space dimensions significantly reduce adverse pregnancy outcomes. Therefore, key strategies for promoting the uptake of antenatal services and strengthening iron-folic acid supplementation are strongly recommended, alongside increasing utilization of key packages of antenatal services and conducting awareness creation campaigns on maximizing the benefits of prenatal care.

Data availability statement

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the Research Review and Ethics Committee (REC) of School of Public Health, Addis Ababa University with protocol number SPH/3089/011. Then, Ethical approval was acquired from the Institutional Review Board (IRB) of the College of Health Science, Addis Ababa University with protocol number 048/19/SPH. The Regional Health Bureau provided formal approval letters to their respective local administrative offices. Before any data collection begins, each respondent provided verbal consent to participate in the study. By deleting any identities from the questionnaire, confidentiality was maintained. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors contributed to the conception, design, and execution of the study and the acquisition, analysis, and interpretation of the data; prepared and commented on the manuscript; gave final approval of the version to be published, agreed to submit to the journal, and agreed to be accountable for all aspects of the work. All authors contributed to the article and approved the submitted version.

Acknowledgments

We would like to thank Addis Ababa University, College of Health for providing ethical approval and partially sponsoring our work. The authors would also like to express their gratitude to all of the pregnant women, data collectors, supervisors, and other individuals who contributed directly or indirectly to the study's success. Last but not least, the authors wish to express their gratitude to Miss Abebech Tefera, Miss Chaltu Argeta, Dr. Nigatu Disassa, and Assistant Professor Atnafu Morka for their unwavering assistance in the preparation, management, and duplication of the research questionnaires.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

1. Bahk J, Yun S-C, Kim Y-m, Khang Y-H. Impact of unintended pregnancy on maternal mental health: a causal analysis using follow up data of the panel study on Korean children (PSKC). *BMC Pregnancy Childbirth*. (2015) 15(1):85. doi: 10.1186/s12884-015-0505-4

2. Dunlop AL, Dubin C, Raynor BD, Bugg GW Jr, Schmotzer B, Brann AW Jr. Interpregnancy primary care and social support for African-American women at risk for recurrent very-low-birthweight delivery: a pilot evaluation. *Matern Child Health J*. (2008) 12(4):461–8. doi: 10.1007/s10995-007-0279-z

3. Yeshialem E, Abera M, Tesfay A. Determinants of adverse pregnancy outcomes among mothers who gave birth in jimma university specialized hospital, case control study, 2016. *Ethiopian J Reprod Health*. (2019) 11(1):10. Available at: https://ejrh.org/index.php/ejrh/article/view/235

4. GBD 2016 Causes of Death Collaborators. Global, regional, and national age-sex specific mortality for 264 causes of death, 1980–2016: a systematic analysis for the global burden of disease study 2016. *Lancet*. (2017) 390(10100):1151–210. doi: 10.1016/S0140-6736(17)32152-9

5. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, et al. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health*. (2014) 2(6):e323–33. doi: 10.1016/S2214-109X(14)70227-X

6. Addisu D, Biru S, Mekie M, Minuye B, Bezie M, Alebachew W, et al. Predictors of adverse pregnancy outcome at Hospitals in South Gondar Zone, North-central Ethiopia: a multicenter facility-based unmatched case-control study. *Heliyon*. (2021) 7(2):e06323-e. doi: 10.1016/j.heliyon.2021.e06323

7. Engmann C, Walega P, Aborigo RA, Adongo P, Moyer CA, Lavasani L, et al. Stillbirths and early neonatal mortality in rural Northern Ghana. *Tropl Med Int Health*. (2012) 17(3):272–82. doi: 10.1111/j.1365-3156.2011.02931.x

8. Engmann C, Garces A, Jehan I, Ditekemena J, Phiri M, Mazariegos M, et al. Causes of community stillbirths and early neonatal deaths in low-income countries using verbal autopsy: an international, multicenter study. *J Perinatol*. (2012) 32 (8):585–92. doi: 10.1038/jp.2011.154

9. Sedgh G, Singh S, Hussain R. Intended and unintended pregnancies worldwide in 2012 and recent trends. *Stud Fam Plann*. (2014) 45(3):301–14. doi: 10.1111/j.1728-4465.2014.00393.x

10. Moore AM, Gebrehiwot Y, Fetters T, Wado YD, Bankole A, Singh S, et al. The estimated incidence of induced abortion in Ethiopia, 2014: changes in the provision of services since 2008. *Int Perspect Sex Reprod Health*. (2016) 42(3):111. doi: 10.1363/42e1816

11. Gebrehiwot Y, Fetters T, Gebreselassie H, Moore A, Hailemariam M, Dibaba Y, et al. Changes in morbidity and abortion care in Ethiopia after legal reform: national results from 2008 to 2014. *Int Perspect Sex Reprod Health*. (2016) 42(3):121. doi: 10.1363/42e1916

12. Ethiopia Central Statistical Agency (CSA) and ICF. Ethiopia demographic and health survey 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF.: The DHS program ICF Rockville, Maryland, USA. (2017). Available at: https://dhsprogram.com/pubs/pdf/FR328/FR328.pdf

13. Woday A, Muluneh MD. Determinants of preterm birth among mothers who gave birth at public hospitals in the Amhara region, Ethiopia: a case-control study. *PLoS ONE*. (2019) 14(11):e0225060. doi: 10.1371/journal.pone.0225060

14. Mihretie G, Bisetegn T, Gelaye K, Ayele T. The effect of antenatal depression on birth weight among newborns in South Gondar zone, Northwest Ethiopia: a population-based prospective cohort study. *Arch Public Health*. (2021) 79:121. doi: 10.1186/s13690-021-00567-7

15. Wubetu AD, Amare YE. Newborn birth weight and associated factors among mother-neonate pairs in public hospitals, North Wollo, Ethiopia. *Pediatric Health Med Ther*. 2021;2021(11):111–8. doi: 10.2147/PHMT.S299202

16. Laelago T, Yohannes T, Tsige G. Determinants of preterm birth among mothers who gave birth in East Africa: systematic review and meta-analysis. *Ital J Pediatr*. (2020) 46(1):10. doi: 10.1186/s13052-020-0772-1

17. Awoleke JO, Olofinbiyi BA. Poor prenatal service utilization and pregnancy outcome in a tertiary health facility in Southwest Nigeria. *Pan Afr Med J*. (2020) 35:28. doi: 10.11604/pamj.2020.35.28.20426

18. Hailemichael HT, Debelew GT, Alema HB, Weldu MG, Misgina KH. Determinants of adverse birth outcome in Tigrai region, North Ethiopia: Hospital-based case-control study. *BMC Pediatr*. (2020) 20(1):10. doi: 10.1186/s12887-019-1835-6

19. Haftu A, Hagos H, Mehari MA, G/Her B. Pregnant women adherence level to antenatal care visit and its effect on perinatal outcome among mothers in tigray public health institutions, 2017: cohort study. *BMC Res Notes*. (2018) 11(1):872. doi: 10.1186/s13104-018-3987-0

20. Worku AG, Yalew AW, Afework MF. The contributions of maternity care to reducing adverse pregnancy outcomes: a cohort study in Dabat district, northwest Ethiopia. *Matern Child Health J*. (2014) 18(6):1336–44. doi: 10.1007/s10995-013-1367-x

21. United Nations Development Programme—Ethiopia (UNDP). The Benishangul Regional State is selected for design of model REDD program under the UNFCCC Warsaw framework. (2017). Available at: https://www.undp.org/sites/g/files/zskgke326/files/migration/et/564b2c04d28fb9d51671ff55a627808510ebfbc49cba774c343394c26fc46f3b.pdf

22. Federal Democratic Republic of Ethiopia Central Statistical Agency (CSA). Population projection of Ethiopia for all regions at Wereda level from 2014 to 2017. Addis Ababa, Ethiopia. (2013). Available at: http://www.statsethiopia.gov.et/wp-content/uploads/2019/05/Population-Projection-At-Wereda-Level-from-2014-2017.pdf

23. Asiki G, Baisley K, Newton R, Marions L, Seeley J, Kamali A, et al. Adverse pregnancy outcomes in rural Uganda (1996–2013): trends and associated factors from serial cross sectional surveys. *BMC Pregnancy Childbirth*. (2015) 15:279. doi: 10.1186/s12884-015-0708-8

24. Zelka MA, Yalew AW, Debelew GT. The effects of completion of continuum of care in maternal health services on adverse birth outcomes in Northwestern Ethiopia: a prospective follow-up study. *Reprod Health*. (2022) 19(1):200. doi: 10.1186/s12978-022-01508-5

25. Ethiopia Central Statistical Agency (CSA) and ICF. Ethiopia demographic and health survey 2011. Addis Ababa: The DHS program ICF Rockville, Maryland, USA. (2012). Available at: https://dhsprogram.com/pubs/pdf/fr255/fr255.pdf

26. Ethiopian Minisry of Health (MoH). National technical guidance for maternal and perinatal death surveillance and response (MPDSR). Ethiopian Public Health Institue. (2017). Available at: https://www.ephi.gov.et/images/pictures/National-Maternal-and-Perinatal–Death-Surveillance-and-Response-guidance-2017.pdf

27. Agha S, Williams E. Maternal and child health program indicator survey 2013, Sindh Province. MNCH Services component, USAID/Pakistan MCH Program. Karachi, Pakistan: Jhpiego. (2013). Available at: https://www.mchip.net/sites/default/files/MCH%20Program%20Indicator%20Survey%20Report%202013%20Sindh%20Province.pdf

28. Debelew GT, Afework MF, Yalew AW. Determinants and causes of neonatal mortality in Jimma Zone, Southwest Ethiopia: a multilevel analysis of prospective follow up study. *PLoS One*. (2014) 9(9):e107184. doi: 10.1371/journal.pone.0107184

29. Balla YY, Data T, Lindtjorn B. Maternal and neonatal mortality in rural south Ethiopia: outcomes of community-based birth registration by health extension workers. *PLoS ONE*. (2015) 10(3). doi: 10.1371/journal.pone.0119321

30. Sikder SS, Labrique AB, Craig IM, Wakil MA, Shamim AA, Ali H, et al. Patterns and determinants of care seeking for obstetric complications in rural northwest Bangladesh: analysis from a prospective cohort study. *BMC Health Serv Res*. (2015) 15:166. doi: 10.1186/s12913-015-0832-1

31. Adane AA, Ayele TA, Ararsa LG, Bitew BD, Zeleke BM. Adverse birth outcomes among deliveries at Gondar University Hospital, Northwest Ethiopia. *BMC Pregnancy Childbirth*. (2014) 14:90. doi: 10.1186/1471-2393-14-90

32. Tsegaye B, Kassa A. Prevalence of adverse birth outcome and associated factors among women who delivered in Hawassa town governmental health institutions, south Ethiopia, in 2017. *Reprod Health*. (2018) 15(1):193. doi: 10.1186/s12978-018-0631-3

33. Tafere TE, Afework MF, Yalew AW. Providers adherence to essential contents of antenatal care services increases birth weight in Bahir Dar City Administration, North West Ethiopia: a prospective follow up study. *Reprod Health*. (2018) 15(1):163. doi: 10.1186/s12978-018-0610-8

34. Onwuhafua PI, Williams ICO, Kolawole AO, Adze JA. The effect of frequency of antenatal visits on pregnancy outcome in Kaduna, Northern Nigeria. *Trop J Obstet Gynaecol*. (2016) 33:317–21. doi: 10.4103/0189-5117.199813

35. Kananura RM, Wamala R, Ekirapa-Kiracho E, Tetui M, Kiwanuka SN, Waiswa P, et al. A structural equation analysis on the relationship between maternal health

services utilization and newborn health outcomes: a cross-sectional study in Eastern Uganda. *BMC Pregnancy Childbirth*. (2017) 17(1):98. doi: 10.1186/s12884-017-1289-5

36. Sarker BK, Rahman M, Rahman T, Rahman T, Khalil JJ, Hasan M, et al. Status of the WHO recommended timing and frequency of antenatal care visits in Northern Bangladesh. *PLoS ONE*. (2020) 15(11):e0241185. doi: 10.1371/journal.pone.0241185

37. Hillemeier MM, Domino ME, Wells R, Goyal RK, Kum H-C, Cilenti D, et al. Effects of maternity care coordination on pregnancy outcomes: propensity-weighted analyses. *Matern Child Health J*. (2015) 19(1):121–7. doi: 10.1007/s10995-014-1502-3

38. Kikuchi K, Ansah EK, Okawa S, Enuameh Y, Yasuoka J, Nanishi K, et al. Effective linkages of continuum of care for improving neonatal, perinatal, and maternal mortality: a systematic review and meta-analysis. *PLoS One*. (2015) 10(9): e0139288. doi: 10.1371/journal.pone.0139288

39. Kikuchi K, Okawa S, Zamawe CO, Shibanuma A, Nanishi K, Iwamoto A, et al. Effectiveness of continuum of care-linking pre-pregnancy care and pregnancy care to improve neonatal and perinatal mortality: a systematic review and meta-analysis. *PLoS One*. (2016) 11(10):e0164965. doi: 10.1371/journal.pone.0164965

40. Emiru AA, Alene GD, Debelew GT. Women's retention on the continuum of maternal care pathway in west Gojjam zone, Ethiopia: multilevel analysis. *BMC Pregnancy Childbirth*. (2020) 20(1):258. doi: 10.1186/s12884-020-02953-5

41. Afulani PA. Determinants of stillbirths in Ghana: does quality of antenatal care matter? *BMC Pregnancy Childbirth*. (2016) 16(1):132. doi: 10.1186/s12884-016-0925-9

42. Turienzo C F, Bick D. Midwifery continuity of care versus standard maternity care for women at increased risk of preterm birth: a hybrid implementation-effectiveness, randomised controlled pilot trial in the UK. *PLoS Med*. (2020) 17(10): e1003350. doi: 10.1371/journal.pmed.1003350

frontiers | Frontiers in Public Health

TYPE Original Research
PUBLISHED 06 July 2023
DOI 10.3389/fpubh.2023.1139334

OPEN ACCESS

EDITED BY
Lorena Binfa,
University of Chile, Chile

REVIEWED BY
Cristina González Blázquez,
Universidad Autónoma de Madrid, Spain
Xavier Espada-Trespalacios,
Universitat Ramon Llull, Spain
Olga Canet-Vélez,
Universitat Ramon Llull, Spain

*CORRESPONDENCE
Ángela León Cáceres
✉ angelaleoncaceres@gmail.com
Andreas Deckert
✉ a.deckert@uni-heidelberg.de

†PRESENT ADDRESS
Rohan Michael Ramesh,
Division of Gastrointestinal Sciences,
The Wellcome Trust Research Laboratory,
Christian Medical College, Vellore, India

‡These authors have contributed equally to this work and share first authorship

RECEIVED 06 January 2023
ACCEPTED 16 June 2023
PUBLISHED 06 July 2023

CITATION
Cáceres ÁL, Ramesh RM, Newmai P, Kikon R and Deckert A (2023) Perceptions, health seeking behavior and utilization of maternal and newborn health services among an indigenous tribal community in Northeast India—a community-based mixed methods study.
Front. Public Health 11:1139334.
doi: 10.3389/fpubh.2023.1139334

Perceptions, health seeking behavior and utilization of maternal and newborn health services among an indigenous tribal community in Northeast India—a community-based mixed methods study

Ángela León Cáceres[1,2*‡], Rohan Michael Ramesh[3†‡], Puisaumaliu Newmai[4], Rhondemo Kikon[4] and Andreas Deckert[1*]

[1]Heidelberg Institute of Global Health, University of Heidelberg, Heidelberg, Germany, [2]Tropical Herping, Quito, Ecuador, [3]Christian Institute of Health Sciences and Research, Dimapur, India, [4]Community Health Initiative, Dimapur, India

Background: Evidence suggests that healthcare utilization among tribal communities in isolated regions can be influenced by social determinants of health, particularly cultural and geographical factors. The true mortality and morbidity due to these factors in remote tribal communities are often underestimated due to facility-dependent reporting systems often difficult to access. We studied the utilization of health services for maternal and newborn care and explored how cultural beliefs, perceptions, and practices influence the health-seeking behavior (HSB) of an indigenous tribal community in Northeast India.

Methods: Within a concurrent triangulation design, the combined results from 7 focus group discussions and 19 in-depth interviews, and the 109 interviews of mothers from a community-based survey were interpreted in a complementary manner. The qualitative data were analyzed using a conceptual framework adapted from the socio-ecological and three-delays model, using *a priori* thematic coding. Multivariable logistic regression was carried out to identify factors associated with home delivery.

Results: Only 3.7% of the interviewed mothers received the four recommended antenatal check-ups in health centers, and 40.1% delivered at home. Mothers residing in the villages without a health center or one that was not operational were more likely to deliver at home. HSB was influenced significantly by available finances, the mother's education, low self-esteem, and a strong belief in traditional medicine favored by its availability and religious affiliation. The community sought health services in facilities only in emergency situations, determined primarily by the tribe's poor perception of the quality of health services provided in the irregularly open centers, locally available traditional medicine practitioners, and challenges in geographical access. National schemes intended to incentivize access to facilities failed to impact this community due to flawed program implementation that did not consider this region's cultural, social, and geographical differences.

Conclusion: The health-seeking behavior of the tribe is a complex, interrelated, and interdependent process framed in a medical pluralistic context. The

utilization of health centers and HSBs of indigenous communities may improve when policymakers adopt a "bottom-up approach," addressing structural barriers, tailoring programs to be culturally appropriate, and guaranteeing that the perceived needs of indigenous communities are met before national objectives.

KEYWORDS

maternal and newborn health, health seeking behavior, tribal, access to health services, health service utilization, social determinants of health, universal health coverage (UHC), India

Introduction

The global health agenda has emphasized decreasing maternal and newborn mortality as key components of sustainable human development. Despite the progress, 830 women die every day from causes related to pregnancy or childbirth; of this, 20 percent are from India (1, 2). This country still has significant challenges, even if the maternal mortality ratio was reduced from 212 deaths per 100,000 live births in 2007 to 167 deaths in 2013 (3). However, in 2013, the highest number of neonatal deaths globally (0.75 million) was reported in India (4). Further, within the country, the neonatal mortality rate (NMR) nearly doubles in some rural and tribal areas compared to the urban areas since they face considerable inequalities in access to antenatal, intranatal, and postnatal healthcare services (4). Other reasons that contribute to this disparity in India are low public expenditure on health (1.02% of India's Gross Domestic Product for 2015–2016), high dependency on private healthcare services (78%-outpatients and 60%-inpatients), and high out-of-pocket (OOP) expenditures especially in Nagaland (61.7%) compared to the rest of India (20.5%) (5–7). To address the aforementioned issues, the Indian Government launched the "Janani Shishu Suraksha Karyakaram" (JSSK) scheme in 2011 for pregnant women and newborns to decrease OOP and neonatal deaths by providing free transport, medicines, and consumables, diagnostic tests, blood transfusions, and food for the duration of a woman's stay. Sick neonates are also entitled to free treatment and transport (5). Additionally, another program, the "Janani Suraksha Yojana" (JSY) program offers cash assistance to mothers and accredited social health activists (ASHA-local community health volunteers who promote access to health services, mobilize communities, and provide community care) to facilitate institutional deliveries (8).

The Northeast region of India accommodates the country's largest proportion of scheduled tribes (ST) and ranks the lowest in social indicators (9). One such state in this region is Nagaland, where 61% of the people are multidimensionally poor and live in rural and remote zones that lack connectivity due to inadequate or non-existent public transport systems, which markedly influences timely, affordable, and accessible maternal and child public healthcare services (10). In 2016, the more developed states like Kerala and Tamil Nadu reported almost 100% institutional deliveries, but Nagaland reported only a third of its births in health facilities (11). Nearly 90% of the population living in Nagaland are tribal or indigenous. "Nagas" is a collective term for several indigenous communities in the Northeast Region of India and upper Myanmar that share similar social and cultural characteristics. In India, the majority of the Nagas live in the state of Nagaland, within 16 administrative districts inhabited by 17 major and sub-tribes. In India, Nagas are classified as a scheduled tribe (Indigenous people from India who are officially regarded as socially disadvantaged) under the Indian constitution article 342 (12).

While there is anecdotal evidence suggesting that political unrest, the rugged terrain, and the lack of transport greatly influence access to healthcare services, a paucity of data demonstrates that social and cultural factors also influence health-seeking behavior (HSB) exhibited by this community. This study employed a mixed methods approach to quantitatively study the utilization of maternal and newborn health services while adopting a salutogenic perspective to explore how cultural beliefs, perceptions, and practices influence the HSB of an indigenous tribal community in Northeast India.

Materials and methods

Study setting

The study was conducted in Tening, a block in Peren district, located in the hilly north-eastern state of Nagaland, India. The community's total population is around 95,000, and the Tening block consists of 23 registered villages, currently home to the Christianized Liangmai Naga tribe (also called "Zeliang", one of the 17 major tribes in Nagaland) (13). Due to civil conflicts, this territory became a no-go area in 1947, was a restricted area for more than 50 years, and is presently considered a disturbed area, the consequences of which still disrupt everyday life (14). Their lifestyles and social structures are based on a lineage and patriarchal clan system. The Northeastern region of India presents a complicated geographical picture that isolates this region from the rest of the country. The Tening block is landlocked by the neighboring states of Manipur in the southeast and Assam in the southwest. Dimapur is the closest city with tertiary healthcare facilities located ~120 km from the block in the adjacent district;

Abbreviations: ASHA, Accredited social health activist; ANC, Antenatal care; CHW, Community health worker; TBA, Traditional birth attendant; FGD, Focus group discussion; HSB, Health seeking behavior; IDI, In-depth interviews; JSSK, Janani Shishu Suraksha Karyakaram; JSY, Janani Suraksha Yojana; OOP, Out-of-pocket expenditure; PNC, Postnatal care; TH, Traditional healers; TM, Traditional medicine; SEM, Socio-ecological model.

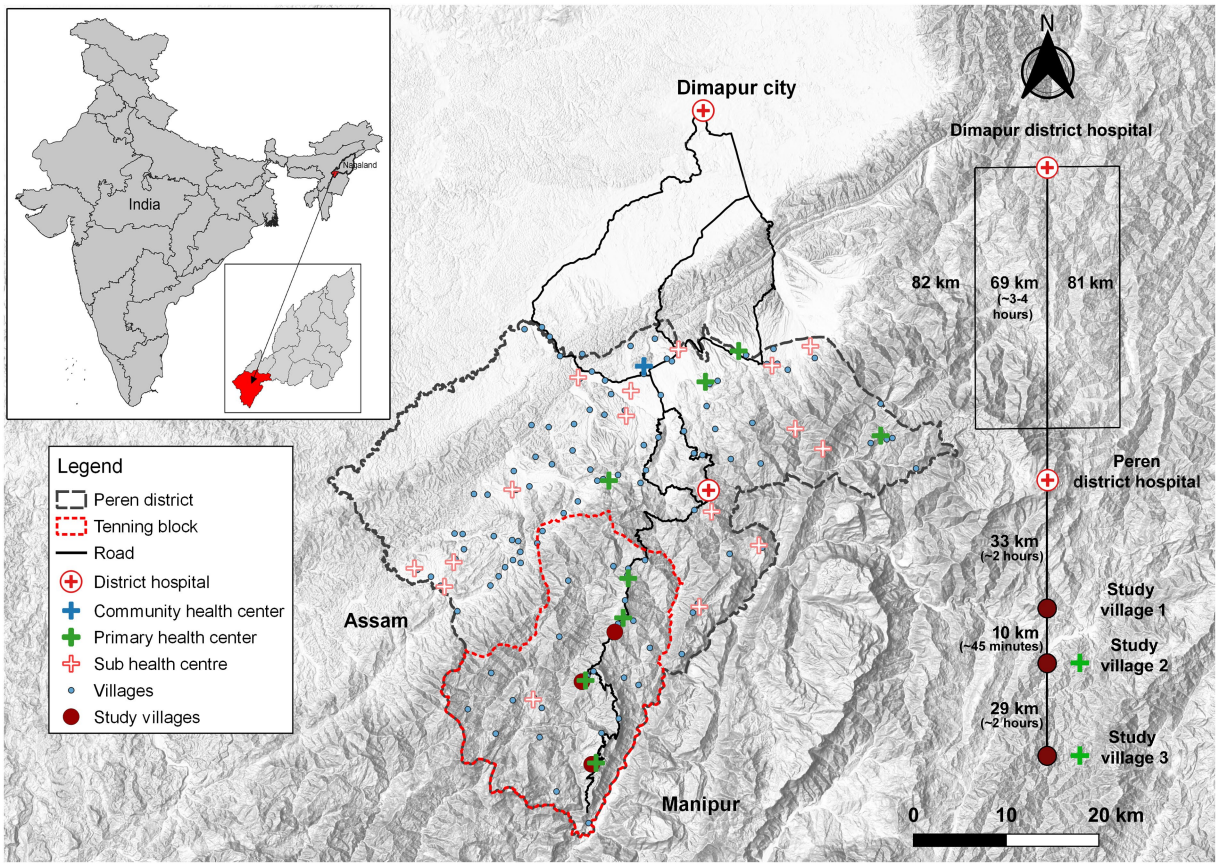


FIGURE 1
A topographic map of the study area with details of access to health facilities.

however, it takes nearly 6–8 h to reach there due to the poor condition of the roads, especially during the rainy season (Figure 1). Accessibility is further complicated due to the high costs expected by local private transport agencies in the absence of a functional public transport system. Around 80% of the population is engaged primarily in agricultural activities (15). In 2016, the district reported that 41% of the mothers delivered in health centers, and only 13% of pregnant women received the recommended ≥4 antenatal care (ANC) checkups in a facility (16). In 2018, the government reported four stillbirths, nine infant deaths, and zero maternal deaths during the same period (17). Of the four primary health centers (PHC) and one Health sub-centre (HSC) located in the Tening block, only one PHC is fully functional as a delivery point. The structure of the Indian public health system has been described in detail elsewhere (18). Obstetric and neonatal emergencies are referred to the District hospital located in the adjacent block, but due to the lack of facilities to manage complications, they are further referred to tertiary centers located in Dimapur city (Figure 1).

Study design

A mixed-methods approach with a concurrent triangulation design was used to capture qualitative and quantitative maternal and newborn health information from the participants residing in the study villages. Three villages from the block were selected after a pilot visit based on the presence and functionality of a PHC in the village. Village 1 did not have a health facility inside the village and the closest functional delivery point is the PHC is located in Village 2. Village 2, has a fully operational PHC in the village and also caters to the entire block. Village 3 was the furthermost village; although there was a physical structure the PHC was not-operational (Figure 1).

Conceptual framework

We explored the HSB of the tribe from a holistic and community-centered perspective based on a theoretical framework that assumes that perceptions are subjective and thus guided by social actions, which can be constructed or deconstructed individually and socially, with an emphasis on the effect of social interactions, relations, and language conventions. This study considered pregnancy and childbirth as social and cultural events guided by different nested norms in a pluralistic medical system. The socio-ecological model (SEM) explored cultural beliefs and practices influencing the decision-making process and perceptions of the provided services. The SEM offers a multi-level approach to understanding the interaction and interdependence of the individual, interpersonal, organizational, community, and public policy levels (19). Furthermore, it includes the

individual's perceptions, cultural beliefs, and knowledge about the issue under investigation. At the organizational level, the model seeks to interpret the reciprocal causation between people's considerations about the access and utilization of these services in the given environmental circumstances to explore possible barriers that are perceived to influence community and individual behaviors (19). To describe the barriers that might affect access and utilization of maternal and newborn healthcare services and the process of seeking them, we constructed a conceptual framework based on the *three delays model* (20). We adapted the model, which originally addressed the factors that affect obstetric complications and explored the *delays* in access to ANC, perinatal care services, postnatal care (PNC), and neonatal care while considering relevant factors that influence maternal and newborn mortality and morbidity. The first and second delays: (1) delay in the decision to seek care, and (2) delay in arrival to the facility, were especially emphasized (20). For the perceptions of the tribe regarding the government's services, the third delay offered a suitable framework: (3) delay in the provision of adequate care (20).

Data collection

Qualitative data was collected through focus group discussions (FGDs) and in-depth interviews (IDIs) conducted between March 23 – April 19, 2019. To *triangulate sources* and consider the cultural context in which the study was developed, we selected participants all above 18 years of age from five different groups of the Liangmai tribe: (1) women of childbearing age, (2) male relatives/partners of women of childbearing age, (3) traditional birth attendants (TBA), (4) or ASHAs/ community health workers (CHWs) who are currently residing in each village, and (5) health managers or health professionals at the government health facilities. The cross-lingual IDIs and FGDs were conducted in groups of 5–6 participants and were facilitated by a bilingual moderator.

The *quantitative* part comprised information from an extensive district-level community-based cross-sectional survey studying the influence of geographical variation on maternal and child health events conducted between November 2018 and December 2019 from 70 villages in the Peren district. In brief, all mothers who delivered in the last 2 years, regardless of the outcome and residing in the study villages, were approached to participate in the in-person interviews. After obtaining the informed consent, the trained field interviewers administered a questionnaire to collect the antenatal, intranatal, and postnatal details from the mother. Details of the child were also collected while corroborating the information provided using the "mother and child tracking card" provided by the government to all mothers, when available. Waypoints of the mother's house and routes to the nearest health facility were mapped. For this study, the data from the 3 study villages using a subset of relevant questions were extracted to analyze and corroborate with the findings from the *qualitative* component. The aim of the quantitative part was to describe the scenario rather than testing a certain scientific hypothesis; hence, we waived a sample size calculation and instead used data from the full study population (all mothers who delivered in the last 2 years) to get more precise estimates. Data from the community-based survey: Thirteen pertinent questions from the cross-sectional survey (demographic details, obstetric history, antenatal care, pregnancy outcome, healthcare workers visits, details of the delivery, and transportation) were selected to corroborate with the qualitative demographic questionnaire, the FGD, and the IDI guides.

Data collection tools

The qualitative data collection tools included semi-structured cross-lingual FGDs and IDIs, adapted to the different target groups and supported by participant observation. In the FGDs, *free listing* and *pile sorting* techniques were applied to identify which health conditions people were seeking healthcare services for and to prioritize the intensity or severity of their thoughts. This was used to systematically identify robust group schemes and shared knowledge, beliefs, and perceptions. IDIs explored the individuals' perceptions, experiences, knowledge, beliefs, practices, and behaviors. The questions were also meant to guide the participants to reflect and perceive themselves as community members and to understand the individual and their families within the structure of the macro system. In this cultural setting, we arranged the groups by sex and similar ages to understand their perspectives, obtain information about the social norms, group behaviors, hierarchies, power relations, degree of consensus, and demonstrate group emotional processes.

Additionally, we wanted to understand the group's influence on an individual and how or in what ways it influences individuals. To facilitate communication with the community, a trained research assistant operated as a bilingual moderator and interviewer in the FGDs/IDIs, and also as an interpreter and translator in the informal conversations with key informants. The principal researcher trained the research assistant before the study on qualitative methods, tools, ethical considerations for research, social determinants of health, and basic concepts of maternal and newborn health. A problem tree analysis was performed to contextualize the problem and study hypothesis. A document with key terms was formulated during the training to guide the interviewer in obtaining answers from the participants.

Semi-structured interview guides were developed for the interviews to avoid potential personal bias. The principal researcher was a passive observer, taking notes of the body language of the participants and occasionally assisting the interviewer. IDIs were used to explore the perceptions, experiences, knowledge, beliefs, practices, and behaviors of the participants. The IDI guides were selected as an appropriate tool to ensure consistency during the interviews and facilitate the analysis process, tailored for each sub-group. FGD as a qualitative tool was chosen understand the perceptions of the group in its social setting and collecting several perspectives on the topic. FGDs helped to obtain information about the social norms, group behaviors, hierarchies, power relations, degree of consensus, and demonstration of group emotional processes. The FGD and IDI guides, the information-sheet, and informed consent forms (for the FGD, IDI, demographic questionnaire, and photograph use) were developed in English and were translated into Nagamese and Liangmai. The FGDs and IDIs were primarily conducted in the local language (Liangmai and Nagamese). No FGD participants were interviewed in the IDIs.

The quantitative data from the survey were collected by a trained interviewer using a mobile-based, semi-structured, translated, pilot-tested questionnaire. The pilot questionnaire was administered in the

local language to 12 tribal mothers who had delivered in the last 2 years residing in a non-study village in the adjacent district. When the study commenced, the field interviewer approached a mother and invited her to participate after providing an information sheet printed in the local language. If the mother could not read, the field interviewer was instructed to read it out in the local language. Any queries regarding the study were discussed before obtaining the informed consent sheet if she decided to participate.

Data analysis

Four of the 26 audio-recorded sessions were transcribed verbatim into Liangmai and then translated to English, while the rest were translated directly into English. Additional revisions of the translations were done in collaboration with an external Liangmai native speaker, assuring confidentiality. The study used a combination of both deductive and inductive approaches to coding. The English transcripts were coded *a priori* according to specific content priority analysis. Two coding approaches were used: *concept-driven* and *data-driven coding*; then, the data were analyzed using NVivo 12 Pro [QSR International Pty Ltd., (2018) NVivo (Version 12)]. The codes used were related to the conceptual framework, guiding principles of the study, and social determinants of health. The codes were related to the adapted Three Delays Model in order to describe the barriers that might affect the access and utilization of maternal and newborn healthcare services and the process of seeking them. A special emphasis was put on the first and second delays: (1) delay in the decision to seek care; (2) delay in arrival to the facility. For perceptions of the tribe regarding the government's services, the third delay; and (3) delay in providing adequate care offered the suitable framework. This was combined with the SEM, because it offered a multiple-level approach to understanding the interaction and interdependence of the individual, interpersonal, organizational, community, and public policy levels.

Emphasis was placed on cultural determinants, barriers to accessing or utilizing healthcare services, motivational determinants, decision-making processes, and linkages between Traditional Medicine (TM) and government healthcare services, human, and interpersonal relationships A qualitative multilevel data analysis approach was applied, complementing it with an analysis of the observation notes and the free-listing and pile sorting techniques conducted in FGDs. We described the characteristics of the FGDs and IDIs participants, using frequencies for age, marital status, education, and occupation, stratified by gender.

Quantitative data: The frequencies for categories of all survey variables were calculated. Additionally, simple descriptive statistics with fisher's exact test were used to investigate if there were significant differences in each demographic variable between the study villages. The significance level alpha was set at 5%.

To adjust for potential confounders, variables from the univariable analysis were chosen for a multivariable logistic regression model in (i) a full model and (ii) a model with backward selection to study the factors associated with home delivery, using SPSS 21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). The outcome variable was the place of delivery. The backward selection started with all variables included except for marital status (only one unmarried person), the person responsible for the delivery (directly related to the outcome variable), and fully immunized children (immunization was beyond the time point of delivery). The final model consisted of only the villages.

Ethics approval statement

The ethical approval was obtained from the Ethics Committee of the Medical Faculty, the Ruprecht Karls University of Heidelberg, Germany (#S-138/2019, 13.03.2019), and from the Institutional Review Board (Research and Ethics Committee) of the Christian Institute of Health Sciences and Research, Nagaland, India for the qualitative component and the quantitative data from the cross-sectional survey from the "Project on the use of Geographic Information Systems in Health Systems Research in Rural Areas of Nagaland". Approved data collection tools were translated into Nagamese and Liangmai languages and submitted to the Institutional Review Board of the Christian Institute of Health Sciences and Research. Written informed consent was obtained from all participants.

Results

A total of 57 community members participated in the seven FGDs (four FGDs with women of childbearing age and three FGDs with male relatives/partners) and 19 IDIs (five with women of childbearing age, four with male partners or relatives of women of childbearing age, four with the ASHAs, four with TBAs and traditional healers, and two with health professionals). Responses from interviews with 109 mothers residing in the 3 study villages were included in the cross-sectional survey.

Characteristics of the survey participants

Of the 109 women who participated in the cross-sectional survey, most (73.4%) were 20 to 29 years of age, with a mean age of 27 years, and married. The majority (46.8%) of the mothers had completed up to middle school education, while 21.1% had completed only up to primary education, and 5.5% were graduates or held higher educational degrees. Most (45.9%) mothers were housewives and farmers (41.3%), but this differed between the three villages ($p < 0.01$) as farming was the preferred vocation in villages 1 and 3 (Supplementary Table S1).

Characteristics of the FGD and IDI participants

The demographic information collected from the female participants in the FGDs and IDIs portrayed a similar picture. Most 80.0% ($n = 28$) of the women were currently married, 63.6% of them had completed only up to primary education, 6% held a university degree, and the majority of them were housewives (20%) and farmers (34%). Most (76.2%, $n = 16$) participating males were married, 20.0% had university or higher degrees, and 52.9% worked as farmers (Supplementary Table S2).

Obstetric details

The cross-sectional survey revealed that 56.0% (61/109) of the mothers had experienced 2–4 pregnancies, while 22.0% (24/109) had up to five or more pregnancies. Only 3.7% (4/109) had completed atleast the four recommended ANC check-ups, and 11.9% (13/109) of the mothers did not receive even one ANC check-up. Around 14.7% (13/109) of the mothers received just one, while most (69.7%, 76/109) received at least 2–3 check-ups in a health facility. The proportion of mothers receiving nil or just one ANC check-up was higher in the village with no health center (village 1) compared to the other two. The difference in proportions between the three villages was statistically significant ($p < 0.01$). Some (11%, 9/109) mothers reported at least one spontaneous abortion, and 14.7% (16/109) reported 1–2 newborn or infant deaths in the near past. The majority (40.4%, 44/109) of mothers delivered at home, while 41.3% (45/109) at the local PHC located inside the block, 13.8% (15/109) at a public health facility located outside the block, and 4.6% (5/109) in private facilities outside the block. Most (50%) mothers residing in the village with a functional delivery point (village 2) preferred to deliver in a facility hence the proportion of home deliveries was the lowest (22.6%) of the three. Though village 1 did not have a health facility located in the village, many mothers (41.3%) chose to deliver at the closest local PHC located in village 2 (Figure 1). However, 73.9% of the mothers residing in the furthermost village with a non-operational health center (village 3) delivered at home, while only 17.4% of the mothers delivered in a facility that was located 2–3 h away because the delivery point the village was mostly nonfunctional (Figure 2). A statistically significant difference was noticed in the place of delivery between the three villages ($p < 0.01$). The majority of the deliveries were attended to by a nurse (64.2%), and the rest were attended to by relatives (22.9%), ASHAs (10.1%), TBAs (0.9%), and only 1.8% by a doctor. Most (83.9%) women residing in the village with a functional delivery point informed that nurses conducted the deliveries. In comparison, only 41.7% of women from the village with no health center (Village 1) reported the same. The difference in the person responsible for the deliveries between the three villages was statistically significant ($p < 0.01$; Supplementary Table S1). Most women (61.3%, 19/31) who chose to deliver in the functional health facility inside their village (Village 2) walked to the delivery point. At the same time, the majority (54.5%, 12/22) who decided to deliver in health facilities outside the block hired a local taxi, and one respondent reported using an ambulance. The multivariable logistic regression model using backward selection revealed that mothers residing in Village 1-without a health center [adjusted odds ratio (aOR), 4.1, 95% CI, 1.5–11.0] and especially Village 3-with a non-operational health center (aOR,9.7, 95%CI, 3.2–29.3) were more likely to deliver at home (Supplementary Table S3).

Beliefs, practices, behaviors, and perceptions influencing health-seeking behavior

The SEM was adapted to understand the factors influencing decision-making that affect individual HSBs and their perceptions regarding healthcare facilities. They are subdivided according to the order of influence into three levels.

The intrapersonal and interpersonal level

This level had the most decisive influence on an individual's perceptions and HSB, as illustrated in Figure 2. The qualitative component identified socio-economic status, education, low self-esteem, shyness, fear, traditions, home remedy/TM practices, and religion immensely influence the individual's HSB. Most participants stated they could not access healthcare services, including preventive health and medicines, due to the lack of money and their own-self denomination as "poor" (Table 1). The gender disparity in educational levels may also influence decision-making (40% of men with university education compared to 6% of women). The interviewed women showed low confidence and self-esteem; most indicated anxieties, suffering, pain, and fear of pregnancy, especially childbirth (Table 1). These were guided by the idea of dying or watching a partner die during delivery. According to the TBAs, most women in this community expressed 'shyness' when deciding on or visiting health facilities. Health professionals also corroborated that most women were shy and reluctant to be treated by a male doctor, compelling them to seek care from female nurses.

Traditions, myths, religion, and perceptions about biomedical services and TM influence the tribe's HSB. Most participants expressed that their forefathers believed pregnancy and childbirth could endanger the mother's life (Table 1). They also reluctantly spoke about the myths surrounding the practices of a primordial religious minority community. The latter was associated with black magic and witchcraft, which contradicts their strong faith in Christianity for healing, as evident through the discussions (Table 1). All participants responded that praying and their belief in God will resolve their health issues, indicating that most healing practices, either traditional or biomedical, are accompanied by individual or group praying sessions. Some participants believe that praying protects the baby from "abnormalities". Strong religious beliefs were also observed in the responses from TBAs, ASHAs, and traditional healers as well. The latter believe their healing is a gift from God and is also achieved through the individual's faith.

Most participants stated they would access a healthcare facility only when "feeling sick" or when there was a complication or emergency, such as when the woman is "unable to deliver at home". Participants expressed mixed feelings regarding biomedical services and TM; while some felt health centers were unsafe since appropriate care may not be provided, others thought the TM healers were not trained and thus opted out (Table 2). TM, home remedies, services of the ASHA, and self-medication practices were preferred over accessing biomedical services or even faith-based organizations for their health needs, as illustrated in Figure 3.

Gender roles and the extended family played an essential role in influencing HSB.

During pregnancy, there is a strong tendency for women to depend on their male partners, assuming that it is the husband's responsibility to take care of the woman. Most male participants considered themselves responsible for the delivery as the head of the family (Table 1). However, the health professionals stated that it's uncommon to see the partners accompanying their wives during the ANC visits. Most husbands admitted to participating in the home delivery by assisting with the birth, cutting the umbilical cord, or burying the placenta. Although the husband's participation is limited in institutional deliveries mainly due to restrictions imposed in the

health facility, they were responsible for facilitating the transportation, communication, and financial arrangements. Extended family (mothers, fathers, grandparents, and in-laws of the mother) also participated during childbirth. Home delivery was a common practice among the elders, and there is a strong belief among the participants that since elders are knowledgeable and experienced, their advice should be followed (Table 1). During home delivery, the family members were summoned to primarily attend to the delivery, take care of the newborn, do the household chores, or occasionally for financial support.

The community level

This level moderately influenced the tribe's HSB, as illustrated in Figure 2. The FGDs identified key community-level actors who influence HSB, such as the ASHAs (CHWs), faith-based organizations (FBO), local health committees, and village councils. The ASHAs were

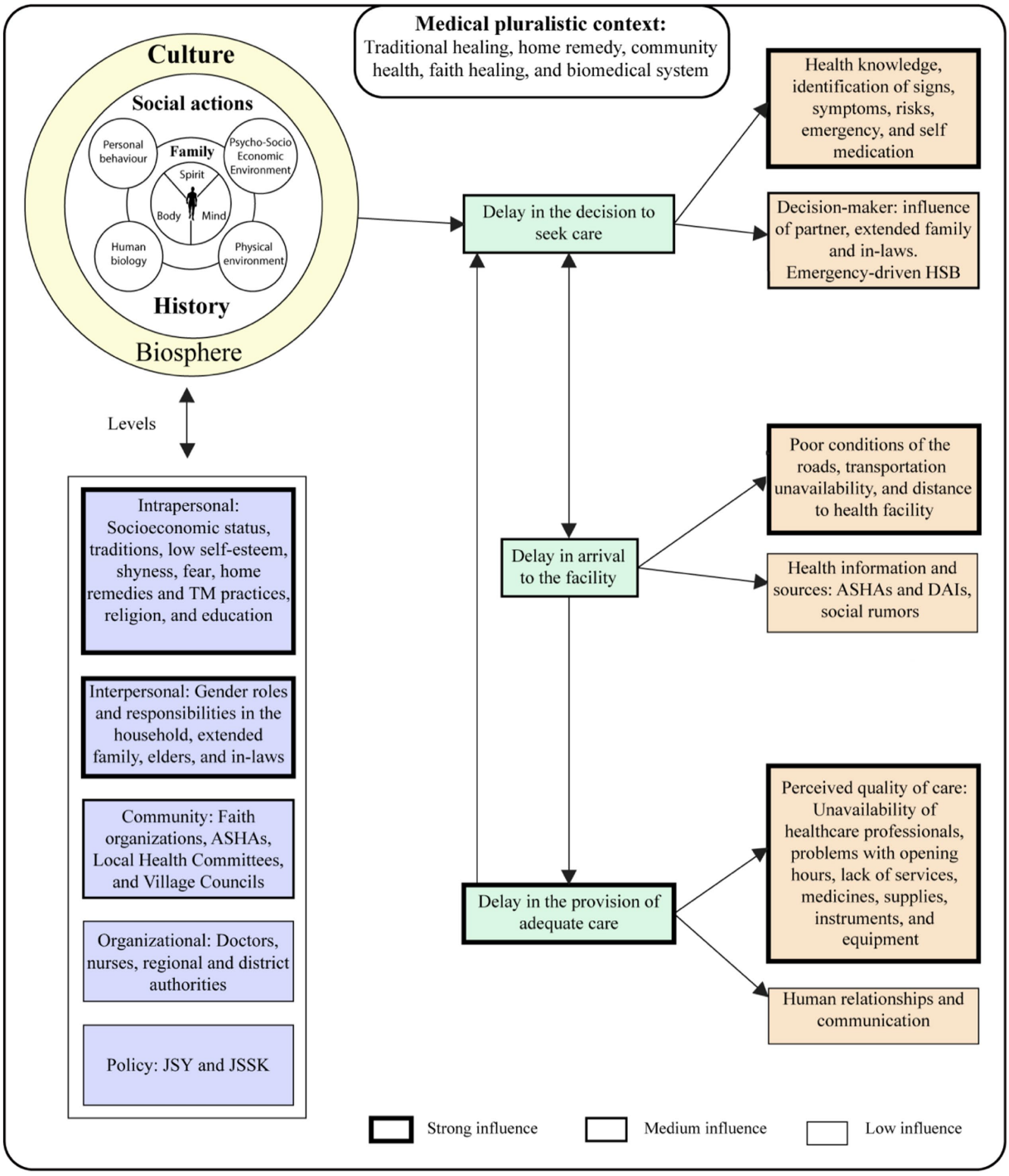


FIGURE 2
Main determinants and their level of influence regarding the SEM and the adapted-three delays model.

TABLE 1 Highlights from the focus group discussions and in-depth interviews included in the socio-ecological model.

Level on the socio-ecological model	Factors	Quotes
The intrapersonal and interpersonal level	Socioeconomic status	*"While pregnant and to take her, the biggest obstacle would be money. If there is no money how do we take? Many want to go but if there is no money, how can we? That's the biggest difficulty we face in village. Those who have, they can, but those who do not then that's the problem and that's how they do not take them and deliver at home."- Liangmai man, 38 years old*
	Sense of confidence and self-esteem	*"Me, I am not clever, and we are nothing right?" – Liangmai woman, 35 years old*
	Fear of the individual and the community	*"So, for women, giving birth is the toughest thing. It is like sitting on the edge of the cemetery." – Liangmai woman, 27 years old*
	Traditions and myths	*"My grandmother always said: you should not go anywhere, and you do this and that ok? (…) When we are pregnant our stomach should be properly hidden. Our stomach should not be open. That is the advice of the elders which we know, from our experience. Means, they say that bad things are seen through it. When we get pregnant our stomach should be covered very nicely and should not be allowed to be seen." – Young Liangmai pregnant woman*
		"Giving birth is a battle of life, during delivering whether a woman will live or die. Before our forefathers left us with this saying. A pregnant or women after deliveries should be taken good care because they fight for their lives and whether they live or die they do not know." – Liangmai male partner, 38 years old
	Religion and trust kinships	*"Because when we go to doctors and they cannot do, we ask God for the help and His direction. Because God knows everything. So, God shows the direction on how to go and do." – Liangmai woman, 28 years old*
		"More than doctors. I trust God more. Prayers." – Liangmai woman, 31 years old
	Family and spouse	*"If a woman is getting a baby, then the full responsibility should be on the father, a husband should take care of everything." – Liangmai husband, 30 years old*
	Perception of biomedical services	*"So we will go to the hospital… that's the last resource or else no other way." – Liangmai man, 24 years old*
	Role of family as sources of knowledge	*"We get advice from the elder people. Like from my mom and dad. What's the best thing(s) that we should do? Like for our health issues. They will just give us the advice: "Do like that." And then we will go" – Liangmai man, 30 years old*
The community, organizational, and policy level	Community health workers	*"When pregnant, our families, husbands also, or brothers-sister… suppose, to me, I should not go alone. ASHA is there, colony's ASHA is there. ASHA takes you and will take you (referring to the health facility)" – Liangmai woman, 35 years old*
	Faith based organizations	*"We, after birth do not have anything to do…We take it to the church, we do this only" – Liangmai woman, 37 years old*
	Public health strategies	*"In our report, we write for more hospital deliveries. Home delivery is more, but because the women wants to get the money, because we they are told to give birth in the PHC. It is difficult for us to take them also. So, even if the delivery is at home we write as delivery in the hospital. We lie because they will not get money, right? The JSY and all." – ASHA, 41 years old*
	Health professionals perspective	*"We do not have proper light also, we do not have electricity, we do not have mobile network also, we are facing problems" – Doctor*

TABLE 2 Perceptions toward biomedical services and traditional medicine.

Biomedical services		Interrelated	Traditional medicine	
Positive perceptions	Negative perceptions		Positive perceptions	Negative perceptions
"The health staff and nurses all take good care (.) they are all from our village. Even the doctor is from our own Liangmai tribe. I can communicate well and share all my problems in my own language, which is very good" – Liangmai woman, 26 years old	*"We go to hospital ok, some they are wrongly treated, some they die, there are some like that. Go to hospital, wrong medicine is injected." – Liangmai woman, 27 years old*	*"So, what doctors are not able to treat, I treat it. And what I cannot treat, doctors treat (…) Doctor's medicines are also good and I believe that it should be used" – Liangmai male traditional healer, 65 years old*	*"How will I know if people trust me, I cannot say it is because I'm like this and that, that is why. But they only believe that by coming here they will be treated and healed" – Liangmai traditional healer, 65 years old*	*"So, for that it will be good if we are seen from the hospitals by the doctors because kobiraj (traditional healer) they have not studied nor are they trained. That's why, going to the doctors, we feel safe and better" – Liangmai woman, 35 years old*

the most influential since most participants referred positively to them. Women considered them as a source of information, advice, emotional and economic support, and primary healthcare providers in their village (Table 1). Some highlighted their importance, as doctors or nurses are usually unavailable in the village. However, most ASHAs and TBAs stated that they were hesitant to help the parturient

10.3389/fpubh.2023.1139334

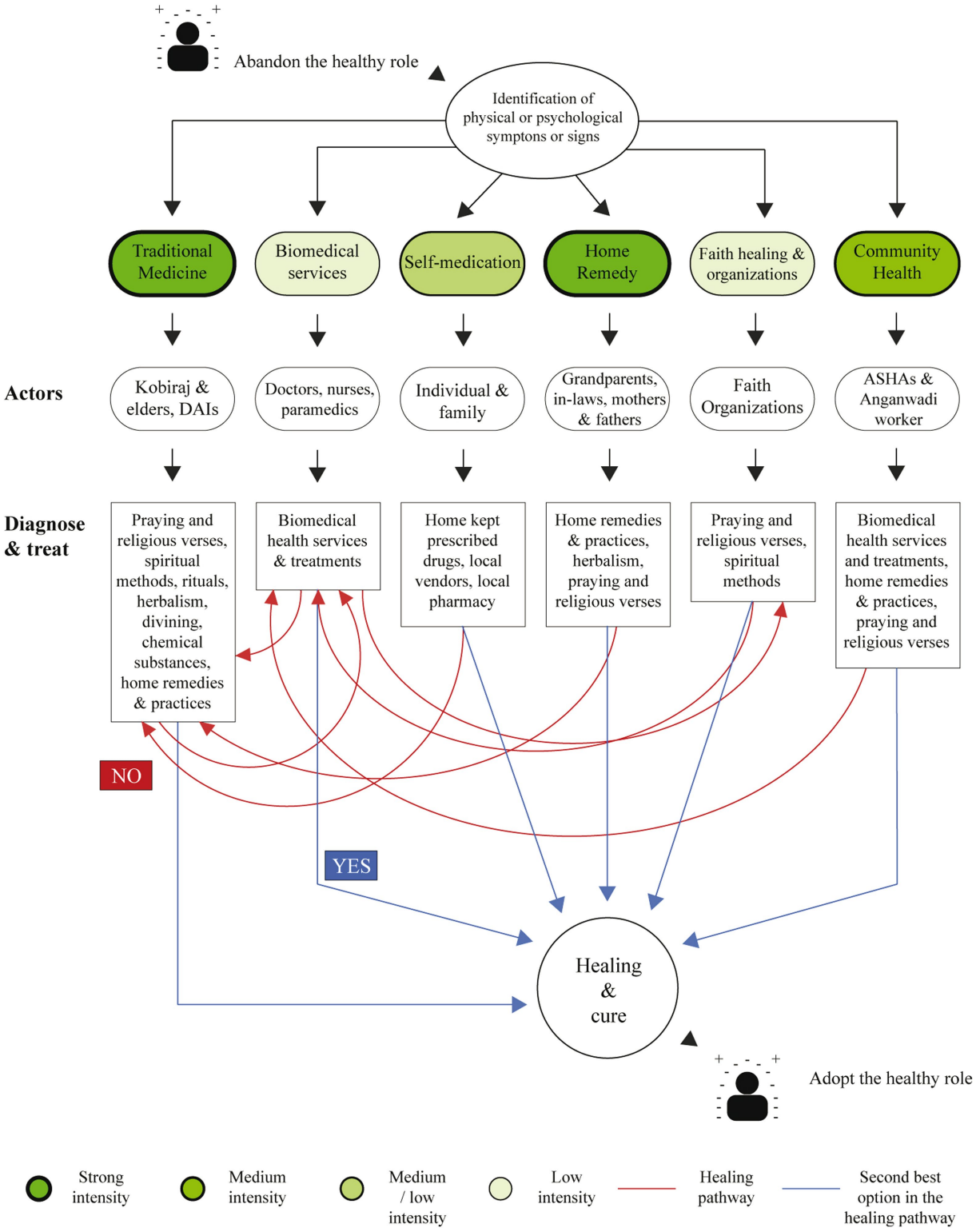


FIGURE 3
Health-seeking behavior and preferences of the tribe for maternal and newborn health services.

with home deliveries, especially if the woman is experiencing a "*bad delivery*" (obstetric complications), since they perceive themselves as insufficiently trained to manage complications confidently. They also expressed difficulties in recognizing neonatal conditions.

The IDIs noted that some interviewees were mildly influenced by faith-based organizations, as they are perceived as sources of salvation and healing (Table 1). A few participants even admitted giving birth in prayer centers near their homes. We observed that prior permission

from the local church authorities is a prerequisite for conducting any community activity. Almost everyone referred to church leaders with reverence and obedience. Few interviewees regarded Village Health Committees (VHC) and village councils as sources of information but were perceived hierarchically.

The organizational and policy level

This level was noted to have the most negligible influence on HSB. At the organizational level, health professionals perceived that their services were underutilized because of the lack of awareness, social mobilization, and proper health facilities; however, they reported no official complaints from the community (Table 1). There was a general lack of awareness of health policies at the policy level, and only a few interviewees referred to the JSSK and JSY programs. The majority of ASHAs reported insufficient and inconsistent payments of the monetary incentives, often paying from their own pockets to cover costs incurred while accompanying the patient. Most interviewees reported attempting to go to the health facility even if the distance was considered a challenge. According to one ASHA, even with the monetary benefits of the JSSK scheme, the mother would need to use additional money to cover travel costs since the villages are far away from the delivery points.

An ASHA also confided in having to confabulate data for the community members to benefit from the financial incentives (Table 1). Most of them were reluctant to promote the schemes since it failed to cover basic expenses.

Barriers to accessing and utilizing maternal and newborn health services

According to our adapted-three delays model, the most decisive influence was found on the third delay related to the provision of adequate care, which had a negative effect on the first delay associated with the decision to seek healthcare. Consequently, the second delay regarding the arrival at the health facility appeared to be the one with the lowest influence. The results of this model have been summarized and illustrated in Figure 2.

Delay in the provision of adequate care

The most relevant factor deterring access to health services is the perceived deficient quality of care in health centers. The limited availability of healthcare professionals, low quality of services/medicines, and irregular facility opening hours were key factors influencing this domain. A typical response noted was that staff are often absent in the facilities. Some interviewees mentioned that the health centers are closed on most days and only functional for a few hours when opened. Respondents also wished the centers were open to conducting deliveries at night (Table 3). The majority perceived that the health centers' facilities were inadequate as there was a dearth of instruments, supplies, medicines, and equipment. The shortage of essential drugs and supplies in the health centers was corroborated by a doctor, too (Table 3). However, most participants and doctors agreed that vaccines were always available for newborns and mothers.

Delay in the decision to seek care

In this domain, we identified the key factors that influence the decision of a mother to seek healthcare facilities. Most participants preferred home delivery if it was considered an "easy delivery" since it is deemed a familiar and comfortable environment to deliver in (Table 4). Conversely, they perceived complicated obstetric emergencies necessitated an institutional delivery as it is best managed in a health center and may be unsafe at home (Table 4). Specific uncommon or alarming symptoms like retained placenta, non-progress in labor, vaginal bleeding, mal presentations, large abdomen, and swelling triggered the individual or the family to visit healthcare facilities. Newborns were only taken to a health center in case of incessant crying, seizures, jaundice, and any suspected gastrointestinal or respiratory tract infection. A few women and men opted for ANC services offered in health centers, while only some respondents elucidated to seeking postpartum services in health facilities, as homecare was predominantly favored. They perceive visiting a health facility related to sickness, complications, and emergencies and prefer seeking TM first (Table 4). Few women informed that they adopt a vertical position during labor and deliver the baby by kneeling, contrary to what is done in health facilities (Table 4).

For most women, TM was the preferred option for primary healthcare due to their availability and since their beliefs and relationships; are assumed to be spiritual or religious. ASHAs, TBAs, and traditional healers informed that they also refer patients to the health centers if they cannot manage an obstetric complication (Table 3). Notably, the TM actors positively perceived the skills of health professionals and considered them "experts" (Table 3). However, health professionals were unfamiliar with TM practices and thus felt disconnected from the TM healers.

Some women indicated that they self-medicate using biomedical medicines on themselves or their babies to avoid visiting a facility. Most interviewees mentioned that they procure the drugs from informal local pharmacies, the local hospital, ASHAs, or local taxi delivery from other villages and stock them at home. Due to the lack of available pediatric preparations, a woman described manually pulverizing tablets and diluting them with hot water to give them to the baby. Women agreed that the husband is the decision-maker and his permission regarding health decisions is essential; however, this was not stated as a rule (Table 3).

Delay in arrival at the facility

Three significant factors were identified under this domain: transportation and roads, distance to the health facility, and health information and sources (Table 3). The dilapidated condition of the roads appeared to be the most influential factor, as the majority of respondents, specifically men, mentioned challenges in arranging a vehicle to transport patients due to bad roads. Some preferred to travel by foot, and some had either experienced or heard about women delivering on the way. The price quoted by private transportation agencies was often higher than the average costs, especially after dark, increasing the OOP expenditure incurred due to the lack of alternatives like ambulance services or public transportation. An ASHA disclosed that the incentive received to cover transportation costs in the JSSK scheme did not suffice in these circumstances.

The female participants informed that the ASHA was the primary source for information on the services provided in the health centers and health in general. Few respondents indicated receiving information from nurses and doctors, while others received it from the TBAs. A general sense of lack of awareness in their tribe compared to other tribes was conveyed (Table 3).

TABLE 3 Highlights from the focus group discussions and in-depth interviews included in the adapted three-delays model.

Delays	Factors and determinants	Quote
Delay in the provision of adequate care	Services and treatment availability	*"In hospital going and giving birth, our hospital is nothing right? For operations, also no instruments right? For that, operation case comes out, or birth, cannot be normal, like that suffers, for nurses and doctors becomes difficult." – Liangmai woman, 35 years old*
	Availability of health professionals	*"We are told to go and deliver in the hospitals right? And some they do too when the doctor is present but most of the time they are not present. That's why since the hospital is here so if the things are complete and everything is done from here then the death also will not be there. Because of the poor facility and improper functioning of it, even the patient's illness is prolonged right? That's why I want everything to be there." – Liangmai woman, 43 years old*
	Quality of the services	*"That is the reason the patients are not coming more. This is also the reason, because in here there are no medical facilities, so we better go outside, sometimes the people used to think like that. So it is not only here, but it is all over Nagaland" – Health professional*
	Opening hours	*"We give birth at home but by nurses… always even though the birth was not from hospital, because the hospital does not open all the time… even if we think of going to the hospital and give birth, it is not open." – Liangmai woman, 36 years old*
Delay in the decision to seek care	Identification of risks and symptoms	*"When it's time for delivery and blood comes out, while giving birth, the blood drops. When we get pregnant-heavy, in pregnancy then the baby starts moving. But if the baby does not move then it is to be worried." – ASHA, 37 years old*
	Health knowledge and self-medication	*"My experience is that some (referring to babies) they have stomach pain and continue crying, so we give Gripes juice ok? If something happens then we take them to hospital also ok? Or if they get jaundice we worry and take to hospital." – Liangmai husband, 42 years old*
	Decision-making process and preferences	*"But we do not go to the hospital direct, people this side goes to the kobiraj (traditional healer) first. So the kobiraj is first approached." – Liangmai woman, 31 years old*
		"So, me if I check and see that it will be hard for me to do, then I send them to the hospital" – Liangmai male traditional healer, 65 years old
		"I send them because it is always better to be taken care by someone who knows and have studied right?" – Liangmai female TBA, 58 years old
	Decision-maker	*"Afterall, the head of the family is me. I should take decisions. So in Zeliangrong or Naga's context, the head of the family is the man, so decision maker is to be the man only" – Male Liangmai teacher, 38 years old*
Delay in arrival to the facility	Transportation and roads	*"So, roads you just see, from here if you go to (X), it would take around 3 h only, but really it is taking 6 h. So, in 3 h that would save a patient's life" – Health professional*
	Distance to the health facility	*"In here (X), it is a walkable distance though it is long. But in (X) if we go once. We are ready only for delivery. We cannot come back because it takes a day or so. It is that to travel so far. So, for me and my wife, we do not go to (X) for normal checking" – Liangmai man, 50 years old*
	Health information and sources	*"Other tribes…they have crossed the awareness level now. But, in our level… are still in the awareness. If there is no awareness… everything will be bad" – Liangmai man, Social worker*

TABLE 4 Perceptions toward home delivery and institutional delivery.

Home delivery		Institutional delivery	
Positive perceptions	Negative perceptions	Positive perceptions	Negative perceptions
"So delivery and delivering at home is the best place. And then the safest place. No hesitation. No new person, no new environment, no new things. So that is the best thing (…) We have many positive things in delivering at home, as I said home is the safest place for the mother, they are really comfortable, they are really acquainted with the things" – Liangmai church worker, 50 years old	*"Delivering at home, I feel is very dangerous (…) and after torturing your body enough only then give birth, so instead of facing these problems, it is better to go to the hospitals and deliver from there (…) then in hospital, we feel free, no worries. At home it is risky" – Liangmai woman, 38 years old*	*"If we give birth in the hospital it will be good, that's what I feel because when my children died, that way, I think that might have been while cutting the umbilical cord something went wrong or what. So, it will be better when someone who knows takes care of us, and our children's life will also be saved" – TBA, 58 years old*	*"Delivery in the hospital, they say: they lay down and deliver but for me I can 't deliver by laying down. Those who deliver by laying down their children is good ok? But it is difficult for us. I also feel that laying down and delivering will be difficult, at home I kneel and deliver." – Liangmai woman, 24 years old*

We visited three health centers located in and around our study villages to corroborate the findings from the IDIs and FGDs. One was open, had an ambulance, and implemented a functional newborn care corner in the labor room. Multiple educational posters and signs of maternal and newborn health were available, informing about immunizations, ANC, PNC, clean delivery practices, governmental

incentives like JSY and JSSK, family planning, breastfeeding, malaria and HIV awareness, newborn resuscitation, and the ASHA program. However, almost all the information was presented in English, not in Liangmai. The other facility we visited was sub-optimally functional, with non-availability of running water, improper biohazardous waste disposal, fluctuant electricity, and a lack of modern medical equipment. Some medicines were expired, and others were not properly stored. Supplies seemed to be lacking in the delivery room too. No patient was in the out-patient or in-patient ward during the observation. One visited facility was closed and not functional apparently for a long time.

Discussion

In this concurrent mixed-methods study, we studied the HSB of the mothers and women from the Liangmai tribe and the factors that influence them. To our knowledge, this is the first study to be conducted in this region concerning this topic. The maternal HSB exhibited by this community was influenced by several social, economic, cultural, geographic, and political factors that were closely interlinked.

We identified that the interpersonal and intrapersonal factors significantly influenced the HSB of this tribe. As their perception of risk was low, the tribe has an emergency-driven health-seeking behavior only with evident physical signs of danger. Thus, there is a low preventive-driven health-seeking behavior for ANC and PNC (21). This explains why only 4% of women reported four routine antenatal visits and 41% delivered at home. Functional health centers were better utilized for deliveries by locals living in that village than the villages with no or non-functional health centers. Another dominant reason for low healthcare facility utilization was that community members physically accessed biomedical services only when they perceived severe sickness, complications, or an emergency. It was sought secondary to failure of primary treatment with TM, home remedy, or self-medication. Similar findings were reported in a study of the socio-cultural and service delivery dimensions of maternal mortality in central India (22).

Since pregnancy for this tribe is a normal process and primarily not associated with a disease or a health problem, the decision to visit a health facility is often limited in childbirth, which is additionally determined by obstetric emergencies or in moments of fear. A similar emergency-driven HSB for newborn conditions was observed, except for seeking preventive health associated with receiving immunizations, perhaps because vaccines were most often available in the health centers. This protective behavior can be leveraged as an entry point for mothers and babies to access other health services. Since access to a health center is challenging in this arduous terrain and preventive health is not a priority to this community. Routine preventive antenatal, postnatal, and immunization services could alternatively be delivered monthly by a mobile medical unit linked with the health center allocated for that area in collaboration with the ASHAs as implemented successfully in other Indian states like Tamil Nadu (23).

Previous cases of death of the mother or newborn during childbirth influenced the HSB of the individuals, especially since infant mortality and spontaneous abortions were commonly reported and complemented by the survey results. This contradicts the governmental statistics, where only four stillbirths were reported in the district from 2018 to 19 (17). Any health event occurring in a healthcare facility is more likely to be captured formally by the health information system, but since access to these facilities is limited in remote tribal areas, deaths, and events occurring in these villages are likely to be missed. A national-level survey in India revealed that out of 10,109 scheduled tribe women, 44% reported difficulties accessing healthcare services because of the distance to the health facility and 42% due to inadequate transportation options (24). The results from the multivariable logistic regression analysis also supported this by suggesting that mothers residing in the villages without a health center or one that was not operational were more likely to deliver at home, suggesting that challenges in access may influence the decision to deliver at home.

Traditions and practices handed down from generation to generation influenced the current behavior of the tribe, which still firmly believes in faith healing. This belief is reinforced since TM healers are always locally available, accessible, and conforming to their religious beliefs. Therefore, culture determines the perceptions of the individual and the community regarding their definition of health and well-being (25). This also influences or shapes their sense of coherence, initiating or stopping the individual on the health-ease-disease continuum. In a medical pluralistic system, the Liangmais are struggling between traditional practices and the biomedical health system representing a mixed, interrelated, interdependent, and in a way, competing structure.

From a non-cognitive perspective, the individual's socioeconomic status influences their decision to seek healthcare services, as highlighted by other studies conducted in Bangladesh and Africa (26–29). The direct and indirect costs incurred to access public services are strongly associated with considerable personal expenditure since the services are not perceived as free. Therefore, they chose to stick to their traditions and prioritize other financially viable options, such as TM or home remedies, as biomedical health expenditures pose a high economic burden on their families. Another study conducted in India also reported financial barriers associated with the lack of access to ANC and safe delivery with lower socioeconomic characteristics (4). The Government of Nagaland has also acknowledged this high OOP expenditure experienced by patients in the state in the State Human Development Report (7). Nevertheless, our observations indicate that in emergency situations, when alternative local healthcare options have been exhausted, financial resources do not play a determining role in visiting healthcare facilities.

When analyzing the adapted three-delays model, we noticed that a delay in one level significantly affects the other subsequent levels. The delay in providing adequate care strongly enhances the uncertainty in the decision to seek care with moderate influence from the delay in arrival to the facility, thus impeding people of the tribe from effectively and promptly seeking biomedical healthcare. Nevertheless, the community finds alternatives to the presented barriers by accessing TM actors, self-medicating using biomedical drugs, or home remedies. As observed in various medical pluralistic studies conducted in South America, a combination of the three alternate modalities has also been demonstrated by the Liangmais (30–32). Since access to essential biomedical medication in the village and health centers is difficult, women tend to store medicines at home and adopt various dosage mechanisms for their babies. Pregnant women and their babies risk experiencing untoward side effects or overdosage due to unsupervised self-medication, as described in a study conducted among pregnant women from Iran (33).

The delay in providing adequate care was also attributed to all previous individual or community experiences, rumors, and beliefs

related mainly to the low quality of the services available in the health facilities. Our findings corroborated with *Singh* et al.*'s* findings that the lack of resources and services in health centers affects institutional delivery rates in Northeast India (34). Significant concerns regarding the availability of healthcare professionals, opening hours, and lack of medicines and health services deterred them from even attempting to seek maternal or newborn biomedical healthcare services. This was complemented by a study conducted in rural Nigeria that reported that low utilization of government facilities was due to staff irregularities, low quality of services, and the high costs incurred to access them (35). Even health professionals agreed that the facilities were not offering adequate services, which demotivates them from promoting the services, obliging them to adopt risky treatment options and plan strategies for emergency referrals. Given the community's perception that the quality of services provided at the health centers is defective, the conventional approach to increase the overall knowledge to improve HSB in these communities may prove futile unless the quality and quantity of services in the health centers improve. The state has launched a World Bank-aided project to strengthen a few health centers to mitigate this issue (36). However, this impact is yet to be ascertained in the few communities they serve.

The generalized feeling of shyness among women was an essential attitudinal determinant that discouraged them from consulting male doctors and visiting the health facility since they associate biomedical practices with examining reproductive and sexual organs. Similar findings where feelings of embarrassment influenced the HSB of mothers from Amazonian communities in Peru were reported by Westgard et al. (37). The gender of the healthcare provider (female TBAs, ASHAs, or nurses) is preferred during childbirth. However, this cannot be assumed as the only factor, as male relatives attended deliveries, also denoting a complementary behavior that prefers trust or familiar relationships over gender preferences.

There is no kinship or formal communication between the doctors and the traditional actors, which explains the misunderstandings or incompatibilities between the two systems. It can be assumed that reluctance toward TM originates from the health professional's perspective. Nonetheless, TM actors see biomedicine, to some extent, as complementary. Some of these elements are also stated in a study of medical pluralism and its implications on health policy in Northeast India (38). Similarly, a rural Ghana study showed that health personnel did not consider traditional birth attendants' contribution (39). There is also a weak relationship between the community and the doctors, as doctors are not perceived to be present in the facilities when needed. However, a better relationship exists between the community and the nurses, especially for delivery. The most substantial relationship was noted between the ASHAs and the women, especially in the village with a non-functional health center as corroborated by another study from India (40). ASHAs are perceived to have gained credibility in the community, leading to social recognition and increased legitimacy as service providers. Consequently, this kinship can be a potential mechanism to reduce maternal and newborn mortality and morbidity, considering community-oriented primary healthcare as an essential strategy to reduce inequalities by adequately training them and proportionately officially recognizing their efforts and health work, especially in rural, remote indigenous areas such as this. In addition to the ASHAs, traditional healers and TBAs are also primary contact points for mothers seeking treatment. They can also be sensitized and engaged in disseminating information regarding preventive health and be trained to recognize red flags to initiate early referrals.

Another approach to address the low uptake of health services is to strengthen a process named "Communitization," which formulates a Health Centre Managing Committee (HCMC) that consists of members from the village council, FBOs, and staff from the health center located in the village to closely monitor the functioning of the health center along with the Government. Even before being endorsed nationwide by the National Health Mission, this system originated from a policy implemented by the Government of Nagaland in 2002, titled *"The Nagaland Communization of Public Institutions and Services Act"* (40). The health component of the scheme purports to ensure that the community is sufficiently and meaningfully represented and empowered to participate in the health center's planning, implementation, and utilization of services. The HCMC can be further empowered to monitor the performance of government schemes that are intended to influence healthcare delivery uptake positively. The impact and challenges faced by HCMCs in Nagaland have been comprehensively documented by Tushi and Kaur (41).

Our study highlights that if the perceived basic needs of the community are unmet, all other efforts become irrelevant, and services will not be utilized satisfactorily by the community. In a setting such as this, where the community functions around socio-cultural norms, it may be pragmatic for policymakers to adopt a "bottom-up approach" and tailor programs by placing the community's needs before national objectives. Policies must focus on primarily empowering local village councils, FBOs, and VHCs to monitor their health centers effectively. Inter-sectoral policies from the educational, economic, employment, infrastructure, housing, sanitation, and essential services must also be considered to address the social determinants contributing to this issue. It is relevant to design and implement salutogenic enabling environments that allow individuals to make informed decisions about their health. The objective is to attain health and well-being by guaranteeing substantive freedom and respect for the self-determination of indigenous people.

Conclusion

The HSB of this community is influenced by multiple social, economic, cultural, geographic, and political factors that are closely related. Health facilities are sought only in emergencies, secondary to locally available traditional medicine, determined primarily by the tribe's perception of the quality of services provided and challenges in geographical access.

Economic reasons, low awareness, unrealistic reimbursements, and inadequate implementation of national schemes were pivotal in deterring access to health facilities. Engaging, recognizing, integrating, and supporting local actors like ASHAs, TBAs, TM healers, and FBOs may be a more realistic approach to influence individual or familial decisions to seek health facilities for maternal and child health. Community agents trained to consider the needs of vulnerable population groups represent a key catalyst in the community system. In addition, community perspectives can provide crucial insight into why health interventions may struggle or succeed in various locations. Moreover, community-led monitoring can provide a vital tool for accountability. This framework must also be supported with adequate financing for these community systems.

At the policy level, the two national programs to financially incentivize institutional deliveries and decrease OOP expenses failed

to impact the local health center utilization rates due to inadequate program implementation at the grassroots as it did not consider this region's cultural and geographical differences. The amount intended to incentivize mothers and ASHAs failed to cover the basic costs they incurred to reach a delivery point. The "one size fits all" approach to planning these policies implemented countrywide has to be tailored to the local needs of the region and must factor in the exorbitant direct and indirect costs involved with travel on rugged terrains.

Strengthening and empowering existing Health Centre Managing Committees to monitor their health centers may improve service quality. The crucial role and impact of communities stem from their strengths, which include but are not limited to legitimacy among individuals, a strong understanding of the contexts, trust, social solidarity, social motivation, and adaptation abilities. Community systems offer critical support in the areas where the conventional health system fails. The extent to which the terrain influences the delays in healthcare access should be comprehensively studied.

Study strengths and limitations

This study is strengthened by its mixed-method approach, reinforcing its implementation with community actors, empowering people as agents who can investigate their own situation, and providing an alternative to traditional research, especially in remote and indigenous areas. The quantitative evidence from a community-based survey was supported by the findings that evolved from the qualitative components of this marginalized population. This study was conducted in one of the region's most remote areas, being indicative of logistical problems and organizational/financial difficulties.

Due to time constraints, 22 of the 26 audio recordings were directly transcribed and translated to English, with additional revisions of the translations in collaboration with an external Liangmai native speaker.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Ethics Committee of the Medical Faculty, the Ruprecht Karls University of Heidelberg, Germany (#S-138/2019, 13.03.2019), and the Institutional Review Board (Research and Ethics Committee) of the Christian Institute of Health Sciences and Research, Nagaland, India. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

AD, ÁLC, RK, and RR developed the idea and designed the study. ÁLC and RR elaborated the methodology and data collection tools with the support of AD. ÁLC, PN, and RK collected the data. PN translated and transcribed the data. ÁLC analyzed the qualitative data with the backing of AD. RR analysed the quantitative data. ÁLC, RR, PN, RK, and AD contributed to data interpretation. ÁLC drafted the manuscript. ÁLC, AD, and RR revised the final version of this manuscript. All authors contributed to the article and approved the submitted version.

Funding

A research grant from the German Academic Exchange Service (DAAD) covered logistical costs for the fieldwork. All the other costs were covered by ÁLC. The Science and Engineering Research Board, Department of Science and Technology (Sanction Order: ECR/2016/002059), funded the community-based survey (Project on the use of Geographic Information Systems in Health Systems Research in Rural Areas of Nagaland). For the publication fee we acknowledge financial support by Deutsche Forschungsgemeinschaft within the funding programme "Open Access Publikationskosten" as well as by Heidelberg University.

Acknowledgments

This research would not have been possible without the unique collaboration and the indispensable support and kindness of the members of the Liangmai tribe. The authors also thank Sedevi Angami, Director, Christian Institute of Health Sciences and Research, Nagaland, India, for his unending support. The authors also thank Venkateshprabhu Janagaraj for his help with the map.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1139334/full#supplementary-material

References

1. The United Nations Children's fund. Maternal health. (2016). Available at: http://unicef.in/Whatwedo/1/Maternal-Health (Accessed January 23, 2019).

2. The United Nations Population Fund. Maternal health-digital. (2016). Available at: https://www.unfpa.org/maternal-health. (Accessed January 23, 2019).

3. The United Nations Children's fund. Maternal health. (2015). Available at: http://unicef.in/Whatwedo/1/Maternal-Health (Accessed January 23, 2019).

4. Sankar MJ, Neogi SB, Sharma J, Chauhan M, Srivastava R, Prabhakar PK, et al. State of newborn health in India. *J Perinatol*. (2016) 36:S3–8. doi: 10.1038/jp.2016.183

5. Ministry of Health and Family Welfare. *National Health Profile – 2018*. New Delhi: (2018). 336 p.

6. Swedish Agency for Growth and Policy Analysis. (2013). India's healthcare system: Overview and quality improvements. Available at: https://www.tillvaxtanalys.se/in-english/publications/direct-response/direct-response/2013-05-20-indias-healthcare-system-----overview-and-quality-improvements.html (Accessed May 1, 2019).

7. Government of Nagaland. (2016). Nagaland: State human development report. Kohima. Available at: https://es.scribd.com/document/381850403/Nagaland-SHDR-2016-Final-Mail (Accessed January 25, 2022).

8. Ministry of Health and Family Welfare. (2011). Update on the ASHA Programme. Available at: https://nhsrcindia.org/sites/default/files/2021-06/Update%20on%20ASHA%20Programme%20%20July%202011.pdf (Accessed May 1, 2019).

9. Expert Committee on Tribal Health. (2018). Tribal health in India: bridging the gap and a roadmap for the future. Available at: http://nhm.gov.in/nhm_components/tribal_report/Executive_Summary.pdf (Accessed May 01, 2019).

10. Poverty and Inequality in Nagaland. (2017). Available at: http://ijahms.com/upcomingissue/09.06.2017.pdf (Accessed May 28, 2022).

11. Ministry of Health and Family Welfare. (2016). National Family Health Survey (NFHS-4). Available at: http://rchiips.org/nfhs/nfhs-4Reports/India.pdf (Accessed May 01, 2019).

12. Census India. (2001). Nagaland data highlights: the scheduled tribes. Available at: https://censusindia.gov.in/Tables_Published/SCST/dh_st_nagaland.pdf (Accessed May 01, 2019)

13. Directorate of census operations, census of India 2011: Nagaland. District census handbook Peren. (2011). Available at: https://www.censusindia.gov.in/2011census/dchb/1311_PART_B_DCHB_PEREN.pdf (Accessed May 01, 2019).

14. Oppitz M, Kaiser T, von Stockhausen A, Wettstein M. *Naga Identities: Changing Local Cultures in the Northeast of India*. Ghent, Belgium: Snoeck Publishers (2008). 464 p.

15. Government of Nagaland. District plan-Peren. (2018). Available at: https://cdn.s3waas.gov.in/s32dea61eed4bceec564a00115c4d21334/uploads/2018/08/2018082872.pdf (Accessed May 01, 2019).

16. Ministry of Health and Family Welfare. Nagaland-National Family Health Survey (NFHS-4). (2016). Available at: http://rchiips.org/nfhs/NFHS-4Reports/Nagaland.pdf (Accessed May 01, 2019).

17. Ministry of Health and Family Welfare. (2019). Performance of key HMIS indicators for Peren, 2018-19. Available at: https://hmis.nhp.gov.in/#!/standardReport. (Accessed February 01, 2019).

18. Chokshi M, Patil B, Khanna R, Neogi SB, Sharma J, Paul VK, et al. Health systems in India. *J Perinatol*. (2016) 36:S9–S12. doi: 10.1038/jp.2016.184

19. Glanz K. *Theory at a glance: a guide for health promotion practice*, vol. *viii*. *2nd* ed. Washington, USA: Dept of Health and Human Services, National Cancer Institute (2005). 52 p.

20. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Soc Sci Med*. (1994) 38:1091–110. doi: 10.1016/0277-9536(94)90226-7

21. Sychareun V, Somphet V, Chaleunvong K, Hansana V, Phengsavanh A, Xayavong S, et al. Perceptions and understandings of pregnancy, antenatal care and postpartum care among rural Lao women and their families. *BMC Pregnancy Childbirth*. (2016) 16:245. doi: 10.1186/s12884-016-1031-8

22. Jat TR, Deo PR, Goicolea I, Hurtig AK, San SM. Socio-cultural and service delivery dimensions of maternal mortality in rural Central India: a qualitative exploration using a human rights lens. *Glob Health Action*. (2015) 8:24976. doi: 10.3402/gha.v8.24976

23. Department of Health & family welfare Govt. of Tamil Nadu, India. (2022). Mobile medical units (MMU) National Health Mission-Tamil Nadu. Available at: https://nhm.tn.gov.in/en/r-c-h/mobile-medical-units-mmu (Accessed April 1, 2022).

24. Ministry of Health and Family Welfare. (2006). National Family Health Survey (NFHS-3). Available at: https://dhsprogram.com/pubs/pdf/frind3/frind3-vol1andvol2.pdf (Accessed March 23, 2023).

25. Graner S, Klingberg-Allvin M, Duong le Q, Krantz G, Mogren I. Pregnant women's perception on signs and symptoms during pregnancy and maternal health care in a rural low-resource setting. *Acta Obstet Gynecol Scand*. (2013) 92:1094–100. doi: 10.1111/aogs.12170

26. Amin R, Shah NM, Becker S. Socioeconomic factors differentiating maternal and child health-seeking behavior in rural Bangladesh: a cross-sectional analysis. *Int J Equity Health*. (2010) 9:9. doi: 10.1186/1475-9276-9-9

27. Tuyisenge G, Hategeka C, Kasine Y, Luginaah I, Cechetto D, Rulisa S. Mothers' perceptions and experiences of using maternal health-care services in Rwanda. *Women Health*. (2019) 59:68–84. doi: 10.1080/03630242.2018.1434591

28. Babalola S, Fatusi A. Determinants of use of maternal health services in Nigeria--looking beyond individual and household factors. *BMC Pregnancy Childbirth*. (2009) 9:43. doi: 10.1186/1471-2393-9-43

29. Firoz T, Vidler M, Makanga PT, Boene H, Chiau R, Sevene E, et al. Community perspectives on the determinants of maternal health in rural southern Mozambique: a qualitative study. *Reprod Health*. (2016) 13:112. doi: 10.1186/s12978-016-0217-x

30. Zank S, Hanazaki N. The coexistence of traditional medicine and biomedicine: a study with local health experts in two Brazilian regions. *PLoS One*. (2017) 12:e0174731. doi: 10.1371/journal.pone.0174731

31. Calvet-Mir L, Reyes-Garcia V, Tanner S. Is there a divide between local medicinal knowledge and Western medicine? A case study among native Amazonians in Bolivia. *J Ethnobiol Ethnomed*. (2008) 4:18. doi: 10.1186/1746-4269-4-18

32. Vandebroek I, Calewaert JB, De Jonckheere S, Sanca S, Semo L, Van Damme P, et al. use of medicinal plants and pharmaceuticals by indigenous communities in the Bolivian Andes and Amazon. *Bull World Health Organ*. (2004) 82:243–50.

33. Ebrahimi H, Atashsokhan G, Amanpour F, Hamidzadeh A. Self-medication and its risk factors among women before and during pregnancy. *Pan Afr Med J*. (2017) 27:183. doi: 10.11604/pamj.2017.27.183.10030

34. Singh K, Kanika G. Factors affecting maternal health care seeking behaviour in northeast states, India: evidence from district level household survey-4 (2012-2013). *Int J Res Med Sci*. (2016) 4:4949–56. doi: 10.18203/2320-6012.ijrms20163797

35. Osubor KM, Fatusi AO, Chiwuzie JC. Maternal health-seeking behavior and associated factors in a rural Nigerian community. *Matern Child Health J*. (2006) 10:159–69. doi: 10.1007/s10995-005-0037-z

36. Morung Express. (2017). 4 major health projects launched in Nagaland. Available at: https://morungexpress.com/4-major-health-projects-launched-nagaland (Accessed April 9, 2022).

37. Westgard CM, Rogers A, Bello G, Rivadeneyra N. Health service utilization, perspectives, and health-seeking behavior for maternal and child health services in the Amazon of Peru, a mixed-methods study. *Int J Equity Health*. (2019) 18:155. doi: 10.1186/s12939-019-1056-5

38. Albert S, Nongrum M, Webb EL, Porter JD, Kharkongor GC. Medical pluralism among indigenous peoples in Northeast India – implications for health policy. *Tropical Med Int Health*. (2015) 20:952–60. doi: 10.1111/tmi.12499

39. Adatara P, Afaya A, Baku EA, Salia SM, Asempah A. Perspective of traditional birth attendants on their experiences and roles in maternal health Care in Rural Areas of northern Ghana. *Int J Reprod Med*. (2018) 2018:2165627–10. doi: 10.1155/2018/2165627

40. Hamal M, de Cock BT, De Brouwere V, Bardaji A, Dieleman M. How does social accountability contribute to better maternal health outcomes? A qualitative study on perceived changes with government and civil society actors in Gujarat, India. *BMC Health Serv Res*. (2018) 18:653. doi: 10.1186/s12913-018-3453-7

41. Tushi A, Kaur P. Process evaluation of Communitisation Programme in public sector health facilities, Mokokchung District, Nagaland, 2015. *Indian J Community Med*. (2017) 42:81–7. doi: 10.4103/ijcm.IJCM_202_15

frontiers | Frontiers in Global Women's Health

TYPE Original Research
PUBLISHED 09 August 2023
DOI 10.3389/fgwh.2023.1091863

OPEN ACCESS

EDITED BY
Loreto Pantoja,
University of Chile, Chile

REVIEWED BY
Loreto Villanueva,
University of Chile, Chile
Jael Quiroz Carreño,
University of Chile, Chile

*CORRESPONDENCE
Ketemaw Negese
ketemu2004@gmail.com

RECEIVED 27 March 2023
ACCEPTED 26 July 2023
PUBLISHED 09 August 2023

CITATION
Negese K and Belachew DZ (2023) Maternal complications and associated factors among mothers who underwent a cesarean section at Gebretsadik Shewa general hospital: an institution based cross-sectional study. Front. Glob. Womens Health 4:1091863. doi: 10.3389/fgwh.2023.1091863

Maternal complications and associated factors among mothers who underwent a cesarean section at Gebretsadik Shewa general hospital: an institution based cross-sectional study

Ketemaw Negese* and Dereje Zeleke Belachew

Department of Midwifery, College of Medicine and Health Sciences, Mizan–Tepi University, Mizan Aman, Ethiopia

Introduction: Cesarean sections have played a major role in lowering maternal morbidity and mortality rates, but are a major concern in developing countries. This study aims to assess the magnitude of maternal complication and its associated factors among women who underwent a cesarean section at Gebretsadik Shewa general hospital, Southwest Ethiopia.

Method: A hospital-based cross-sectional study was conducted in Gebretsadik Shewa general hospital. Data were extracted from 382 mothers' medical charts, retrieved from the labor and operations theatre log book registry using systematic random sampling technique. The extracted data was coded and entered into Epi Data version 3.0, and exported to Statistical Package for Social Sciences (SPSS) version 20 for analysis. Logistic regression analysis was conducted and significance and strength association was determined considering AOR with a 95% confidence level.

Result: A total of 382 mothers' charts were reviewed; however, 368 charts were eligible for data entry. The age of the participants ranges between 16 and 42 years with mean and standard deviation of 26.1 ± 4.8 years. Maternal complication rate was 30.4% [95% CI: 25.8- 35.1]. Surgical site infection (10.3%), anemia (6.5%) and intraoperative bleeding (4.6%) were the most common. Multivariable logistic regression analysis showed that no antenatal care follow up, medical illness during pregnancy, emergency cesarean section and not receiving a prophylactic antibiotic were statistically associated with maternal complications.

Conclusion: The incidence of maternal complication following cesarean delivery was unduly high. Community based education about antenatal care follow up and its importance should be further strengthened for favorable maternal and fetal outcomes.

KEYWORDS

magnitude, cesarean section, associated factors, maternal complication, Gebretsadik Shewa general hospital

Introduction

Cesarean section (CS), also known as cesarean delivery, refers to the delivery of the fetus, placenta and membrane through abdominal and uterine incision after fetal viability (1). Globally, the cesarean section rate is unevenly distributed and results in 21.1% of abdominal deliveries. Africa accounts for 5.0% cesarean deliveries in the world (2).

Maternal complications related to cesarean delivery are defined as the presence of either one of intraoperative or postoperative surgical complications. The American College of Obstetricians and Gynecologists (ACOG) reported that cesarean delivery significantly increased a woman's risk of pregnancy-related fatality (35.9 deaths per 100,000 live births) compared to a woman who delivered vaginally (9.2 deaths per 100,000 live births) (3). A study conducted in Australia reported that among 43 maternal deaths, 31 were related to cesarean deliveries (4).

A prospective study conducted in Finland examined the complication rate among 2,500 women who underwent a cesarean section within a 6 months time frame. The rate of serious complications (serious complications were defined as follows: more than 1,500 ml blood loss, need for blood transfusion, hysterectomy, need for another surgery, septicemia, blood clots, pulmonary edema, and pneumonia) for all cesarean sections was 10.4% (5). When groups are stratified, emergency and crash-emergency cesarean sections had far higher serious complication rates; 11.7% and 25% respectively (5).

In Africa, a cesarean section is performed under harmful conditions in order to save the mother and her fetus (6). However, the maternal mortality rate related to caesarean section is nearly 5 times higher than that of vaginal delivery (7). There is disparity regarding the prevalence of cesarean sections and maternal morbidity and mortality (8). Studies conducted in Nigeria found that despite an increase in cesarean sections, the maternal mortality rate is reduced only from 831.9 to 708 per 100,000 live births (9, 10) and 190 per 100,000 live births in South Africa (11). About 50% of mothers develop complications such as post-operative wound infection, anemia requiring blood transfusion, respiratory tract infection, puerperal psychiatric disorders, septicemia, and wound dehiscence within the first 7 days of operation (10).

The increased risk of maternal morbidity and mortality associated with increased rates of cesarean sections underlie the growing concerns of health care providers. Obstetricians in the United Kingdom (UK) have conducted studies to address this issue. A woman delivered via cesarean section has developed a uterine scar. This scar has important implications for future pregnancies as the patient is predisposed to uterine rupture, placenta previa and placenta accreta (12).

A facility based survey of 797 health facilities in Ethiopia indicated that the cesarean delivery rate was 1.9% with regional rates varying from 0.2% to 9% (13, 14). The overall institutional rate was 18%, which varied between 46% in the private sector and 15% in the public sector. Majorities were performed for emergency cesarean section and maternal indications. More than 50% of the cases were operated on within a 30 min to 5 h interval between decision and delivery. Prophylactic antibiotics were administered to 94% of reviewed cases; however, 12% of the cases reported post-operative wound infection, and there were two maternal deaths (14).

A retrospective study conducted in Tigray, Northern Ethiopia, also reported higher adverse maternal outcomes in 11 hospitals of the region. Of the total 2,835 cesarean deliveries, there were 17 (0.6%) maternal and 506 (17.8%) fetal deaths (15). The cesarean section rate in Jimma Hospital was 28.1%. The most common indications were cephalopelvic disproportion (14.1%) and previous cesarean section (3.8%). Fever (6.21%) and fistula (2%) were complications following cesarean section (16).

Ethiopia implements various strategies to overcome these adverse maternal outcomes including strengthening health facilities, providing training for health care providers, including health extension workers (HEW), so that at least each low and mid-level facility can provide basic emergency obstetrics and neonatal care (BEMONC) to early identify indications and reduce the cesarean section rate (17, 18). Gebretsadik Shewa general hospital is a health facility equipped to provide comprehensive emergency obstetric care including cesarean sections and blood transfusion services.[1]

Various studies in Ethiopia indicated that maternal complication following cesarean section is higher and mainly related to medical illnesses during pregnancy, urgency of indication, and operation related factors (type of cesarean section performed, length of cesarean section and the type of anesthesia used) (19, 20). It is also found that rural residency of the mother, prolonged labor, gestational age, previous history of obstetric complication, parity, and no antenatal care follow up are the contributing factors for an increased maternal complication following cesarean delivery (20–23).

To the best of our knowledge, however, the magnitude of maternal complication and its associated factors in women who underwent a cesarean section at Gebretsadik Shewa general hospital has not yet been studied. This study was aimed to assess the magnitude of and factors associated with maternal complications following cesarean sections at Gebretsadik Shewa general hospital.

Methodology

Study area and period

This study was conducted at Gebretsadik Shewa general hospital from November 1, 2021 to January 1, 2022. It is located in Bonga town, a municipality for Kaffa zone, Southwest Ethiopia Region. It is located 445 kms south of Addis Ababa, the capital city of Ethiopia. It provides health care services for a catchment population of 4.5 million mainly from Kaffa zone and surrounding areas. It provides service for patients referred from health centers and district hospitals. This hospital has 545 workers (328 health professionals and 217 supporting staff). It serves approximately 70,517 patients of all types annually. Gebretsadik Shewa general hospital has six departments and 115 beds. Obstetrics and Gynecology is one of the major departments in the hospital. The department has three specialist physicians in Obstetrics and Gynecology, 5 general practitioners, 2 Integrated Emergency

[1]Kaffa zone Health Department Communication Office report. Bonga town, Ethiopia. (2021)

Obstetric care Surgeons (IEOSs) and 20 midwives. It provides maternal health care services free of charge. It has a total of 40 beds and 4 delivery coaches. Cesarean section is the most common surgical procedure performed by the Obstetrics and Gynecology department. The average quarterly total number of cesarean deliveries was 199 per 715 of the total deliveries in 2021/22. However, the department does not have its own separate operating theater room.

Study design

A hospital-based cross-sectional audit of patient records was conducted to estimate the magnitude of maternal complication and identify associated factors among mothers who underwent a cesarean section/delivery from September 1, 2018 to August 30, 2021.

Source and study population

Source population

All mothers who gave birth via cesarean section in Gebretsadik Shewa general hospital.

Study population

All records of mothers who gave birth via cesarean section in Gebretsadik Shewa general hospital from September 1, 2018 to August 30, 2021.

Inclusion and exclusion criteria

Inclusion criteria

All cesarean deliveries performed after the period of fetal viability (> = 28 weeks) were included for this study.

Exclusion criteria

Cesarean deliveries with complications referred from other health facility, lost charts and lacking complete documentation were excluded from the study.

Sample size determination

Sample size was computed using a single population proportion formula by considering the following assumptions; $p = 38\%$ (19), $z = 1.96$, $CI = 95\%$ and $d = 5\%$; Where

p = Population proportion.

z = Standard normal distribution for 95% confidence level.

d = Margin of error and.

CI = Confidence interval.

The final sample size for the study was computed after using adjustment formula and 10% non-response rate, with final sample size (nf) = 382.

Sampling procedure

The study population (all records of cesarean deliveries from September 1, 2018 to August 30, 2021) was retrieved from the labor and operation theatre log book registry. They were listed in order based on the date and year of the operation performed (starting from September 1, 2018) to form the sampling frame of the study. There were 2,413 total cesarean deliveries in the hospital from September 1, 2018 to August 30, 2021. Sampling/skip interval, k was then calculated by dividing the total number of eligible mothers who delivered via cesarean section (2,413) by the final sample size (382), providing sampling/skip interval, $k = 6$. The first chart/patient record was randomly selected using lottery method and subsequent records were identified using systematic random sampling in every sixth case after arranging the study units in order of the date of operation. The chart/record of the patient whose cesarean delivery procedure was performed next to the case selected for data extraction was considered if the selected patient's chart/record was missed or lost.

Variables

Dependent variable

Maternal complication following cesarean section/delivery.

Independent variables

Socio demographic factors (age, residency, religion, occupation).

Obstetrics related factors (antenatal care, parity, previous CS scars, urgency of surgery, medical illness during pregnancy, duration of labor, and gestational age at delivery).

Operation related factors (type of cesarean section performed, type of anesthesia used, indications for cesarean section, prophylactic antibiotic and duration of surgery).

Operational definition

Maternal complications following cesarean delivery include the presence of one or more of the following signs and symptoms on a patient during the operation or following cesarean delivery within 7 days of surgery: infection, fever, wound dehiscence, hemorrhage (intra partum or postpartum), organ injuries, anemia, respiratory tract infection, and postpartum cardiomyopathy.

Data collection tools and procedures

Data was collected from client records using a designed, structured data extraction format containing important

preoperative, intraoperative and postoperative data. It was prepared in English and developed after review of various literatures and books and through observing clinical and operating records, delivery room charts, and institutional annual reports. Data was extracted by four midwives and direct supervision was made by two Integrated Emergency Obstetric care Surgeons (IEOS) working in Obstetrics and Gynecology department.

Quality assurance technique

One day of training was given for data collectors and supervisors regarding the data extraction procedure. Before proceeding to data extraction, the format was pretested to check for its consistency and the ability of data collector's performance. It was conducted on 5% (18) samples of cesarean section cases in Mizan–Tepi University Teaching Hospital (MTUTH) and necessary modification was made based on pretest result. The final data extraction format was then checked by data collectors and supervisors on daily basis for its completeness, consistency, accuracy and validity of the data. Both supervisors and principal investigators provided day-to-day onsite supervision in the whole data extraction period of the study.

Data analysis and processing

The extracted data was coded in a pre-arranged data sheet. It was entered into Epi Data version 3.0 and exported to Statistical Package for Social Sciences (SPSS) version 20 for analysis. Bivariable analysis was performed to determine the association between different factors with the outcome variable. Variables which were significant on bivariable analysis (p-value ≤ 0.25) were entered for multivariable logistic regression analysis. Variables with p-value ≤ 0.05 using multivariable logistic regression analysis were considered statistically significant associated factors with the outcome variable. Odds Ratio (OR) with 95% confidence interval (CI) was used to determine the association between independent and dependent variables. Model of fitness was checked with Hosmer and Lemeshow goodness of fit test setting p-value = 0.895. Multicollinearity test was performed and all variables had variance inflation factor (VIF} less than 10. Finally, descriptive statistics were computed and the results were presented in the form of texts, tables and figures.

Ethics approval and consent to participate

Ethical approval for this study was obtained from the Research Ethics Committee of Mizan–Tepi University, College of Medicine and Health Sciences; with a reference number MTU/REC/00975/DA/2021. Written and signed consent was obtained from the administrative staff of Gebretsadik Shewa general hospital after a permission letter was written from Medicine and Health Sciences College, Mizan–Tepi University.

Result

Socio-demographic characteristics of study subjects

A total of 368 cases were involved for this study, providing 96.3% response rate. This was due to incomplete data for fourteen cases which were purposely excluded from analysis. The age of study participants ranges between 16 and 42 years, with a mean and standard deviation of 26.1 ± 4.8 years. The dominant age group was in the range between 25 and 29 years and the majority (67.1%) were from a rural residence. About 97.8% of mothers were married (Table 1).

Obstetrics related factors

Mothers who were referred from other health institutions numbered 294 (79.9%) and the remaining 74 (20.1%) were self-referred. Regarding parity, 170 (46.2%) were primipara, 151 (41%) were multipara, and 47 (12.8%) were grand multipara. About 84.8% were booked for antenatal care and 87.2% were term (≥37 weeks) and 6% preterm (<37 weeks) (Table 2).

Fifty-nine mothers had developed medical illnesses during their pregnancy period. The number of mothers with hypertension was 42 (71%), followed by diabetes 7 (11.7%), HIV/AIDS 6 (9.7%), and anemia 4 (6.5%) respectively (Figure 1).

TABLE 1 Socio-demographic characteristics of mothers who underwent a caesarean section at Gebresadik Shewa general hospital (n = 368).

Variables	Category	Number	Percent (%)
Age in years	<20	34	9.2
	20–24	127	34.5
	25–29	138	37.5
	30–45	69	18.8
Place of residency	Urban	121	32.9
	Rural	247	67.1
Marital status	Married	360	97.8
	Others	8	2.3

TABLE 2 Obstetric factors of mothers who underwent a caesarean section at Gebretsadik Shewa general hospital (n = 368).

Variables	Category	Frequency	Percent (%)
Parity	Primipara	170	46.2
	Multipara	151	41
	Grand-multipara	47	12.8
ANC follow up	Yes	312	84.8
	No	56	15.2
Referral status	Yes	294	79.9
	No	74	20.1
Gestational age	Preterm	22	6
	Term	321	87.2
	Post term	25	6.8
Medical illness	No	309	84
	Yes	59	16
Number of children	Single	344	93.5
	Multiple	24	6.5

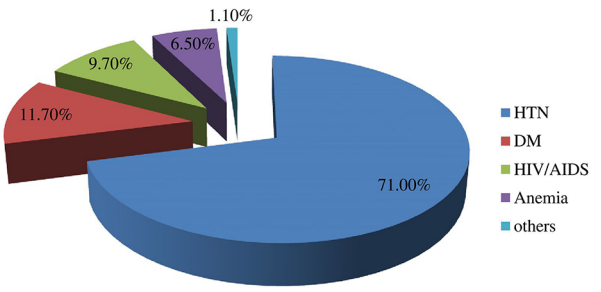


FIGURE 1
Medical illnesses during pregnancy among mothers who underwent a caesarean section in Gebretsadik Shewa general hospital.

Operation related factors

The prevalence of cesarean section at Gebretsadik Shewa general hospital was 20.9%. The majority 327 (88.9%) underwent emergency cesarean section while the rest were elective (11.1%). Regarding the type of anesthesia, 298 (81%) were performed with spinal anesthesia and the rest 70 (19%) with general anesthesia. Mothers who underwent surgery for more than 60 min were 25.3% and mothers who did take antibiotics before surgery were 207 (56.3%). Regarding the types of surgery performed, 346 (94%) were delivered with lower uterine segment transverse caesarean section (LUSTCS), followed by classical 17 (4.6%), and inverted T 5 (1.4%) respectively (Table 3).

Indications for surgery (cesarean section)

The leading indication of caesarean section at Gebretsadik Shewa general hospital was non-reassuring fetal heart rate pattern (NRFHRP) (31.3%), followed by cephalopelvic disproportion (CPD) (28.5%), obstructed labor (OL) (12.2%), previous cesarean section (9.5%), antepartum hemorrhage (APH) (8.2%), hypertensive disorders of pregnancy (HDP) (4.6%), and others (transverse lie, cord presentation, previous myomectomy, and tumor previa) were 5.7% (Table 4).

TABLE 3 Operation related factors for mothers who underwent a caesarean section at Gebretsadik Shewa general hospital (n = 368).

Variables	Category	Frequency	Percent (%)
Circumstance of surgery	Elective	41	11.1
	Emergency	327	88.9
Frequency of surgery	Primary	321	87.2
	Repeat	47	12.8
Duration of surgery (minutes)	<30	12	3.3
	30–60	263	71.4
	>60	93	25.3
Antibiotics before surgery (CS)	Yes	207	56.3
	No	161	43.7
Decision to delivery	<1 h	60	17.6
	1–2 h	191	56
	≥ 2 h	90	26.4
Types of caesarean section	LUSTCS	346	94
	Classical	17	4.6
	Inverted T	5	1.4
Type of anesthesia	Spinal anesthesia	298	81
	General anesthesia	70	19

TABLE 4 Indications for caesarean section at Gebretsadik Shewa general hospital (n = 368).

Indications for caesarean section	Frequency	Percent (%)
CPD	105	28.5
NRFHRP	115	31.3
Hypertensive disorders	17	4.6
Obstructed labor	45	12.2
Previous cesarean section	35	9.5
APH	30	8.2
Others	21	5.7

Maternal outcomes

The number of study subjects who developed maternal complications both in the intraoperative (during surgery) and following cesarean section was 112 (30.4%); [95% CI: 25.8–35.1] (Figure 2).

Intraoperative complication

Of those mothers who developed maternal complications, 28 (7.3%) occurred in the intraoperative period (time of surgery). These include intraoperative bleeding which accounts for 4.6% followed by surgical site extension (1.6%) and organ (bowel and bladder) injury (1.1%) respectively (Figure 3).

Postoperative (post-surgery) complication

Out of the total study subjects, 90 (24.5%) maternal complications developed after surgery/cesarean delivery was completed. Surgical site infection (SSI) was the most common complication (10.3%), followed by anemia (6.5%), postpartum hemorrhage (PPH) (3%), wound dehiscence (3.0%), respiratory tract infection (RTI) (1.10%), fistula

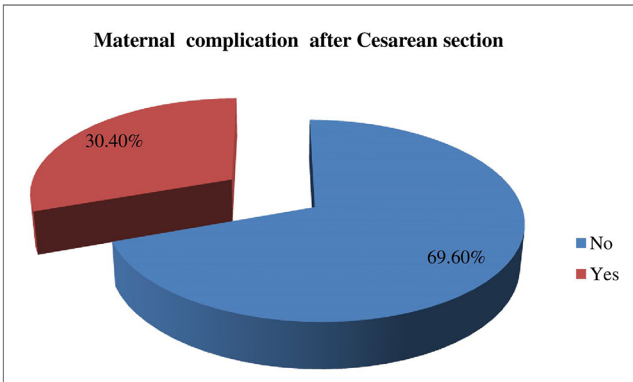


FIGURE 2
Magnitude of maternal complication among mothers who underwent a caesarean section in Gebretsadik Shewa general hospital.

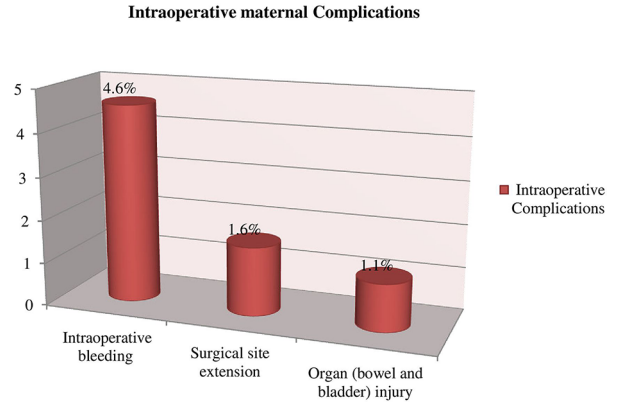


FIGURE 3
Intraoperative maternal complications among mothers who underwent a caesarean section in Gebretsadik Shewa general hospital.

(0.3%) and others (0.3%) respectively. There were two postoperative maternal deaths due to multiple organ failure secondary to septic shock and cardiogenic shock secondary to postpartum cardiomyopathy (Figure 4).

Factors associated with maternal complication at Gebretsadik Shewa general hospital

Variables such as residence, referral status, duration of labor, type of anesthesia used for surgery, history of antenatal care follow up, medical illness during pregnancy, urgency for surgery, and prophylactic antibiotic administration were significantly associated with adverse maternal outcome in bivariable analysis (p-value $\leq$ 0.25). However, variables such as history of antenatal care follow up, medical illness during pregnancy, urgency for cesarean delivery and prophylactic antibiotic administration remained independent factors contributing towards maternal complication using multivariable logistic regression (p-value ≤ 0.05).

Accordingly, mothers who did not have a history of antenatal care follow up and mothers with medical illness during pregnancy were 2.95 [AOR: 2.95; 95% CI: 1.19–7.29] and 4.28 [AOR: 4.28; 95% CI: 1.58–11.61] times more likely to develop maternal complications compared with mothers with a history of antenatal care follow up and without medical illness history respectively.

Similarly, pregnant women who underwent emergency cesarean section and who did not take prophylactic antibiotics before surgery were 7.09 [AOR: 7.09: 95% CI: 1.19–45.5] and 3.20 [AOR: 3.20; 95% CI: 1.43–6.94] times more likely to develop adverse maternal outcomes than those who underwent elective cesarean section and took prophylactic antibiotics before surgery respectively (Table 5).

Discussion

The magnitude of maternal complication in this study was 30.4% [95% CI: 25.8–35.1]. This is higher compared with studies conducted in Tigray (19.3%) (24), Oromia (20.5%) (25) and Debre Birhan (16.5%) (26). The possible reason might be due to the difference in level of hospitals. In this study, more cesarean deliveries were performed on mothers with history of previous cesarean section and even in a single episode of fetal distress due to the absence of specialists who can manage complicated labor using other modes of delivery. It is also greater than the finding in Germany (10.5%) (27). This might be due to a more pronounced and advanced obstetrics emergency care in Germany. Maternal complications as a result of cesarean sections are unevenly distributed around the globe and are lower for developed countries (6).

However, this finding was relatively lower than findings in Arba-minch (38.2%) (19), Bahirdar (44.04%) (28) and Hawassa

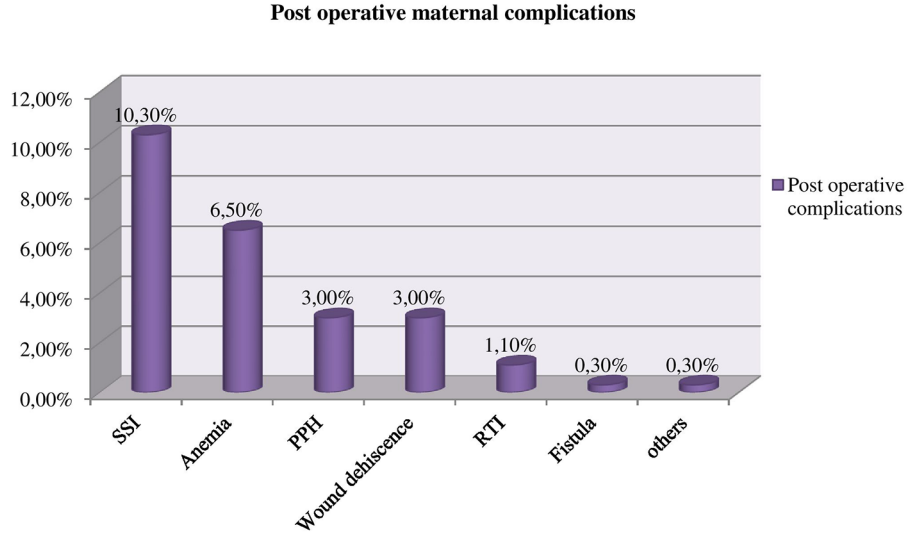


FIGURE 4
Postoperative maternal complications among mothers who underwent a caesarean section in Gebretsadik Shewa general hospital.

TABLE 5 Factors associated with maternal complication following caesarean delivery at Gebretsadik Shewa general hospital ($n = 368$).

Predictor variables	Maternal complication		COR (95% CI)	AOR (95% CI)
	Yes	No		
Address				
Rural	84	163	1.54 (1.04–2.81)*	1.46 (0.6–3.41)
Urban	28	84	1	1
ANC follow up				
No	23	33	1.74 (0.97–3.13)*	2.95 (1.19–7.29)**
Yes	89	223	1	1
Referral status				
No	58	16	16 (8.6–30.1)*	2.53 (0.92–6.91)
Yes	54	240	1	1
Medical illness				
Yes	35	24	4.41 (2.46–7.84)*	4.28 (1.58–11.61)**
No	77	232	1	1
Duration of labor				
No labor	17	42	0.19 (0.09–0.41)*	0.21 (0.92–2.35)
≥ 24 h	51	25	0.11 (0.064–0.204)*	3.19 (0.67–15.2)
< 24 h	44	189	1	1
Urgency of surgery				
Emergency	107	220	3.5 (1.33–9.17)*	7.09 (1.19–45.5)**
Elective	5	36	1	1
Type of anesthesia				
Spinal	73	225	1	1
General	39	31	0.26 (0.15–0.44)*	0.5 (0.2–1.26)
Antibiotics				
No	77	84	4.5 (2.79–7.26)*	3.2 (1.43–6.94)**
Yes	35	172	1	1

COR, crude odds ratio; AOR, adjusted odds ratio.
*$p < 0.25$ in bivariate.
**$p < 0.05$ in multivariate.

(56%) (29). The possible explanation might be due to the discrepancy in number of obstetrics emergency cases for hospitals. Bahirdar and Hawassa hospitals are fourth tier health institutions and may include cases referred with complications from district and general hospitals. Finding inconsistency with Arba-minch general hospital can be also due to the difference in study design. The study in Arba-minch hospital was conducted with retrospective cohort study design.

In this study, intraoperative complications such as intra operative bleeding (4.6%), surgical site extension (1.6%) and organ (bowel and bladder) injury (1.1%) were the most common complications that occurred during surgery, while surgical site infection (10.3%), anemia (6.5%), postpartum hemorrhage (3.0%), wound dehiscence (3.0%) and respiratory tract infection (1.1%) were most common after the cesarean section was complete. Bladder and bowel injuries were lower compared with the finding in Arba-minch hospital (5.5%) (19). Studies conducted in Finland did not find organ injury (5). This can be due to the difference in antenatal care follow up of participants. More participants from Arba-minch hospital had no history of antenatal care follow up and may be more likely to have an emergency cesarean delivery which in turn increases the risk of organ injury. The other possible explanation might be due to lacking a specialist who is skillful in managing complicated labor using modes of delivery other than cesarean section.

Antenatal care follow up is found to be a statistically significant associated factor with maternal complication in this study. Mothers who did not have a history of antenatal care follow up were 2.95 times more likely to develop maternal complications than their counterparts. This is consistent with the finding in Attat hospital (30). This could be due to the fact that mothers who do not attend antenatal care are not screened and identified early for high risk pregnancy and therefore timely intervention.

A medical disorder during pregnancy was also another statistically significant associated factor with maternal complication in this study. This is in agreement with studies in Arba-minch and Gelemso hospitals (24, 31). Pregnant mothers with medical illness were 4.28 times more likely to develop maternal complications. The possible reason might be because pregnancy is a period of immune suppression, providing a weaker immune response to disease, exposing the mother to an increased likelihood of post operative wound infection.

Studies conducted at Bertha Gxawa Hospital and hospitals in Finland found that emergency cesarean section was a significant factor which contributes for adverse maternal outcome (32, 33). A study which was conducted to assess fetal and neonatal outcome in emergency vs. elective cesarean section in Nepal concluded that post-operative wound infection, post-partum hemorrhage and need for blood transfusion were higher for cesarean section than elective cesarean groups (34). The finding of this study also supported findings of these hospitals. Mothers who underwent an emergency cesarean section were 7.09 times more likely to develop maternal complications than mothers who had a planned/elective cesarean section. The reason might be due to insufficient pre-arranged operation theater room optimization for patients requiring emergency surgery.

Mothers who did not take prophylactic antibiotics before surgery were 3.20 times more likely to develop maternal complications in this study. It was supported by findings in Gelemso and Hawassa hospitals (31, 35). These studies documented that administration of first dose antimicrobial prophylaxis within 1 h before surgery reduces the incidence of infection that develops as result of contaminations during surgery. This might be due to the fact that either low or poor potent serum antimicrobial levels that can fight against foreign microbials acquired during surgery for mothers who did not take prophylactic antibiotic.

Duration of labor greater than 24 h and general anesthesia were significantly associated at Gelemso and Gondar University Teaching Hospital (31, 36). However, there is no statistically significant association in this study. This might be due to the small sample size and difference in study design and study period.

Limitations of the study

Maternal complication related factors such as Body Mass Index (BMI) and estimated blood loss were not registered in patients' medical charts and if fulfilled may affect the outcome. The result

of this study was limited to only Gebretsadik Shewa general hospital and it is not generalized to other hospitals located in the region.

Conclusion and recommendation

The magnitude of maternal complication following cesarean section was higher than non-cesarean deliveries. The study identified that mothers who did not have antenatal care follow up, had medical illnesses during pregnancy, delivered via emergency cesarean section and did not receive prophylactic antibiotics were factors statistically associated with maternal complication. Community based education about antenatal care follow up and its importance should be further strengthened for favorable maternal and fetal outcomes. Waiting rooms should be prepared at hospitals for pregnant mothers previously screened and identified as having a high risk pregnancy and mothers living in areas where access to health care service is difficult/poor. Operating theater rooms should be well organized, optimized and reserved for mothers seeking emergency cesarean section. Prophylactic antimicrobials/antibiotics must be administered before surgery and continue after surgery based on physician recommendation.

Finally, for researchers who are willing to conduct similar research, it is better to include Body Mass Index and the amount of total blood lost during and after surgery, which are not included in this study but may have a significant impact on the outcome.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Research Ethics Committee of Mizan–Tepi University, College of Medicine and Health Sciences; with a reference number MTU/REC/00975/DA/2021. The patients/participants provided their written informed consent to participate in this study.

Author's contribution

Conception and original draft writing: KN. Study design, data analysis, and interpretation: KN and DB. Critically review initial draft and finalizing manuscript: DB and KN. Preparing manuscript: KN acts as guarantor. Both authors reviewed and approved the final manuscript. All authors contributed to the article and approved the submitted version.

Acknowledgments

The authors would like to express their deep gratitude to the data collectors and supervisors participated in the study. Health Management Information System (HMIS) workers in the hospital also deserve thanks for providing necessary information during data collection.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

1. Gabbe SG, Niebyl JR, Simpson JL, Landon MB, Galan HL, Jauniaux ER, et al. *Obstetrics: normal and problem pregnancies Elsevier e-book on vitalsource*. 7th ed. Philadelphia: Elsevier (2016) 425–42.

2. Betran AP, Ye J, Moller A-B, Souza JP, Zhang J. Trends and projections of caesarean section rates: global and regional estimates. *BMJ Global Health*. (2021) 6 (6):e005671. doi: 10.1136/bmjgh-2021-005671

3. The American College of Obstetricians and Gynecologists. ACOG report. Attachment Parenting International (API). Washington DC. (2003) https://www.attachmentparenting.org/support/articles/acogpr (Accessed August 2021).

4. Shamsa A, Bai J, Raviraj P, Gyaneshwar R. Mode of delivery and its associated maternal and neonatal outcomes. *Open J Obstet Gynecol*. (2013) 3(3):30972. doi: 10.4236/ojog.2013.33057

5. Pallasmaa N, Ekblad U, Aitokallio-Tallberg A, Uotila J, Raudaskoski T, Ulander VM, et al. Cesarean delivery in Finland: maternal complications and obstetric risk factors. *Acta Obstet Gynecol Scand*. (2010) 89(7):896–902. doi: 10.3109/00016349.2010.487893

6. Betrán AP, Ye J, Moller A-B, Zhang J, Gülmezoglu AM, Torloni MR. The increasing trend in caesarean section rates: global, regional and national estimates: 1990-2014. *PloS One*. (2016) 11(2):e0148343. doi: 10.1371/journal.pone.0148343

7. Gupta M, Saini V. Caesarean section: mortality and morbidity. *J Clin Diagn Res*. (2018) 12(9):QE01–06. doi: 10.7860/JCDR/2018/37034.11994

8. Yaya S, Uthman OA, Amouzou A, Bishwajit G. Disparities in caesarean section prevalence and determinants across Sub-Saharan Africa countries. *Glob Health Res and Policy*. (2018) 3:1–9. doi: 10.1186/s41256-018-0074-y

9. Galadanci H, Dongarwar D, Künzel W, Shittu O, Yusuf M, Abdurrahman S, et al. Cesarean section and maternal-fetal mortality rates in Nigeria: an ecological lens into the last decade. *Int J Matern Child Health AIDS*. (2020) 9(1):128. doi: 10.21106/ijma.349

10. Nwosu C, Agumor K, Aboyeji A, Ijaiya M. Outcome of caesarean section in a Sub-Urban secondary health care facility in Nigeria. *Niger Med Practitioner*. (2005) 46(4):77–9. doi: 10.4314/nmp.v46i4.28733

11. Gebhardt GS, Fawcus S, Moodley J, Farina Z. Maternal death and caesarean section in South Africa: results from the 2011-2013 saving mothers report of the national committee for confidential enquiries into maternal deaths. *S Afr Med J*. (2015) 105(4):287–91. doi: 10.7196/samj.9351

12. Dutta D. *Text book of obstetrics; Operative obstetrics*. 6th ed. New Delhi: Jaypee Brothers Medical Publishers (2013).

13. Betran A, Ye J, Moller A, Souza J, Zhang J. Trends and projections of caesarean section rates: global and regional estimates. *BMJ Global Health*. (2021) 6(6):e005671. doi: 10.1136/bmjgh-2021-005671

14. Fesseha N, Getachew A, Hiluf M, Gebrehiwot Y, Bailey P. A national review of cesarean delivery in Ethiopia. *Int J Gynaecol Obstet*. (2011) 115(1):106–11. doi: 10.1016/j.ijgo.2011.07.011

15. Hussein J, Kanguru L, Astin M, Munjanja S. The effectiveness of emergency obstetric referral interventions in developing country settings: a systematic review. *PLoS Med*. (2012) 9(7):e1001264. doi: 10.1371/journal.pmed.1001264

16. Taye A, Yuya M. One year retrospective analysis of prevalence of caesarean section in jimma university specialized hospital, South Western Ethiopia. *J Pregnancy Child Health*. (2015) 2(3):16–20. doi: 10.4172/2376-127X.1000172

17. EPHA. EPHA in its 21st Annual conference, passed resolutions and recommendations on "Maternal and newborn health in Ethiopia". (2011). *Ethiopian Public Health Association (EPHA)*: Addis Ababa, Ethiopia. https://etpha.org/news/114-epha-in-its-21st-annual-conference.html (Accessed November 7, 2021).

18. Berhan Y, Abdela A. Emergency obstetric performance with emphasis on operative delivery outcomes does it reflect on the quality of care? *Ethiop J Health Dev*. (2004) 18(2):96–106.

19. Wae MB, Belayneh F, Mekonnen N, Hailemicheal F. Magnitude of maternal complications and associated obstetric factors among women who gave birth by cesarean section at Arba-Minich general hospital, Southern Ethiopia: retrospective cohort. *J Public Health Epidemiol*. (2017) 9(5):133–44. doi: 10.5897/JPHE2016.0898

20. Traoré Y, Téguété I, Bocoum A, Gamby M, Traore S, Sanogo S, et al. Infectious complications after cesarean delivery: trends of incidences, risk factors, and prognosis in a third health level center in Africa. Case of gabriel touré teaching hospital. *Open J Obstet Gynecol*. (2018) 8(1):10–9. doi: 10.4236/ojog.2018.81002

21. Al Jama FE. Risk factors for wound infection after lower segment cesarean section. *Qatar Med J*. (2013) 2012(2):9. doi: 10.5339/qmj.2012.2.9

22. Bi S, Zhang L, Chen J, Huang M, Huang L, Zeng S, et al. Maternal age at first cesarean delivery related to adverse pregnancy outcomes in a second cesarean delivery: a multicenter, historical, cross-sectional cohort study. *BMC Pregnancy Childbirth*. (2021) 21:1–10. doi: 10.1186/s12884-020-03485-8

23. Mangi G, Mlay P, Oneko O, Maokola W. Postoperative complications and risk factors among women who underwent caesarean delivery from northern Tanzania: a hospital-based analytical cross-sectional study. *Open J Obstet Gynecol*. (2022) 12(4):243–57. doi: 10.4236/ojog.2022.124023

24. Abay M, Gebremariam W, Kurie MW, Berhane H, Mengstu A. Post-Cesarean section maternal health outcome and its determinants in tigray regional state, north Ethiopia. *Res Sq*. (2019) 7–8. doi: 10.21203/rs.2.16563/v1

25. G/Mariam B, Tilahun T, Merdassa E, Tesema D. Indications, outcome and risk factors of cesarean delivery among pregnant women utilizing delivery services at selected public health institutions, Oromia Region, South West Ethiopia. *Patient Relat Outcome Meas*. (2021) 12:227–36. doi: 10.2147/PROM.S304672

26. Asfaw T, Tesema A. Determinant factors, trend and outcomes of cesarean delivery in debre berhan referral hospital, north shewa zone, Ethiopia. *Pediatr Rep*. (2020) 12(2):8430. doi: 10.4081/pr.2020.8430

27. Staboulidou I, Beslic J, Kuehnle E. Neonatal and maternal short-term outcome after emergency caesarean section in comparison to elective and second stage caesareans: results of a retrospective 10-year survey. *Int J Women's Health and Wellness*. (2018) 4(80):2474–1353. doi: 10.23937/2474-1353/1510080

28. Alemu H, Yigzaw ZA, Asrade L, Nega B, Belachew A. Proportion and associated factors of maternal complications of cesarean sections among mothers who deliver at Bahir Dar city public specialized hospitals, Bahir Dar, Ethiopia. *BMC Women's Health*. (2023) 23(1):1–8. doi: 10.1186/s12905-023-02388-y

29. Dibabi MM, Debiso AT, Rodamo KM. Adverse maternal outcomes associated with cesarean deliveries and their determinants: hospital based cross sectional, mixed-methods study. *J Health Res*. (2022) 36(4):696–704. doi: 10.1108/JHR-09-2020-0396

30. Moges A, Ademe B, Akessa G. Prevalence and outcome of cesarean section in attat hospital gurage zone, SNNPR. *Ethiopia*. (2015) 7(4):4–8.

31. Ridwan A, Amin AM. Magnitude of Maternal Complication and Associated Factors Among Women who Gave Birth by Cesarean Section at Gelemso General Hospital, Western Hararghe, Ethiopia; A one Year Retrospective Study. (2016).

32. Pallasmaa N. *Cesarean section—short term maternal complications related to the mode of delivery* [*Thesis*]. Turku: University of Turku (2014).

33. Inyang-Otu US. *Factors associated with high caesarean section rates in bertha gxowa hospital* [*Master's thesis*]. Johannesburg: University of the Witwatersrand (2014).

34. Darnal N, Dangal G. Maternal and fetal outcome in emergency versus elective caesarean section. *J Nepal Health Res Counc*. (2020) 18(2):186–89. doi: 10.33314/jnhrc.v18i2.2093

35. Legesse Laloto T, Hiko Gemeda D, Abdella SH. Incidence and predictors of surgical site infection in Ethiopia: prospective cohort. *BMC Infect Dis*. (2017) 17(1):119. doi: 10.1186/s12879-016-2167-x

36. Abdissa Z, Ayele TA, Belayneh T, Tefera Y. Birth outcome after caesarean section among mothers who delivered by caesarean section under general and spinal anesthesia at gondar university teaching hospital North-West Ethiopia. *J Anesth Clin Res*. (2013) 4(7):335. doi: 10.4172/2155-6148.1000335

frontiers | Frontiers in Medicine

TYPE Systematic Review
PUBLISHED 16 August 2023
DOI 10.3389/fmed.2023.1242490

OPEN ACCESS

EDITED BY
Loreto Pantoja,
University of Chile, Chile

REVIEWED BY
Xin Li,
Chengdu Women and Children's Central Hospital, China
Elsa Vitale,
Bari Local Health Authority, Italy

*CORRESPONDENCE
Hui Jiang
✉ jianghuitest@163.com

†These authors have contributed equally to this work and share first authorship

RECEIVED 20 June 2023
ACCEPTED 01 August 2023
PUBLISHED 16 August 2023

CITATION
Shi J, Li X, Li Y, Liu Y, Li J, Zhang R and Jiang H (2023) Experiences of newly qualified midwives during their transition to practice: a systematic review of qualitative research. *Front. Med.* 10:1242490. doi: 10.3389/fmed.2023.1242490

Experiences of newly qualified midwives during their transition to practice: a systematic review of qualitative research

Jinjin Shi[1†], Xuemei Li[1†], Yongqi Li[2†], Ying Liu[3], Junying Li[3], Rongli Zhang[1] and Hui Jiang[4*]

[1]Shanghai First Maternity and Infant Hospital, School of Medicine, Tongji University, Shanghai, China, [2]School of Nursing, Naval Medical University, Shanghai, China, [3]Department of Obstetrics, Shanghai First Maternity and Infant Hospital, School of Medicine, Tongji University, Shanghai, China, [4]Department of Nursing, Shanghai First Maternity and Infant Hospital, School of Medicine, Tongji University, Shanghai, China

Objective: To summarize and evaluate the experiences and expectations of newly qualified midwives (NQMs) during their transition from school to clinical practice. One of the main objectives was to provide references for the development of midwifery professional teaching and provide a basis for hospital administrators and instructors of midwifery to develop guidelines and strategies.

Methods: A systemic review of qualitative research using meta-aggregation was conducted. We collected studies from 12 databases between inception and February 2023. All qualitative studies published in English and Chinese that reported on the experiences of NQMs during their transition to practice were included. Two independent reviewers assessed the study quality and the credibility of study findings by using the JBI Qualitative Assessment and Review Instrument. The process of searching followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses recommendations.

Results: A total of 14 studies were included, and 84 findings were extracted. The results were grouped into 8 new categories and synthesized into 3 main themes: multi-dimensional challenges, physical and emotional responses, and demands and expectations. The included studies were identified to be of good quality and the results of the methodological quality appraisal were all B grade or higher.

Conclusion: The transition period is a critical career development for NQMs. However, they faced various stress during the period, which had a negative impact on their physical and mental health. Therefore, it's important to deeply understand their challenges and needs. And effective management strategies should be implemented, such as in-depth cooperation between hospitals and schools, improvement of the clinical transition support system, enhancement of continuing education, and standardization of the management system. This may be beneficial to improve the quality of clinical midwifery and maintain the stability and sustainable development of the midwifery team.

KEYWORDS

newly qualified midwives, transition to practice, experience, meta-synthesis, qualitative systematic review

1. Introduction

Improving the health of mothers and newborns is one of the unfinished Millennium Development Goals and remains a priority in the era of sustainable development goals (1). The Global Strategy for Women, Children, and Adolescents Health (2016–2030) also highlights the significance of ensuring that every woman, child, and adolescent has access to fundamental interventions and a strong team of health professionals (2). Particularly, midwives play a significant role in improving mother–child dyads' health. Approximately two-thirds of maternal and neonatal deaths can be prevented with the assistance of well-trained midwives (3). However, the State of the World's Midwifery 2021 shows that only 42 percent of people with midwifery skills work in 73 countries where more than 90 percent of all maternal and newborn deaths and stillbirths occur (4). The survey also reveals that there is a 900,000-midwife deficit worldwide, with a projected 750,000-midwife shortage by 2030 (3, 4).

NQMs represent the future of this profession. However, recruitment and retention of midwives is a major challenge, with a high turnover of NQMs. A previous study indicated that the experiences during the transition to practice had an impact on job satisfaction and employee retention, which was a key factor of the global midwifery shortage (5). The transition period is defined as the period of study and adaptation to work as a registered nurse midwife after completion of a recognized midwifery education program (6). For many newly qualified practitioners, the transition period from students to qualified health professionals is typically 12 to 18 months (7). According to the data from the Royal College of Midwives (RCM), the lack of support of NQMs contributes to attrition ranging from 5 to 10% whereby graduates leave during the first year of practice (8).

To facilitate the retention of valuable midwifery workforce, many countries have developed structured transition support programs to help NQMs successfully transition to practice. However, studies conducted in Australia (7), Canada (9), New Zealand (10), and the United Kingdom (11) reported that NQMs still faced many challenges during the period, including but not limited to increased customer care responsibilities, problems with healthcare systems, political, managerial and role uncertainty (12). These challenges caused them to feel insecure, fearful, and stressed (13). Consequently, the smooth transition into their new roles was interfered and increased personnel losses occurred.

It's crucial to deeply understand their experiences during the transition period and to explore what factors promote or inhibit the progress. Several qualitative studies have explored the challenges and feelings encountered by NQMs during the transition period but did not provide integrated results. As a result, we conducted a qualitative synthesis that could potentially provide a basis for hospital administrators and instructors of midwifery to develop guidelines and strategies to effectively support NQMs during the transition period.

2. Aims

This qualitative systematic review aimed to understand the experiences of NQMs during their transition to practice and to explore factors that promote or inhibit the progress. In particular, the review may provide hospital administrators and instructors of midwifery a new perspective to formulate guidelines and strategies, consequently, it can provide a better training system and platform for NQMs to help them gain fully play their professional roles and positive working experience.

3. Methods

3.1. Design

A systematic review of qualitative research using meta-aggregation was conducted. The Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) checklist (Supplementary Table S1) was used to report the process and results of synthesis, and enhance transparency (14).

3.2. Search strategy

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline was adopted in this review. A three-step approach was used to identify the studies: (a) an initial limited search via PubMed, (b) a systematic search of electronic databases, and (c) a manual search of journal references. To find search terms, a preliminary limited search via PubMed was first carried out to examine the index words and the derivatives of terms for studies linked to the experiences of NQMs during their transition from education into practice. Then, we systematically searched 12 electronic databases, including eight English language databases: PubMed, Web of Science Core Collection (via ISI Web of Science), MEDLINE (via ISI Web of Science), Cochrane Library, LWW (via OVID), CINAHL Complete (via EBSCO), Scopus, and ScienceDirect, and four Chinese databases: China National Knowledge Infrastructure (CNKI), Wanfang Database (CECDB), VIP Database, and China Biomedical Database (CBM). For different databases, a separate search strategy is designed and optimized based on the corresponding subject terms and search rules. Results were limited to journal articles written in English or Chinese and published before 15 February 2023. The query included five groups of keywords and MeSH terms combined with Boolean operators: (1) (new graduate midwives) OR (newly graduated midwives) OR (newly qualified midwives) OR (newly qualified nurse midwives) OR (new nurse midwives) OR (new midwives) OR (graduate midwives); (2) (transition) OR (transition period) OR (transition to practice) OR (transition programs) OR (change) OR (culture shock) OR (orientation) OR (standardized training) OR (pre-service training) OR (residency programs) OR (induction program); (3) (perception) OR (feel*) OR (experience*); (4) (qualitative research) OR (qualitative method) OR (qualitative study). Finally, the references of each qualifying articles were searched manually to identify further relevant studies. The sample search strategy for PubMed is presented in Figure 1.

3.3. Inclusion and exclusion criteria

3.3.1. Inclusion criteria

Studies were included according to the following:

Participant (P): Newly qualified midwives (NQMs) started clinical work for less than three years after graduation.

#1 (new graduate midwives[Title/Abstract]) OR (newly graduated midwives[Title/Abstract]) OR (newly qualified midwives[Title/Abstract]) OR (newly qualified nurse midwives[Title/Abstract]) OR (new nurse midwives[Title/Abstract]) OR (new midwives[Title/Abstract]) OR (graduate midwives[Title/Abstract])

#2 (transition[Title/Abstract]) OR (transition period[Title/Abstract]) OR (transition to practice[Title/Abstract]) OR (transition programs[Title/Abstract]) OR (change[Title/Abstract]) OR (culture shock[Title/Abstract]) OR (orientation[Title/Abstract]) OR (standardized training[Title/Abstract]) OR (pre-service training[Title/Abstract]) OR (residency programs[Title/Abstract]) OR (induction program[Title/Abstract])

#3 ((perception[MeSH Terms])) OR ((feel*[Title/Abstract]) OR (experience*[Title/Abstract]))

#4 ((qualitative research[MeSH Terms])) OR ((qualitative method[Title/Abstract]) OR (qualitative study[Title/Abstract]))

#5 #1 AND #2 AND #3 AND #4

Search results:15

FIGURE 1
Search strategy in PubMed.

Interest of phenomena (I): The real experiences of NQMs during their transition from education into practice. The focus was on their stressors, demand, and expectation.

Context (Co): Included studies were those performed during their transition from education into practice.

Study design (S): Qualitative research and mixed-method studies from which the qualitative part could be extracted were included. Studies were included that used any qualitative methodology, including but not limited to phenomenology, grounded theory, case studies, action research, ethnography, and feminist research.

3.3.2. Exclusion criteria

Excluded were studies with qualitative data that were analyzed using quantitative methods; duplicate and unavailable full-text literature; non-English or Chinese literature; research not published in peer-reviewed journals, case reports, conference proceedings, poster abstracts, and theses. Additionally, we looked through their sources to find potential pertinent studies while excluding systematic reviews and other reviews.

3.4. Appraisal of methodological quality

By comparing the evaluation criteria of qualitative research, two researchers (JS, XL) who had undergone qualitative research studies and training in evidence-based methods were selected to conduct the study. Two researchers used the "JBI Evidence-Based Quality Evaluation Criteria for Qualitative Studies in Evidence-Based Health Care Centers" for the final independent evaluation of the included studies. Each item is evaluated by "yes," "no," "unclear" and "not applicable." If all 10 items are "yes," the possibility of bias is minimal and is A. If the above quality criteria are partially met, the possibility of bias is considered to be B. If all items are If "No," the possibility of bias is considered high as C. After independent evaluation, the results of the two individuals were compared. Third party re-evaluation or arbitration in case of disagreement. The literature with a quality level of C was finally excluded.

3.5. Data extraction and synthesis

According to the JBI meta-aggregation, qualitative data were extracted in two steps. Firstly, publication details (author's name, publication year, country or region, research aim, research design, method of data collection, sampling and data analysis, participants) and findings were extracted. Secondly, verbatim statements about the experiences of NQMs during their transition to practice were extracted for a subsequent meta-synthesize across all included studies. Two reviewers (JS, XL) independently evaluated the plausibility of each finding and identified them into three levels: (1) Unequivocal (U): relates to evidence beyond a reasonable doubt, which may include findings that are matter of fact, directly reported/observed and not open to challenge; (2) Equivocal (E): those that are, albeit interpretations, plausible in light of data and the theoretical framework. They can be logically inferred from the data; (3) Not Supported (NS): when 1 nor 2 apply and when most notable findings are not supported by the data. The extracted findings that had similar meanings were aggregated to form new categories. Eventually, these categories were further synthesized to generate more comprehensive findings, called synthesis findings.

4. Results

4.1. Search results

A total of 509 relevant articles were initially searched from the database. 453 articles were collected in total through NoteExpress after removing duplicates. Two researchers independently read the titles, abstracts and keywords to obtain 20 articles, after reading the full text, 14 articles were included. The detailed search and screening process is showed in Figure 2.

4.2. Methodological quality

The quality of the included literature was evaluated and the results were all B grade or higher. The results of the methodological quality appraisal are presented in Table 1.

4.3. Study characteristics

The 14 studies were conducted in the following countries: China ($n = 1$), Malawi ($n = 1$), South Africa ($n = 2$), Netherlands ($n = 2$), Ireland ($n = 2$), the United Kingdom ($n = 3$), and Australia ($n = 3$). These studies involved 238 NQMs. Study designs included qualitative action-research approach ($n = 1$), phenomenological approach ($n = 4$), qualitative descriptive approach ($n = 5$), mix-method study ($n = 2$), ethnography ($n = 1$), and a study described as qualitative without a specific approach ($n = 1$). All the studies were published after 2008 and were original articles. Study characteristics are presented in Table 2.

4.4. Results of meta-synthesis

The researcher extracted 84 findings from 14 articles and summarized into 8 categories. From the 8 categories, three synthesized

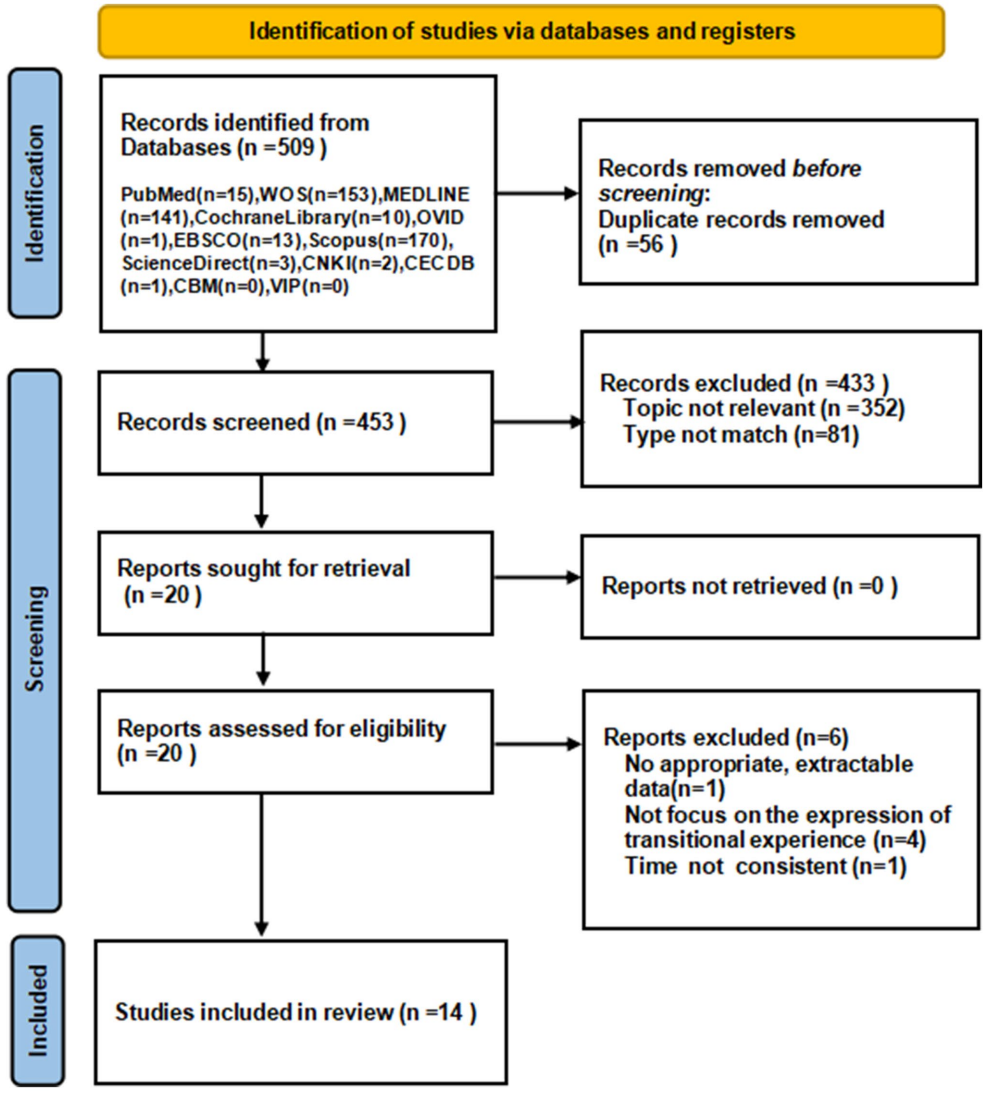


FIGURE 2
PRISMA flow diagram for article selection.

TABLE 1 Methodological quality of the 14 included studies.

Study*	Q 1**	2	3	4	5	6	7	8	9	10	Total percent of "yes" (%)
Wier et al. (2022) (15)	U	Y	Y	Y	Y	N	Y	Y	Y	Y	B
Simane-Netshisaulu (2022) (16)	U	Y	Y	Y	Y	N	Y	Y	Y	Y	B
Mtegha et al. (2022) (17)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	B
Cazzini et al. (2022) (18)	U	Y	Y	Y	Y	N	Y	Y	Y	Y	B
Simane-Netshisaulu et al. (2022) (19)	U	Y	Y	Y	Y	N	Y	Y	Y	Y	B
Donovan et al. (2021) (20)	U	Y	Y	Y	Y	N	N	Y	Y	Y	B
Kool et al. (2020) (21)	U	Y	Y	Y	Y	N	Y	Y	Y	Y	B
Kool et al. (2019) (22)	U	Y	Y	Y	Y	N	Y	Y	Y	Y	B
Norris (2019) (23)	U	Y	Y	Y	Y	N	Y	Y	Y	Y	B
Huang Shu-rong et al. (2017) (24)	U	Y	Y	Y	Y	N	Y	Y	Y	Y	B
Hobbs (2012) (25)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	A
Fenwick et al. (2012) (26)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	B
Clements et al. (2012) (27)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	B
van der Putten (2008) (28)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	A

*Critical appraisal ($n = 10$): Y = yes; N = no; U = unclear; NA = not applicable. **Question = Q, Critical appraisal questions for qualitative studies: Q1: Is there congruity between the stated philosophical perspective and the research methodology?; Q2: Is there congruity between the research methodology and the research question or objectives?; Q3: Is there congruity between the research methodology and the methods used to collect data?; Q4: Is there congruity between the research methodology and the representation and analysis of data?; Q5: Is there congruity between the research methodology and the interpretation of results?; Q6: Is there a statement locating the researcher culturally or theoretically?; Q7: Is the influence of the researcher on the research, and vice-versa, addressed?; Q8: Are participants and their opinions adequately represented?; Q9: Are the research ethics according to the current criteria or for recent studies, and is there evidence of ethics approval by an appropriate body?; Q10: Are the conclusions drawn in the research report obtained from the analysis or interpretation of the data?.

findings emerged: multi-dimensional challenges, physical, and emotional responses, and demands and expectations. The main findings with illustrations and levels of credibility are presented in Supplementary Table S2, and the detailed process of synthesis is reported in Supplementary Table S3.

4.4.1. Synthesized finding 1: multi-dimensional challenges

4.4.1.1. Shock from realistic clinical settings

The real work in the delivery room was challenging for NQMs. First, there was a gap between theoretical knowledge in school and clinical practice. Many participants reported that the theoretical knowledge learned in school was relatively outdated or inconsistent with its application in practice. *"Upon reaching the ward, I found that most of the guidelines like HIV guidelines, and some reproductive health standards had changed. There were also new things like CPAP (continuous positive airway pressure). So it was really tough for me as I was referring to old things, yet, the practice had changed on the ground"* (18). In addition, the delivery room was a place of uncertainty, full of challenges and risks directly related to the safety of the mother-infant dyads' lives. *"Getting a baby into the world alive was what everyone worried about"* (26). At the same time, the lack of human resources was a very serious problem, which led to the huge amount of work that individuals need to carry on. *"…human resource is a challenge…Despite the nursery ward being one of the busy wards, there are times that you are alone on duty and you are expected to do all the activities…"* (17). In addition, the job was insecure and they always faced the possibility of losing their jobs due to the lack of permanent contracts. *"Yes, you know…you have no job security, so you take all the work you can get everywhere…that increases pressure"* (22).

4.4.1.2. High expectations from themselves and others

NQMs were strict with themselves and others also expected more from them. They were eager to prove their abilities quickly, which put a lot of pressure on themselves. *"You want to be the best of the best…I probably put too much pressure on myself…I just need to have confidence and take a deep breath…and I'll be alright…but then every once I have a little panic…"* (15). They viewed them as true midwives and must be responsible for mothers and babies, so they held themselves to a higher standard. *"you are more independent as a midwife because you have to make more choices you have to have more clinical judgment…more pressure, more responsibility and being more accountable for what I do"* (18). Experienced colleagues also had high expectations of NQMs because they thought that NQMs were fresh out of school and knowledgeable. *"I think are they going to perceive me as: well, you are newly qualified and you need to be able to do this…"* (15). Besides, they were also expected to do more than work, some even beyond their current capabilities. *"After three months I was left in charge of the ward as the only midwife and when I questioned it I was told (by the manager) 'Oh, you can manage … 'because you have got experience a nurse'…"* (27).

4.4.1.3. Lack of transitional support

Many participants reacted hospitals did not provide a perfect support system during the transition to practice, which increased the difficulty of adapting to new environments and transitioning into new roles. At first, there was a lack of the training about the hospital-related management system. *"There are a lot of dynamics in the hospital…And it took me some time to realize which disciplines are involved and which agreements are made per hospital, and about protocols. And even if you have a protocol, the usual way of doing things can be different, and it takes a while before you know this…"* (21). Secondly, the absence of

training in clinical skills made NQMs scared. *"The situation is not good at all; in some instances, you have to learn through trial and error. I was so scared of resuscitating a new-born baby, until one day in which I had to practice it all by myself"* (16). Thirdly, NQMs were frustrated about the lack of support from experienced mentors. *"Do you know in my whole year as a new grad [graduate] I do not think I worked with an [midwifery] educator once"* (26). Finally, NQMs often did not receive a positive response from colleagues when they asked for help. *"…however, some are unfriendly. The unfriendly ones give bad and demotivating remarks when we seek for assistance. It's bad"* (19). *"…fter*

TABLE 2 Characteristics of the 14 included qualitative studies.

Study	Country	Aim	Research method	No. of participants	Characteristics of participants	Results
Wier et al. (2022) (15)	United Kingdom	To explore the perceptions and experiences of becoming a newly qualified midwifery practitioner	Phenomenological Approach Focus group methodology Purposive sampling Content analysis	8	Newly qualified midwives (NQMs)	Two themes: 1. Becoming a midwife: expectations of self and others 2. Diverse support practices:accessible support and peer support
Simane-Netshisaulu (2022) (16)	South Africa	To explore and describe the experiences of newly qualified midwives with regard to the provision of midwifery services during transition from students to qualified midwives	Qualitative approach with explorative and descriptive Purposive sampling Semi-structured, individual interviews Content analysis	25	Newly qualified midwives who participated in the study were those whose practicing period after completing the training was not more than 12 months and were placed in maternity units in the facilities sampled for the study	Three themes: 1. Excessive workload, resulting in physical exhaustion 2. Roles and responsibilities of newly qualified midwives 3. Collegial relationships: A burden on emotional well-being
Mtegha, Mathews Brave et al. (2022) (17)	Malawi	To explore the transition experiences of newly qualified nurse-midwives working in selected midwifery units in Northern Malawi	Qualitative descriptive approach Purposive sampling In-depth, semi-structured, individual interviews Content analysis	13	Newly qualified nurse-midwives who had completed undergraduate nursing and midwifery education in Malawi (diploma and degree) and had less than two years of transitioning period in practice	Five themes: 1. Theory practice gap. 2. Lack of confidence and skills 3. Inadequate resources 4. Lack of transition support system 5. The workplace conflict
Cazzini et al. (2022) (18)	Ireland	To explore Irish midwives' experiences of their transition to practice. The objectives were to identify the support required by newly qualified midwives during their first year of clinical practice and to explore what factors facilitate or inhibit newly qualified midwives' progress during their transition	Qualitative approach Descriptive phenomenology Convenience sampling In-depth, semi-structured interviews Thematic analysis	7	Midwives who commenced their post-registration clinical practice between December 2018 and September 2019	Three themes: 1. Feeling challenged 2. Learning from experience 3. Support
Simane-Netshisaulu et al. (2022) (19)	South Africa	To explore and describe the mentoring process as experienced by newly qualified midwives and experienced mid-wives during the transition period	Qualitative approach with explorative and descriptive Purposive sampling In-depth, semi-structured, individual interviews Thematic analysis	25	Newly qualified midwives working in a maternity unit during their first year of clinical practice following their graduation	Two themes: 1. Newly qualified midwives' experiences regarding mentoring 1.1. Mentorship: Does it exist? 1.2. Midwifery units: How conducive are they for learning? 2. Experienced midwives' views regarding mentoring role 2.1. Mentors: How ready are they? 2.2. Shortage of staff and increased workload: How burdensome are they for mentoring?

(Continued)

TABLE 2 (Continued)

Study	Country	Aim	Research method	No. of participants	Characteristics of participants	Results
Donovan,Helen et al. (2021) (20)	Australia	To explore the transition to practice experiences of double degree graduate nurse midwives practicing in either or both nursing and midwifery in the Australian health care system	Husserl's descriptive phenomenological approach Purposive sampling Semi-structured individual interviews Colizzi's seven-step phenomenological analysis	23	Participants who were registered with the Australian Nursing and Midwifery Board of Australia and had been employed to work either as a nurse or a midwife or as a dual nurse midwife within the past 9 to 12 months	Four themes: 1. Physical, emotional, and mental exhaustion 2. Safe practice 3. Difficulties in achieving a work–life balance 4. 4. The importance of time to rest and reflect
Kool et al. (2020) (21)	Netherlands	To explore newly qualified Dutch midwives' perceptions of their job demands and resources during their initiation to hospital-based practice	Qualitative descriptive approach Snowball sampling Semi-structured individual interviews Thematic analysis	21	NQMs who graduated less than three years ago and work as hospital-based midwives in the Netherlands	Four themes: 1. Job demands: high workload, becoming a team member, learning additional medical procedures and job insecurity 2. Job resources: participants experienced the variety of the work, the teamwork, social support, working with women, and employment conditions 3. Personal demands: perfectionism, self-criticism, and fear of failure 4. Personal resources: openness for new experiences, sociability, calmness and accuracy
Kool et al. (2019) (22)	Netherlands	To identify perceived job demands and job resources of newly qualified midwives (NQMs), working in primary midwifery care during their first years in practice	Qualitative descriptive approach Convenience sampling Semi-structured group interviews Thematic analysis	31	NQMs, less than three years after graduation and working in primary midwifery care in the Netherlands	Four themes: 1. Job demands: working as locum; balancing work private life; adjusting to local practice/protocols; dealing with emotions from clients; Administration organizational tasks; colleagues; autonomy 2. Job resources: peers; family; clients; working from home base; textbooks and internet; earning money; colleagues; autonomy 3. Personal demands: perfectionism; prove yourself 4. Personal resources: strict boundaries; flexible; sense of perspective; assertive; self-confidence; humor; persistence
Norris (2019) (23)	United Kingdom	To explore the experience of NQMs in Wales, and to evaluate a current preceptorship program in order to inform the development of a new all Wales preceptorship program	Qualitative action-research approach Convenience sampling Focus group methodology Keep a reflective diary Thematic analysis Spiral analysis	5	NQMs, less than three years after graduation	Five themes: 1. 'Early days' 2. 'A time of transition' 3. 'Relationships with colleagues' 4. 'Relationships with women' 5. 'A new beginning'

(Continued)

TABLE 2 (Continued)

Study	Country	Aim	Research method	No. of participants	Characteristics of participants	Results
Huang Shu-rog et al. (2017)	China	To understand the career experience of new undergraduate midwives	Qualitative approach Purposive sampling In-depth, semi-structured individual interviews Colizzi's seven-step phenomenological analysis	13	Undergraduate students engaged in midwifery after graduation and entered in July 2015 Clinical work, working time is about half a year; Good communication skills Force, clear language expression; Willing to participate in this study	Five themes: 1. High risk, high intensity, physical and mental stress 2. Full of the joy of new life, have a sense of achievement and value 3. There is a gap between the actual work and the ideal 4. Looking forward to diversified career development 5. See the development potential of the profession and desire to standardize the industry management
Hobbs (2012) (25)	United Kingdom	To ascribe meaning to the everyday experiences of midwives during their first year of practice as they interact with their work environment	Medical ethnographic approach Non-probability sampling Phased interviews Semi-structured interviews Thematic analysis	7	Participants were NQMs, less than three years after graduation	Three themes: 1. "what is a midwife?" Old school midwives (entrenched viewpoint) 2. Service and sacrifice (core/shared dispositions) 3. Being with the woman and making a difference (new ways of thinking)
Fenwick, J et al. (2012) (26)	Australia	To explore the experiences of newly qualified midwives and described the factors that facilitated or constrained their development during the transition from student to registered midwife	Qualitative descriptive approach Convenience sampling Semi-structured interviews Thematic analysis	16	Participants were newly qualified midwives and worked predominantly in standard hospital maternity settings	Four themes: 1. 'The Pond': was used to describe new midwives perceptions of the context and culture of hospital-based maternity care 2. The 'Life-raft' metaphor was used to describe the importance of midwife-to-midwife relationships 3. The theme of 'Swimming' captured the consequence of positive interactions with colleagues and a supportive environment 4. 'Sinking' described the consequence of poor relationships with midwives and a difficult working environment
Clements et al. (2012) (27)	Australia	This article reports on newly qualified midwives' experiences of the core elements of their transition support program	Qualitative descriptive approach Convenience sampling Telephone interviews and focus groups Content analysis	38	Newly qualified midwives from 14 hospitals in the state of New South Wales, Australia	Three themes: 1. The importance of planned clinical rotations and supernumerary time that allowed them to ease into the new clinical area 2. Study days provided an opportunity for graduates to focus on new skills and to connect with their peers 3. Support from colleagues, managers and educators was essential, though workloads often impacted on its availability

(Continued)

TABLE 2 (Continued)

Study	Country	Aim	Research method	No. of participants	Characteristics of participants	Results
van der Putten, Deirdre (2008) (28)	Ireland	To explore newly qualified midwives' lived experience of clinical practice with a view to gaining a deeper understanding of their individual experiences and as a result, to highlight and inform the practice issues which need to be addressed by midwifery educators	Heideggerian's descriptive phenomenological approach Purposive sampling Participant observation and in-depth interviews Colizzi's seven-step phenomenological analysis	6	Newly qualified midwives, all of whom had qualified within the previous six months and who were currently employed within the Maternity Department.	Six themes: 1. Reality shock 2. Feeling prepared 3. Living up to expectations; 4. Theory–practice gap 5. Clinical support and mentorship 6. Continuous professional education

you have had handover and they are like, 'Oh fine, do not worry.' Then they go to the desk and they are like: 'I do not want to come on to work after her, she leaves everything for the night staff" (23).

4.4.2. Synthesized finding 2: physical and emotional responses

4.4.2.1. Physical fatigue

NQMs suffered physically fatigue because of the high intensity of work. And due to the shift system, their life was irregular and did not get enough rest, which even affected their safe operation. *"It's just exhausting, just physically. Some days you just need to sleep"* (20). *"I do not think I will ever get used to shift work! It's almost debilitating…you just start to doubt yourself and I think 'Am I safe practicing when I'm this tired or this exhausted?'"* (20).

4.4.2.2. Negative emotion: lack of confidence, fear, and loneliness

NQMs' negative feelings included lack of confidence, fear, and loneliness. When they entered a new environment, due to unfamiliar with the environment and lack of training, they were not confident in themselves. *"When we were students, we were never given any chance to practice managing the unit, but suddenly you are expected to manage the unit including patients, staff members, equipment and supplies. This is not easy. Especially because you do not feel confident enough to delegate duties to some members of staff"* (16). In addition, they often felt fear when facing some clinical problems alone. *"I was absolutely terrified just because I had not done it for so long…and I would be like, I do not know if I can do this. I do not know what I'm doing"* (20). For many NQMs who work away from home, they were not accompanied by family and friends and felt very lonely. *"Just the loneliness was probably the most emotionally draining thing"* (20). It is very important for them to have time to spend time with their family and friends, and to get their support and company. *"It's really important that you are able to debrief with friends and family because you will say things to friends and family that you would not say to work colleagues"* (20).

4.4.3. Synthesized finding 3: demands and expectations

4.4.3.1. Support from peers, colleagues, and managers

NQMs desperately needed substantial support from peers, colleagues and managers, which was like a light in the dark, making them less nervous and more confident. Support from peers reduced their anxiety. *"[having peer support] should be part of the support process…an opportunity for us to feel like our concerns are being listened too…It's not just us talking amongst ourselves…"* (15). Support from colleagues, especially experienced midwives, helped them smoothly transition, which was essential for them to adapt quickly to their new roles. *"…they orientate you, they explain everything to you, the routine, the procedures and practices and they still keep an eye on you, you know make sure you are doing ok and that gives you confidence"* (28). In addition, it was important to have an approachable leader who can provide great clinical and emotional support to NQMs. *"The manager on the ward was excellent, she was always checking in with you making sure that you were doing okay"* (18).

4.4.3.2. Improve professional competence

NQMs wanted to improve their professional skills, including clinical decision-making ability, humanistic care, and clinical professional skills. First, NQMs expected independent clinical decision-making capabilities and they needed to have independent autonomy in the care of their patients. *"I also dared to make decisions and I dared to pick up [tasks] independently and it is really not that I needed help with anything and everything. I think that I can generally work independently"* (16). Second, almost all the participants hoped to give more humanistic care to women. *"My frustration is mainly to do with the women not getting the care that maybe they expected or I expected them to get"* (25). *"For me, being with the woman is just a part of my soul…but I do not get a lot of time to do that…I have to do a lot of things rather than actually being with woman…"* (18). By improving humanistic care, in turn inspires them to work better. *"When I support a woman…that is why I chose this profession. Then it is easy to get out of my bed in the night. Moreover, I feel that my work is my passion, and my passion is my work"* (22). Finally, NQMs would like to receive more professional training or study in order to adapt faster to the new environment and further strengthen their professional skills. *"I hope to continue my study in midwifery and continuously improve my skills in technical operation and clinical thinking"* (29).

4.4.3.3. Standardize the management system

NQMs desired to standardize the industry management and establish an independent midwifery management and training system. *"For young midwives, there should be a standardized training system, and they should have standardized training just like clinicians. After all, this line of work requires a high level of competence for midwives, and*

our work is also related to the safety of mothers and babies" (29). Besides, there were some shortcomings about the hospital management systems, such as paying too much attention to employee rank, ignoring NQMs' opinions and feelings, and focusing solely on number rather than quality of the work. *"Midwifery is a hierarchical system. It is based on midwifery-in-charge [and] also who has been here the longest or who has the most experience and it's like you were in a food chain"'* (26). *"Midwifery practice requires me to actually give more loyalty to the hospital and do all the tasks that they expect of me in a day to save [them] from being sued or just to say, 'These jobs have been done"'* (26).

5. Discussion

The systematic review of 14 qualitative studies was rigorously conducted by researchers trained in evidence-based nursing, contributing to a more in-depth and comprehensive understanding of experiences of NQMs during the transition period. The main findings indicated that NQMs faced challenges from multiple sources. These challenges mainly derived from the realistic clinical settings. They felt so stressed as a fresh midwife. At the same time, we also discovered their real needs and expectations. Therefore, to ease their physical and mental stress and further create a friendly work environment, transitional support for NQMs should be strengthened and the training system should be improved, which will play a positive role in reducing the resignation rate of new midwives.

Hospitals and schools should collaborate to facilitate a smooth transition to clinical practice for NQMs. Gap between theory and practice, high risk, high intensity, job insecurity are the main challenges NQMs faced during the transition. Complex interpersonal relationships and high-loaded work cause negative work experience, and affect adversely their physical and mental health (30). Therefore, it's urgent to take various measures to help them meet challenges, and enhance their positive career experience. Hospitals and schools need deep cooperation to provide targeted career guidance to students. During the school, midwifery specialists can introduce the nature, significance, professional content and history of the midwifery profession in China and abroad, and share their professional experiences. Besides, the clinical practice is equally important. The midwifery training room should be available for students so that they can have a preliminary understanding and experience of the clinical midwifery work. This may help them identify and internalize their professionalism. Educators should pay attention to the combination of theoretical and practical teaching, cultivate students' practical ability, so that they can better adapt to clinical after graduation. At the same time, attention should be paid to improve students' psychological quality and improve their ability to cope with occupational stress.

The clinical transition support system should be improved to promote positive career experience for NQMs. The multifaceted, multi-disciplinary clinical support system has positive implications for the smooth transition of NQMs to new roles. According to studies, the level of clinical support new midwives receive during the clinical transition greatly influences their clinical competence (31). According to Thunes (32) and Fenwick (33), obstetrics students attribute their clinical success to the practitioners they work together every day. On the one hand, improving the support system can reduce the clinical responsibility and pressure of NQMs and prevent them from intentionally narrowing the scope of their practice for fear of taking risks; on the other hand, it can promote NQMs to maximize the professional role and provide maternal-centered midwifery services, so as to further improve the quality of maternal and infant health care.

Strengthen continuing education to ensure the sustainability of the NQMs team. Many NQMs often feel a lack of expertise and competence when face with complex clinical problems, and continuing professional learning becomes the expectation of most of them. And their new level of responsibility inspires the importance of continuous professional education in order to continue to provide safe care for women. Continuing education programs will help healthcare providers improve their professional competence and adapt them to rapidly changing and new roles (34–36). Particularly, midwives are one of the important healthcare providers, and their continuing education can enhance midwives' ability to improve maternal and child health status (37).

Standardize the management system and provide a broad career exhibition path for NQMs. They have high expectations for regulated management systems, especially they want independent professional systems and independent professional behavior. At present, in many countries, the midwifery major still belongs to the nursing major (38), and midwives do not have independent professional title evaluation and promotion sequence, and lack of the corresponding assessment, registration and promotion system (38), which forms certain obstacles to the echelon construction of midwifery talents and the development of professional characteristics. Improving the standard management system of midwifery professional education and midwife registration is conducive to enhancing the sense of responsibility and autonomy of NQMs, providing a richer career development path, so as to promote the development of midwifery profession and the retention of talent resources.

6. Conclusion

This qualitative systematic review expounds the experience and feelings of NQMs during the transition to practice. Studies have shown that NQMs face multifaceted challenges, which have negative effects on their physical and mental health. NQMs are at a critical time in their career development, and properly guiding their role change is a difficult but important task. From the perspective of obstetric educators and clinical managers, this study suggests that hospitals and schools collaborate on guidance and intervention to improve clinical transitional support systems, standardize management systems, and strengthen continuing education. And thus, it helps NQMs make a smooth transition to clinical practice, gain positive career experiences, and provide them with a broad career path. This can contribute to the building and sustainable development of the midwifery workforce and better serve people.

7. Limitations

Although a systematic search was conducted using appropriate search strategies, according to the eligible criteria, only qualitative research or mixed-method studies from which qualitative data could be extracted were included. Gray literature and dissertations were not searched; only articles published in indexed journals in either Chinese

or English were included. The omittance may have caused information bias. The included studies were of high quality, but two-thirds of the literature omitted information about the researcher's theoretical or cultural background, which could have an impact on the results.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

JS and XL: conceptualization, methodology, formal analysis, writing of original draft, and writing – review and editing. YL: conceptualization, methodology, writing of original draft, and writing – review and editing. YL, JL, RZ, and HJ: conceptualization, methodology, formal analysis, and writing – review and editing. All authors contributed to the article and approved the submitted version.

Funding

This work was supported by: (1) Technical standard project of Shanghai Municipal 2022 "Action Plan for Science and Technology Innovation" (22DZ2203800), (2) Shanghai Shenkang Hospital Development Center Management Research Project (2022SKMR-18) and (3) Shanghai Shenkang Hospital Development Center Technology Standardization Management and Promotion Project (SHDC22022227).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fmed.2023.1242490/full#supplementary-material

References

1. Nove A, Friberg IK, de Bernis L, McConville F, Moran AC, Najjemba M, et al. Potential impact of midwives in preventing and reducing maternal and neonatal mortality and stillbirths: a lives saved tool modelling study. *Lancet Glob Health*. (2021) 9:e24–32. doi: 10.1016/S2214-109X(20)30397-1

2. Callister LC. Global strategy for the health of women, children, and adolescents: 2016-2030. *MCN Am J Matern Child Nurs*. (2016) 41:190. doi: 10.1097/NMC.0000000000000237

3. Boateng AB, Opoku DA, Ayisi-Boateng NK, Sulemana A, Mohammed A, Osarfo J, et al. Factors influencing turnover intention among nurses and midwives in Ghana. *Nurs Res Pract*. (2022) 2022:4299702–8. doi: 10.1155/2022/4299702

4. The State of the World's Midwifery in 2021.

5. Clements V, Davis D, Fenwick J. Continuity of care: supporting new graduates to grow into confident practitioners. *Int J Childbirth*. (2013):3–12. doi: 10.1891/2156-5287.3.1.3

6. Rahmadhena MP, McIntyre M, McLelland G. New midwives' experiences of transition support during their first year of practice: a qualitative systematic review protocol. *JBI Database Syst Rev Implement Rep*. (2017) 15:1265–71. doi: 10.11124/JBISRIR-2017-003374

7. Gray M, Malott A, Davis BM, Sandor C. A scoping review of how new midwifery practitioners transition to practice in Australia, New Zealand, Canada, United Kingdom and The Netherlands. *Midwifery*. (2016) 42:74–9. doi: 10.1016/j.midw.2016.09.018

8. Shortage of midwives is the reason for high agency staff costs, says RCM. *Pract Midwife*. (2015) 18:8.

9. Nour V, Williams AM. "Theory becoming alive": the learning transition process of newly graduated nurses in Canada. *Can J Nurs Res*. (2019) 51:6–13. doi: 10.1177/0844562118771832

10. Dixon L, Calvert S, Tumilty E, Kensington M, Gray E, Lennox S, et al. Supporting New Zealand graduate midwives to stay in the profession: an evaluation of the midwifery first year of practice programme. *Midwifery*. (2015) 31:633–9. doi: 10.1016/j.midw.2015.02.010

11. Lennox S, Skinner J, Foureur M. Mentorship, preceptorship and clinical supervision: three key processes for supporting midwives. *NZ Coll Midwives J*. (2008) 39:7–12.

12. Hofler L, Thomas K. Transition of new graduate nurses to the workforce: challenges and solutions in the changing health care environment. *N C Med J*. (2016) 77:133–6. doi: 10.18043/ncm.77.2.133

13. Labrague LJ, McEnroe-Petitte DM. Job stress in new nurses during the transition period: an integrative review. *Int Nurs Rev*. (2018) 65:491–504. doi: 10.1111/inr.12425

14. Tong A, Flemming K, McInnes E, Oliver S, Craig J. Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. *BMC Med Res Methodol*. (2012) 12:181. doi: 10.1186/1471-2288-12-181

15. Wier J, Lake K. Making the transition: a focus group study which explores third year student and newly qualified midwives' perceptions and experiences of becoming a registrant midwife. *Midwifery*. (2022) 111:103377. doi: 10.1016/j.midw.2022.103377

16. Simane-Netshisaulu K, Maputle M, Netshikweta LM, Shilubane H. Mentorship during transition period: a challenge for newly qualified midwives in Limpopo province of South Africa. *Afr Health Sci*. (2022) 22:191–9. doi: 10.4314/ahs.v22i1.25

17. Mtegha MB, Chodzaza E, Chirwa E, Kalembo FW, Zgambo M. Challenges experienced by newly qualified nurse-midwives transitioning to practice in selected midwifery settings in Northern Malawi. *BMC Nurs*. (2022) 21:1–12. doi: 10.1186/s12912-022-01012-y

18. Cazzini H, Cowman T, Fleming J, Fletcher A, Kuriakos S, Mulligan K, et al. An exploration of midwives' experiences of the transition to practice in the Republic of Ireland. *Br J Midwifery*. (2022) 30:136–43. doi: 10.12968/bjom.2022.30.3.136

19. Simane-Netshisaulu KG. Student to midwife transition: newly qualified midwives? Experiences in Limpopo province. *Health SA Gesondheid*. (2022) 27:27. doi: 10.4102/hsag.v27i0.1992

20. Donovan H, Welch A, Williamson M. Reported levels of exhaustion by the graduate nurse midwife and their perceived potential for unsafe practice: a phenomenological study of Australian double degree nurse midwives. *Workplace Health Saf*. (2021) 69:73–80. doi: 10.1177/2165079920938000

21. Kool LE, Schellevis FG, Jaarsma D, Feijen-De JE. The initiation of Dutch newly qualified hospital-based midwives in practice, a qualitative study. *Midwifery*. (2020) 83:102648. doi: 10.1016/j.midw.2020.102648

22. Kool L, Feijen-de Jong EI, Schellevis FG, Jaarsma D. Perceived job demands and resources of newly qualified midwives working in primary care settings in the Netherlands. *Midwifery*. (2019) 69:52–8. doi: 10.1016/j.midw.2018.10.012

23. Norris S. In the wilderness: an action-research study to explore the transition from student to newly qualified midwife. *Evid Based Midwifery*. (2019) 17:128–34.

24. Huang S, Yu Y, Zhou X, Cai W. The occupational experience of the new-recruited undergraduate midwives. *Chinese Nursing Education*. (2017) 14:692–6.

25. Hobbs JA. Newly qualified midwives' transition to qualified status and role: assimilating the 'habitus' or reshaping it? *Midwifery*. (2012) 28:391–9. doi: 10.1016/j.midw.2011.04.007

26. Fenwick J, Hammond A, Raymond J, Smith R, Gray J, Foureur M, et al. Surviving, not thriving: a qualitative study of newly qualified midwives' experience of their transition to practice. *J Clin Nurs*. (2012) 21:2054–63. doi: 10.1111/j.1365-2702.2012.04090.x

27. Clements V, Fenwick J, Davis D. Core elements of transition support programs: the experiences of newly qualified Australian midwives. *Sex Reprod Healthc*. (2012) 3:155–62. doi: 10.1016/j.srhc.2012.08.001

28. van der Putten D. The lived experience of newly qualified midwives: a qualitative study. *Br J Midwifery*. (2008) 16:348–58. doi: 10.12968/bjom.2008.16.6.29592

29. Karimyar JM, Minaei S, Abdollahifard S, Maddahfar M. The effect of stress management on occupational stress and satisfaction among midwives in obstetrics and gynecology hospital wards in Iran. *Glob J Health Sci*. (2016) 8:91. doi: 10.5539/gjhs.v8n9p91

30. U-Eun C, Hyun-Young K. The impact of safety climate and fatigue on safety performance of operating room nurses. *J Korean Acad Nurs Adm*. (2016) 22:471. doi: 10.11111/jkana.2016.22.5.471

31. Thunes S, Sekse RJ. Midwifery students first encounter with the maternity ward. *Nurse Educ Pract*. (2015) 15:243–8. doi: 10.1016/j.nepr.2015.01.012

32. Power A, Grzelak I. University midwifery societies: support for student midwives, by student midwives. *Br J Midwifery*. (2016) 24:787–9. doi: 10.12968/bjom.2016.24.11.787

33. Heslehurst N, Russell S, McCormack S, Sedgewick G, Bell R, Rankin J. Midwives perspectives of their training and education requirements in maternal obesity: a qualitative study. *Midwifery*. (2013) 29:736–44. doi: 10.1016/j.midw.2012.07.007

34. Elliott S, Murrell K, Harper P, Stephens T, Pellowe C. A comprehensive systematic review of the use of simulation in the continuing education and training of qualified medical, nursing and midwifery staff. *JBI Libr Syst Rev*. (2011) 9:538–87. doi: 10.11124/01938924-201109170-00001

35. Yolanda FP, Magdalena AC. Factors influencing nursing staff members' participation in continuing education. *Rev Lat Am Enferm*. (2006) 14:309–15. doi: 10.1590/S0104-11692006000300002

36. Abedian K, Charati JY, Samadaee K, Shahhosseini Z. A cross-sectional study of Midwives' perspectives towards their professional educational needs. *Mater Sociomed*. (2014) 26:182–5. doi: 10.5455/msm.2014.26.182-185

37. O'Connell MA, Sosa G. Midwifery in Abu Dhabi: a descriptive survey of midwives. *Women Birth*. (2023) 36:e439–44. doi: 10.1016/j.wombi.2023.02.002

38. Ten HP, Lopes ST, Nove A, Michel-Schuldt M, Moyo NT, Bokosi M, et al. Midwifery 2030: a woman's pathway to health. What does this mean? *Midwifery*. (2016) 32:1–6. doi: 10.1016/j.midw.2015.10.014

frontiers | Frontiers in Global Women's Health

TYPE Original Research
PUBLISHED 29 August 2023
DOI 10.3389/fgwh.2023.1215405

OPEN ACCESS

EDITED BY
Lorena Binfa,
University of Chile, Chile

REVIEWED BY
Alicia Carrasco,
University of Chile, Chile
Macarena Martínez Órdenes,
University of Chile, Chile

*CORRESPONDENCE
Sara E. Casey
✉ sec42@columbia.edu

RECEIVED 01 May 2023
ACCEPTED 16 August 2023
PUBLISHED 29 August 2023

CITATION
Perera SM, Isa GP, Sebushishe A, Sundararaj P, Piccirillo M, Xia S, Langaigne A, Ali J and Casey SE (2023) "Midwives are heroes of the country": qualitative evaluation of a midwifery education program in South Sudan.
Front. Glob. Womens Health 4:1215405.
doi: 10.3389/fgwh.2023.1215405

"Midwives are heroes of the country": qualitative evaluation of a midwifery education program in South Sudan

Shiromi M. Perera[1], Guma Patrick Isa[2], Abdou Sebushishe[2], Preethika Sundararaj[3], Megan Piccirillo[3], Shanell Xia[3], Amaya Langaigne[3], Javed Ali[1] and Sara E. Casey[3]*

[1]International Medical Corps, Washington, DC, United States, [2]International Medical Corps, Juba, South Sudan, [3]RAISE Initiative, Heilbrunn Department of Population and Family Health, Mailman School of Public Health, Columbia University, New York, NY, United States

Background: Countries affected by armed conflict have higher maternal mortality than stable settings. South Sudan has one of the highest maternal mortality ratios in the world, with an estimated 789 maternal deaths per 100,000 live births. Long-term socio-political instability has contributed to significant challenges in its health system. To reduce maternal and newborn morbidity and mortality, South Sudan must increase the number of skilled midwives.

Methods: A cross-sectional mixed methods study was conducted in 2022 to assess the midwifery education program at three schools receiving support from International Medical Corps in South Sudan, including in-depth interviews with 15 midwifery school graduates currently working as midwives, their supervisors, 16 school faculty (in dyads), and two Ministry of Health officials; and nine focus group discussions with women clients of graduate midwives.

Results: Participants identified strengths of the schools, including being well equipped with trained and competent teaching staff, competency-based curriculum, including practical training which prepared graduate midwives to apply their skills in practice. Weaknesses of the program included its dependence on donor funding, inadequate mentorship and number of tutors, and insufficient practice for some services due to low client load at clinical sites. Additionally, participants identified challenges affecting midwives' ability to provide good quality care, including lack of equipment and supplies, low client load, low salaries, and insecurity due to conflict. Nevertheless, women in the community appreciated the immense work that midwives do. Midwives were respected by the community at large, and graduates expressed pride and satisfaction in their job, as well as the positive impact they have had in providing critical services to communities.

Discussion: Overall, the quality of the midwifery education program appears to be strong, however gaps in the program and the provision of quality care remain. The findings highlight the need to ensure sustained funding for midwifery education, as well as health system strengthening to ensure midwives can practice their skills. Continued investment in midwifery education and training is critical to reduce high maternal mortality and morbidity in South Sudan.

KEYWORDS

midwifery education, South Sudan, sexual and reproductive health, mixed methods, armed conflict

Introduction

Investing in midwifery could prevent two-thirds of maternal and newborn deaths globally (1). Midwives are trained to provide a range of sexual and reproductive health services, including management of uncomplicated pregnancies and deliveries, antenatal and postnatal care, and contraceptive services (2). Trained midwives working in collaboration with other medical professionals have been associated with rapid and sustained decrease in maternal and newborn mortality (3).

In 2020, nearly 290,000 women globally lost their lives during and following pregnancy and childbirth, with about 70% of these maternal deaths occurring in Sub-Saharan Africa (4). Countries affected by armed conflict have maternal mortality ratios that are double those found in conflict-free countries (5). Childbirth and pregnancy are the leading causes of death among women and girls in South Sudan (6). The world's newest country, South Sudan has one of the highest maternal mortality ratios in the world, with an estimated 789 maternal deaths per 100,000 live births, a decrease from over 1,300 maternal deaths at independence in 2011 (7). Other health indicators are also alarming: in 2021, the neonatal mortality rate and under-five mortality rate were 40 and 99 deaths per 1,000 live births, respectively (8). A report from the government of South Sudan and UNFPA attributed the country's high maternal mortality ratio to limited availability of quality health care services and the lack of skilled birth attendants (9). An estimated 19% of births in the country are attended by skilled health personnel (10). Shortages of health workers are rampant across Sub-Saharan Africa, with many countries relying on task-shifting in order to improve health care coverage (11). Even so, mid-level health workers such as midwives are severely lacking in South Sudan. At independence in 2011, the country had only 12 fully qualified midwives (12). As of 2019, this had increased to over 600 fully trained midwives, but this is not enough to meet the needs of the South Sudanese population (12). The *State of the World's Midwifery 2021* report highlights the importance of investing in midwives and calls on all governments to increase midwifery education and training (1). Embedding midwives into the health system will advance progress towards Sustainable Development Goal 3—"Good Health and Well-Being" (1).

Since South Sudan gained independence in 2011, long-term socio-political instability has contributed to significant challenges in its health system (13). Economic recession and the government's limited capacity to fund the health system has had a catastrophic impact on the health sector, thus requiring substantial dependence on external sources like international organizations and foreign governments (14). Ongoing conflict that re-started in 2013 caused widespread destruction, a shortage of healthcare workers, and limited health infrastructure, further contributing to these challenges. Additionally, 50% of the South Sudanese population live below the poverty line, and more than 80% of the population live in rural areas with poorly developed infrastructure such as roads and health facilities (15). It is imperative for the country to develop a sustainable health service delivery system and increase adequately trained health personnel, such as midwives, to address the needs of the people.

Since 2008, International Medical Corps (IMC) has co-managed and supported three midwifery schools in South Sudan: Juba College of Nursing and Midwifery (JCONAM), Kajo Keji Health Sciences Institute (KKHSI) and Wau Health Sciences Institute (WHSI). The schools offer a 3-year midwifery diploma program that includes research, management, and leadership training. The diploma curriculum meets the standards on essential competencies established by the International Confederation of Midwives and includes basic emergency obstetric and newborn care (BEmONC). The schools also offer an enrolled midwifery program, which is a 2.5-year certificate program, similar to the diploma program without the research, management, and leadership training. Various pedagogical approaches are utilized to build the skills needed to be successful midwives. Through this education program, IMC has sought to contribute to reductions in maternal, neonatal, and child morbidity and mortality in South Sudan by increasing the number of trained midwives in the country. IMC, with donor funding, provides funding for faculty, scholarship students, resources, and facilities. Since the start of the program, 472 midwives have graduated from the three IMC-supported schools.

An outbreak of violence in 2016 temporarily closed all three schools. KKHSI experienced severe loss, with the destruction of property and equipment. As a result, the entire school, including staff and students, was relocated to Juba for their safety. In Juba, they shared the same premises with JCONAM, leading to considerable issues with space and resources. In August 2022, KKHSI moved back to the original Kajo Keji property.

In 2022, IMC, in collaboration with the Reproductive Health Access, Information and Services in Emergencies (RAISE) Initiative at Columbia University conducted a cross-sectional mixed methods evaluation of the midwifery education program to determine its strengths and weaknesses. The evaluation sought to understand perceptions of midwife graduates and their current supervisors, key stakeholders, and South Sudanese women who received care from the graduates. This manuscript focuses on the qualitative findings; quantitative results will be published elsewhere.

Materials and methods

The evaluation of the midwifery education program was conducted at the three midwifery schools receiving IMC support: JCONAM, KKHSI, and WHSI. Key informant interviews were conducted individually or in dyads or triads with stakeholders involved in the midwifery education program (**Table 1**). These included principals, teachers, and clinical preceptors from the three schools and Ministry of Health (MOH) staff in Juba involved in the national midwifery education program.

In-depth interviews were conducted with 15 midwife graduates and their supervisors working in Juba, Wau or Malakal at the time of data collection (**Table 2**). Kajo Keji was still insecure at the time of the study; therefore Malakal was identified as an alternative

TABLE 1 Number of key informant interviews.

	JCONAM	KKHSI	WHSI	Total
Principal	–	1	1	2
Teachers (Dyads)	2	1	1	4
Clinical preceptors (Dyads or triads)	2	–	2	4
Ministry of health	–	–	–	2
Total key informant interviews	–	–	–	12

TABLE 2 Number of in-depth interviews and focus group discussions.

	Juba	Wau	Malakal	Total
In-depth interviews	10	10	10	30
Supervisors	5	5	5	15
Midwife graduates	5	5	5	15
Focus group discussions	3	3	3	9

location since IMC has presence in the area and many midwife graduates were working in the area. Focus group discussions were conducted with female clients of a subset of these midwife graduates. Graduate midwives were purposely selected from a list of graduates provided by the schools whose current job showed they were working in Juba, Wau or Malakal. Respondents were selected to ensure a mix of schools, graduation dates, and sex. Interviewers contacted selected graduates to explain the study and ask if they were willing to participate, and if the interviewer could also speak to their current supervisor about their work. Finally, the graduates were asked to purposely identify a group of women from the local community who had used their midwifery services for a focus group with a goal of completing nine focus groups.

Data collection

Four interviewers who were themselves midwives (three females and one male) participated in a five-day training covering qualitative methods, research ethics and the study instruments. The teams completed data collection in Juba first, and then the team split in half with two interviewers traveling to Wau and two to Malakal for further data collection. Interviews with graduates, supervisors and key informants were mostly conducted in English. Focus group discussions were conducted by female interviewers primarily in Juba Arabic. Interviewers did not interview faculty or preceptors from the school they attended. Interviews took 30–45 min and focus group discussions lasted 50–80 min. Data collection took place in March and April 2022.

Analysis

All interviews and focus groups were transcribed, and if needed, translated to English. The English transcripts were clarified with members of the research team in South Sudan. Using an inductive approach, researchers created codebooks for each type of respondent through an iterative process. After the codebooks were finalized, transcripts and codebooks were uploaded into Dedoose (16). All focus group discussions were double coded while interview transcripts were coded by one researcher, with a second researcher coding 20% of the transcripts. When discrepancies arose, they were discussed and resolved until inter-rater reliability was achieved. When coding was completed, researchers conducted thematic content analysis to identify the main themes.

Ethical considerations

Before the interviews and focus group discussions, verbal informed consent was obtained from all participants. Interviews and discussions were audio recorded; no participant names were included in transcripts. Only members of the research team had access to the recordings and transcripts. The Institutional Review Board of Columbia University and the Ministry of Health for the Republic of South Sudan determined the study to be exempt.

Results

Results were categorized into six major themes: strengths of the midwifery education program, areas identified for strengthening, effects of the midwifery education program, service delivery challenges, community women's views, and perceptions of male midwives.

Strengths of the midwifery education program

Participants described the schools as well-equipped to train competent and skilled midwives given the high quality and standards of the faculty. Teachers explained that IMC-supported schools benefited from well trained and competent staff, such as teachers and clinical preceptors. Teachers were described as skilled and confident in their abilities and were known to not only teach, but also shape student's attitudes through mentorship. Several teachers found it rewarding to share their knowledge and mentor students. They described seeing their graduates applying the knowledge and providing good quality services when they visited health facilities as a source of pride. In addition, a few teachers explained how their teaching expands beyond the classroom and their own students when they found themselves teaching students and staff from other schools while at clinical sites.

> *"Having been in the private sector, and also having seen what takes place in government- owned and government- run institutes which provide midwifery trainings, you can realize that this midwifery training by IMC, at least it is better facilitated. This is one of the strengths, [it is] better facilitated, you have good well-trained staff, well- trained clinical instructors, competent tutors! I could say in summary that*

> *competent staff is one of the strengths, they are well remunerated, compared to others and the graduates that are produced are of good quality because of these factors." (Teachers, Dyad 3).*

Many respondents referred to the competency-based approach to teaching and the practical component of the curriculum as a strength of the midwifery education program. Practice at clinical sites allowed midwifery students to refine their knowledge and attitudes, while practicing their skills.

> *"We look at the curriculum and then we look at how best we allocate [students] according to what they have covered in theory. …and then before they're taken to the clinical [sites], once they"ve finished their first theory, we evaluate them … we evaluate them to look at how best they understood the class teaching and when they are evaluated then we can see the level of performance that they have before we take them to the clinical area. … So we give them that time to learn a lot. You demonstrate and then after that you allow them to do a return demonstration so that you can know the level of competencies." (Teachers, Dyad 1).*

Clinical preceptors explained the process of successful practical training, which involved close monitoring and providing step-by-step guidance.

> *They [students] will be given time to correct their mistakes, but you are still in the learning stage, and this will be between [the student] and the monitor. But these students are good, if they make a mistake and you tell them, they correct the mistake and are happy because you told them the mistake and you help in correcting it." (Clinical preceptors, Dyad 4).*

Graduates of the midwifery schools explained that the practical component was a vital part of their education, providing skills they were prepared to apply in practice after graduation.

> *"What made me a successful midwife was the practical clinical attachment that I had. They gave me exposure and much experience, even when I was still a student, plus the tutorship that I had. So, the combination of the two made me the midwife I am today." (Male midwife 14).*

Graduates reported feeling prepared to provide a range of midwifery services upon graduation, with family planning, antenatal, and labor/delivery care the most frequently mentioned. The majority of supervisors agreed, indicating that their midwife was well-prepared for the work following their formal training. Most supervisors noted that midwives provided a range of care, including family planning and safe delivery. Midwives also participated in community education to raise awareness about the importance of antenatal care, fulfill administrative tasks, and facilitate referrals to and from the facility.

For a select number of students who could not afford schooling, IMC provided financial support (with donor funds) for tuition and accommodation. Several faculty mentioned this support as a strength.

> *"To the students actually they benefited because some students they can't pay school fees going to the university, so their parents are not able to do that. So at least they got free education, they have graduated and they are working. And by working you are able to support your mothers, your parents, in case they are not married so this one is already the benefit for the student." (Principal 2).*

Areas identified for strengthening

Graduates described the services that they felt least prepared to provide, with complicated deliveries most frequently mentioned, along with newborn care, care for survivors of gender-based violence, and post-abortion care. Supervisors concurred, mentioning weaknesses in manual vacuum aspiration (MVA) and subcutaneous depot medroxyprogesterone acetate (DMPA-SC) administration as well as documentation and clinical register maintenance. While graduates generally reported being well-prepared to provide family planning, they mentioned needing additional practice and training on long-acting methods, such as intrauterine device (IUD) placement and removal, due to low client load during their training.

> *"In family planning, like this IUD, unless supported by another, how to insert, I cannot manage alone." (Female midwife 15).*

While the practical component of their training was consistently identified as a critical strength of the training, graduates reported some gaps, including insufficient time, mentorship, and clients to practice on. Supervisors also mentioned that the practical components of the midwifery program were insufficient at times as the midwives did not always have the opportunity to put theory into practice during their training.

> *"We came and realized that sometimes the number of students was more than the patients. So, any client that comes to the facility, if someone grabs them already, then other students will not get…there is lack of patients" (Female midwife 4).*

Although overall satisfaction with the faculty was high, some participants identified the need for additional and better trained clinical preceptors and tutors. Several graduates discussed weaknesses with some tutors and preceptors that supported their studies, primarily when they were too few, had high turnover, or limited skills. Teachers also suggested that there were too few preceptors at clinical sites to guide the many students for practical training.

> *"The only weakness I have seen…is the inconsistency of the tutors. We can have a tutor today, tomorrow, [but] maybe after some months that tutor will be out…although the tutor was not competent enough and the replacement was*

> *competent enough, still we felt that was not good and that was a weakness of the institution." (Male midwife 14).*

Many teachers also worried about the insufficient number of tutors to properly teach large class sizes. Over the previous six years, the number of tutors was reduced due to budget cuts and nationalizing of staff positions. Teachers expressed concern over the reduced quality of teaching and being unable to provide sufficient attention to all students. A few teachers felt that they were doing "double work" to help with the shortage. The MOH respondents suggested that the shortage of qualified teachers and preceptors resulted in some students being supervised and taught by untrained personnel at the clinical sites.

Key informants described the midwifery education program's dependence on donor support and funding issues over the past few years as a substantial weakness. Budget cuts impacted all three schools, resulting in decreased financial support and scholarships, reduced number of staff, and fewer students recruited into the program. The staff pointed out that the government and other stakeholders had no clear plans for sustainability, nor sufficient political will to sustain the school once funds depleted. A few teachers also mentioned low salaries, especially for those employed by the MOH, as particularly demotivating when they were asked to increase their workload following staffing cuts.

> *"If you look at these three schools you are doing this survey on, these schools were fully supported by the NGO. So, currently, funding has ended and ending the funding means, there is no more hope again because the Ministry [of Health] has not yet stepped in. So, that one I see it as one of the weaknesses, meaning our government will never look at what will happen after the NGOs leave." (Principal 1).*

MOH staff explained that the MOH was unable to provide much support to the program given its low budget.

> *"The program is ongoing but it's stagnating. It's stagnating. When we had the training, it was donor supported. When there is no donor support, that is where the problem is. The other parties, the government has not put in funds to take care of these midwifery trainings…Because the budget of the Ministry of Health was very low." (Ministry of Health 1).*

Participants also described the impact of conflict on the education program, with each school closing for periods of time when students and staff could not safely come to school. Since these closures, MOH staff explained the importance of working with principals to develop contingency plans to ensure the schools' continued operation.

> *"When there's insecurity that comes out, like in 2016, when the outbreak of civil war in South Sudan broke out…there's no teaching. The activities were locked down. For around 3 months, there were no other activities that were running." (Teacher, Dyad 4).*

Effects of the midwifery education program

Teachers described that South Sudan had few midwives prior to independence in 2011, a grave problem until IMC and other partners began supporting midwifery education in the country. Teachers perceived a considerable decrease in maternal and neonatal mortality in the last few decades in South Sudan, partly attributing this reduction to the education program and the increase in the number of midwives in the country.

> *"You know, when the census was done, the maternal mortality [ratio] was 2054 at that time in 2008. But now when you compare the maternal mortality at that time and this time, now we have [a maternal mortality ratio of] 789. So, there's a great improvement that has occurred. And why did it come like that? Because there are midwives outside, they're already serving. At least, they've done their best. And not only midwives alone, also nurses, to reduce maternal mortality. … That's why the maternal mortality ratio has gone down. And we hope that it will continue to go down until zero if possible." (Teacher, Dyad 1).*

Teachers and clinical preceptors explained that midwife graduates worked all over South Sudan, even reaching remote villages to provide much needed services to marginalized communities. Graduates described how their training was relevant to the communities they served as it filled a gap in the existing health services. They reported increases in health facility deliveries and family planning use—a change they credited to their midwifery education and training. Additionally, new midwives were seen to bring "updated" knowledge from their training that they could teach to current staff at facilities.

> *"The most important thing about this program is the fact that these mothers are being attended to by skilled, trained midwives. Skilled ones. And, when these mothers are being attended to, it means a lot. You find that she has less chances of getting in this kind of risk during pregnancy and so forth. So, you find that this program it has been positive in the community, especially for mothers." (Teacher, Dyad 1).*

> *"Yes, [the services I was trained in are] relevant because it's helping people… For family planning, it's helping mothers now to delay instead of just rapidly deliver [again]. Also, for mothers who are pregnant they go for antenatal care, for focused antenatal care. Instead of staying at home and delivering from home… [they know] the importance of delivering in the hospital. It's very relevant." (Female midwife 13).*

Similarly, supervisors also noticed the impact of the work done by midwives. Due to an increase in both quality of care and community education, supervisors indicated that more women were now delivering in facilities, as well as coming for antenatal care (ANC) and family planning. A few supervisors also stated

that they made fewer referrals to the hospital now that midwives are present.

> *"You know at the beginning, people here have a lot of referrals to [Hospital] but since he came here, we have no more referrals now unless when he cannot manage [them]. Like before, this incomplete abortion we did refer them and when he was not there those people used to go to [Hospital], but after we recruited him and brought him here, now it has reduced the level of referral. Most of the mothers are not reaching [Hospital] because he is now here and can provide all these services." (Supervisor 7, male midwife).*

Almost all supervisors spoke about how the midwives were respected by community members who understood the importance of the work that midwives do. Several participants also noted reductions in women coming in with infections.

> *"The community knows the impact of our midwife in this hospital. Let me give you one example. One time due to some political issues, the OPD [outpatient department] and other services were closed. But the community said you can close all other services except the maternity. … We can never accept to close the maternity. So, I mean that's when the community understood that this service is very important." (Supervisor 2, male midwife)*

> *"Actually, there is great improvement compared to the time before those midwives were working. After the graduation, these new students start coming in to practice; there is a lot of changes in every area. Sepsis has gone down, antenatal has increased, deliveries have increased, family planning has increased." (Supervisor 5, female midwife)*

Midwives largely reported pride and satisfaction in their work, providing services to women and the positive impact these services have on communities.

> *"You know working as a midwife, actually in my experience is a great joy, because you are saving lives and at the end of any successful work, you find that you are putting a smile onto the faces of these women who have delivered and to the family. So that joy gives me happiness and it actually motivates me in the work I am doing as a midwife." (Male midwife 9).*

> *"The life challenges that they go through are not comparable to our neighboring countries because we live in a resource constrained country, resource constrained health facilities. … When they go out there, to me, they beat all the odds. They beat the odds. For them to live year in year out and providing services out there, for me they are heroes. They are heroes of the country." (Teacher, Dyad 3).*

Teachers and clinical preceptors also discussed their pride in being part of the midwifery profession through their roles in this program. They also expressed pride in the midwives they have trained over the years.

> *"So when I think of the fact that these people I trained tomorrow would deliver a mother and the mother and the baby would be safe, I feel so proud because I feel that I'm one of those people who are involved in reducing the maternal mortality ratio… I feel proud about that and that is the reason why I keep moving forward." (Teacher, Dyad 3).*

> *"My two hands as a midwife would not have reached the whole country of South Sudan, but through the training of the students my two hands are almost reaching all states of South Sudan. Meaning it is helping women in almost the whole country, so that makes me very proud. I feel so good because if the mother who is deep in the village there can be attended to by my own students, that is my pride." (Principal 1).*

Service delivery challenges

Both supervisors and graduate midwives described barriers to providing good quality care. Some of the barriers included commodity stock outs, lack of equipment, insufficient staff, and no dedicated rooms for services such as family planning and post-abortion care.

> *"Some of the challenges or barriers could be sometimes we do not have the [resources] that we needed to deliver [services]. Like for example, I'm supposed to be doing BEmONC [basic emergency obstetric and newborn care], but when I came in we did not have the MVA [manual vacuum aspiration] machine. Sometimes we have post-abortion cases to manage so I feel like this is a gap, this is a barrier. I could not do my best. I have the skills and knowledge but the device to perform is not there. That is one. Another is off and on supply of the commodities." (Male midwife 14).*

Supervisors noted that midwives were not always able to put theory into practice due to low client load and suggested that midwife graduates may lose competency in some skills due to lack of practice. Several supervisors had provided on the job training, and most said that the midwives had received at least one refresher training, often on BEmONC, post-abortion care and family planning. However, nearly all said the midwives would benefit from additional refresher training.

> *"For example, if you have trained how to give [family] planning services, at the end of the day you don't have [supplies], so end up doing nothing. So, you may have that skill until it is wasted, and it has no use.… services have to be available to make sure midwives practice what they have learned in school, and they should continue practicing it in their area of work. And that should help to make midwives succeed, because you cannot have the theoretical part and you don't have the practical part." (Supervisor 9, male midwife).*

Among the midwives, low salaries and insufficient compensation were frequently mentioned as a challenge. While some accepted the low salary because of the importance and impact of the work, others expressed greater concern, including that low compensation may force them to move into other career paths. Several midwives mentioned working as volunteers in a health facility first before being hired. Key informants voiced that there were not always enough jobs, and those that were available, especially with the government, paid little to no salary.

> *"The salary I'm getting, the incentive is very little. But the service that I deliver to the community is more than what I am receiving so I am very proud." (Female midwife 1).*

Insecurity due to conflict was a common challenge mentioned by respondents in all groups. Key informants described insecurity as a challenge. In times of conflict, midwives and other health workers did not work in insecure areas of the country out of fear, leaving these areas without vital services. Insecurity also posed a challenge for both midwives and women to safely reach health facilities, especially at night.

> *"I remember when I was working outside of the town, I could not travel due to insecurity issues. So, during such days I would always feel like now I can't make it to the field but my clients and patients need me more than I could stay here. That created instability within myself whenever I'm blocked from access to my facility where I could be able to interact with my clients and patients. It always created a sense of insecurity and instability within me." (Male midwife 14).*

Community women's views

Women in all focus groups described positive experiences with their midwives. Participants expressed their appreciation for the work that midwives do, especially their handling of pregnancy-related care. Women recognized that they and their babies are safer when receiving care from the midwife.

> *Participant 1: "[The midwives] helped me with their words or their medicines or with their things, I am happy with them up to when I gave birth successfully."*

> *Participant 2: "Because she gives you good advice; if you go home, you will remember the things that she told you and you will work with it." (Community women, FGD 1).*

Others described how the contraceptive services provided by the midwives helped them to better provide for their families, educate their children, and space their births. Mothers who had positive experiences with midwives encouraged other women in the community to seek out midwifery care.

> *"Or when you are sick also, they must treat you before you are discharged. You cannot be discharged into the community while the baby is sick, and you are also sick. The midwife does all these before they discharge you, so that there is no complication in your body and no complication in the baby's when you go to the community. The midwife does them all, there is nothing she does not do." (Community women, FGD 5).*

> *"If it is in the place of family planning, they give you this medicine, it will be able to protect you. You will be able to work for yourself. If it is business, you will be able to concentrate for yourself. Even with your children, you will be able to work." (Community women, FGD 3).*

While participants were mostly satisfied with the care received from the midwives, a few participants across groups described negative experiences with them such as being harassed, yelled at, or judged by midwives, or that the midwives had bad tempers. Other negative experiences that women had were related to health system issues, such as lack of materials like maternity kits, stockouts of medication at the health facility, or the lack of capacity for nighttime deliveries. Long distances to the health facility, and cost of or limited availability of transport created barriers to accessing care.

> *"All the things are available, but there is no electricity and there is no torch. The midwife is using her phone light." (Community women, FGD 4).*

> *"There is no midwife who delivers people here at night in [the health facility]. … they carry pregnant women to her home. Everyone gives birth there. I do not know why this hospital does not work at night." (Community women, FGD 6).*

Overall, women recognized that both they and their babies are safer with the midwife's presence. They described how the good work of the midwives and women's positive experiences encouraged other women in the community to visit the midwife. Several noted that more women in their community deliver in the health facility than previously.

> *"Before the midwives were brought, we are suffering, children and women are dying, but since the midwives were brought, there is no death." (Community women, FGD 2).*

> *"A person will hear, like this pregnant mother, if she is given drugs and returns to the community with proper understanding of the nature of the work here, she may mobilize people. … So, now all mothers are here, there is no one in the community or nobody who does not want to come here." (Community women, FGD 5).*

Perceptions of male midwives

Nine of the 15 midwife graduates interviewed were male. A few described the need to convince their families and friends that midwifery was a good profession for them. One mentioned that

his wife appreciated that he now understood what she goes through during pregnancy and delivery.

> *"So, the culture in the community I came from, being a male midwife is a shameful profession. Being in my culture, there is no male midwife…you cannot be a midwife when you are a man." (Male midwife 10).*

The male midwives said that while they faced some pushback or incredulity when they first arrived in a community, community members eventually came to accept them in their role. In the beginning, when some women would refuse (or their husbands prohibited them) to come see them, they described talking to community members and performing their jobs well which ultimately resulted in their acceptance.

> *"Yeah, there is that little bit level of resistance but not from many people… Some of them can refuse to be seen by a male midwife but at the end they will always accept." (Male midwife 14).*

> *"You know at first when you come … and the community see the man is the one conducting deliveries. So in the beginning it was not good, we were facing a lot of challenges but when we get people on more awareness that men also can also conduct delivery [as well as] female then we have no problem. We are receiving our clients and they are very comfortable with us." (Male midwife 2).*

Focus group participants concurred. Some expressed surprise that male midwives existed, but generally, once they overcame their surprise, they appreciated them. Others described feeling uncomfortable in the presence and care of male midwives.

> *"Her surprise is that she has never seen men before conducting delivery and caring for women very well like this. But when she stayed here for two days, she sees positive things. A long time ago women are the ones who can conduct delivery, but now it happens, men also they are conductors. So, she was very surprised when she sees a man now conducting the delivery of her daughter." (Community women, FGD 5).*

> *"When a male midwife is the one conducting deliveries in the hospital and examining the mothers, the mother will refuse and say, "I don't want this man to examine me." All these things are there, they discourage pregnant mothers. You may not wish to return, coming back to the hospital, because you are confused." (Community women, FGD 5).*

Discussion

Our findings suggest that the overall quality of the midwifery education program is strong. The program was described as high quality and well facilitated. Teachers at the schools were committed to their students. Midwife graduates felt prepared to provide most midwifery services, with their supervisors in agreement about their capabilities. The competency-based approach and practical learning component of the midwifery education program were seen as vital. When midwives are educated to international standards, they can provide a full scope of comprehensive interventions and 80% of maternal deaths could be prevented (17). Participants from our study also reported increased use of midwifery services, including safe delivery, ANC, and contraception. They noted that more women were now delivering in facilities and coming in for ANC and family planning because of the midwives' work. Evidence shows that increased healthcare worker density is associated with increased use of ANC and facility birth (18). Delivery in a health facility with a skilled health worker and good quality ANC contributes to reducing maternal and neonatal mortality. Midwife graduates and teachers expressed great pride in their work, similar to findings from midwives in South Africa who reported that their work boosted their self-esteem (19), and in Mozambique who felt empowered by "saving lives, giving hope, helping people, and having the sense that their work was meaningful" (20).

Despite the overall positive perceptions of the education program and the work done by midwives, participants identified a few areas for improvement. Midwife graduates mentioned feeling less prepared to deliver services such as complicated deliveries, newborn care, care for survivors of gender-based violence, and post-abortion care. Graduates mentioned needing additional practice and training on procedures such as IUD placement and removal due to low client load. This finding is comparable to that of Afghanistan, where a dearth of caseloads in health facilities made it difficult for midwives to maintain their skills (21). It is imperative to ensure that midwives receive enough practical training on a range of services and retain competency after graduation. Providing midwives with refresher training and opportunities for clinical simulation of emergencies and rare cases can be an effective technique to enhance skill performance (22). Moreover, supportive supervision of midwives also plays a pivotal role in improving the quality of care (23). One study with village midwives in Sudan found that consistent and sufficient supervision in conjunction with follow-up improved their skills and knowledge (24).

Another area for improvement identified by the participants was the shortage of qualified preceptors which resulted in some midwife students being taught by untrained personnel at clinical sites. Experienced preceptors play a crucial role in clinical education by providing students with the opportunity to become immersed in their future roles as midwives (25). Challenges to preceptorship in countries across Africa include preceptors who are young and inexperienced, high turnover contributing to inadequate numbers, demanding workload and limited tutoring competence (26). Clinical sites must ensure an adequate number of qualified preceptors are employed so that students can learn and effectively put theoretical knowledge into practice. The program should provide additional training to clinical preceptors to ensure they have the skills to effectively supervise students.

In addition to weaknesses in the education program, midwife graduates also described challenges they faced to practice what they have learned in their postings after graduation. For example, midwife graduates and supervisors mentioned commodity stock outs and lack of equipment as a barrier to the delivery of good quality services. Insufficient medical supplies and lack of equipment have also been observed elsewhere in South Sudan (27, 28). According to Jones et al., procurement and supply chain management of essential medicines was a highly difficult task in South Sudan where the MOH is responsible for supplying essential medicines to healthcare facilities and operates on a "push system based on forecasting" rather than one based on demand, which proved to be unresponsive to the actual needs of the facilities (27). Further, the health sector in South Sudan is critically underfunded, with only 2.9% of the national budget allocated to the sector in 2012–2013 (15) and dropping down to 1.08% in 2019–2020 (29). Key informants described the dependence on donor support and funding as a weakness of the education program. With the decreased allocation of funds, the country is straying further from achieving the Abuja Declaration spending target of 15% of the national budget for health (29). Key informants described the dependence on donor support and funding as a weakness of the education program. This study was conducted during a time when IMC was experiencing challenges with funding for the midwifery education program; however renewed donor funding has since been obtained, addressing at least some of the issues highlighted by teachers. South Sudan's health system continues to rely heavily on donor aid, with non-governmental organizations providing an estimated 70% of health services (15). Decision-making and power over the use of funds often lie with the donor, whose interests may not always align with the government (30). Innovative approaches to health system strengthening and MOH capacity building are needed alongside improved governance and accountability mechanisms and increased national health funding (14). Advocacy to the MOH and other relevant Ministries is needed to obtain a stable stream of funding to sustain the education program.

Midwives frequently mentioned low salaries and insufficient compensation, and several had to work as volunteers. Despite the high need for midwives in South Sudan, public funding is inadequate to pay them. Similar findings of low salaries were reported in a study among maternal and child health providers, including midwives, who reported a monthly salary of as little as 300–500 South Sudanese pounds (US$2.30–3.80) when working at state level or 500–700 South Sudanese pounds (US$3.80–5.40) at tertiary level (28). Inadequate compensation was associated with decreased motivation, poor performance and loss of staff (28). Midwives across Africa and other low income countries report wages that barely meet basic needs and standard of living (31). Additionally, some midwives from our study have expressed concern about low salaries, leading them to consider changing careers. Low salaries were the most common factor contributing to high rates of nurses and midwives in Ghana expressing intention to quit their jobs (32). Not only should the budget allocation for the health sector be increased, but it is also crucial to ensure that the funds are utilized to provide paid positions for trained midwives and that they receive appropriate compensation.

Insecurity due to conflict was mentioned as a challenge by participants in all groups interviewed. Classes were suspended because the three schools had to close for periods of time when it was unsafe for students and staff. Contingency planning is important to reducing disruptions to education and training, which was also mentioned by the MOH staff. Insecurity also affects both providers and women seeking healthcare, especially at nighttime. The most rural areas are likely deprived of skilled providers due to fear and lack of security. Safety is often a major concern, particularly among providers who are young unmarried women, preventing them from being able to provide 24 hour quality care due to the risk of violence and sexual harassment (23, 31). For example, midwives in South Africa and Uganda have reported physical attacks when attending home births or leaving work late at night (31). As seen in other studies, insecurity was also a commonly reported barrier to women accessing maternal healthcare services (28, 33–36). Violence during times of conflict often targets civilians and health workers, causing great harm and even death (28, 37). To increase accessibility and safety, health facilities should consider adding security measures for both providers and clients.

Notably, our findings demonstrated that midwives were more than just providers of care, they were respected leaders and important members of the community. This is contrary to the poor status and image of nurses and midwives found in an earlier study in South Sudan when traditional birth attendants worked as "midwives" in health facilities and were viewed as unskilled and uneducated (15). Cultural influences may also shape the view that assisting childbirth is considered unskilled labor and inherently "women's work" (31). Additionally, many ethnic groups in South Sudan are patriarchal where men hold authority on all aspects of the family and society, while women are viewed as inferior (38). Due to this, early marriage and negative attitudes toward female educational attainment are common which contribute to low school enrollment of girls (39). Only 10.9% of women in South Sudan have completed upper secondary school (40) which poses a challenge to identifying sufficient female students for midwifery schools since eligibility criteria include the completion of secondary school (15). Although midwifery remains a profession that is almost entirely represented by women globally (31), the midwifery program in South Sudan has enrolled a sizeable number of male students. Some community members who have received care from graduate midwives were not aware that male midwives existed. However, many of those who did see a male midwife came to appreciate the work that they do while others described feeling uncomfortable having a male midwife provide care. Findings from a study in South Sudan investigating the community's preference for the gender of midwives revealed similarly mixed results with some participants preferring male midwives due to their considerate and prompt work, while others expressed shame at undressing and discussing sex with male midwives (41). Increasing the number of male midwives can help address the shortage of midwives in the country, while also challenging gender norms in a society where midwives may be viewed as inferior.

Study limitations

Our study was subject to several limitations. We interviewed midwife graduates and supervisors who were accessible in terms of location and security. We selected three locations for data collection where we knew many graduates would be found: Juba, Wau, and Malakal. Kajo Keji was not safe for our research team to visit at the time this study was conducted. The midwife graduates and supervisors we interviewed were limited to those working in health facilities that were accessible given security and distance from one of the three towns visited, excluding very rural locations. In addition, when interviewing women from the community who used services at the health facilities, it is possible that they spoke about experiences with midwives other than the one who was interviewed as they may have engaged with multiple midwives during their care. Although interviews were not conducted by IMC staff, the interviewers were hired by IMC which may have resulted in courtesy bias wherein respondents may have provided favorable responses to the researchers.

Conclusion

Overall, graduates of the midwifery education program are working around South Sudan, delivering positive impacts in their communities. Most expressed pride in their work, and their contribution to their communities—despite the many challenges they face. The country's health system requires strengthening, increased budget allocations to the health sector, and security and protections put in place for providers and clients alike. As one teacher mentioned, midwives are heroes that the country needs. Continued investment in midwifery education and training is needed as midwives are critical to reduce high maternal mortality in South Sudan, and other countries similarly affected by conflict.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the Institutional Review Board of Columbia University and the Ministry of Health for the Republic of South Sudan. The studies were conducted in accordance with the local legislation and institutional requirements. The ethics committee/institutional review board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because the study was determined to be exempt and met the criteria for minimal risk.

Author contributions

SC, SP, AS, JA participated in the study conception and design; SC, GPI, SP participated in implementation of the study; SC, SP, AL, MP, PS, SX participated in analysis of the data; SX wrote the first draft of the manuscript; SC, SP contributed to the writing process; all authors had access to all the data; the corresponding author had final responsibility for the decision to submit for publication. All authors contributed to the article and approved the submitted version.

Acknowledgments

The authors would like to acknowledge the interviewers, transcribers, and other International Medical Corps staff that helped make this study possible. The authors would also like to thank all of the respondents who participated in this important study.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

1. United Nations Population Fund (UNFPA), International Confederation of Midwives (ICM), World Health Organization (WHO). State of the World's Midwifery 2021. New York: UNFPA (2021). Available at: https://www.unfpa.org/sites/default/files/pub-pdf/21-038-UNFPA-SoWMy2021-Report-ENv4302.pdf

2. UNFPA. Midwifery. Available at: https://www.unfpa.org/midwifery (Accessed March 14, 2023).

3. Renfrew MJ, McFadden A, Bastos MH, Campbell J, Channon AA, Cheung NF, et al. Midwifery and quality care: findings from a new evidence-informed framework for maternal and newborn care. *Lancet*. (2014) 384:1129–45. doi: 10.1016/S0140-6736(14)60789-3

4. Trends in maternal mortality 2000 to 2020: estimates by WHO. *UNICEF, UNFPA, world bank group and UNDESA/population division*. Geneva: World Health

Organization (2023). Available at: https://www.who.int/publications/i/item/9789240068759

5. Jawad M, Hone T, Vamos EP, Cetorelli V, Millett C. Implications of armed conflict for maternal and child health: a regression analysis of data from 181 countries for 2000–2019. *PLOS Med*. (2021) 18:e1003810. doi: 10.1371/journal.pmed.1003810

6. UNICEF. Making childbirth safer in South Sudan. Available at: https://www.unicef.org/stories/making-childbirth-safer-south-sudan (Accessed March 14, 2023).

7. Alkema L, Chou D, Hogan D, Zhang S, Moller A-B, Gemmill A, et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN maternal mortality estimation inter-agency group. *Lancet*. (2016) 387:462–74. doi: 10.1016/S0140-6736(15)00838-7

8. UNICEF. South Sudan (SSD)—Demographics, Health & Infant Mortality. Available at: https://data.unicef.org/country/ssd/ (Accessed March 14, 2023).

9. Investment Cases Towards Ending Unmet Need for Family Planning, Preventable Maternal Deaths, and Gender-Based Violence: South Sudan. Government of South Sudan and UNFPA (2021). Available at: https://esaro.unfpa.org/sites/default/files/pub-pdf/south_sudan_investment_report.pdf

10. World Bank Open Data. Available at: https://data.worldbank.org/indicator/SH.STA.BRTC.ZS?locations=SS

11. Kinney MV, Kerber KJ, Black RE, Cohen B, Nkrumah F, Coovadia H, et al. on behalf of the Science in Action: Saving the lives of Africa's mothers N. Sub-Saharan Africa's mothers, newborns, and children: where and why do they die? *PLOS Med*. (2010) 7:e1000294. doi: 10.1371/journal.pmed.1000294

12. The Maternal and Newborn Health Thematic Fund. *Case studies on strengthening midwifery services to avert maternal and newborn deaths*. New York: UNFPA (2019). Available at: https://www.unfpa.org/sites/default/files/pub-pdf/UNFPA_maternalHealth_thematicFund_web.pdf

13. The World Bank in South Sudan, Overview. *World Bank* Available at: https://www.worldbank.org/en/country/southsudan/overview.

14. Belaid L, Bayo P, Kamau L, Nakimuli E, Omoro E, Lobor R, et al. Health policy mapping and system gaps impeding the implementation of reproductive, maternal, neonatal, child, and adolescent health programs in South Sudan: a scoping review. *Confl Health*. (2020) 14:20. doi: 10.1186/s13031-020-00258-0

15. Tveit B, Evjen O, Buyanca L, Karstad H. *Developing nurses/midwives education in South Sudan—a pre-study*. Oslo: Norwegian Church Aid (2014). Available at: https://core.ac.uk/download/pdf/30807892.pdf

16. Dedoose, version 9.0.62, cloud application for managing, analyzing, and presenting qualitative and mixed method research data. (2022) Available at: www.dedoose.com

17. Strengthening quality midwifery education for Universal Health Coverage 2030: framework for action. Geneva: World Health Organization (2019). Available at: https://apps.who.int/iris/bitstream/handle/10665/324738/9789241515849-eng.pdf

18. Rosser JI, Aluri KZ, Kempinsky A, Richardson S, Bendavid E. The effect of healthcare worker density on maternal health service utilization in Sub-Saharan Africa. *Am J Trop Med Hyg*. (2022) 106:939–44. doi: 10.4269/ajtmh.21-0727

19. Hastings-Tolsma M, Temane A, Tagutanazvo OB, Lukhele S, Nolte AG. Experience of midwives in providing care to labouring women in varied healthcare settings: a qualitative study. *Health SA Gesondheid*. (2021) 26(0):a1524. doi: 10.4102/hsag.v26i0.1524

20. Adolphson K, Axemo P, Högberg U. Midwives' experiences of working conditions, perceptions of professional role and attitudes towards mothers in Mozambique. *Midwifery*. (2016) 40:95–101. doi: 10.1016/j.midw.2016.06.012

21. Kim YM, Ansari N, Kols A, Tappis H, Currie S, Zainullah P, et al. Assessing the capacity for newborn resuscitation and factors associated with providers' knowledge and skills: a cross-sectional study in Afghanistan. *BMC Pediatr*. (2013) 13:140. doi: 10.1186/1471-2431-13-140

22. Zainullah P, Ansari N, Yari K, Azimi M, Turkmani S, Azfar P, et al. Establishing midwifery in low-resource settings: guidance from a mixed-methods evaluation of the Afghanistan midwifery education program. *Midwifery*. (2014) 30:1056–62. doi: 10.1016/j.midw.2013.10.026

23. Homer CS, Turkmani S, Wilson AN, Vogel JP, Shah MG, Fogstad H, et al. Enhancing quality midwifery care in humanitarian and fragile settings: a systematic review of interventions, support systems and enabling environments. *BMJ Glob Health*. (2022) 7:e006872. doi: 10.1136/bmjgh-2021-006872

24. Nakano K, Nakamura Y, Shimizu A, Alamer SM. Exploring roles and capacity development of village midwives in Sudanese communities. *Rural Remote Health*. (2018) 18:4668. doi: 10.22605/RRH4668

25. Mhango L, Jere D, Msiska G, Chorwe-Sungani G, Chirwa E. The roles and experiences of preceptors in clinical teaching of undergraduate nursing and midwifery students in Malawi. *Malawi Med J*. (2021) 33:35–9. doi: 10.4314/mmj.v33iS.7

26. Dennis-Antwi J. Preceptorship for midwifery practice in Africa: challenges and opportunities. *Evid Based Midwifery*. (2011) 9:137–42. ISSN:14794489.

27. Jones A, Howard N, Legido-Quigley H. Feasibility of health systems strengthening in South Sudan: a qualitative study of international practitioner perspectives. *BMJ Open*. (2015) 5:e009296. doi: 10.1136/bmjopen-2015-009296

28. Mugo NS, Dibley MJ, Damundu EY, Alam A. Barriers faced by the health workers to deliver maternal care services and their perceptions of the factors preventing their clients from receiving the services: a qualitative study in South Sudan. *Matern Child Health J*. (2018) 22:1598–606. doi: 10.1007/s10995-018-2555-5

29. South Sudan National Budget Brief 2019/20. Ministry of Finance and Planning, UNICEF. Available at: http://www.mofep-grss.org/wp-content/uploads/2020/12/S-Sudan-national-BB-2020_V2-002.pdf

30. Widdig H, Tromp N, Lutwama GW, Jacobs E. The political economy of priority-setting for health in South Sudan: a case study of the health pooled fund. *Int J Equity Health*. (2022) 21:68. doi: 10.1186/s12939-022-01665-w

31. Filby A, McConville F, Portela A. What prevents quality midwifery care? A systematic mapping of barriers in low and middle income countries from the provider perspective. *PLOS ONE*. (2016) 11:e0153391. doi: 10.1371/journal.pone.0153391

32. Boateng AB, Opoku DA, Ayisi-Boateng NK, Sulemana A, Mohammed A, Osarfo J, et al. Factors influencing turnover intention among nurses and midwives in Ghana. *Nurs Res Pract*. (2022) 2022:4299702. doi: 10.1155/2022/4299702

33. Dahab R, Sakellariou D. Barriers to accessing maternal care in low income countries in Africa: a systematic review. *Int J Environ Res Public Health*. (2020) 17:4292. doi: 10.3390/ijerph17124292

34. Mugo NS, Dibley MJ, Damundu EY, Alam A. "The system here isn't on patients' side"- perspectives of women and men on the barriers to accessing and utilizing maternal healthcare services in South Sudan. *BMC Health Serv Res*. (2018) 18:10. doi: 10.1186/s12913-017-2788-9

35. Kane S, Rial M, Kok M, Matere A, Dieleman M, Broerse JEW. Too afraid to go: fears of dignity violations as reasons for non-use of maternal health services in South Sudan. *Reprod Health*. (2018) 15:1–11. doi: 10.1186/s12978-018-0487-6

36. Bayo P, Itua I, Francis SP, Boateng K, Tahir EO, Usman A. Estimating the met need for emergency obstetric care (EmOC) services in three payams of torit county, South Sudan: a facility-based, retrospective cross-sectional study. *BMJ Open*. (2018) 8:e018739. doi: 10.1136/bmjopen-2017-018739

37. Violence Against or Obstruction of Health Care in South Sudan in 2020. Safeguarding Health in Conflict Coalition. Available at: https://insecurityinsight.org/wp-content/uploads/2021/05/2021-SHCC-South-Sudan.pdf

38. Kane S, Rial M, Matere A, Dieleman M, Broerse JEW, Kok M. Gender relations and women's reproductive health in South Sudan. *Glob Health Action*. (2016) 9:33047. doi: 10.3402/gha.v9.33047

39. Ajak BEB. The factors contributing to low schools enrollment of females in South Sudan. *Arch Community Med Public Health*. (2019) 5:029–34. doi: 10.17352/2455-5479.000049

40. Educational attainment, at least completed upper secondary, population 25+, female (%) (cumulative)—South Sudan. *World Bank Open Data* Available at: https://data.worldbank.org/indicator/SE.SEC.CUAT.UP.FE.ZS?locations=SS (Accessed April 8, 2023).

41. Loponi LE, Birungi S. Community preference for genders of midwives in providing maternal and new-born care in Yei river state, South Sudan. *Texila Int J Public Health*. (2020) 8. ISSN: 2520-3134. doi: 10.21522/TIJPH.2013.08.02.Art013

frontiers | Frontiers in Global Women's Health

TYPE Original Research
PUBLISHED 18 September 2023
DOI 10.3389/fgwh.2023.1159693

OPEN ACCESS

EDITED BY
Lorena Binfa,
University of Chile, Chile

REVIEWED BY
Macarena Martínez Órdenes,
University of Chile, Chile
Audra Gollenberg,
Shenandoah University, United States

*CORRESPONDENCE
Abraham Negash
harmee121@gmail.com

RECEIVED 02 May 2023
ACCEPTED 16 August 2023
PUBLISHED 18 September 2023

CITATION
Fetena N, Negash A, Kebede A, Sertsu A, Nega A, Nigussie K, Lami M, Yadeta E, Dereje J, Tamire A, Tolessa F and Tadele A (2023) Utilization of preconception care and associated factors among pregnant mothers in Fiche Town, Central Ethiopia: a community-based cross-sectional study 2021.
Front. Glob. Womens Health 4:1159693.
doi: 10.3389/fgwh.2023.1159693

Utilization of preconception care and associated factors among pregnant mothers in Fiche Town, Central Ethiopia: a community-based cross-sectional study 2021

Negash Fetena[1], Abraham Negash[2*], Alemi Kebede[3], Addisu Sertsu[2], Addisu Nega[4], Kabtamu Nigussie[2], Magarsa Lami[2], Elias Yadeta[2], Jerman Dereje[2], Aklilu Tamire[5], Fikadu Tolessa[6] and Afework Tadele[3]

[1]Yaya Gulale Woreda Health Office, North Shoa, Oromia, Ethiopia, [2]School of Nursing and Midwifery, College of Health and Medical Sciences, Haramaya University, Harar, Ethiopia, [3]Department of Population and Family Health, Institute of Health, Faculty of Health Sciences, Jimma University, Jimma, Ethiopia, [4]Department of Public Health and Emergency Management, Kellam Wallaga Zonal Health Office, Dembi Dolo, Oromia, Ethiopia, [5]School of Public Health, College of Health and Medical Sciences, Haramaya University, Harar, Ethiopia, [6]Department of Midwifery, College of Health Sciences, Salale University, Fitche, Ethiopia

Introduction: Preconception care is an important preventive intervention for adverse pregnancy outcomes. It is recognized as a strategy to optimize women's health and pregnancy outcomes in Western countries. However, preconception care is underutilized in sub-Saharan Africa, like Ethiopia, where maternal mortality is high. Evidence is scarce in the study area about the prevalence and factors associated with preconception care utilization. Therefore this study aimed to assess the proportion of preconception care utilization and associated factors among pregnant mothers in Fiche town, central Ethiopia, 2021.
Method: A community-based cross-sectional study was done from May 10 to June 25, 2021. A systematic random sample technique was used to choose 393 pregnant women for the study. A structured, pre-tested, interviewer-administered questionnaire was used to collect data. The data were entered into Epi Data version 3.1 and then exported into SPSS version 25 for analysis. A Bivariable and multivariable logistic regression analysis was used to check for the association. Odds ratio along with 95% was used to describe the association. Finally, a significant association was declared at a *p*-value less than 0.05.
Results: 388 respondents participated in this study, making the response rate 98.7%. Of total study participants only 84 (21.6%; 95% CI, 18, 25.8) utilized preconception care. The study found that diploma or higher level of education (AOR = 3.47, 95% CI: 1.27, 9.53), psychological and financial support from a partner (AOR = 3.86, 95% CI: 2.1, 7.10), joint discussion and plan with a partner (AOR = 3.32, 95% CI: 1.55, 7.13), history of chronic disease (AOR = 3.47, 95% CI: 1.67, 7.25), and good knowledge about preconception care (AOR = 2.42, 95% CI: 1.34, 4.38) were significantly associated with preconception care utilization.

Abbreviations
ANC, Antenatal Care; PCC, Preconception Care; WHO, World Health Organization; SDG, Sustainable Development Goal.

Conclusions: Overall, less than a quarter of the pregnant mothers utilized preconception care, indicating that awareness is very low. Pregnant mothers who have a higher educational level, have good communication and support from their partners, have chronic health problems, and have good knowledge about preconception care were more likely to utilize the service. Preconception care is a better opportunity to intervene and maintain the mother in the continuum of care.

KEYWORDS

preconception, care, utilization, pregnant, Fiche, Ethiopia

1. Introduction

Preconception care (PCC) is the provision of biomedical, behavioral, and social health interventions to women and couples before conception to enhance their health and improve pregnancy outcomes (1–3). PCC is an important preventive health care intervention before conception for a couple (4, 5). It is also cost-effective in preventing adverse pregnancy outcomes, especially for those with chronic medical disorder (6–8).

Globally, 303,000 mothers die each year from maternal causes, with one in every 180 at risk; developing regions account for 99% of maternal deaths (9). About 66% of the global maternal mortality ratio (MMR) accounts for sub-Saharan Africa alone (10). In developing countries, maternal and neonatal mortality continues to be a serious public health problem (11, 12). To ensure and enhance maternal health and reduce MMR, preconception care is essential (11, 13).

Globally, less than one-third of women of reproductive age discuss their health status and its impact on pregnancy outcomes with a health professional (11, 13, 14). Moreover, the risks to reproductive health are still unacceptably high in many countries (14).

In Western societies, PCC is well recognized as a means of enhancing a healthy pregnancy and its outcome (14). Preconception care is widely recognized as being essential to ensuring the well-being of both women and their offspring (7, 15, 16). However, in most low-income countries, including Ethiopia, maternal health care may not begin until the pregnancy is well established or until more than half of the pregnancy has passed (11, 17).

Preconception care is a strategy for achieving sustainable development goal 3 (SDG 3): reducing maternal mortality to less than 70 per 100,000 live births and newborn mortality to as few as 12 per 1,000 live births by 2030 (18).

A health extension program was in place to address this problem and link the mother and newborn to the continuum of care, especially for those in remote areas (19).

Even though bad pregnancy outcomes, like malformation, are still a public health problem, the Ethiopian government has done its best to increase coverage and access to a continuum of maternity care (20, 21). The majority of policy initiatives have focused on enhancing women's health, increasing child survival, and reducing unfavorable pregnancy outcomes; however, there is an underuse of maternal preconception care (22, 23).

At the time women became aware of their pregnancy and started antenatal care (ANC) in Ethiopia, most of the fetal organs had developed (7, 24). PCC, which is the earliest link between maternal and newborn health, provides a window of opportunity to intervene accordingly and improve this gap (16, 25).

Preconception care is a key entry point to increase other services such as antenatal care, skilled delivery, and postnatal care and reduce adverse pregnancy outcomes (2, 26). Only, little is known and there are few studies on preconception care utilization in the study area. Therefore, this study was done to determine preconception care utilization and associated factors among pregnant women in Fiche Town, central Ethiopia, in 2021.

2. Method

2.1. Design, period and setting

A community-based, cross-sectional study was conducted from 10 May to 25 June, 2021, in Fiche Town, central Ethiopia. Fiche is a town located in the central part of Ethiopia, about 120 kilometers (km) from Addis Ababa. It is in the northern Shoa Zone of the Oromia region and has four kebele (lowest administrative unit in Ethiopia). The district has a total population of 104,345 people, according to the 2021 report obtained from the town health office, with 54,981 men and 49,364 women. Women in reproductive age groups in the town were 17,129. Data obtained from the health bureau of the Fiche town administration at the time of the study indicated the presence of about 936 pregnant women in the study area.

2.2. Source and study population

All pregnant women who lived in Fiche town for 6 months and above.

2.3. Sample size and sampling procedure

The single population proportion formula was used to calculate sample size with the following assumptions: Z /2 = 1.96, 95% confidence level, $p = 18.2\%$ of women use preconception care from a previous study conducted in northern Ethiopia (27),

margin of error (d) = 4%, non-response rate = 10%. Finally, 393 people were chosen as the final sample size.

Data from the Fiche town health bureau, with the support of the health extension, was used to identify the number of pregnant women. Individual study participants were chosen using a systematic random sampling technique with *k* values of 2 (936/393 = 2.38). The first household to be included in the study was selected by the lottery method. If more than one pregnant mother was found in a single household, the lottery method was used to select study participants.

2.4. Variables of the study

Maternal utilization of preconception care is the study's dependent variable. Socio-demographic characteristics, obstetric and gynecologic characteristics, awareness and knowledge of preconception care, partner-related factors, and health system-related aspects are all independent variables.

2.5. Operational definitions

Preconception care is a comprehensive set of interventions that should be given to reproductive-age women before pregnancy to promote a healthy pregnancy and its outcome (28).

Preconception care utilization: Women will be considered to have used PCC if they received at least one of the following components of preconception care before pregnancy: counseling, disease screening and treatment, folic acid, vaccines, changing their diet, cessation of alcohol drinking, cessation of smoking, or creating a healthy environment (advice, treatment, and lifestyle modification) (26).

Knowledge of women about PCC: Eight knowledge questions were used to measure preconception care knowledge. Those who responded correctly 50% or above to preconception care knowledge questions were considered to have good knowledge, while those who scored less than 50% of correct responses were considered to have poor knowledge (29).

History of adverse pregnancy outcome: Previous pregnancy that ended in any of the following: preterm, low birth weight, abortion, stillbirth/intrauterine fetal death, birth defect (30).

2.6. Data collection instrument

A face-to-face interview was used to collect data using a pre-tested structured questionnaire. The tool consists of different parts that were developed from reviewing different literature and modified according to the local context (21, 31–33). Four bachelor's degree-holding nurses were used as data collectors and supervised by two MSC-holding nurses. During the data collection, regular supportive supervision and discussions with data collectors and supervisors were done. Onsite checking and review of the completed questionnaire were done by the principal investigator.

2.7. Data management and quality

Data collectors were trained for two days so that they became familiar with the aims of the study, its contents, sampling procedure, interviewing technique, data collection tools, and the issue of confidentiality. The questionnaire was first prepared in English and then translated to Afan Oromo and Amaharic by experts, then translated back to English by another person to ensure its consistency and accuracy. A pretest was carried out on 5% of the total sample size in one kebele, Sheraro town, which was placed outside of the main study area before the actual data collection. Following the pre-test, questionnaire modifications were made to improve the instrument's validity and reliability.

2.8. Data analysis

The editing, coding, and sorting of the collected questionnaire were done manually daily to check for completeness. After being checked for completeness, the data were entered into Epi-data Manager version 3.1 and then exported to SPSS version 25 for analysis. Descriptive statistics were done and the information was presented using tables, figures, and text.

There was no multicollinearity among the independent variables included in the model, and the maximum variance inflation factor was 1.058. The models' fitness was checked using the Hosmer and Lemeshow goodness of fit test. The internal validity of the tools was tested using Cronbach's alpha coefficient (0.76), which is good. Logistic regression was applied to analyze the association between dependent and independent variables. Bivariate analysis was employed to select candidate variables for multivariable analysis. Multivariable analysis was performed on variables with a *p*-value of less than or equal to 0.2. Multivariable analysis was carried out to assess the association between dependent and independent variables, and variables that have a *p*-value of less than 0.05 were identified as predictors. Adjusted odds ratios along with 95% confidence intervals were calculated for each of the independent variables in logistic regression to declare a significant association.

3. Results

3.1. Socio-demographic characteristics of pregnant mothers

A total of 388 pregnant women were interviewed, making the response rate 98.7%. The study participants' median age was 29 years, with an interquartile range of 24–33 years. More than half of the respondents were between 25 and 34 years old. Approximately half of the study participants (52.1%) have a monthly income of 5,000 ETB (91.68 USD) or less, while 229 (59%) were at the educational level of secondary school or above. The majority of the participants, 306 (78.9%), were married, and 81 (20.9%) of the women were merchants. Nearly half of the participants, 187 (48.2%), have a family size of 5 or above (**Table 1**).

TABLE 1 Socio-demographic characteristics of pregnant mothers living in Fiche town, 2021.

Variable	Category	Frequency	Percentage (%)
Age	15–24	99	25.5
	25–34	237	61.1
	35–49	52	13.4
The educational level of the pregnant mother	No formal education	75	19.3
	Primary education	84	21.6
	Secondary education	95	24.5
	Diploma and above	134	34.5
The educational level of the husband	No formal education	51	13.1
	Primary education	69	17.8
	Secondary education	131	33.8
	Diploma and above	137	35.3
Marital status	Single	21	5.4
	Married	306	78.9
	Divorced	27	7.0
	Widowed	12	3.1
	Separated	22	5.7
Number of family members	1–2	49	12.6
	3–4	152	39.2
	≥5	187	48.2
Average monthly income	<2,500 ETB	128	33.
	2,500–5,000 ETB	113	29.1
	>5,000 ETB	147	37.9
Occupation	Farmer	25	6.4
	Housewife	145	37.4
	Merchant	81	20.9
	Government employee	67	17.3
	Non-government employee	40	10.3
	Other	30	7.7
Occupation of husband	Farmer	32	8.2
	Merchant	46	37.6
	Government employed	106	27.3
	Non-government employed	76	19.6
	Daily laborer	28	7.2

TABLE 2 Obstetric history and reproductive health service-related factors among pregnant mothers living in Fiche town, 2021.

Variable	Category	Frequency	Percentage (%)
Gravidity	1	56	14.4
	2–4	251	64.7
	≥5	81	20.9
Parity	0–1	150	38.7
	2–4	213	54.9
	≥5	25	6.4
History of adverse pregnancy outcomes	Yes	91	23.5
	No	297	76.5
History of institutional delivery	Yes	265	68.3
	No	123	31.7
Had ever used family planning	Yes	260	67
	No	128	33
Status of pregnancy	Planned	314	80.9
	Unplanned	74	19.1
Joint discussion plan with partner	Yes	297	76.5
	No	91	23.5
Get financial and psychological support from a partner	Yes	112	28.9
	No	276	71.1
Heard about preconception care	Yes	146	37.6
	No	242	62.4
Screened for sexually transmitted disease	Yes	199	51.3
	No	189	48.7
Means of transport to reach a health facility	Foot	284	68%
	Public transport	91	23.5
	Private transport	33	8.5
Is the service delivery time convenient for you (at the health facility)?	Yes	352	90.7
	No	36	9.3
Does your partner enter the service delivery room with you?	Yes	53	13.7
	No	335	86.3
Having challenges to reach a health facility	Yes	152	39.2
	No	236	60.8
Preconception care utilization	Yes	84	21.6
	No	304	78.4
Presence of a chronic health problem	Yes	95	24.5
	No	293	75.5
Knowledge of preconception care	Good knowledge	106	27.3
	Poor knowledge	282	72.7

3.1.1. Obstetric history and reproductive health service-related factors

Almost two-thirds (64.7%) of study participants had 2–4 pregnancies, and 76.5% of study participants received financial and psychological support from a partner. Unplanned pregnancies accounted for 74 pregnancies (19.1%). Ninety-one (23.5%) had had previous miscarriages. We found that 62.4% of study participants had never heard of preconception care (Table 2).

3.2. Utilization of preconception care

Only 84 (21.6%; 95% CI: 18, 25.8) of the 388 study participants use at least one component of the World Health Organization's preconception care package. Micronutrient supplementation (i.e., iron, folic acid) is the most commonly used component of PCC while optimizing psychological health is the least used (Figure 1).

3.3. Factors associated with preconception care

Age, educational status, joint discussion and planning with a partner, getting financial and psychological support from a partner, partner inter ANC rooms, having a chronic health problem, having a bad obstetric history, hearing about preconception care, and having good knowledge about preconception care were associated with preconception care in

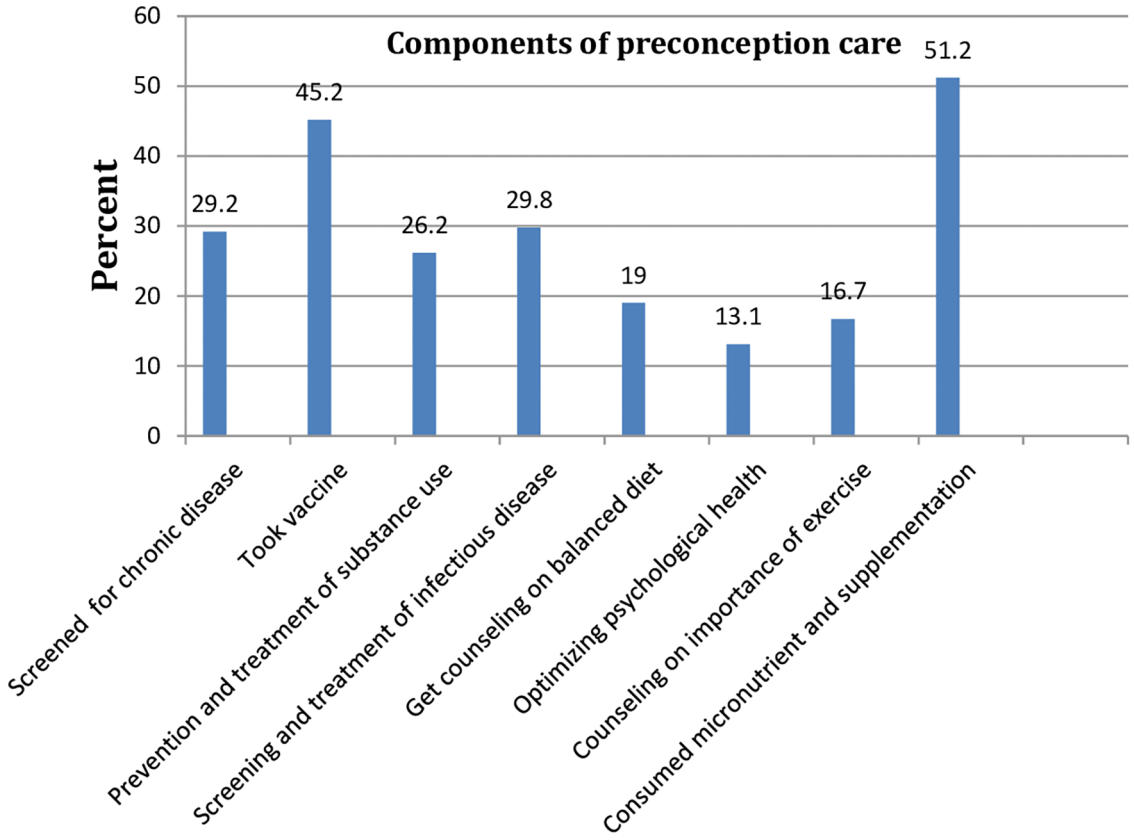


FIGURE 1
Proportion of World Health Organization components of preconception care utilization among pregnant women found in Fiche town, 2021.

binary logistic regression. However, in multivariable logistic regression, the educational status of the study participant, joint discussion and planning with the partner, getting financial and psychological support from the partner, having a history of chronic health problems, and knowledge of preconception care were significantly associated with preconception care.

Preconception care use was 3.47 (AOR = 3.47, 95% CI: 1.27, 9.53) times more likely among pregnant women who completed a diploma or a higher level of education. Preconception care utilization was 2.42 (AOR = 2.42; 95% CI: 1.34, 4.38) times more likely among pregnant mothers who had good knowledge (**Table 3**).

4. Discussion

In developing countries, like Ethiopia, where adverse maternal and neonatal outcomes are high, emphasizing preconception care is crucial. This community-based, cross-sectional study identified factors influencing PCC utilization among pregnant mothers in Fiche Town, central Ethiopia.

The findings of our study revealed that 21.6% (95% CI: 18, 25.8) of the respondents utilized preconception care. This finding was in line with studies done in the West Guji Zone (22.3%) (34), Mekelle (18.2%) (27), Hosanna Town (19%) (35), southeast Nigeria (23.4%) (36), and systematic review and meta-analysis in Africa (18.72%) (37).

Our study's findings, on the other hand, were lower than those of Mizan Aman (28.6%) (38), Southern Sri Lanka (27.2%) (39), Los Angeles 29.7 (40), Shanghai, China (42.2%) (41). Disparities in information accessibility, socioeconomic status, and the quality of the healthcare delivery system may all contribute to this variation (42).

This study's findings, however, are higher than those of Adet (9.6%) (26), Debre Birhan town (13.4%) (2), West Shoa zone (14.5%) (29), and Debre Tabor (15.8%) (43). The reason for this variation may be differences in the study population's level of education, culture, study setting, or year of the study. As the year elapses, there may be an increase in awareness and knowledge about the importance of preconception care, which leads to increased service utilization. This study finding is also higher than the systematic review and meta-analysis done by Ayele et al. (16.27%) (44). The possible justification for this may be a single study vs. systematic review and meta-analysis (SRMA). Our study was done at the community level while SRMA was a pooled result of both community and institutional-based studies.

Regarding factors, pregnant mothers who attended education to the level of a diploma or above were 3.47 times more likely to utilize PCC when compared to those who didn't attend formal education. Studies done in Debre Birhan town (2), Adet (26),

TABLE 3 A bivariable and multivariable logistic regression model of factors associated with preconception care among pregnant mothers in Fiche town, North Shoa, Ethiopia, in 2021.

Variable	Pre-conception care utilization		COR 95%CI	AOR 95%CI	*p*-value
	Yes	No			
Age					
15–24	16	83	1	1	
25–34	55	182	1.57 (0.85, 2.90)	0.91 (0.44, 1.88)	0.79
35–49	13	39	1.73 (0.76, 3.95)	1.67 (0.65, 4.33)	0.28
Educational status					
No formal education	6	69	1	1	
Primary education	15	69	2.5 (0.92, 6.82)	2.74 (0.92, 8.12)	0.069
Secondary education	20	75	3.07 (1.16, 8.08)	2.15 (0.74, 6.23)	0.15
Diploma and above	43	91	5.43 (2.18, 13.49)	**3.47 (1.27, 9.53)**	0.02
Joint discussion and plan with partner					
Yes	71	226	1.88 (0.98, 3.59)	**3.32 (1.55, 7.13)**	0.002
No	13	78	1	1	
Get financial and psychological support from her partner					
Yes	46	66	4.36 (2.62, 7.26)	**3.86 (2.10, 7.10)**	0.00
No	38	238	1	1	
Partner enters PCC service delivery room with his wife					
Yes	16	37	1.69 (0.89, 3.23)	0.45 (.018, 1.09)	0.07
No	68	267	1	1	
Had a history of chronic health problems					
Yes	42	53	4.73 (2.82, 7.97)	**3.47 (1.67, 7.25)**	0.001
No	42	251	1	1	
Had a history of negative pregnancy outcomes					
Yes	33	58	2.74 (1.63, 4.63)	1.03 (0.47, 2.25)	0.95
No	51	246	1	1	
Heard about preconception care					
Yes	46	100	2.47 (1.51, 4.04)	1.57 (0.84, 2.93)	0.16
No	38	204	1	1	
Knowledge of preconception care					
Good knowledge	35	71	2.34 (1.41, 3.90)	**2.42 (1.34, 4.38)**	0.003
Poor knowledge	49	233	1	1	

COR, Crude odd ratio; AOR, Adjusted odd ratio.

and China (45) support this finding. The reason for this may be that pregnant women with higher educational levels have more information and a better understanding of the importance of PCC, which is one of the driving factors for service utilization (34). Additionally, empowering women has a positive impact on maternity service utilization (46, 47).

Discussing and planning with a partner as well as obtaining psychological and financial support from her husband have a significant effect on PCC utilization. This finding was consistent with studies done in Mekelle (27), and Shanghai, China (45). This can be justified as, in developing countries, men are the chief decision-makers; therefore, their psychological and financial support enhances service utilization (31, 20).

The odds of PCC utilization were 3.47 times more likely among pregnant mothers who had a history of chronic health problems. This finding was supported by a study done in Mekelle (27). This may be because those with chronic health problems have followed up with and may have gotten information and advice from health professionals about the effect of their disease on pregnancy (48). They may also be advised on what to do before conception (49–51).

Knowing PCC increases service utilization by 2.42 times. This finding is supported by research conducted in the west Shoa zone (52), Mekelle (27), Mizan Aman (38), and Hosanna town(35). Evidence from Shanghai, China (45), also supports this study. This is an indicator that improving pregnant women's knowledge of the importance of PCC is an entry point for increasing service utilization (53, 54).

5. Strength and limitations

The study was conducted at the community level to address the pregnant mothers who did not visit the health facility. It is also the first study in the study area. However, the study was not without limitations, was cross-sectional, which did not indicate causation, and it was not multicenter. Additionally, there may be social desirability bias as it is interviewer administered.

6. Conclusion

This study indicated that the utilization of preconception care among study participants was found to be low. Reaching a high level of education, having a joint discussion and plan with a partner about pregnancy, getting psychological and financial support from a partner, and having good knowledge about preconception care were among the factors that enhanced service utilization. Having a chronic health problem is also one of the factors that promote service utilization. Involving partners in the maternity care continuum is critical to a positive maternal and neonatal outcome. Preconception is a better opportunity to intervene and maintain the mother in the continuum of care (55).

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by Ethical approval was obtained from the Institutional Health Research Ethics Review Committee (IHRERC) (ref. no. P/S/H/D52) of Jimma University's Institute of Public Health. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

NF is the principal investigator. All authors contributed equally to the work, whether at the conceptual level (NF, AfT, and AK), data acquisition (NF, AdN, AS, and EY), analysis (AbN, AS, KN, and JD), or interpretation (AkT, ML, and FT). They participated equally in drafting, revising, or critically reviewing the work and agreed to be accountable for all aspects of it. All authors contributed to the article and approved the submitted version.

Funding

Jimma University's Faculty of Health Sciences contributed to the study's funding in part. However, they are not involved in the study's planning, data gathering, analysis, or interpretation.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

1. Chibwae A, Kapesa A, Jahanpour O, Seni J, Basinda N, Kadelya E, et al. Attendance of male partners to different reproductive health services in Shinyanga District, North western Tanzania. *Tanzan J Health Res*. (2018) 20(2). doi: 10.4314/thrb.v20i2.9

2. Demisse TL, Aliyu SA, Kitila SB, Tafesse TT, Gelaw KA, Zerihun MS. Utilization of preconception care and associated factors among reproductive age group women in Debre Birhan town, North Shewa, Ethiopia. *Reprod Health*. (2019) 16(1):1–10. doi: 10.1186/s12978-019-0758-x

3. Jack BW, Culpepper L. Preconception care: risk reduction and health promotion in preparation for pregnancy. *JAMA*. (1990) 264(9):1147–9. doi: 10.1001/jama.1990.03450090083032

4. Hillemeier MM, Weisman CS, Chase GA, Dyer AM, Shaffer ML. Women's preconceptional health and use of health services: implications for preconception care. *Health Serv Res*. (2008) 43(1p1):54–75. doi: 10.1111/j.1475-6773.2007.00741.x

5. Shannon GD, Alberg C, Nacul L, Pashayan N. Preconception healthcare delivery at a population level: construction of public health models of preconception care. *Matern Child Health J*. (2014) 18:1512–31. doi: 10.1007/s10995-013-1393-8

6. Mittal P, Dandekar A, Hessler D. Use of a modified reproductive life plan to improve awareness of preconception health in women with chronic disease. *Perm J*. (2014) 18(2):28–32. doi: 10.7812/TPP/13-146

7. Organization WH. Meeting to develop a global consensus on preconception care to reduce maternal and childhood mortality and morbidity: World Health Organization Headquarters, Geneva, 6–7 February 2012: meeting report. (2013).

8. Tieu J, Middleton P, Crowther CA, Shepherd E. Preconception care for diabetic women for improving maternal and infant health. *Cochrane Database Syst Rev*. (2017) (8). doi: 10.1002/14651858.CD007776.pub3

9. Organization WH. Trends in maternal mortality: 1990–2015: estimates from WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division: World Health Organization. (2015). Available at: https://reliefweb.int/report/world/trends-maternal-mortality-1990-2015-estimates-who-unicef-unfpa-world-bank-group-and?gclid=Cj0KCQjw7aqkBhDPARIsAKGa0oJyNpv7L4Txqnd86j5XVL_nguinkMOAtRDO1G7xp4o3zyrJ4VAPwsgaAvJGEALw_wcB

10. Organization WH. Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. (2019).

11. Berglund A, Lindmark G. Preconception health and care (PHC)—a strategy for improved maternal and child health. *Upsala J Med Sci*. (2016) 121(4):216–21. doi: 10.1080/03009734.2016.1191564

12. Dean SV, Mason EM, Howson CP, Lassi ZS, Imam AM, Bhutta ZA. Born too soon: care before and between pregnancy to prevent preterm births: from evidence to action. *Reprod Health*. (2013) 10(1):1–16. doi: 10.1186/1742-4755-10-1

13. Johnson K, Posner SF, Biermann J, Cordero JF, Atrash HK, Parker CS, et al. Recommendations to improve preconception health and Health Care—United States: report of the CDC/ATSDR preconception care work group and the select panel on preconception care. *MMWR Recomm Rep*. (2006) 55(6):1-CE-4.

14. World Health Organization. Pre-conception care: maximizing the gains for maternal and child health. Policy brief. (2013).

15. Dean SV, Lassi ZS, Imam AM, Bhutta ZA. Preconception care: closing the gap in the continuum of care to accelerate improvements in maternal, newborn and child health. *Reprod Health*. (2014) 11(3):1–8. doi: 10.1186/1742-4755-11-S3-S1

16. Bailey C, Walker R, Hill B, Hills Ap, Venn A, Skouteris H. Preconception health and wellbeing interventions in the workplace: A systematic review. Research Square [preprint]. (2019) Available at: https://doi.org/10.21203/rs.2.12690/v1

17. Bishwajit G, Tang S, Yaya S, Ide S, Fu H, Wang M, et al. Factors associated with male involvement in reproductive care in Bangladesh. *BMC Public Health*. (2017) 17 (1):1–8. doi: 10.1186/s12889-016-3915-y

18. United Nations Ethiopia. Good Health and Well-being. Available at: https://ethiopia.un.org/en/sdgs/3

19. Karim AM, Admassu K, Schellenberg J, Alemu H, Getachew N, Ameha A, et al. Effect of Ethiopia's health extension program on maternal and newborn health care practices in 101 rural districts: a dose-response study. *PLoS One*. (2013) 8(6): e65160. doi: 10.1371/journal.pone.0065160

20. Abrha MW, Asresu TT, Weldearegay HG. Husband support rises women's awareness of preconception care in Northern Ethiopia. *Sci World J*. (2020) 2020:1–7. doi: 10.1155/2020/3415795

21. Falade-Fatila O, Adebayo AM. Male partners' involvement in pregnancy related care among married men in Ibadan, Nigeria. *Reprod Health*. (2020) 17(1):1–12. doi: 10.1186/s12978-020-0850-2

22. Masaba BB, Mmusi-Phetoe RM. Barriers to and opportunities for male partner involvement in antenatal care in efforts to eliminate mother-to-child transmission of human immunodeficiency virus in Kenya: systematic review. *Open Nurs J*. (2020) 14 (1):232–9. doi: 10.2174/1874434602014010232

23. Young CT, Urquia ML, Ray JG. Preconception care in low-and middle-income countries: new opportunities and a new metric. *PLoS Med*. (2013) 10(9):e1001507. doi: 10.1371/journal.pmed.1001507

24. Hailegebreal S, Gilano G, Seboka BT, Ahmed MH, Simegn AE, Tesfa GA, et al. Prevalence and associated factors of caesarian section in Ethiopia: a multilevel analysis of the 2019 Ethiopia Mini Demographic Health Survey. *BMC Pregnancy Childbirth*. (2021) 21(1):1–9. doi: 10.1186/s12884-021-04266-7

25. Yohannes Z, Tenaw Z, Astatkie A, Siyoum M, Bekele G, Taye K, et al. Levels and correlates of knowledge and attitude on preconception care at public hospitals in Wolayita Zone South Ethiopia. *BioRxiv*. (2019) 1:586636. doi: 10.1101/586636

26. Goshu Y, Liyeh T, Ayele AS. Preconception care utilization and its associated factors among pregnant women in Adet, North-Western Ethiopia (Implication of Reproductive Health). *J Women's Health Care*. (2018) 7(445):2167-0420. doi: 10.4172/2167-0420.1000445

27. Asresu TT, Hailu D, Girmay B, Abrha MW, Weldearegay HG. Mothers' utilization and associated factors in preconception care in northern Ethiopia: a community based cross sectional study. *BMC Pregnancy Childbirth*. (2019) 19 (1):1–7. doi: 10.1186/s12884-019-2478-1

28. World Health Organization. Preconception care [Internet]. WHO Regional Office for South-East Asia. (2014). Available at: https://apps.who.int/iris/handle/10665/205637

29. Fekene DB, Woldeyes BS, Erena MM, Demisse GA. Knowledge, uptake of preconception care and associated factors among reproductive age group women in West Shewa zone, Ethiopia, 2018. *BMC Womens Health*. (2020) 20:1–8. doi: 10.1186/s12905-020-00900-2

30. Kebede AS, Muche AA, Alene AG. Factors associated with adverse pregnancy outcome in Debre Tabor town, Northwest Ethiopia: a case control study. *BMC Res Notes*. (2018) 11(1):1–6. doi: 10.1186/s13104-017-3088-5

31. Yargawa J, Leonardi-Bee J. Male involvement and maternal health outcomes: systematic review and meta-analysis. *J Epidemiol Community Health*. (2015) 69 (6):604–12. doi: 10.1136/jech-2014-204784

32. Fitrianingsih J, Stang C, Amiruddin R. Prevention model on pregnancy complication as early warning programs through self care approach. *Ann Romanian Soc Cell Biol*. (2021) 25(6):12226–40.

33. Hibbert EJ, Chalasani S, Kozan P, Myszka R, Park KE, Black KI. Preconception care and contraceptive use among Australian women with diabetes mellitus. *Aust J Gen Pract*. (2018) 47(12):877–83. doi: 10.31128/AJGP-03-18-4529

34. Amaje E, Fikrie A, Utura T. Utilization of preconception care and its associated factors among pregnant women of West Guji Zone, Oromia, Ethiopia, 2021: a community-based cross-sectional study. *Health Serv Res Manag Epidemiol*. (2022) 9:23333928221088720. doi: 10.1177/23333928221088720

35. Wegene MA, Gejo NG, Bedecha DY, Kerbo AA, Hagisso SN, Damtew SA. Utilization of preconception care and associated factors in Hosanna Town, Southern Ethiopia. *PLoS One*. (2022) 17(1):e0261895. doi: 10.1371/journal.pone.0261895

36. Odira CC, Chiejina EN, Okafor CN, Ibekwe AM. Preconception care utilization among childbearing women in South-East Nigeria. *Midwifery*. (2020) 4(6):1–13. doi: 10.52589/AJHNM-5MRKM80J

37. Tekalign T, Lemma T, Silesh M, Lake EA, Teshome M, Yitna T, et al. Mothers' utilization and associated factors of preconception care in Africa, a systematic review and meta-analysis. *PLoS One*. (2021) 16(7):e0254935. doi: 10.1371/journal.pone.0254935

38. Setegn Alie M, Alemu T, Alemayehu D, Negesse Y, Gebremariam A. Preconception care utilization and associated factors among reproductive age women in Mizan-Aman town, Bench Sheko zone, Southwest Ethiopia, 2020. A content analysis. *PLoS One*. (2022) 17(8):e0273297. doi: 10.1371/journal.pone.0273297

39. Patabendige M, Goonewardene I. Preconception care received by women attending antenatal clinics at a Teaching Hospital in Southern Sri Lanka. *Sri Lanka J Obstet Gynaecol*. (2013) 35(1):3–9. doi: 10.4038/sljog.v35i1.5996

40. Batra P, Higgins C, Chao SM. Previous adverse infant outcomes as predictors of preconception care use: an analysis of the 2010 and 2012 Los Angeles mommy and baby (LAMB) surveys. *Matern Child Health J*. (2016) 20(6):1170–7. doi: 10.1007/s10995-015-1904-x

41. Du L, La X, Zhu L, Jiang H, Xu B, Chen A, et al. Utilization of preconception care and its impacts on health behavior changes among expectant couples in Shanghai, China. *BMC Pregnancy Childbirth*. (2021) 21(1):1–8. doi: 10.1186/s12884-020-03485-8

42. Celik Y, Hotchkiss DR. The socio-economic determinants of maternal health care utilization in Turkey. *Soc Sci Med*. (2000) 50(12):1797–806. doi: 10.1016/S0277-9536(99)00418-9

43. Ayele AD, Ayenew NT, Kassa BG, Teffera AG, Mihretie GN, Yehuala ED, et al. Preconception care utilization and its associated factors among women in debre tabor town Northwest Ethiopia: community based cross-sectional study. *SAGE Open*. (2022) 12(2):21582440221097392. doi: 10.1177/21582440221097392

44. Ayele AD, Belay HG, Kassa BG, Worke MD. Knowledge and utilisation of preconception care and associated factors among women in Ethiopia: systematic review and meta-analysis. *Reprod Health*. (2021) 18(1):1–15. doi: 10.1186/s12978-021-01132-9

45. Ding Y, Li XT, Xie F, Yang YL. Survey on the implementation of preconception care in S hanghai, C hina. *Paediatr Perinat Epidemiol*. (2015) 29(6):492–500. doi: 10.1111/ppe.12218

46. Ahmed S, Creanga AA, Gillespie DG, Tsui AO. Economic status, education and empowerment: implications for maternal health service utilization in developing countries. *PLoS One*. (2010) 5(6):e11190. doi: 10.1371/journal.pone.0011190

47. Tekelab T, Chojenta C, Smith R, Loxton D. Factors affecting utilization of antenatal care in Ethiopia: a systematic review and meta-analysis. *PLoS One*. (2019) 14(4):e0214848. doi: 10.1371/journal.pone.0214848

48. Metasebia G. (2020) Utilization of preconception care and associated factors among HIV positive women attending art clinics in north Shoa Zone governmental hospitals, 2020 [dissertation]. Debre Berhan: Debre Berhan University.

49. Willhoite MB, Bennert HW Jr, Palomaki GE, Zaremba MM, Herman WH, Williams JR, et al. The impact of preconception counseling on pregnancy outcomes: the experience of the Maine Diabetes in Pregnancy Program. *Diabetes Care*. (1993) 16(2):450–5. doi: 10.2337/diacare.16.2.450

50. Chuang CH, Velott DL, Weisman CS. Exploring knowledge and attitudes related to pregnancy and preconception health in women with chronic medical conditions. *Matern Child Health J*. (2010) 14:713–9. doi: 10.1007/s10995-009-0518-6

51. Dunlop AL, Jack BW, Bottalico JN, Lu MC, James A, Shellhaas CS, et al. The clinical content of preconception care: women with chronic medical conditions. *Am J Obstet Gynecol*. (2008) 199(6):S310–27. doi: 10.1016/j.ajog.2008.08.031

52. Gezahegn A. (2016) Assessment Knowledge and Experience of Preconception Care among Pregnant Mothers Attending Antenatal Care in West Shoa Zone Public Health Centers, 2016. [master's thesis]. Addis Ababa: Addis Ababa University.

53. Mousa O, Alfadhel R, Almubarak H. Assessing the level of awareness and utilization of preconception care among Saudi women in Al Ahsa, Saudi Arabia. *Nur Primary Care*. (2021) 5(6):1–6. doi: 10.33425/2639-9474.1200

54. Gamshe E, Demissie D. Perinatal factors affecting knowledge and utilization of preconception care among pregnant women in Addis Ababa: A cross-sectional study. *MJH* (2022) 1(1):2790–1378.

55. Tollman SM, Bastian H, Doll R, Hirsch LJ, Guess HA. What are the effects of the fifth revision of the declaration of Helsinki? Fair partnerships support ethical researchGains and losses for rights of consumer and research participantsResearch will be impededSome clauses will hinder development of new drugs and vaccines. *Br Med J*. (2001) 323(7326):1417–23. doi: 10.1136/bmj.323.7326.1417

frontiers | Frontiers in Global Women's Health

TYPE Original Research
PUBLISHED 31 October 2023
DOI 10.3389/fgwh.2023.1192473

OPEN ACCESS

EDITED BY
Lorena Binfa,
University of Chile, Chile

REVIEWED BY
Jackline A. Oluoch-Aridi,
University of Notre Dame, United States
Matias Henriquez,
University of Chile, Chile

*CORRESPONDENCE
Aline Semaan
✉ asemaan@itg.be

†These authors have contributed equally to this work and share first authorship

RECEIVED 09 May 2023
ACCEPTED 10 October 2023
PUBLISHED 31 October 2023

CITATION
Semaan A, Annerstedt KS, Beňová L, Dossou J-P, Boyi Hounsou C, Agballa G, Namazzi G, Kandeya B, Meja S, Ally Mkoka D, Asefa A, El-halabi S and Hanson C (2023) Provision and utilization of maternal health services during the COVID-19 pandemic in 16 hospitals in sub-Saharan Africa.
Front. Glob. Womens Health 4:1192473.
doi: 10.3389/fgwh.2023.1192473

Provision and utilization of maternal health services during the COVID-19 pandemic in 16 hospitals in sub-Saharan Africa

Aline Semaan[1*†], Kristi Sidney Annerstedt[2†], Lenka Beňová[1], Jean-Paul Dossou[3], Christelle Boyi Hounsou[3], Gottfried Agballa[3], Gertrude Namazzi[4], Bianca Kandeya[5], Samuel Meja[5], Dickson Ally Mkoka[6], Anteneh Asefa[1], Soha El-halabi[2] and Claudia Hanson[2,7]

[1]Department of Public Health, Institute of Tropical Medicine, Antwerp, Belgium, [2]Department of Global Public Health, Karolinska Institutet, Stockholm, Sweden, [3]Department of Health Policy and Systems, Centre de Recherche en Reproduction Humaine et en Démographie, Cotonou, Benin, [4]Centre of Excellence for Maternal Newborn and Child Health, Department of Health Policy Planning and Management, School of Public Health, Makerere University, Kampala, Uganda, [5]College of Medicine, the Centre for Reproductive Health, University of Malawi, Blantyre, Malawi, [6]Department of Clinical Nursing, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania, [7]Department of Disease Control, London School of Hygiene and Tropical Medicine, London, United Kingdom

Objective: Maintaining provision and utilization of maternal healthcare services is susceptible to external influences. This study describes how maternity care was provided during the COVID-19 pandemic and assesses patterns of service utilization and perinatal health outcomes in 16 referral hospitals (four each) in Benin, Malawi, Tanzania and Uganda.

Methods: We used an embedded case-study design and two data sources. Responses to open-ended questions in a health-facility assessment survey were analyzed with content analysis. We described categories of adaptations and care provision modalities during the pandemic at the hospital and maternity ward levels. Aggregate monthly service statistics on antenatal care, delivery, caesarean section, maternal deaths, and stillbirths covering 24 months (2019 and 2020; pre-COVID-19 and COVID-19) were examined.

Results: Declines in the number of antenatal care consultations were documented in Tanzania, Malawi, and Uganda in 2020 compared to 2019. Deliveries declined in 2020 compared to 2019 in Tanzania and Uganda. Caesarean section rates decreased in Benin and increased in Tanzania in 2020 compared to 2019. Increases in maternal mortality ratio and stillbirth rate were noted in some months of 2020 in Benin and Uganda, with variability noted between hospitals. At the hospital level, teams were assigned to respond to the COVID-19 pandemic, routine meetings were cancelled, and maternal death reviews and quality improvement initiatives were interrupted. In maternity wards, staff shortages were reported during lockdowns in Uganda. Clinical guidelines and protocols were not updated formally; the number of allowed companions and visitors was reduced.

Abbreviations
ALERT, action leveraging evidence to reduce perinatal mortality and morbidity in sub-Saharan Africa; ANC, antenatal care; DHO, district health office; HFA, health facility assessment; HMIS, Health Management Information System; IPC, infection prevention and control; LMIC, low- and middle-income country; PCR, polymerase chain reaction; PNC, postnatal care; PPE, personal protective equipment; QI, quality improvement; WHO, World Health Organization.

Conclusion: Varying approaches within and between countries demonstrate the importance of a contextualized response to the COVID-19 pandemic. Maternal care utilization and the ability to provide quality care fluctuated with lockdowns and travel bans. Women's and maternal health workers' needs should be prioritized to avoid interruptions in the continuum of care and prevent the deterioration of perinatal health outcomes.

KEYWORDS

referral hospital, maternal health, routine data, health facility survey, COVID-19 pandemic, sub-Saharan Africa

1. Introduction

The COVID-19 pandemic, declared by the World Health Organization (WHO) in March 2020, continues to challenge health systems globally. Besides responding to and managing the disease itself, health systems have struggled to maintain the provision of essential services during this period (1). In maternal and newborn healthcare, the pandemic has disrupted the availability, utilization, and quality of care provided to women and newborns (2–5). According to WHO's national pulse survey, antenatal and postnatal care (PNC) were disrupted in over a third of 121 countries, and a quarter of countries reported disruptions in facility-based births (6). In eight sub-Saharan African countries, significant reductions in the number of antenatal care (ANC) visits, facility-based childbirths, and PNC visits during the pandemic were reported (7). A survey of 500 pregnant women during the first lockdown in France (March–May 2020) revealed that one fifth had delayed or cancelled at least one ANC consultation (8). The COVID-19 pandemic also affected maternal and newborn health outcomes. There is evidence that infection with SARS-CoV-2 is associated with higher risks of stillbirths and preterm births (9). Additionally, some trends suggest increases in stillbirths and maternal deaths in low- and middle-income countries (LMIC) as a result of delayed care seeking (10).

From the supply side, maintaining care provision in healthcare facilities was challenging as health system governance and financing prioritized the response to the pandemic. Additionally, facilities were affected by national restriction measures such as lockdowns, bans on public transportation, and the emergency response to the pandemic. Some hospitals and healthcare centers were closed or converted into COVID-19 treatment centers. Pre-existing shortages in the health workforce were exacerbated by high rates of illness among providers, reassignment of healthcare workers to pandemic-related response, and implemented mitigation measures, which prevented healthcare providers from reaching the workplace (2, 11, 12). The lack of accessibility to clinical guidelines and training in a formal manner, particularly regarding care provision to women diagnosed with COVID-19, worsened fear and anxiety among midwives, nurses and doctors globally (2, 3, 11, 13–16).

Healthcare facilities globally, particularly hospitals, adapted their processes and guidelines in response to the dynamic situation resulting from the COVID-19 pandemic. Many of these adaptations aimed to ensure the safety of staff and patients, and were established, communicated and implemented relatively early in the response to the pandemic. In facilities providing maternity care, these included the allocation of triage areas for screening and testing women and establishing isolation wards to host women suspected/confirmed with COVID-19 (2, 17). A shift to telehealth was utilized to continue providing ANC (18). However, some of these adaptations were not evidence-based considering the lack of knowledge during the early phase of the pandemic. In some settings, women were required to leave healthcare facilities early after childbirth, some women were not allowed companions during childbirth, and new visiting rules restricted family and friends from accompanying mother and baby. Women with COVID-19 were not allowed to breastfeed or to be in contact with their baby (2, 19–21). In June 2020, the WHO issued guidance to ensure the continuity of provision of essential care services, including antenatal, intrapartum and PNC for the mother and newborn (22). The guide highlighted the necessity of maintaining breastfeeding and non-separation for all mothers and newborns (23).

A recently published scoping review concluded that preparedness and response to the COVID-19 pandemic in African countries was sub-optimal (24). A comprehensive assessment of trends in maternal care utilization, provision, and health outcomes during the COVID-19 pandemic is lacking, particularly in referral hospitals in LMICs. The triangulation of such quantitative trends with information on how healthcare facilities responded to the pandemic and adapted care provision processes is not available. This study aims to describe how maternity care was provided and organized, and to assess patterns of service utilization and perinatal health outcomes, before and during COVID-19 in four referral hospitals each in Benin, Malawi, Tanzania and Uganda.

2. Methods

2.1. Context

This study is part of the Action Leveraging Evidence to Reduce perinatal mortality and morbidity in sub-Saharan Africa trial (ALERT) (25). The project aims to reduce perinatal mortality and morbidity by strengthening the health system to provide safe and respectful intrapartum care. It is conducted in four hospitals

each in four countries (Benin, Malawi, Tanzania, and Uganda). From each country, there are three public hospitals and one private/faith-based. All 16 hospitals provide outpatient ANC and care for vaginal births and caesarean sections. In 2019, the number of deliveries ranged from 1,265 in UG2 to 7,791 in UG3. The 2019 perinatal mortality rate ranged from 17 perinatal deaths per 1,000 births in MW2 to 115 perinatal deaths per 1,000 births in UG2 (**Supplementary File S1**).

Each of the four countries experienced the COVID-19 pandemic differently. **Supplementary File S2** summarizes response measures and their respective duration during 2020, as well as the daily number of confirmed COVID-19 cases during the same time period. Data on response measures were extracted from Oxford COVID-19 Government Response Tracker (26) and validated by the ALERT country teams. We selected response measures which potentially influence healthcare-seeking behaviors and the ability to provide services, such as movement restrictions, stay-at-home orders, public transportation bans, and school and workplace closures. Data on the number of COVID-19 cases were extracted from the WHO COVID-19 dashboard (27). In Benin, strict measures of movement restrictions and school closure were implemented shortly between April–May 2020, without staying at home requirements. Restricting the number of passengers allowed in public transport was applied between April–June 2020. In Malawi, schools closed between March–September 2020, without any strict measures regarding movement restrictions, staying-at-home requirements and public transportation bans. In Tanzania, schools closed between March–June 2020, and international travel was restricted. Country authorities stopped reporting COVID-19 statistics to WHO since 4 July 2020. Uganda had the longest period of response measures, with school closures and movement restrictions implemented between March–October 2020. Public transportation closed between March-September 2020, and a stay-at-home requirement was issued from April 2020 until the end of the study period.

2.2. Study design

This is an embedded case study, where the units of analysis are hospitals during the COVID-19 pandemic, and the sub-units are the maternity wards in each hospital (28, 29). We use data from two sources: data of routinely collected maternal and perinatal health indicators; and responses to open-ended questions in an in-depth health facility assessment (HFA). Collection, analysis and reporting of both data types were conducted independently. The results were integrated during the interpretation phase. We use the framework for organizational case studies as a reporting checklist (30).

2.3. Data collection and measures

This study uses data from a maternity-oriented HFA intended to collect baseline data for the ALERT project. The original questionnaire included a mix of closed- and open-ended questions on hospital governance; financing; infrastructure and supplies; human resources; medicine availability; laboratory support; and guidelines, standards and practices for care provision. Data collection was conducted between December 2020–April 2021 by senior researchers and trained data collectors (at least two per hospital) who were familiar with the participating hospitals. The HFA took between two-three days per hospital to collect and relied on interviews, notes, observations, GPS coordinate logging, and document reviews. An average of three, but up to six respondents were interviewed per hospital. All data were entered into REDCap (31). Additional details about HFA data collection are available elsewhere (32).

The questionnaire included collecting aggregate monthly service statistics covering 24 months between January 2019–December 2020. These data were retrieved from each hospital's Health Management Information System (HMIS) and entered onto REDCap. A quality check allowed the identification of outliers and missing values, which were shared with ALERT country teams who thoroughly verified the data in the HMIS. A review of facility registers was not conducted, partly attributed to the complexity of in-hospital documentation systems (32). Five indicators were selected for this analysis based on data availability, completion, and accuracy across the 16 hospitals: (1) number of outpatient ANC consultations; (2) number of deliveries (women who gave birth); (3) number of caesarean sections and percentage of caesarean section out of deliveries; (4) number of maternal deaths and the ratio of maternal deaths per 100,000 deliveries; and (5) number of stillbirths and rate of stillbirths per 1,000 deliveries. For the last two indicators, the number of deliveries was used as a denominator to calculate the ratio and rate due to the unavailability of highly accurate disaggregated data on the number of births (stillbirths and livebirths) in all 16 hospitals.

The HFA data collection period (December 2020–April 2021) coincided with the COVID-19 pandemic, which presented an opportunity to incorporate brief questions in the questionnaire on the pandemic's effect on participating hospitals in general and on maternity wards in particular. We added open-ended questions on perceived changes in governance/financing (including creation of committees and budgetary changes), infrastructure/supplies (triage zones and/or isolation areas/rooms), staffing (number, cadres, trainings), changes to guidelines and protocols (breastfeeding, separation, visitors and companions, discharge), and changes to the implementation of quality improvement (QI) initiatives and maternal and perinatal death reviews. Additionally, we asked about specific changes regarding the number of women with suspected/confirmed SARS-CoV-2 infection and how care was provided to them (33).

2.4. Data analysis

The five indicators from service statistics were combined from each of the four hospitals per country. We conducted descriptive analysis and presented the data in bar and line charts, separately for 2019 and 2020, and compared the values between the months

of both years. Indicators on maternal deaths and stillbirths heavily fluctuated month-to-month due to the low frequency of the outcome, we therefore present them summarized by quarter (three months). Some values were completely missing and inaccessible from the HMIS, including data on ANC from two hospitals in Tanzania and one in Uganda. These hospitals were excluded from the analysis of this specific indicator.

Data on perceived changes made in hospitals and maternity wards during the pandemic were obtained in textual form, to which we applied content analysis (34). The researchers read and re-read the data by hospital (or case). An analysis framework was developed using categories derived from the HFA sections (deductive approach). Relevant information from the open-text was identified, extracted, and classified into corresponding categories of the framework. As data extraction progressed, the content of the framework evolved to include new categories that were identified in the data (iterative inductive approach). Disagreements and uncertainties were discussed between researchers including country teams, and resolved by consensus. Extracted information was compared between the 16 hospitals and patterns were identified. Findings were summarized in a narrative format, and presented by category at the hospital level and maternity ward level.

2.5. Ethics

Ethical approval was granted by review boards of the authors' institutes. No individual data were collected for this study, therefore individual informed consent was not required. With data collection conducted during the COVID-19 pandemic, each country followed the risk protocol put in place by their respective ethics committees in the beginning of the pandemic. These protocols were followed in relation to all research activities until further notified by the ethics committees. Throughout the manuscript, we refer to participating hospitals using a random coding system (country and hospital number) to protect the identity of hospitals and their staff.

3. Results

3.1. Routine service statistics

In the following section, we summarize the results of the routine service statistics, aggregated by country, for each of the following indicators: ANC visits, number of deliveries, proportion of caesarean section, maternal deaths, and stillbirths.

3.1.1. Antenatal care

Figure 1 displays routine data on outpatient ANC consultations, by country. In Benin, the number of consultations ranges between 1,195 in August 2019 and 1,984 in March 2020. There was no reduction in ANC visits during the pandemic compared to the previous year in Benin hospitals; on the contrary, the number of consultations in some months of 2020 exceeded that of 2019 (e.g., August 2020 in Benin). In Malawi, the minimum number of consultations was 1,597 in December 2020, and the maximum was 2,754 in September 2019. In

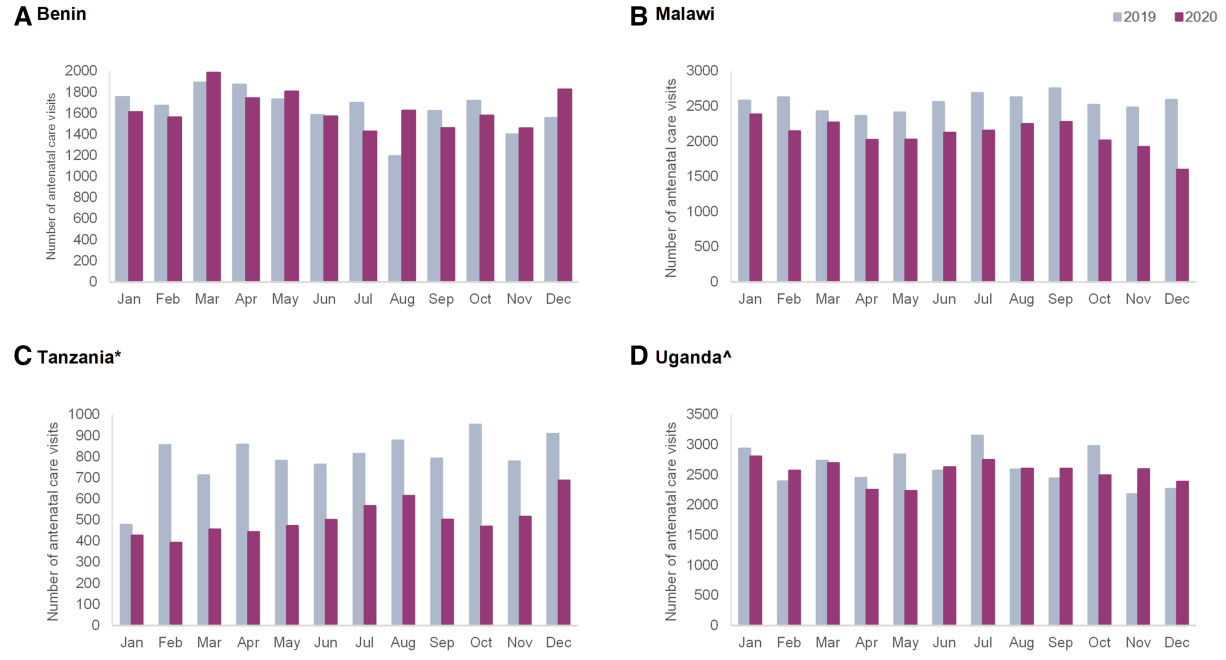


FIGURE 1
Monthly number of antenatal care consultations in the four hospitals in 2019 and 2020 in (A) Benin, (B) Malawi, (C) Tanzania and (D) Uganda.

Tanzania, the number of ANC consultations ranged between 393 in February 2020, and 953 in October 2019. In Malawi and Tanzania, the number of ANC consultations was lower in all months of 2020 compared to those of 2019. In Uganda, the number of ANC visits ranged between 2,184 and 3,155 in November and July 2019, respectively. The number of ANC visits in 2020 was similar to 2019, with the exception of a decline observed in April and May 2020 compared to the same months of 2019.

3.1.2. Deliveries

Figure 2 presents the total number of deliveries, combined by country. In Benin, the monthly number of deliveries ranged between 840 and 1,329 over the study period, and there were no big differences between 2019 and 2020. In Malawi, the number of deliveries ranged between 1,635 and 2,442 per month. The number of deliveries remained stable in 2020 compared to 2019, with the exception of a decline in the number of deliveries in September 2020 compared to 2019. In Tanzania, the number of deliveries ranged between 618 and 949 per month, and lower values were observed in all months of 2020 compared to 2019. In Uganda, the number of deliveries ranged between 1,226 and 1,728, and a small decline in the number of deliveries was observed starting in April 2020 compared to 2019.

3.1.3. Caesarean section

Figure 3 shows the caesarean section rates by country. Monthly rates ranged from 13% in Malawi to 47% in Benin. In Benin, the percentage of caesarean sections was lower during the year 2020 compared to 2019. In Malawi, the caesarean section rate was comparable between the COVID-19 period and the year before. In Tanzania, there was a small increase in the percentage of deliveries by caesarean sections from April to October 2020 compared to 2019. In Uganda, the monthly proportion of caesarean sections was similar in 2020 compared to 2019, with the exception of an increase observed in September 2020.

3.1.4. Maternal deaths

Figure 4 shows the quarterly numbers of maternal deaths and the in-facility maternal mortality ratio per 100,000 deliveries in 2019 and 2020. The highest ratio was recorded in Benin in Q2 of 2020 reaching 2,265.3 maternal deaths per 100,000 deliveries. The lowest rate is noted in Malawi in Q2 of 2020 with 17 maternal deaths per 100,000 deliveries (Table 1). In Benin, there was a small increase observed in Q2 and Q3 in 2020 compared to 2019, followed by a decline in Q4 2020. In Malawi and Tanzania, the ratio of maternal deaths remained stable between 2019 and 2020. In Uganda, it was constant between 2019 and 2020, with an increase observed in the last quarter of 2020 compared to the same period in 2019.

3.1.5. Stillbirths

Figure 5 displays the quarterly stillbirth number and rate per 1,000 deliveries in 2019 and 2020, per country. The highest rate was recorded in Benin in Q1 of 2019 reaching 82 stillbirths per 1,000 deliveries; the lowest value was in Malawi with 14 stillbirths per 1,000 deliveries in the second quarter of 2019 (Table 1). There was an increase in the stillbirth rate in Benin and Uganda at one point in time in 2020 compared to 2019: this increase occurred in Benin during the third and fourth quarter and in Uganda during the third and fourth quarters. In

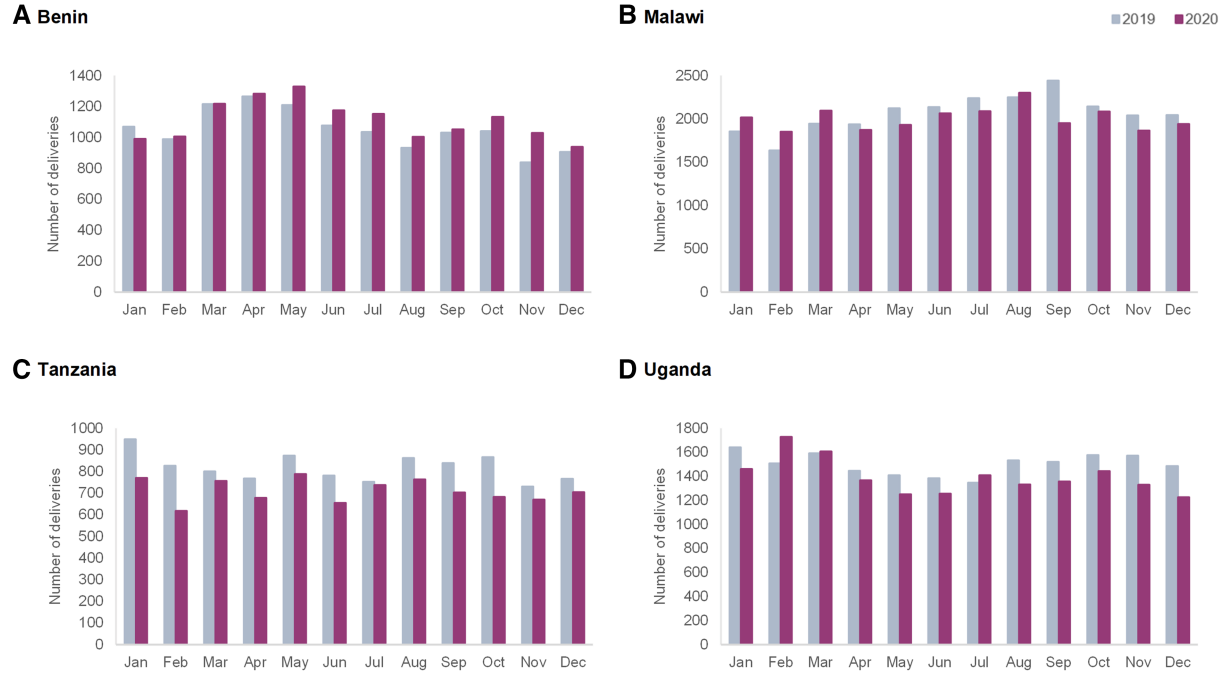


FIGURE 2
Monthly number of deliveries in the four hospitals in 2019 and 2020 in (A) Benin, (B) Malawi, (C) Tanzania and (D) Uganda.

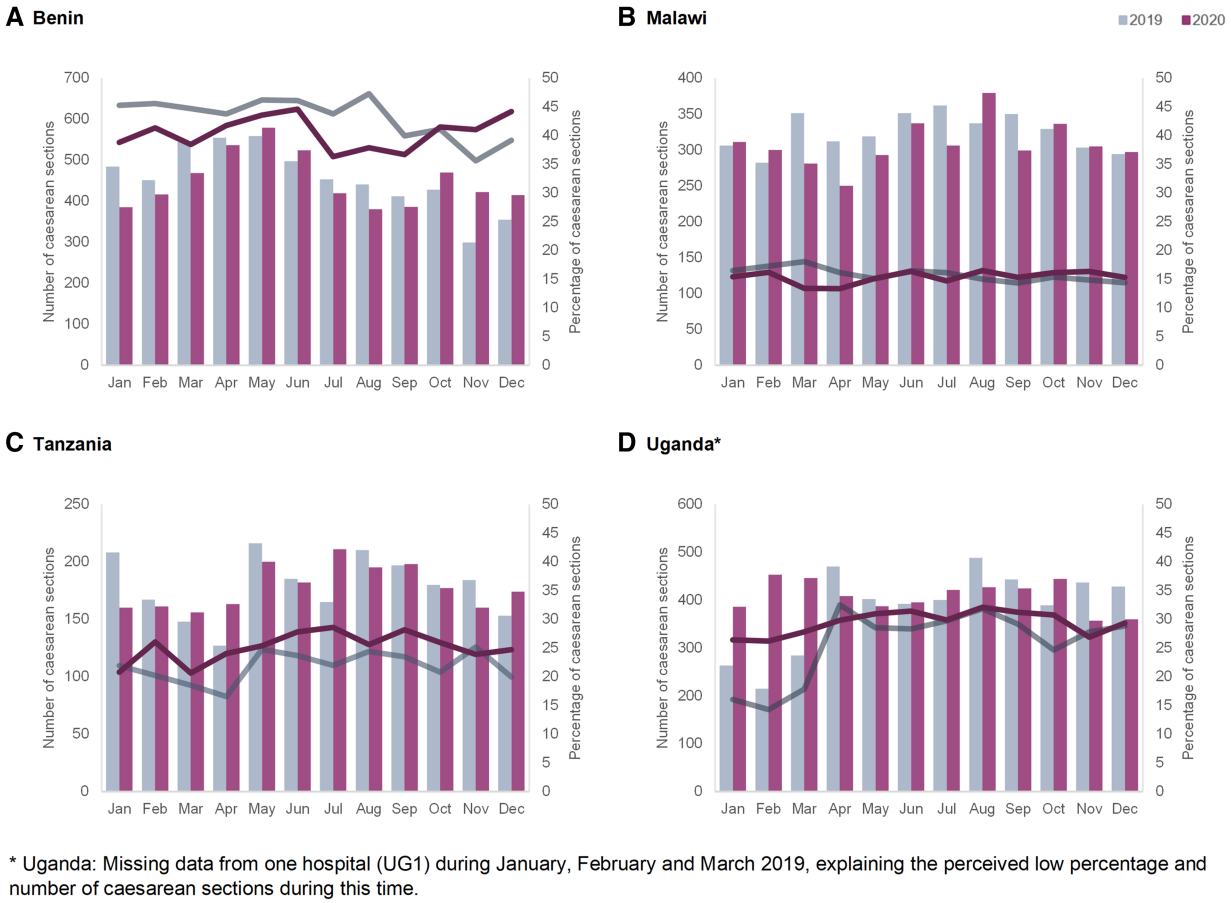


FIGURE 3
Monthly numbers (bars—left axis) and percentages (lines—right axis) of caesarean section in the four hospitals in 2019 and 2020 in (A) Benin, (B) Malawi, (C) Tanzania and (D) Uganda.

Malawi, the proportion of stillbirths was lower in the first quarter of 2020 compared to 2019, and similar throughout the remaining quarters. In Tanzania, the proportion of stillbirths was lower in 2020 compared to 2019.

Hospital-level data on the selected indicators are available in **Supplementary File S3** as well as a heatmap showing the percentage change in indicators between 2020 and 2019, for each hospital and country. The disaggregation shows variability in trends between hospitals in the same country during the study period. For example, while two hospitals (MW1 and MW4) show an increase in MMR in 2020, one hospital (MW3) shows a decline. In Benin, stillbirths increased in one hospital (BN2), and declined in two others (BN1 and BN4).

3.2. Management and organization of health services during the COVID-19 pandemic

Figure 6 summarizes findings of the analysis on management and organization of health service provision during the COVID-19 pandemic, separately at the hospital and maternity ward levels. We explain each category and provide specific examples in the following section. Strengths and lessons-learned are summarized in Box 1.

3.2.1. Hospital-level

3.2.1.1. The "role" of the hospital in the response to the COVID-19 pandemic

None of the hospitals included in this study were assigned as COVID-19 treatment centers. In one hospital in Benin, the hospital management reported negotiating with health authorities regarding the decision to designate the hospital as a COVID-19 referral center.

3.2.1.2. Teams and focal persons managing COVID-19 at the hospital level

Hospitals that established COVID-19 response teams and focal persons operationalized them differently. COVID-19 management teams in Benin and Tanzania had various tasks, including the implementation of infection prevention and control (IPC) measures, i.e., ensuring use of hand-washing devices at the hospital entrance, and raising awareness among patients and healthcare providers to encourage adherence to IPC. Other responsibilities were to ensure screening patients for COVID-19 symptoms, including temperature screening and polymerase

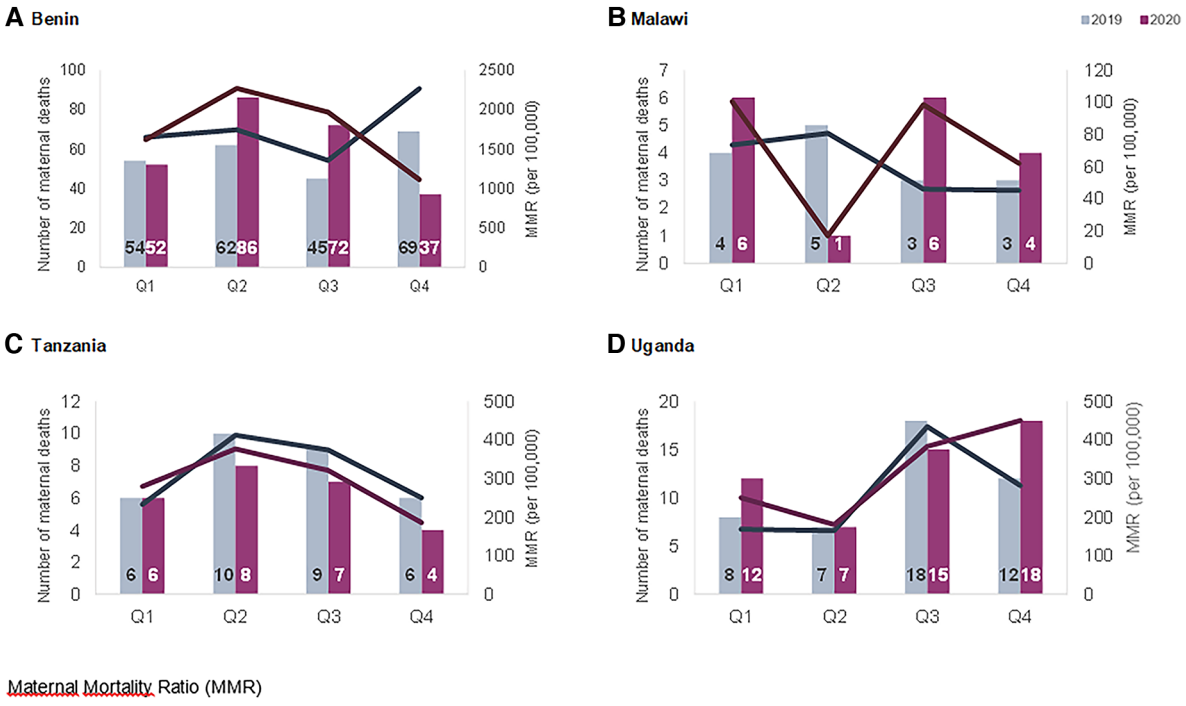


FIGURE 4
Quarterly number (bars—left axis) and in-facility maternal mortality per 100,000 deliveries (lines—right axis) in the four hospitals in 2019 and 2020 in (A) Benin, (B) Malawi, (C) Tanzania and (D) Uganda.

chain reaction (PCR) tests, and to manage COVID-19 positive cases at the hospital, or to care for them temporarily before their transfer to designated treatment hospitals. In one Tanzanian hospital, the team was also in charge of handling the bodies of COVID-19 deaths. In one hospital in Malawi the environmental health officer was assigned as a COVID-19 focal person. The district health office (DHO) communicated with the hospitals through meetings regarding the management of COVID-19 patients and provided training to healthcare providers on managing them. None of the hospitals in Uganda reported allocating teams/focal persons responding to COVID-19.

3.2.1.3. Meetings and hospital administrative activities

Some hospitals reported disruptions to administrative and supervisory activities during the COVID-19 pandemic. In one hospital in Malawi, supervisory meetings from the DHO were suspended starting in April 2020. Morning handover meetings and daily catch-ups were suspended in two hospitals in Malawi, and one in Uganda. While staff meetings were suspended, general board meetings continued without changes in MW2.

Similarly, meetings for holding maternal or perinatal death reviews either decreased in frequency or were interrupted altogether during the pandemic in many hospitals, with the exception of Tanzania. In one hospital in Malawi, maternal death audits continued, but were no longer attended by representatives of the DHO.

One hospital in Benin reported that QI initiatives were interrupted during the six months preceding data collection. This hospital had two ongoing initiatives since 2016; on awareness raising among women, and on specific trainings for providers.

TABLE 1 In-facility maternal mortality per 100,000 deliveries, and stillbirth rates per 1,000 deliveries, by quarters in the four hospitals in Benin, Malawi, Tanzania and Uganda.

		2019				2020			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Maternal mortality ratio	Benin	1,647.8	1,744.5	1,354.2	2,265.3	1,616.9	2,269.7	1,968.3	1,110.1
	Malawi	73.6	80.6	46.1	45.2	100.5	17.0	98.6	62.0
	Tanzania	232.8	412.7	373.9	250.4	279.6	376.8	320.8	185.5
	Uganda	168.8	165.1	434.7	281.3	250.3	180.6	382.8	450.1
Stillbirth rate	Benin	81.8	63.6	52.4	66.0	61.6	64.7	70.5	79.2
	Malawi	29.2	14.2	20.4	20.7	15.1	17.0	21.0	16.7
	Tanzania	28.7	28.5	29.1	28.4	26.1	23.6	16.5	26.9
	Uganda	[a]	47.6	46.8	49.9	45.7	44.4	56.9	54.8

[a]Data on stillbirths in Q1 of 2019 in Uganda was removed from the analysis due to data quality issues.

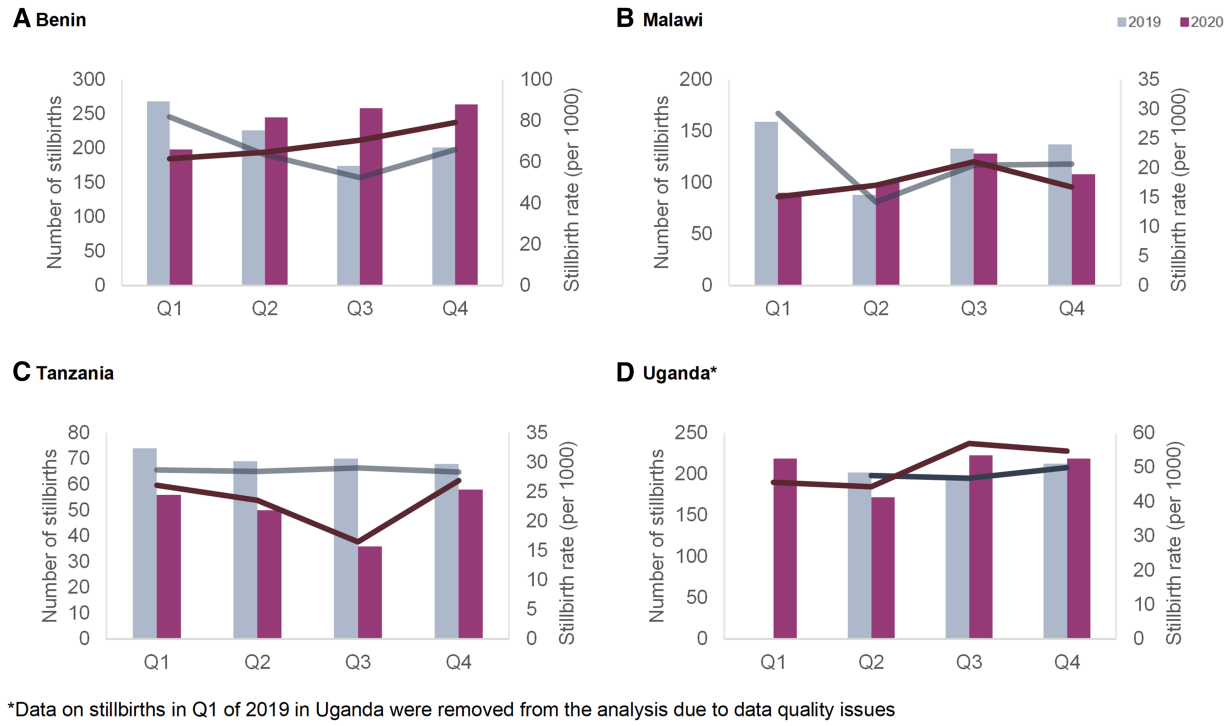


FIGURE 5
Quarterly number (bars—left axis) and rate (lines—right axis) of stillbirths per 1,000 deliveries in the four hospitals in 2019 and 2020 in (A) Benin, (B) Malawi, (C) Tanzania and (D) Uganda.

1. Hospital	**Role of the hospital** None of the hospitals were designated as COVID-19 treatment centers	**Meetings and administrative activities** Hospitals suspended routine handover and catch-up meetings. Maternal and perinatal death reviews were interrupted, and so was the implementation of quality improvement initiatives in some hospitals.	
	Teams and focal persons Hospitals established teams and allocated focal persons to organize the response to the pandemic. Their roles ranged from overseeing infection prevention and control measures, screening, and managing patients with confirmed COVID-19.	**Financial status** Hospitals incurred additional costs to cover expenses on personal protective equipment, as well as reductions in income as a result of declining patient numbers.	**Laboratory support** In some hospitals, laboratories prioritized conducting PCR tests for COVID-19 over other routine tests. In other hospitals COVID-19 test results were taking a long time because they had to send samples to other facilities.
2. Maternity ward	**Staffing** Reduction in the number of staff in wards to decrease the risk of COVID-19 transmission, or because of staff's inability to reach the hospital during lockdown.	**Infrastructure** Isolation rooms and spaces were dedicated to women with suspected or confirmed COVID-19. Hand washing facilities were installed in the maternity wards.	
	Protocols and guidelines None of the hospitals reported changes in guidelines and protocols as a result of adapting to COVID-19. No updated clinical care guidelines about the provision of care during childbirth for women diagnosed with COVID-19.	**Companions and visitors** Reductions in the number of allowed companions and visitors were reported in most hospitals.	**Care to women with confirmed COVID-19** Two hospitals reported caring for women with confirmed COVID-19 in isolation rooms at the hospital level (not at the level of the maternity ward).

FIGURE 6
Summary of the categories of management and organization of health services in the 16 hospitals and maternity wards during the COVID-19 pandemic.

BOX 1 Strengths and lessons-learned from the country and hospital-level response to the COVID-19 pandemic.

Our study revealed several points of strength that enabled maternities within hospitals to maintain the provision of care to women and newborns during the pandemic. These were documented at the country/health authority-levels and the hospital/maternity ward levels:

National/sub-national level:

- Clear chain of communication and training provided to hospitals regarding screening for and management of COVID-19.
- Health authorities not assigning the referral maternity hospitals as COVID-19 treatment centres could have a been a factor in preventing / reducing fear in the community from seeking care in these facilities which are critical providers of life-saving care for obstetric complications (maintaining trust).

Hospital and maternity ward-level:

- Tapping into existing capacities and skills of staff in the hospital to organize COVID-19 response teams and assign focal-persons.
- No interruptions to maternal and perinatal death review meetings throughout the pandemic.
- Maintaining laboratory capacity to conduct tests related to maternal care provision despite the added new load of conducting COVID-19 tests.
- Ability to retain staff numbers in maternities during lockdowns and throughout the pandemic, with active efforts to protect staff from exposure to infection and from being re-assigned to COVID-19 response.
- Introducing a reward system to compensate maternity staff who were screening for and/or managing patients with COVID-19.
- Dedicating isolation rooms specific to pregnant/birthing/postpartum women with suspected or confirmed COVID-19 despite space shortages in some facilities and wards.
- Introducing/expanding hand washing and disinfection facilities in the maternity ward, placing these more conveniently near points of care, ensuring continuity of running water, soap and hand disinfectant supply.

3.2.1.4. Hospital financial status

Financial and budgetary changes during the COVID-19 pandemic varied between hospitals and countries. Two hospitals, one in Benin and one in Uganda had increased costs and budget overruns as a result of purchasing personal protective equipment (PPE) and disinfectant. The same hospital in Uganda reported a decline in income resulting from the reduction in patient numbers. Two hospitals in Tanzania reported delays and irregular schedules of funding transfer from the basket fund, although it was not clear whether this was linked to the pandemic. No budgetary changes were reported in Malawi.

3.2.1.5. Laboratory support

During the COVID-19 pandemic, some adaptations in laboratory capacity and support in hospitals were reported, although not uniformly in all settings. In Benin, none of the four hospitals reported changes in laboratory capacity and ability to conduct routine tests related to maternal care provision. Two hospitals in Tanzania reported receiving viral transport media for collecting and transporting samples from COVID-19 suspected patients. Another hospital in Tanzania reported a decrease in patients needing laboratory services during the study period due to a decrease in overall utilization in this hospital. In Malawi, hospitals noted a decline in support from laboratory staff as some were diagnosed with COVID-19 and went into quarantine, and others were covering shifts to conduct COVID-19 screening and collect samples on the border. In two hospitals in Malawi, PCR tests were sent to another facility for analysis, adding delays in receiving results and managing patients, and one hospital resorted to rapid tests. One hospital noted that laboratory equipment was prioritized for COVID-19 tests leading to delays in other tests (e.g., tuberculosis). No changes in the availability of support from laboratories were reported in Benin and Uganda.

3.2.2. Maternity ward-level

3.2.2.1. Staffing

Implications of the COVID-19 pandemic on staff availability in the maternity ward varied between hospitals and countries. None of the hospitals in Benin and Tanzania reported changes in maternity ward staffing levels due to the pandemic. In Malawi, three hospitals noted that maternity staff were divided in groups and were working during alternate weeks. Reductions in staff numbers were only noted in Uganda, either because of health workers' inability to travel during lockdown or because staff numbers per shift were reduced with the introduction of new schedules. In terms of compensation, only one hospital in Malawi noted that staff received payment when screening/ treating COVID-19 suspected/confirmed cases.

3.2.2.2. Infrastructure

In terms of infrastructure and care organization, the most commonly reported adaptation was dedicating an isolation ward for women with suspected COVID-19 in the maternity before their referral to treatment centers. One hospital in Uganda and one in Malawi reported designating isolation rooms within the maternity ward, specifically a delivery room for isolating

pregnant women with suspected COVID-19. Additionally, five hospitals reported having an isolation room for the hospital in general (not specific to the maternity ward). In Malawi, a hospital dedicated an ambulance for transporting patients suspected with COVID-19. There was a specific triage area dedicated to screening for COVID-19 among patients in one of the hospitals in Benin. Another commonly mentioned change was installing hand washing facilities. In one hospital in Uganda, a hand washing facility was placed at the entrance of the laboratory and hand sanitizers were permanently made available.

3.2.2.3. Protocols and components of maternity care

3.2.2.3.1. Protocols and guidelines. None of the participating hospitals reported formal changes in written clinical care guidelines or protocols as a result of adapting to COVID-19. Additionally, none of the hospitals reported locally updated clinical care guidelines for providing childbirth care, neither received those from authorities nor from other external organizations. All hospitals in Malawi and Uganda, and two hospitals in Benin reported that maternity ward providers received training on COVID-19 during the six months preceding data collection.

3.2.2.3.2. Companionship and visitor policy. Changes in policies on companions and visitors were commonly reported by hospitals. Ten of the 16 hospitals (4 in Benin, one in Tanzania, one in Malawi and 4 in Uganda) noted that the number of allowed persons accompanying women during admission, birth, or visitors during the postpartum period, was reduced during the COVID-19 pandemic. In five of these hospitals (4 in Benin and 1 in Uganda), companions and visitors were required to abide by IPC measures, wear a facemask and wash hands. One hospital in Malawi which previously allowed one birth companion per woman, completely banned companions during the study period, and another hospital only allowed women with complications to have female companions. Other hospitals did not allow companions during labor and birth before the pandemic, and did not report changes to their policy during the study period. In three hospitals in Tanzania where labor companions were not allowed, persons accompanying women to the hospital were instructed to wait outside the hospital, far away from the maternity ward. Data on birth companions and visitors was missing from one hospital in Malawi.

3.2.2.3.3. Care to women with suspected or confirmed COVID-19. Two of the 16 hospitals reported having treated pregnant women with confirmed COVID-19 (two cases in one hospital in Tanzania and six cases in one hospital in Uganda) by the time of data collection. In the Tanzania hospital, women with suspected COVID-19 were isolated and received treatment in a room or ward, designated at the level of the hospital, including after they receive positive PCR test results. In the hospital in Uganda, women with suspected COVID-19 were admitted in a "side room" where samples for the PCR test were taken. If the results, which took three days to come out, were positive, the woman was transferred to an on-site isolation ward. In all the remaining hospitals, women with suspected COVID-19 were managed in an isolation area or room, where the PCR test samples are taken. Women with a positive test result were transferred to COVID-19 treatment centers/hospitals. Two hospitals in Malawi reported that in case of receiving women with suspected/confirmed COVID-19, the women would be isolated together with the newborn (no separation) and that breastfeeding would be encouraged. Nonetheless, these protocols were not applied in these hospitals since they did not report providing care to any pregnant/laboring women with confirmed COVID-19 during the study period.

4. Discussion

This paper documents the response to the COVID-19 pandemic in 16 referral hospitals and maternity wards in four countries of sub-Saharan African countries. The results showed variations in the approach adopted in the four countries, as well as variations between hospitals within the same country. Adaptations implemented included allocating focal teams at the hospital level for the COVID-19 response, shifting staffing schedules, designating COVID-19 triage zones and isolation areas and reducing the allowed number of visitors and companions of women giving birth in those hospitals. Interruptions to usual functioning of the hospitals included delayed or cancelled supervisory activities and/or maternal death review meetings and quality improvement initiatives. Budgetary implications involved increased spending and decreased revenues. None of the 16 hospitals were closed or (partly) converted to COVID-19 treatment centers until the study period.

Routine data trends were also extremely context-specific and trends varied by countries and hospitals. The number of ANC visits and facility-based childbirths were not affected to a large extent in Benin hospitals, whereas in Tanzania and Malawi we observed declines that started before the onset of the pandemic in most hospitals. On the other hand, Shapira et al. in their interrupted time-series analysis of national-level data, show a significant decline in ANC and facility deliveries in Malawi, while assuming an interruption date in March 2020 (7). Our analysis shows that in some cases the timing of onset of declines in service use preceded the onset of the pandemic. This could be a result of early fear of COVID-19 in the community due to influence of the international and local media coverage about the pandemic. Another explanation could be that various factors interacting at the health system level beyond the COVID-19 pandemic influence patterns in use of maternal healthcare services. In some Ugandan hospitals, declines in utilization were noted and coincided with the onset of the "movement restriction" requirement. Previous studies in Uganda also showed declines in ANC attendance and facility-based childbirths during the lockdown (12, 35). Periodic increases in rates of maternal deaths were noted in Benin and Uganda (in Benin coinciding with and following restriction measures and in Uganda coinciding with the second wave of the pandemic and the application of movement restrictions). Higher rates of stillbirths

were observed in Benin and Uganda in the last two quarters of 2020 compared to 2019.

Our comparative analysis shows that the way in which utilization of maternal care fluctuated during the COVID-19 pandemic appeared to be more closely related to national restriction measures than the COVID-19 epidemiological situation. In Malawi, neither strict movement restrictions nor public transportation bans were introduced, and facility-based childbirths remained stable despite a peak in confirmed COVID-19 cases between June and September 2020. On the other hand, in Uganda there was a small number of confirmed COVID-19 cases in May-June 2020, but the timing of the sudden and strict lockdown was reflected in declines in attendance to both outpatient ANC and inpatient childbirth care. Although the study hospitals reported continuing service provision and not closing, the lockdown seems to negatively influence accessibility to care. This decline in service use is alarming and might be linked to deterioration in maternal and perinatal health outcomes. This was observed in Uganda whereby an increase in maternal mortality was noted in the fourth quarter of 2020 in our study. Additionally, the Ebola outbreak in Sierra Leone was associated with a similar decline in service utilization of ANC and institutional births were accompanied with increases in maternal mortality and stillbirths (36). Policies that reduce accessibility and availability of essential care should be avoided in order to prevent the deterioration in maternal and perinatal health outcomes.

The COVID-19 pandemic is associated with higher rates of stillbirths and maternal deaths compared to before the pandemic (10, 37). Public health decision-makers at the national level should have included pregnant women's healthcare needs as a priority during the planning and response to the COVID-19 pandemic. Such considerations could have avoided unnecessary interruptions in the continuum of maternal and newborn care and prevented the deterioration of perinatal health outcomes, particularly in countries that bear the greater part of this burden. Additionally, health systems' ability to capture changes in maternal and newborn health outcomes is compromised by undocumented deaths that occur outside health facilities (38), issues with data quality (some were documented through this project), and interruptions in data collection and monitoring during the COVID-19 pandemic. Efforts to strengthen the collection of routine data and ensure their quality through regular and stable monitoring systems should be prioritized. This will allow to leverage the value of these data in order to foster preparedness for future health system shocks.

Lockdowns not only affected care utilization, but also care provision, partly through the availability of healthcare providers. Uganda, the country with the strictest measures in our study, is the only country in our study in which maternity wards reported shortages of healthcare providers. Curfews and lockdowns made it difficult for healthcare workers in Uganda, and in other LMICs, to reach their workplace, therefore leading to changes in shift schedules, longer working hours, and burnout (2, 39). This effect exacerbates already severe pre-existing shortages in the health workforce and has negative implications on the quality of maternity care and maternal health outcomes (40).

On the other hand, the majority of maternity healthcare providers at the participating hospitals received training on COVID-19, and in Malawi, there were active efforts to protect the workforce from infection with SARS-CoV-2 through implementing new schedules that reduce contact between staff. Maternity healthcare providers must be prioritized in the response and planning to the COVID-19 pandemic and initiatives such as offering them compensations for managing patients with COVID-19 (reported in a hospital in Malawi) should be encouraged (41).

Another challenge faced by maternity healthcare providers during the COVID-19 pandemic is the lack of knowledge and formal clinical care guidelines for the management of women confirmed with COVID-19 (2, 11). In our study, none of the hospitals reported adopting or updating clinical guidelines for the management of pregnant women with suspected or confirmed COVID-19, although two hospitals reported managing such patients without any official changes to the pre-existing guidelines and protocols. This can be an indication of potentially protecting practices that ensured quality of care, such as encouraging breastfeeding and non-separation of newborn, which were recommended by WHO (23). One of the reported adaptations to care provision was reducing the allowed number of companions and visitors in hospitals. This could indicate that some women did not have access to a companion of choice during the intrapartum period, which contradicts with WHO recommendations (42).

However, most of the study hospitals did not allow birth companions for reasons of privacy and lack of space before the COVID-19 pandemic, so effectively there appeared to have been little change during the pandemic to women's labor and birth companionship. The few hospitals that allow birth companions, enforced infection prevention measures on companions and visitors to reduce the risk of the spread of COVID-19. Additionally, reduction of visitors might mean postpartum women did not have access to support provided by visitors, including meals, laundry, personal hygiene such as bathing self and the baby, and emotional support. The COVID-19 pandemic, and the accompanying mitigation measures have threatened the provision of respectful maternity care in many settings (4). Advocacy should be strengthened to ensure that women and newborns be treated respectfully during and beyond the COVID-19 pandemic.

Aside from interrupting care utilization and provision, the COVID-19 pandemic also disrupted regular monitoring and quality improvement activities. Maternal death reviews were stopped or delayed in all countries included in our study with the exception of Tanzania. This can be a result of multiple factors, including the relatively denialist response to the pandemic in Tanzania during the study period (43). As previously mentioned, such interruption compromises the capacity of hospitals to leverage the value of data systems in monitoring and evaluation and to generate evidence-based policies for emergency preparedness. Emergency preparedness and response planning should be incorporated in all quality improvement initiatives, including maternal death reviews. Continuing maternal death surveillance and response systems

during health system shocks, including the COVID-19 pandemic, is of critical importance. Surveillance ensures adequate identification of causes of maternal deaths, including identifying the impact of newly emerging infectious diseases on maternal mortality, and issuing recommendations to avert any negative consequences and improve quality of care.

Many of the applied adaptations and changes were related to infrastructure and resource availability, and varied between hospitals in the same country. For example, the financial impact of the pandemic fell on different entities depending if the hospital is operated by a public or private authority. In Uganda, additional costs resulting from the purchasing of personal protective equipment and conducting PCR tests had to be met by the hospital management in private facilities, and were thus transferred to patient bills. This in turn contributed to driving patients away from the private sector, subsequently reducing the generated income and creating a vicious cycle of budgetary deficit (12). Another example is the lack of laboratory infrastructure to support the rapid issuing of PCR test results for detecting the SARS-CoV-2 virus among women who are pregnant or in labour. This led many maternity wards in our study to send samples for analysis to other institutions, which delayed the test results even further—reaching up to three days in some hospitals. Rapid testing capacity should be strengthened, particularly in maternity wards, as any small delay in care provision can have devastating effects on perinatal health outcomes.

This study's strengths lie in the comparative approach adopted in the synthesis of the findings between and within the four countries. The integration of the results from two data sources allowed for a coherent interpretation of the findings and supporting the evidence with qualitative and quantitative data. Gathering data on adaptations made during the COVID-19 pandemic at the level of the hospital and the maternity ward is another strength of this study as it provides information on similarities and/or differences between the two levels. Additionally, this study builds on a baseline assessment of a large intervention, which showed a flexibility in planning despite difficulties of data collection during the pandemic.

The limitations of this study include combining routine data indicators from four hospitals per country which could have masked hospital-level trends (**Supplementary Fle S3**). Referral hospitals represent complex adaptive systems, and reactions to health system shocks, such as the COVID-19 pandemic, take shape differently between different hospitals (17, 44, 45). Nonetheless, the aggregation helped in the interpretation of the findings when fluctuations at the hospital-level were not clear, particularly with rare outcomes such as maternal mortality. Additionally, this aggregation allows a bigger sample size and represents the case of four large referral hospitals with non-overlapping catchment areas in each country. One of our study's limitations was the missingness of responses to the open-ended questions in the HFA for some hospitals. More complete information was available from the secondary country-level data (e.g., dates and durations of implemented mitigation measures at the country level) and these country-level policies apply to all the hospitals in each country. The aggregation of service statistics at the country-level thus allowed us to triangulate between the country-level data and the quantitative data, which supported our interpretation of the findings. We also acknowledge that collecting the open-ended responses with the HFA could have introduced a level of information bias, as the information is self-reported by respondents working at the selected hospitals. Another limitation is that routine data were extracted from HMIS and therefore quality assurance over these data were difficult to conduct. A unified perinatal data collection system in hospitals could improve data quality and inform quality improvement initiatives; the development and implementation of such a system is part of the ALERT project, and will be used to collect the data for intervention evaluation (25). Last, it is difficult to restrict the explanation of certain routine data trends to the COVID-19 pandemic and its accompanying mitigation measures alone. Some trends in routine data, such as the decline in ANC consultations and the increase in stillbirths, were ongoing even before the onset of the pandemic. Complex factors contribute to such increases and are difficult to identify within the scope of this study and should be explored further.

5. Conclusion

Our study documents that disruptions during the COVID-19 pandemic go beyond the relatively frequently described issues with access to and utilization of maternity care, to include complex issues related to hospital governance and financing, resource availability, modality of care provision, disruptions of certain aspects of care quality, and unnecessary interruptions to routine quality improvement activities. The documented within and between country differences in the response to the pandemic demonstrates the complexity of the issue at hand, and is an example of the difficulty of establishing a unified response at the national and international level. This highlights the importance of contextualized solutions and adaptations in response to the ongoing COVID-19 pandemic, and future shocks to the health system.

Data availability statement

The datasets presented in this article are not readily available because they cannot be shared for ethical/privacy reasons. The data underlying this article cannot be shared publicly in order to protect the privacy of hospitals and the hospital staff who participated in the study. The data will be shared on reasonable request to the lead data manager of ALERT. Requests to access the datasets should be directed to Kristi Sidney Annerstedt, kristi.sidney@ki.se.

Ethics statement

The ALERT project received ethical approval from the following institutional review boards: Karolinska Institute,

Sweden (Etikprövningsmyndigheten—Dnr 2020–01587); Makerere University School of Public Health, Higher Degrees, Research and Ethics Committee, Uganda (HDREC 808); National Institute of Medical Research Tanzania, Tanzania (NIMR/HQ/R.8a/Vol.IX/3493); Muhimbili University of Health and Allied Sciences, Tanzania (REC No. MUHAS-REC-4-2020-11 8); Aga Khan University Ethical Review Committee, Tanzania—(AKU-ERC, EA/2019/044/fb); College of Medicine Research and Ethics Committee (COMREC), Malawi (COMREC P.04/20/3038); Comité National d'Ethique pour la Recherche en Santé, Cotonou, Bénin (N°44 du 21/12/2020); the Institutional Review Board at the Institute of Tropical Medicine Antwerp and The Ethics Committee at the University Hospital Antwerp, Belgium (ITG 1375/20. B3002020000116). Additionally, we received approval from the hospital management teams who agreed to be part of the ALERT intervention.

No individual data were collected for this study, therefore individual informed consent was not required.

Author contributions

This study was conceptualized and designed by LB, J-PD, KSA and CH. CBH, GA, GN, BK and DAM collected the data. AS, LB and KSA analyzed the data and wrote the first draft of the manuscript. All authors contributed to the article and approved the submitted version.

Funding

This study is part of the ALERT-project which is funded by the European Commission's Horizon 2020 (No 847824) under a call for Implementation research for maternal and child health. The contents of this article are solely the responsibility of the authors and do not reflect the views of the European Union (EU). This study proposal has been independently peer-reviewed by the EU.

Acknowledgments

We would like to thank hospital staff who responded to the health facility assessments.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fgwh.2023.1192473/full#supplementary-material.

References

1. World Health Organization. *Scoping review of interventions to maintain essential services for maternal, newborn, child and adolescent health and older people during disruptive events*. Geneva: World Health Organization (2021).

2. Semaan A, Audet C, Huysmans E, Afolabi B, Assarag B, Banke-Thomas A, et al. Voices from the frontline: findings from a thematic analysis of a rapid online global survey of maternal and newborn health professionals facing the COVID-19 pandemic. *BMJ Glob Health*. (2020) 5(6):e002967. doi: 10.1136/bmjgh-2020-002967

3. Rao SPN, Minckas N, Medvedev MM, Gathara D, Prashantha YN, Seifu Estifanos A, et al. Small and sick newborn care during the COVID-19 pandemic: global survey and thematic analysis of healthcare providers' voices and experiences. *BMJ Glob Health*. (2021) 6(3):e004347. doi: 10.1136/bmjgh-2020-004347

4. Asefa A, Semaan A, Delvaux T, Huysmans E, Galle A, Sacks E, et al. The impact of COVID-19 on the provision of respectful maternity care: findings from a global survey of health workers. *Women Birth*. (2021) 35(4):378–86. doi: 10.1016/j.wombi.2021.09.003

5. Galle A, Semaan A, Huysmans E, Audet C, Asefa A, Delvaux T, et al. A double-edged sword—telemedicine for maternal care during COVID-19: findings from a global mixed-methods study of healthcare providers. *BMJ Glob Health*. (2021) 6(2):e004575. doi: 10.1136/bmjgh-2020-004575

6. World Health Organization. *Second round of the national pulse survey on continuity of essential health services during the COVID-19 pandemic: January–March 2021*. (2021). Available at: https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS-continuity-survey-2021.1

7. Shapira G, Ahmed T, Drouard SHP, Amor Fernandez P, Kandpal E, Nzelu C, et al. Disruptions in maternal and child health service utilization during COVID-19: analysis from eight sub-Saharan African countries. *Health Policy Plan*. (2021) 36(7):1140–51. doi: 10.1093/heapol/czab064

8. Doncarli A, Araujo-Chaveron L, Crenn-Hebert C, Demiguel V, Boudet-Berquier J, Barry Y, et al. Impact of the SARS-CoV-2 pandemic and first lockdown on pregnancy monitoring in France: the COVIMATER cross-sectional study. *BMC Pregnancy Childbirth*. (2021) 21(1):1–11. doi: 10.1186/s12884-021-04256-9

9. Gurol-Urganci I, Jardine JE, Carroll F, Draycott T, Dunn G, Fremeaux A, et al. Maternal and perinatal outcomes of pregnant women with SARS-CoV-2 infection at the time of birth in England: national cohort study. *Am J Obstet Gynecol*. (2021) 225(5):522.e1–e11. doi: 10.1016/j.ajog.2021.05.016

10. Chmielewska B, Barratt I, Townsend R, Kalafat E, van der Meulen J, Gurol-Urganci I, et al. Effects of the COVID-19 pandemic on maternal and perinatal outcomes: a systematic review and meta-analysis. *Lancet Glob Health*. (2021) 9(6):e759–e72. doi: 10.1016/S2214-109X(21)00079-6

11. Ameh C, Banke-Thomas A, Balogun M, Makwe CC, Afolabi BB. Reproductive maternal and newborn health providers' assessment of facility preparedness and its determinants during the COVID-19 pandemic in lagos, Nigeria. *Am J Trop Med Hyg*. (2021) 104(4):1495. doi: 10.4269/ajtmh.20-1324

12. Atim MG, Kajogoo VD, Amare D, Said B, Geleta M, Muchie Y, et al. COVID-19 and health sector development plans in Africa: the impact on maternal and child health outcomes in Uganda. *Risk Manag Healthc Policy*. (2021) 14:4353–60. doi: 10.2147/RMHP.S328004

13. Huysmans E, Audet C, Delvaux T, Galle A, Semaan A, Asefa A, et al. How COVID-19 challenged care for women and their newborns: a qualitative case study of the experience of Belgian midwives during the first wave of the pandemic. *medRxiv*. (2021). doi: 10.1101/2021.05.21.21257440

14. Rimmer M, Al Wattar B, Members U. Provision of obstetrics and gynaecology services during the COVID-19 pandemic: a survey of junior doctors in the UK national health service. *BJOG*. (2020) 127(9):1123–8. doi: 10.1111/1471-0528.16313

15. Szabo RA, Wilson AN, Homer C, Vasilevski V, Sweet L, Wynter K, et al. COVID-19 changes to maternity care: experiences of Australian doctors. *Aust N Z J Obstet Gynaecol*. (2021) 61(3):408–15. doi: 10.1111/ajo.13307

16. Bradfield Z, Wynter K, Hauck Y, Vasilevski V, Kuliukas L, Wilson AN, et al. Experiences of receiving and providing maternity care during the COVID-19 pandemic in Australia: a five-cohort cross-sectional comparison. *PLoS One*. (2021) 16(3):e0248488. doi: 10.1371/journal.pone.0248488

17. Banke-Thomas A, Semaan A, Amongin D, Babah O, Dioubate N, Kikula A, et al. A mixed-methods study of maternal health care utilisation in six referral hospitals in four sub-Saharan African countries before and during the COVID-19 pandemic. *BMJ Glob Health*. (2022) 7(2):e008064. doi: 10.1136/bmjgh-2021-008064

18. Palmer KR, Tanner M, Davies-Tuck M, Rindt A, Papacostas K, Giles ML, et al. Widespread implementation of a low-cost telehealth service in the delivery of antenatal care during the COVID-19 pandemic: an interrupted time-series analysis. *Lancet*. (2021) 398(10294):41–52. doi: 10.1016/S0140-6736(21)00668-1

19. Kotlar B, Gerson E, Petrillo S, Langer A, Tiemeier H. The impact of the COVID-19 pandemic on maternal and perinatal health: a scoping review. *Reprod Health*. (2021) 18(1):10. doi: 10.1186/s12978-021-01070-6

20. Townsend R, Chmielewska B, Barratt I, Kalafat E, van der Meulen J, Gurol-Urganci I, et al. Global changes in maternity care provision during the COVID-19 pandemic: a systematic review and meta-analysis. *EClinicalMedicine*. (2021) 37:100947. doi: 10.1016/j.eclinm.2021.100947

21. Wagner M, Falcone V, Neururer SB, Leitner H, Delmarko I, Kiss H, et al. Perinatal and postpartum care during the COVID-19 pandemic: a nationwide cohort study. *Birth*. (2021) 49(2):243–52. doi: 10.1111/birt.12594

22. World Health Organization. *Maintaining essential health services: operational guidance for the COVID-19 context interim guidance*. (2020). Available at: https://www.who.int/publications/i/item/WHO-2019-nCoV-essential-health-services-2020.1

23. World health Organization. *Breastfeeding and COVID-19—scientific brief*. (2020). Available at: https://www.who.int/publications/i/item/WHO-2019-nCoV-Sci_Brief-Breastfeeding-2020.1

24. Tessema GA, Kinfu Y, Dachew BA, Tesema AG, Assefa Y, Alene KA, et al. The COVID-19 pandemic and healthcare systems in Africa: a scoping review of preparedness, impact and response. *BMJ Glob Health*. (2021) 6(12):e007179. doi: 10.1136/bmjgh-2021-007179

25. Akuze J, Annerstedt KS, Benova L, Chipeta E, Dossou J-P, Gross MM, et al. Action leveraging evidence to reduce perinatal mortality and morbidity (ALERT): study protocol for a stepped-wedge cluster-randomised trial in Benin, Malawi, Tanzania and Uganda. *BMC Health Serv Res*. (2021) 21(1):1324. doi: 10.1186/s12913-021-07155-z

26. Hale T, Angrist N, Goldszmidt R, Kira B, Petherick A, Phillips T, et al. A global panel database of pandemic policies (Oxford COVID-19 government response tracker). *Nat Hum Behav*. (2021) 5(4):529–38. doi: 10.1038/s41562-021-01079-8

27. World Health Organization. *WHO coronavirus disease (COVID-19) dashboard*. (2021). Available at: https://covid19.who.int/

28. Yin RK. *Case study research: Design and methods*. United States: Sage (2009).

29. Scholz RW, Tietje O. *Embedded case study methods: integrating quantitative and qualitative knowledge*. United States: Sage (2002).

30. Rodgers M, Thomas S, Harden M, Parker G, Street A, Eastwood A. P30 developing a methodological framework for organisational case studies: a rapid review and consensus development process. *J Epidemiol Community Health*. (2016) 70(Suppl 1):A67. doi: 10.1136/jech-2016-208064.129

31. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. A metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. (2009) 42(2):377–81. doi: 10.1016/j.jbi.2008.08.010

32. Asefa A, Dossou J-P, Hanson C, Hounsou CB, Namazzi G, Meja S, et al. Methodological reflections on health system oriented assessment of maternity care in 16 hospitals in sub-Saharan Africa: an embedded case study. *Health Policy Plan*. (2022) 37(10):1257–66. doi: 10.1093/heapol/czac078

33. Dossou J-P, ALERT Work Package 4 study team. Health facility assessment tool for the action leveraging evidence to reduce perinatal mortality and morbidity in sub-Saharan Africa (ALERT) project. *Zenodo*. (2022) doi: 10.5281/zenodo.5878168

34. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today*. (2004) 24(2):105–12. doi: 10.1016/j.nedt.2003.10.001

35. Burt JF, Ouma J, Lubyayi L, Amone A, Aol L, Sekikubo M, et al. Indirect effects of COVID-19 on maternal, neonatal, child, sexual and reproductive health services in Kampala, Uganda. *BMJ Glob Health*. (2021) 6(8).

36. Jones SA, Gopalakrishnan S, Ameh CA, White S, van den Broek NR. "Women and babies are dying but not of ebola": the effect of the ebola virus epidemic on the availability, uptake and outcomes of maternal and newborn health services in Sierra Leone. *BMJ Glob Health*. (2016) 1(3):e000065. doi: 10.1136/bmjgh-2016-000065

37. Vaccaro C, Mahmoud F, Aboulatta L, Aloud B, Eltonsy S. The impact of COVID-19 first wave national lockdowns on perinatal outcomes: a rapid review and meta-analysis. *BMC Pregnancy Childbirth*. (2021) 21(1):676. doi: 10.1186/s12884-021-04156-y

38. Calvert C, John J, Nzvere FP, Graham WJ. COVID-19 and maternal and perinatal outcomes. *Lancet Glob Health*. (2021) 9(8):e1062. doi: 10.1016/S2214-109X(21)00302-8

39. Kayiga H, Genevive DA, Amuge PM, Ssemata AS, Nanzira RS, Nakimuli A. Lived experiences of frontline healthcare providers offering maternal and newborn services amidst the novel corona virus disease 19 pandemic in Uganda: a qualitative study. *PLoS One*. (2021) 16(12):e0259835. doi: 10.1371/journal.pone.0259835

40. Gerein N, Green A, Pearson S. The implications of shortages of health professionals for maternal health in sub-Saharan Africa. *Reprod Health Matters*. (2006) 14(27):40–50. doi: 10.1016/S0968-8080(06)27225-2

41. Wilson AN, Ravaldi C, Scoullar MJ, Vogel JP, Szabo RA, Fisher JR, et al. Caring for the carers: ensuring the provision of quality maternity care during a global pandemic. *Women Birth*. (2021) 34(3):206–9. doi: 10.1016/j.wombi.2020.03.011

42. World Health Organization. *Every woman's right to a companion of choice during childbirth*. (2020). Available at: https://www.who.int/news/item/09-09-2020-every-woman-s-right-to-a-companion-of-choice-during-childbirth

43. Mfinanga SG, Mnyambwa NP, Minja DT, Ntinginya NE, Ngadaya E, Makani J, et al. Tanzania's position on the COVID-19 pandemic. *Lancet*. (2021) 397 (10284):1542–3. doi: 10.1016/S0140-6736(21)00678-4

44. Barasa EW, Molyneux S, English M, Cleary S. Hospitals as complex adaptive systems: a case study of factors influencing priority setting practices at the hospital level in Kenya. *Soc Sci Med*. (2017) 174:104–12. doi: 10.1016/j.socscimed.2016.12.026

45. Semaan A, Banke-Thomas A, Amongin D, Babah O, Dioubate N, Kikula A, et al. "We are not going to shut down, because we cannot postpone pregnancy": a mixed-methods study of the provision of maternal healthcare in six referral maternity wards in four sub-Saharan African countries during the COVID-19 pandemic. *BMJ Glob Health*. (2022) 7(2):e008063. doi: 10.1136/bmjgh-2021-008063

frontiers | Frontiers in Global Women's Health

TYPE Systematic Review
PUBLISHED 06 November 2023
DOI 10.3389/fgwh.2023.1153640

OPEN ACCESS

EDITED BY
Lorena Binfa,
University of Chile, Chile

REVIEWED BY
Clarissa Lim Velayo,
University of the Philippines Manila, Philippines
Simona Zaami,
Sapienza University of Rome, Italy

*CORRESPONDENCE
Fantu Mamo Aragaw
✉ fantuma3@gmail.com

RECEIVED 24 March 2023
ACCEPTED 02 October 2023
PUBLISHED 06 November 2023

CITATION
Aragaw FM, Belay DG, Endalew M, Asratie MH, Gashaw M and Tsega NT (2023) Level of episiotomy practice and its disparity among primiparous and multiparous women in Ethiopia: a systematic review and meta-analysis. Front. Glob. Womens Health 4:1153640. doi: 10.3389/fgwh.2023.1153640

Level of episiotomy practice and its disparity among primiparous and multiparous women in Ethiopia: a systematic review and meta-analysis

Fantu Mamo Aragaw[1]*, Daniel Gashaneh Belay[1,2], Mastewal Endalew[3], Melaku Hunie Asratie[4], Moges Gashaw[5] and Nuhamin Tesfa Tsega[4]

[1]Department of Epidemiology and Biostatistics, Institute of Public Health, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia, [2]Department of Human Anatomy, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia, [3]Department of Environmental and Occupational Health and Safety, Institute of Public Health, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia, [4]Department of Women's and Family Health, School of Midwifery, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia, [5]Department of Physiotherapy, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia

Background: Episiotomy at the time of vaginal birth is a common lifesaving surgical procedure. In Ethiopia, several studies have been conducted concerning the proportion of episiotomy. However, its prevalence varies across these series of studies. Thus, this systematic review and meta-analysis aimed to estimate the level of episiotomy practice and its disparity among primiparous and multiparous women in Ethiopia.

Methods: This systematic review was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guideline. We systematically searched the PubMed/MEDLINE, EMBASE, Google Scholar, and Science Direct databases for studies conducted in Ethiopia focusing on episiotomy. We included all cross-sectional studies published until October 5,2022. Data were analyzed using R version 4.2.1 software. The pooled estimates with 95% confidence intervals (CIs) were presented using forest plots. A random-effects meta-analysis was conducted on extracted crude rates to calculate the national and regional pooled estimates for the country. The *I*-squared test and Egger's regression test were used to assess heterogeneity and publication bias, respectively.

Results: Our search yielded 390 articles. A total of 13 studies covering five administrative regions and 6,404 women who delivered vaginally were involved. The mean age of the study participants ranged from 22 to 27.7 years. The estimated overall pooled prevalence rate of episiotomy in Ethiopian women was 42.75% (95% CI: 34.97%–50.54%). In the subgroup analysis, the pooled prevalence rate of episiotomy was 61.45% (95% CI: 51.11%–71.80%) among primiparous women. Meanwhile, the pooled estimate appears to be approximately 30.47% (95% CI: 22.08%–38.85%) among multiparous women.

Abbreviations
CI, confidence interval; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analysis; WHO, World Health Organization.

Conclusion: Our findings concluded that the pooled prevalence rate of episiotomy was higher than the evidence-based WHO recommendations for optimal patient care. Parallel to this, nulliparous women had a higher episiotomy rate than multiparous women. These findings highlight the importance of continued training for labor ward staff, particularly healthcare providers who often perform the majority of deliveries.

KEYWORDS

episiotomy, practice, systematic review, meta-analysis, women

Background

Episiotomy is one of the oldest surgical procedures involving the incision of the perineum to enlarge the vaginal opening during the second stage of labor (1, 2). Despite little scientific support for its routine use, it continues to be a frequently implemented obstetric procedure (3–5). Its prevalence varies across the globe, from almost a routine intervention in nearly all first births in some Latin American countries like Argentina (6), European countries (7), and the United States (8).

The major justification for the utilization of episiotomy is the prevention of severe perineal tears (9). Episiotomy prevents the occurrence of third-degree (involving the anal sphincter) and fourth-degree (involving the rectal mucosa) lacerations (9). An observational study has shown that episiotomy has a protective role during delivery (6). Despite the benefits of episiotomy, several studies have identified adverse consequences, including insufficient prevention of obstetric sphincter ani muscle injuries and hemorrhage (9–12). The practice of routine episiotomy increases the risk of major perineal injury (11).

Evidence reported that episiotomy rates vary according to parity (13). Previous studies have shown that primiparous women have an increased episiotomy rate compared with multiparous women (13–17). To date, the prevalence of episiotomy practice has been reported in numerous studies in Ethiopia, ranging from 25% to 65% (13–23). However, most of these studies did not determine the national-level prevalence. Moreover, these primary findings have been inconsistent and inconclusive. Hence, this systematic review and meta-analysis aimed to produce the pooled prevalence of episiotomy among women who delivered vaginally in Ethiopia. Furthermore, this comprehensive estimate will be important to support programmers, policymakers, and other stakeholders in making evidence-based decisions.

Methods

Evidence acquisition

An intensive search was performed in the PubMed/MEDLINE and EMBASE online databases to access articles on episiotomy practice in Ethiopia. Moreover, Google Scholar and Science Direct were used to retrieve articles. In addition, the reference lists of the screened studies were checked to ensure that all relevant studies were included in the systematic review. Three authors (FA, NT, and MG) independently performed the search. The term "episiotomy" was searched with all of the subsequent terms as a mix of free text and thesaurus terms in numerous variations: vaginal delivery, instrumental delivery, maternity care, and Ethiopia. This systematic review and meta-analysis followed the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines (**Supplementary Table S1**).

Inclusion and exclusion criteria

Inclusion criteria

The inclusion criteria included all studies conducted in Ethiopia, women who delivered vaginally, all published and unpublished articles, studies published in the English language, studies that employed an observational study design, and articles published until October 5, 2022.

Exclusion criteria

Articles for which we could not obtain the full text even after two email contacts with the principal investigator or the corresponding author of the particular study were excluded from the analysis.

Study selection procedures

The EndNote X7 citation manager was used to import studies extracted from several sources and to remove duplicates. Three review authors (FA, ME, and NT) independently assessed the inclusion of all the potential studies identified as a result of the search strategy. Other review authors (DB, MA, and MG) assessed the full text of the articles for eligibility for the final inclusion in this study. Any disagreements were resolved through discussion. Finally, eligible articles with full texts were reviewed.

Data extraction

We designed a form to extract data, and three review authors (FA, DB, and NT) extracted the data using the agreed Microsoft Excel form. Any discrepancies were resolved through a review involving the other three authors (ME, MA, and MG). Information on the study location, region, publication year, study design, sample size, name of the authors, and number of episiotomy cases among primiparous and multiparous women was extracted from each study (**Supplementary Table S2**).

Study quality and validity

Two authors (FA and MA) independently assessed the quality of each original study using the Newcastle–Ottawa Scale for the quality assessment of cross-sectional studies (**Supplementary Table S3**). The quality of each study was assessed using the following criteria: representativeness of the study, adequate sample size, acceptable nonresponse rate, use of validated measurement tools, comparability of the study, description of the outcome assessment, and use of appropriate statistical tests. Articles with a global rating score ≥ 7 out of 10 were considered high quality. Any disagreements between the two reviewers were resolved through discussion.

Outcome definition

Episiotomy is a surgical incision of the vaginal orifice and perineum to facilitate the passage of a fetus in a woman who gives birth vaginally (24).

Evidence synthesis and analysis

Data were extracted using a standardized data form prepared in a Microsoft Excel spreadsheet and analyzed using R version 4.0.5 statistical software. The pooled estimates with 95% confidence intervals (CIs) were presented using forest plots. A random-effects meta-analysis was conducted on extracted crude rates to calculate the national and regional pooled estimates for the country. The *I*-squared test and Egger's test were used to assess heterogeneity and publication bias, respectively. For the random-effects model, the DerSimonian and Laird weights were used to estimate the pooled proportion.

Heterogeneity across studies

Heterogeneity among reported proportions was assessed by computing *p*-values of the *I*-squared test (25). In this study, significant heterogeneity was observed among the included studies ($I^2 = 94.47\%$, $p < 0.001$). As a result, a random-effects meta-analysis model was used to estimate DerSimonian and Laird's pooled effects.

Additional analysis

A subgroup analysis was performed to identify potential moderating factors that can explain the inconsistencies between effect sizes across the primary studies based on different variables (i.e., geographical settings and parity). In addition, a univariate meta-regression model was used by taking the sample size, publication year, and quality score of each study to investigate the sources of heterogeneity.

Results

Search results and study selection

During our initial search, 390 articles were retrieved from PubMed, Google Scholar, the Cochrane Library, and Google for gray literature. Of these initial articles, 200 duplicate articles were excluded. Among the remaining 190 articles, 148 articles were excluded because of their titles and abstracts. After reviewing the abstracts, 22 articles were removed. Finally, 23 full-text articles were assessed for eligibility. Among them, 10 full-text articles were excluded due to the absence of results and study location. At the end of the process, 13 studies remained eligible and were included in the systematic review. **Figure 1** describes the detailed selection procedures.

Characteristics of original studies

Table 1 summarizes the study characteristics such as the year of publication, sample size, study design, and study area parameters of the nine included studies.

In this systematic review, a total of 6,404 women who had vaginal delivery were included. The mean age of the study participants ranged from 22 to 27.7 years. Concerning the study design, all included studies were cross-sectional. The sample size of the individual studies included in our meta-analysis ranged from 306 (13) to 2,861 (20). Furthermore, all studies were conducted between 2002 and 2020. In this study, four Ethiopian regions and one administrative town were represented. Three of the studies were conducted in Addis Ababa city administration (15, 19, 21), four in the Amhara region (13, 18, 23, 29), two in the Tigray region (14, 17), two in the southern region (16, 22), and one in the Oromia region (20). No research has been found in Dire Dawa city administration and the Benishangul-Gumuz, Harari, Afar, Gambella, and Somali regions.

Quality of the included studies

The quality score of the included studies ranged from 6 to 9 out of 10 total quality scores, with a mean quality score of 7.7 (SD ± 1.3) (**Supplementary Table S3**). Overall, studies with a quality score of ≥6 are considered high quality. Last, all 13 included articles were categorized as high-quality studies.

Sensitivity analysis and publication bias

First, we screened articles for studentized residuals larger than two absolute values to identify outlying and influential studies. During the screening process, two articles (16, 21) seemed influential (**Figure 2**). Accordingly, a leave-one-out sensitivity analysis was performed to determine whether they were truly influential, which indicates that the exclusion of one article (21) had a significant change in the fitted meta-analytic model (**Supplementary Figure S1**). As a result of this considerable

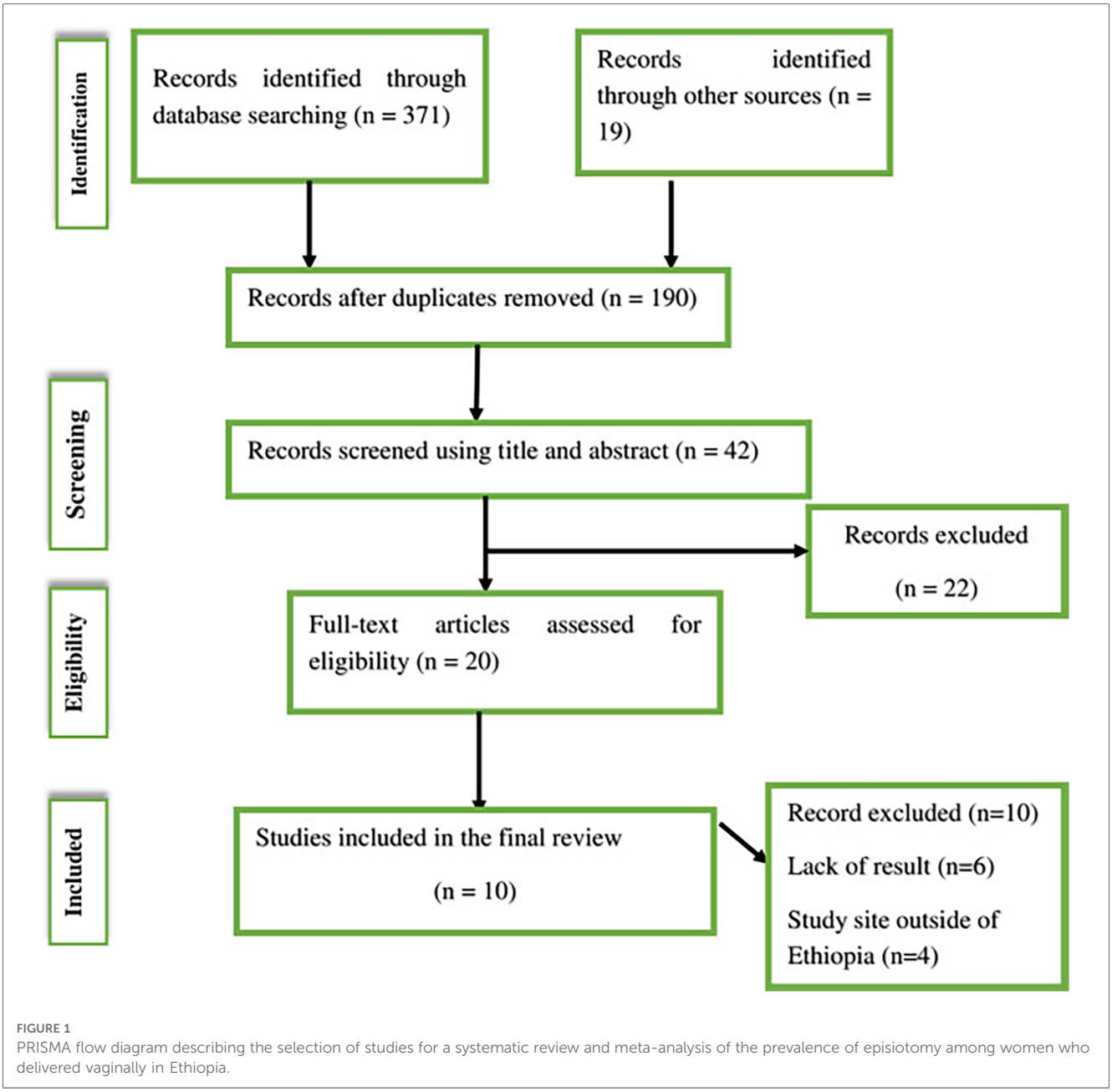


FIGURE 1
PRISMA flow diagram describing the selection of studies for a systematic review and meta-analysis of the prevalence of episiotomy among women who delivered vaginally in Ethiopia.

influence on the summary effect size, we eliminated this article (21) from the final meta-analysis. After the process, 13 studies were used in the final meta-analysis. Regarding the publication bias of the included articles, a funnel plot and Egger's regression test were used to check the indication of publication bias. As indicated in Figure 3, there is clear evidence of heterogeneity and funnel plot asymmetry. Despite this clear evidence in the funnel plot, Egger's regression test failed to find a significant publication bias ($p = 0.56$).

Meta-analysis

The overall estimated pooled prevalence rate of episiotomy among women who delivered vaginally in Ethiopia was 42.75% (95% CI: 34.97%–50.54%) (Figure 4). In addition, the forest plot of our meta-analysis showed that the highest proportion (47.71%) of episiotomy was reported from a study conducted at the University of Gondar Comprehensive Specialized Referral Hospital in Amhara Regional State (13). In contrast, the lowest proportion (25%) was reported from a study at Jimma University Specialized Hospital in Oromo Regional State (20). According to the *I*-squared test statistics ($I^2 = 95.47\%$), the included studies showed high heterogeneity. Therefore, subgroup and univariate meta-regression analyses were conducted to identify the possible sources of heterogeneity.

Subgroup analysis

The subgroup prevalence of episiotomy was estimated by considering the parity and geographical settings of women who

TABLE 1 Study characteristics of included articles for the systematic review and meta-analysis on the prevalence of episiotomy among women who delivered vaginally in Ethiopia.

No.	Authors	Year	Study area and facility type	Sample size	Prevalence of episiotomy (%)		
					Primiparous (%)	Multiparous (%)	Combined
1	Yemane et al. (14)	2017	Public Health Institutions of Axum Town (Tigray region)	338	48.7	31.5	41.4
2	Worku et al. (15)	2019	Public Health Institutions of Akaki Kality (Addis Ababa)	381	67.1	13.9	35.2
3	Teshome et al. (13)	2020	University of Gondar Comprehensive Specialized Referral Hospital (Amhara region)	306	54.9	29.9	47.7
4	Mitiku et al. (16)	2015	Mizan Aman General Hospital (southern region)	310	39.8	31.4	30.6
5	Niguse et al. (17)	2016	Public health facilities of Shire Town (Tigray region)	407	50	27.7	35.4
6	Kiroset al. (19)	2006	Tikur Anbessa Teaching Hospital (Addis Ababa)	672	–	–	40.2
7	Aynalem FW (26)	2016	Debre Markos Referral Hospital (Amhara region)	314	–	–	42
8	Marai (20)	2002	Jimma Teaching Hospital (Oromia region)	2,861	47	5	25
9	Woretaw et al. (27)	2020	Public Health facilities at Metema district (Amhara region)	410	–	–	44.15
10	Tefera et al. (21)	2019	Saint Paul's Hospital Millennium Medical College (Addis Ababa)	405	84.2	44.2	65.4
11	Beyene et al. (23)	2020	Felege Hiwot Referral Hospital (Amhara region)	411	64.9	27.2	41.1
12	Fikadu et al. (22)	2020	Arba Minch General Hospital (southern region)	410	80.66	53.72	68
13	Tamene et al. (28)	2020	St. Paul's Hospital (Addis Ababa)	344	61.86	16.00	41.9

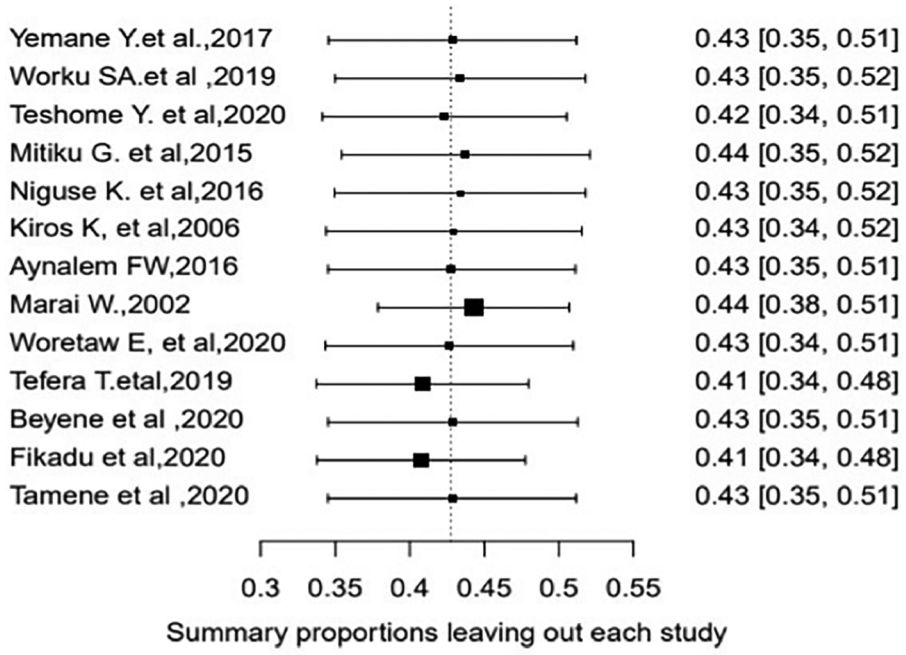


FIGURE 2
Leave-one-out sensitivity analysis for single-study influence on the pooled estimate of episiotomy among women who delivered vaginally in Ethiopia.

delivered vaginally. In the case of heterogeneity, we have conducted a subgroup analysis by considering parity (primiparous or multiparous) to explore possible causes. Accordingly, in the subgroup analysis, the pooled prevalence rate of episiotomy among primiparous women was 61.45% (95% CI: 51.11%–71.80%) (Figure 5A). In contrast, the pooled estimate of episiotomy among multiparous women was 30.47% (95% CI: 22.08%–38.85%) (Figure 5B). In addition, the pooled prevalence of episiotomy varied widely across the regions of Ethiopia. As such, in the regional subgroup analysis, the Amhara region had the highest pooled proportion of episiotomy practice at 44.59% (95% CI: 44.15%–48.85%), followed by the Tigray region at 38.23% (95% CI: 33.07%–40.40%), and Addis Ababa city administration at 37.90% (95% CI: 33.07%–42.76%) (Figure 6).

Meta-regression

A meta-regression was conducted using the study as the unit of analysis to examine the relationship between covariates (sample size, publication year, and quality score of primary studies) and the effect sizes (Table 2). From this output, we can conclude that none of the covariates significantly affected the pooled estimate.

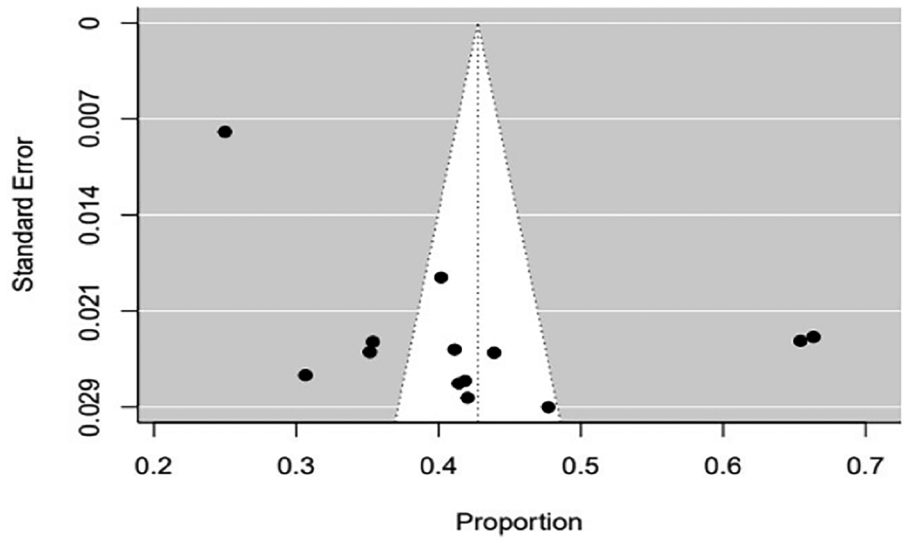


FIGURE 3
Funnel plot episiotomy practice among women who delivered vaginally in Ethiopia.

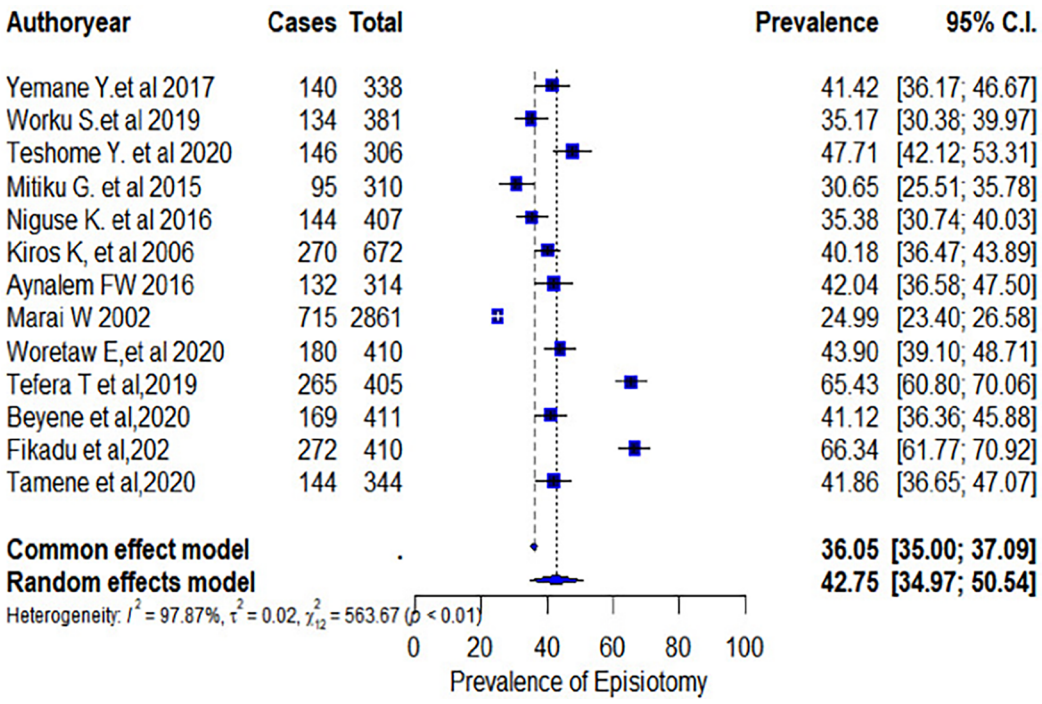


FIGURE 4
Forest plot of the pooled prevalence of episiotomy among women who delivered vaginally in Ethiopia.

Discussion

This systematic review and meta-analysis aimed to estimate the pooled prevalence of episiotomy among Ethiopian women who delivered vaginally. As per the results of this meta-analysis, the pooled prevalence rate of episiotomy among women who delivered vaginally was 42.75% (95% CI: 34.97%–50.54%). This rate is in line with studies conducted at the Nigeria tertiary hospitals at 40.4% (30), Brigham Hospital Boston Massachusetts at 40.6% (31), Morocco at 41.28% (32), and Iran at 41.5% (33). On this basis, even though the exact rate of episiotomy is unknown, it is appropriate to conclude that the episiotomy rate is still higher. Episiotomy was performed to help prevent severe vaginal tears during delivery. However, more recent research suggests that an episiotomy may cause more problems than it aims to prevent. The procedure can increase the risk of infection

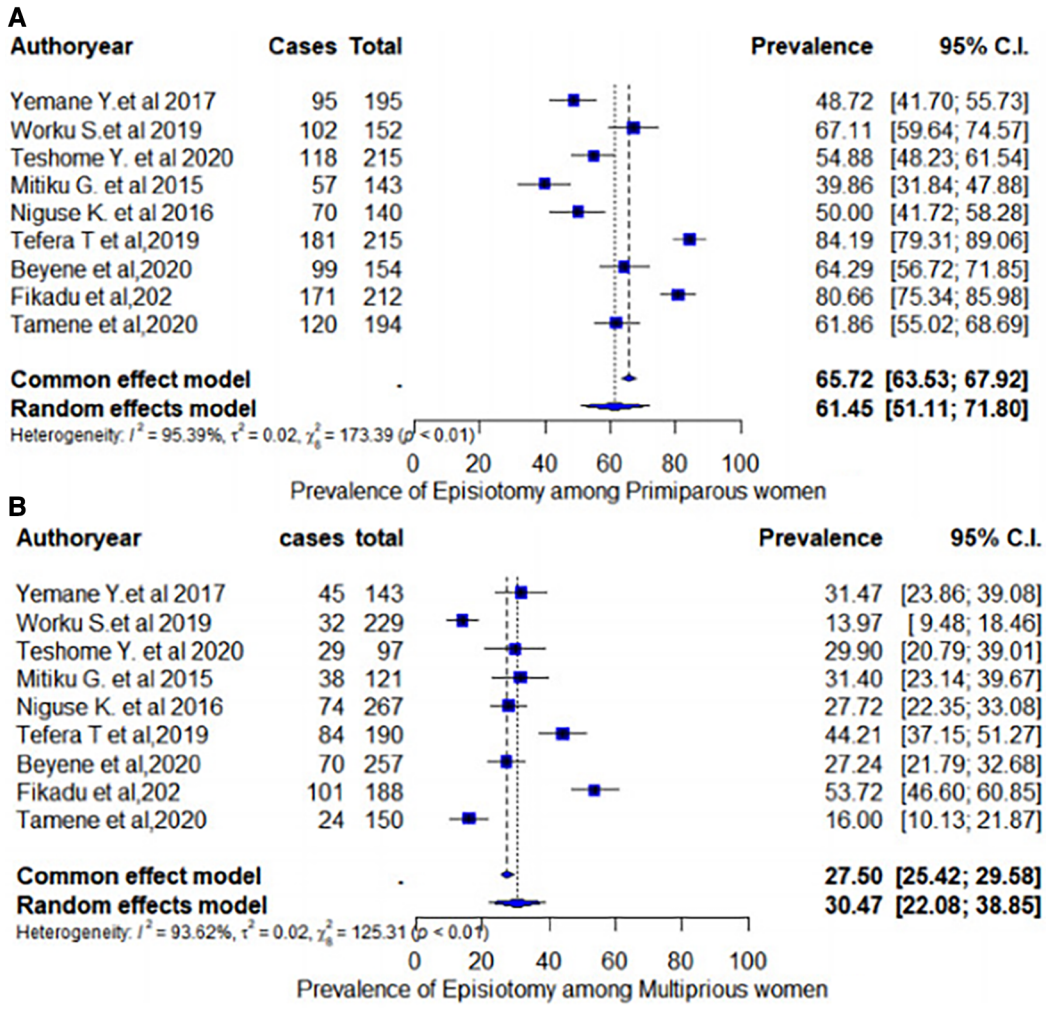


FIGURE 5
Pooled prevalence of episiotomy among women who delivered vaginally in Ethiopia by parity: (A) pooled prevalence of episiotomy among primiparous women; (B) pooled prevalence of episiotomy among multiparous women.

and other complications. Recovery also tends to be lengthy and uncomfortable (2, 34, 35).

However, episiotomy rates vary worldwide. Our pooled estimate of episiotomy prevalence was higher than that of the World Health Organization recommendation (5%–15%) (36). Furthermore, our result (37.82%) was significantly higher than that of other countries such as Denmark (3.7%) (37), Congo (20.4%) (38), and Brazil (29.1%) (39). This overuse of episiotomy intervention might be a symptom of the obstetric transition with medicalization and increasing interventionist birth practices with the obstetric transition stage. Obstetric transition refers to the long-term trend of countries gradually shifting from a pattern of high maternal mortality to a pattern of low maternal mortality; from a direct obstetric cause of maternal mortality to an increasing percentage of indirect causes, non-communicable causes, and maternal population aging; and from the natural course of pregnancy and childbirth to the institutionalization of maternity care, increasing the rates of obstetrical interruption (40). It is the process of transforming a population's reproductive health and birth patterns through time (41). In addition, women in low-income settings are often not informed about the risks and reasons for interventions and not asked to provide informed consent (42). This might contribute to the increments in the episiotomy rate in Ethiopia. Moreover, this wide practice variation suggests that episiotomy use is heavily driven by local professional norms, experiences in training, and individual practitioner preference rather than variations in the needs of individual women at the time of vaginal birth.

Performing episiotomies without consent during labor and childbirth has been deemed disrespectful and abuse or obstetric violence (43). Therefore, it is necessary to obtain informed consent before performing episiotomy during childbirth (44, 45). Selective episiotomies are significantly less likely to be associated with accusations of obstetric violence during childbirth than routine episiotomies (44, 46). Healthcare providers should avoid performing unnecessary episiotomies and understand the potential risks associated with this procedure (45, 46).

Our chief findings suggested that nulliparous women had a higher episiotomy rate (52%) than multiparous women (26.51%). Earlier evidence supported this finding (5, 7, 47). This may be explained by the plausible reason that primiparous women often

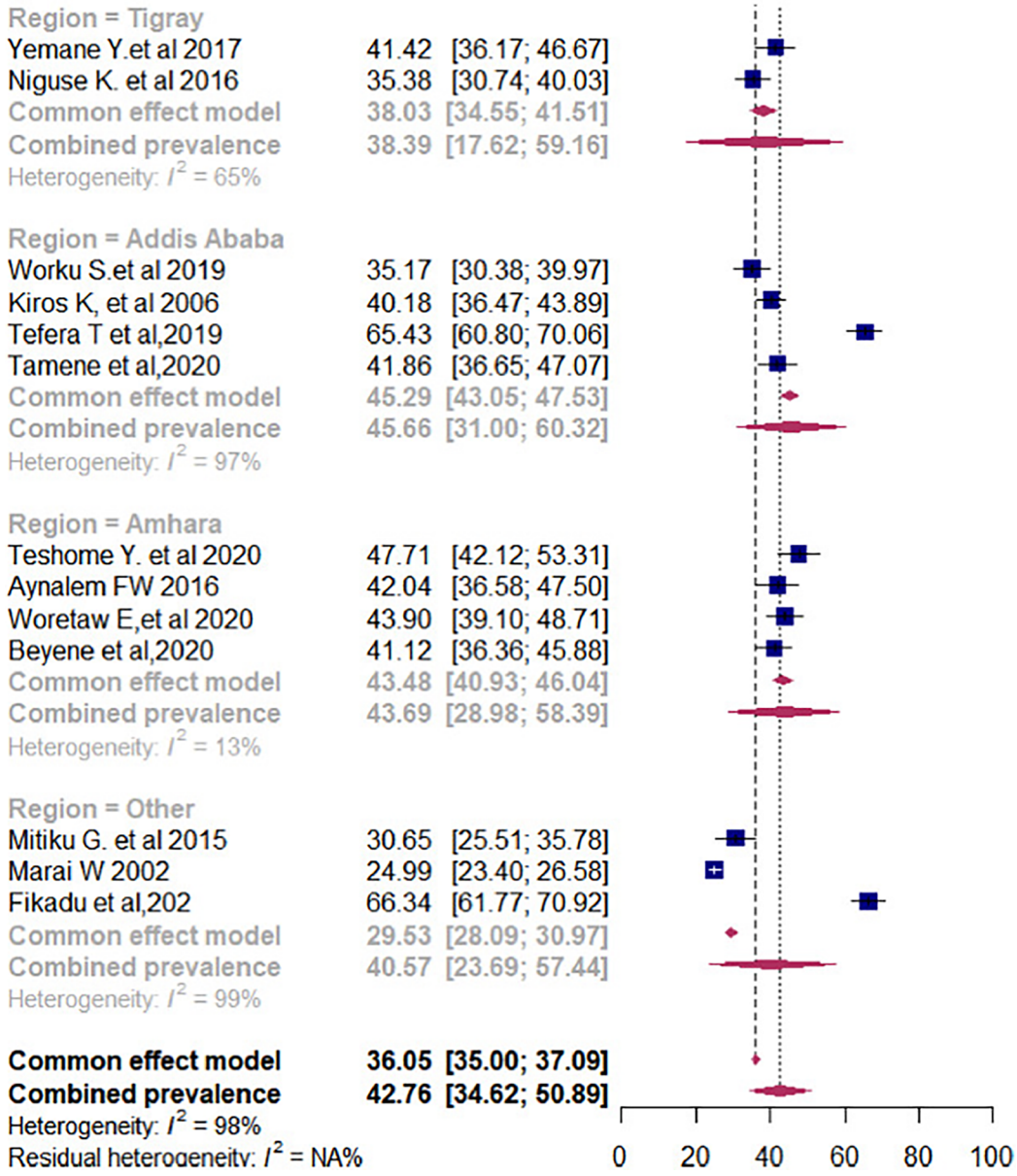


FIGURE 6
Pooled prevalence of episiotomy among women who delivered vaginally in Ethiopia by regions.

have a tight perineum, which is one indication of episiotomy, and the old recommendation of routine episiotomy in primiparous women performed by many health professionals might still have an influence on the indication of this procedure for those women. Furthermore, this finding is probably because many healthcare providers still practice the policy of preventing uncontrolled perineal tears by performing episiotomies on nulliparous women. This study also demonstrates that the pooled prevalence of episiotomy varied across regions of Ethiopia. Accordingly, the Amhara region had the highest pooled proportion of episiotomy practice at 44.59% (95% CI: 44.15%–48.85%). This regional variation might be due to the variations in medical practices that exist among the regions.

TABLE 2 Meta-regressions of the episiotomy practice among women who delivered vaginally in Ethiopia by sample size, publication year, and quality scores of included studies.

Covariate	β (95% CI)	*p*-value
Publication year	0.0022 (−0.0096 to 0.0139)	0.7180
Sample size	0.0001 (−0.0001 to 0.0002)	0.3843
Quality score	−0.0045 (−0.0507 to 0.0416)	0.8468

Limitations

Tremendous efforts have been made to include all articles from Ethiopia. However, this study was not free from limitations. Only articles published in English were considered. Moreover, we have not obtained studies from Benishangul-Gumuz, Ethio-Somali,

Afar, Dire Dawa city administration, and Gambella region, which might affect the issue of generalizability.

Conclusions

Our findings concluded that the pooled prevalence of episiotomy was higher than the evidence-based WHO recommendations for optimal patient care. Parallel to this, nulliparous women had a higher episiotomy rate than multiparous women. These findings highlight the importance of continued training for labor ward staff, particularly healthcare providers, who often perform most deliveries.

Data availability statement

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author.

Author contributions

FMA originated the research idea and analyzed the data. FMA, NTT, DGB, ME, MHA, and MG contributed to the data analysis and manuscript writing. All authors have read and approved the manuscript. All authors contributed to the article and approved the submitted version.

Acknowledgments

The authors would like to specially acknowledge the authors of primary studies.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fgwh.2023.1153640/full#supplementary-material

SUPPLEMENTARY TABLE S1
PRISMA 2009 checklist. (DOC).

SUPPLEMENTARY TABLE S2
Data extraction sheet (XLSX).

SUPPLEMENTARY TABLE S3
Quality score of each study (XLSX) zcx.

SUPPLEMENTARY FIGURE S1
Plots of diagnosis (PDF).

References

1. Carroli G, Belizan J. Episiotomy for vaginal birth. *Cochrane Database Syst Rev*. (1999) (3).

2. Thacker SB, Banta HD. Benefits and risks of episiotomy: an interpretative review of the English language literature, 1860–1980. *Obstet Gynecol Surv*. (1983) 38 (6):322–38. doi: 10.1097/00006254-198306000-00003

3. Lede RL, Belizán JM, Carroli G. Is routine use of episiotomy justified? *Am J Obstet Gynecol*. (1996) 174(5):1399–402. doi: 10.1016/S0002-9378(96)70579-3

4. Carroli G. Episiotomy for vaginal birth (Cochrane Review). *Cochrane Database Syst Rev*. (1999) 3.

5. Lam K, Wong H, Pun T. The practice of episiotomy in public hospitals in Hong. *Hong Kong Med J*. (2006) 12(2):94–8. doi: 10.1097/AOG.0b013e31818649ae

6. Shiono P, Klebanoff M, Carey JC. Midline episiotomies: more harm than good? *Obstet Gynecol*. (1990) 75(5):765–70.

7. Alayande BT, Amole IO, Akin D. Relative frequency and predictors of episiotomy in Ogbomoso, Nigeria. *Internet J Med Update-EJOURNAL*. (2012) 7(2).

8. Alperin M, Krohn MA, Parviainen K. Episiotomy and increase in the risk of obstetric laceration in a subsequent vaginal delivery. *Obstet Gynecol*. (2008) 111 (6):1274–8. doi: 10.1097/AOG.0b013e31816de899

9. Ejegård H, Ryding EL, Sjögren B. Sexuality after delivery with episiotomy: a long-term follow-up. *Gynecol Obstet Investig*. (2008) 66(1):1–7. doi: 10.1159/000113464

10. Hartmann K, Viswanathan M, Palmieri R, Gartlehner G, Thorp J, Lohr KN. Outcomes of routine episiotomy: a systematic review. *JAMA*. (2005) 293 (17):2141–8. doi: 10.1001/jama.293.17.2141

11. Jiang H, Qian X, Carroli G, Garner P. Selective versus routine use of episiotomy for vaginal birth. *Cochrane Database Syst Rev*. (2017) (2). doi: 10.1002/14651858.CD000081.pub3

12. Ampt AJ, Patterson JA, Roberts CL, Ford JB. Obstetric anal sphincter injury rates among primiparous women with different modes of vaginal delivery. *Int J Gynaecol Obstet*. (2015) 131(3):260–4. doi: 10.1016/j.ijgo.2015.06.025

13. Teshome Y, Mekonen M, Sisay T, Chala G, Mengistu A, Shewasinad S, Worku N. Prevalence of episiotomy and its associated factors in University of Gondar Comprehensive Specialized Referral Hospital: a retrospective study from Ethiopia. *Am J Life Sci*. (2020) 8(1):9–13. doi: 10.11648/j.ajls.20200801.12

14. Yemaneh Y, Sahile E, Alehegn A, Girma A, Robles C. Assessment of the proportion and associated factors of episiotomy at public health institutions of Axum Town, Tigray Region, North Ethiopia, 2015. *Crit Care Obstet Gynecol*. (2017) 3(11):10–21767. doi: 10.21767/2471-9803.1000152

15. Worku S, Mitku Y, Getahun S. Episiotomy practice and its associated factor among women who gave birth at public health institutions of Akaki Kality in Addis Ababa, Ethiopia. *Clin Mother Child Health*. (2019) 16(318):2. doi: 10.4172/2090-7214.1000318

16. Mitiku G, Beyene W, Geremew M. Assessment of episiotomy practice in Mizan-Aman General Hospital, Ethiopia. *J Health Med Nurs*. (2015) 20:12–20.

17. Niguse K, Gidey G, Gebrehiwot H, Abay M, Getachew D, Worku T. Episiotomy practice and its associated factors among mothers who gave birth vaginally at public health institutions of Shire town, Northern Ethiopia. *Infection*. (2016) 8(9):10–37591.

18. Woretaw E, Teshome M, Alene M. Episiotomy practice and associated factors among mothers who gave birth at public health facilities in Metema district, northwest Ethiopia. *Reprod Health*. (2021) 18(1):142. doi: 10.1186/s12978-021-01194-9

19. Kiros K, Lakew Z. Magnitude of episiotomy in a teaching hospital in Addis Ababa, Ethiopia. *Ethiop Med J*. (2006) 44(3):205–9.

20. Marai W. A two years retrospective review of episiotomy at Jimma Teaching Hospital, southwestern Ethiopia. *Ethiop Med J*. (2002) 40(2):141–8.

21. Tefera T, Kebede B, Mekonen T. Prevalence of episiotomy and factors associated with practice of episiotomy at Saint Paul's Hospital Millennium Medical College: a cross sectional study. *Ethiop J Reprod Health*. (2019) 11(3):8.

22. Fikadu K, Boti N, Tadesse B, Mesele D, Aschenaki E, Toka E, et al. Magnitude of episiotomy and associated factors among mothers who give birth in Arba Minch General Hospital, Southern Ethiopia: observation-based cross-sectional study. *J Pregnancy*. (2020) 2020. doi: 10.1155/2020/8395142

23. Beyene F, Nigussie AA, Limenih SK, Tesfu AA, Wudineh KG. Factors associated with episiotomy practices in Bahirdar City, Ethiopia: a cross-sectional study. *Risk Manag Healthc Policy*. (2020) 13:2281–9. doi: 10.2147/RMHP.S277657

24. Deyaso ZF, Chekole TT, Bedada RG, Molla W, Uddo EB, Mamo TT. Prevalence of episiotomy practice and factors associated with it in Ethiopia, systematic review and meta-analysis. *Womens Health (Lond)*. (2022) 18:17455057221091659. doi: 10.1177/17455057221091659

25. Rücker G, Schwarzer G, Carpenter JR, Schumacher M. Undue reliance on I^2 in assessing heterogeneity may mislead. *BMC Med Res Methodol*. (2008) 8(1):79. doi: 10.1186/1471-2288-8-79

26. Aynalem FW. *Magnitude and factors associated with episiotomy among mothers who delivered vaginally at Debre Referral Hospital, Ethiopia-Markos*. W.C.o.M.a.W. Health (2016).

27. Woretaw E, Teshome M, Alene M. *Episiotomy practice and associated factors among mothers who gave birth at public health facilities in Metema district, north west, Ethiopia*. Australia: Debre Markos University (2020).

28. Prevalence and determinants of episiotomy in Saint Paul's Hospital: cross-sectional survey. (2020).

29. Aynalem FW. Magnitude and factors associated with episiotomy among mothers who delivered vaginally at Debre Markos Referral Hospital, Ethiopia. *J Womens Healthc*. (2016).

30. Onah HE, Akani CI. Rates and predictors of episiotomy in Nigerian women. *Trop J Obstet Gynaecol*. (2004) 21(1):44–5. doi: 10.4314/tjog.v21i1.14463

31. Robinson JN, Norwitz ER, Cohen AP, Lieberman E. Predictors of episiotomy use at first spontaneous vaginal delivery. *Obstet Gynecol*. (2000) 96(2):214–8. doi: 10.1016/S0029-7844(00)00868-1

32. Bakkali ME, Azzouzi Y, AbderrazzakKhadmaoui NA, Arfaoui A. Risk factors associated with the practice of episiotomy and the occurrence of perineal tears in mothers at the maternity hospital of Chérif Idrissi hospital in the region of Gharb Chrarda Bni Hssen (Morocco). *Int J Innov Appl Stud*. (2014) 7(3):911–9.

33. Rasouli M, Keramat A, Khosravi A, Mohabatpour Z. Prevalence and factors associated with episiotomy in Shahroud City, northeast of Iran. *Int J Womens Health Reprod Sci*. (2016) 4(3):125–9. doi: 10.15296/ijwhr.2016.29

34. Macleod M, Strachan B, Bahl R, Howarth L, Goyder K, Van de Venne MA, et al. A prospective cohort study of maternal and neonatal morbidity in relation to use of episiotomy at operative vaginal delivery. *BJOG Int J Obstet Gynaecol*. (2008) 115 (13):1688–94. doi: 10.1111/j.1471-0528.2008.01961.x

35. Haadem K. Review of the literature on advantages and disadvantages: episiotomy: only limited protection against ruptures–time for a revision? *Lakartidningen*. (1998) 95(40):4354–8.

36. Care in normal birth: a practical guide. Technical Working Group, World Health Organization. *Birth*. (1997) 24(2):121–3. PMID: 9271979.

37. Blondel B, Alexander S, Bjarnadóttir RI, Gissler M, Langhoff-Roos J, Novak-Antolič Ž, et al. Variations in rates of severe perineal tears and episiotomies in 20 European countries: a study based on routine national data in Euro-Peristat Project. *Acta Obstet Gynecol Scand*. (2016) 95(7):746–54. doi: 10.1111/aogs.12894

38. Innocent N, Philemon MM, Prince I, Justine Y, Ntakwinja M, Olivier N, et al. Factors associated with episiotomy practice in Bukavu, Democratic Republic of the Congo. *Int J Reprod Contracept Obstet Gynecol*. (2018) 7(7):2554. doi: 10.18203/2320-1770.ijrcog20182860

39. Carvalho C, Souza A, Moraes OF. Prevalence and factors associated with practice of episiotomy at a maternity school in Recife, Pernambuco, Brazil. *Rev Assoc Med Bras*. (2010) 56(3):333–9. doi: 10.1590/S0104-42302010000300020

40. Souza JP, Tunçalp Ö, Vogel JP, Bohren M, Widmer M, Oladapo OT, et al. Obstetric transition: the pathway towards ending preventable maternal deaths. *BJOG Int J Obstet Gynaecol*. (2014) 121:1–4. doi: 10.1111/1471-0528.12735

41. Ronsmans C, Graham W. Maternal mortality: who, when, where, and why. *Lancet*. (2006) 368(9542):1189–200. doi: 10.1016/S0140-6736(06)69380-X

42. Okafor II, Ugwu EO, Obi SN. Disrespect and abuse during facility-based childbirth in a low-income country. *Int J Gynaecol Obstet*. (2015) 128(2):110–3. doi: 10.1016/j.ijgo.2014.08.015

43. Sen G, Reddy B, Iyer A. Beyond measurement: the drivers of disrespect and abuse in obstetric care. *Reprod Health Matters*. (2018) 26(53):6–18. doi: 10.1080/09688080.2018.1508173

44. Zaami S, Stark M, Beck R, Malvasi A, Marinelli E. Does episiotomy always equate violence in obstetrics? Routine and selective episiotomy in obstetric practice and legal questions. *Eur Rev Med Pharmacol Sci*. (2019) 23(5):1847–54. doi: 10.1080/09688080.2018.1508173

45. Malvasi A, Trojano G, Tinelli A, Marinelli E, Zaami S. Episiotomy: an informed consent proposal. *J Matern Fetal Neonatal Med*. (2021) 34(6):948–51. doi: 10.1080/14767058.2019.1622677

46. Xu B, Luo Q, Wu R, Lu Y, Ying H, Xu Y, et al. Perineal stress as a predictor of performing episiotomy in primiparous women: a prospective observational study. *BMC Pregnancy Childbirth*. (2022) 22(1):793. doi: 10.1186/s12884-022-05075-2

47. Izuka EO, Dim CC, Chigbu CO, Obiora-Izuka CE. Prevalence and predictors of episiotomy among women at first birth in Enugu, south east Nigeria. *Ann Med Health Sci Res*. (2014) 4(6):928–32. doi: 10.4103/2141-9248.144916

frontiers | Frontiers in Global Women's Health

TYPE Original Research
PUBLISHED 22 November 2023
DOI 10.3389/fgwh.2023.1267156

OPEN ACCESS

EDITED BY
Ramon Escuriet,
Blanquerna Ramon Llull University, Spain

REVIEWED BY
Laura Rodellar Merino,
University General Hospital of Catalonia, Spain
Francesca Palestra,
World Health Organization, Switzerland

*CORRESPONDENCE
Loreto Paola Villanueva
✉ loreto.villanueva@uchile.cl

RECEIVED 26 July 2023
ACCEPTED 09 October 2023
PUBLISHED 22 November 2023

CITATION
Carroza Escobar MB, Silva N, Ortíz-Contreras J, Villegas R, Vargas SL, Núñez C, Vergara Maldonado LF and Villanueva LP (2023) Immigration and C-sections incidence: Maternal care and perinatal outcomes in the context of the pandemic in Chile. Front. Glob. Womens Health 4:1267156. doi: 10.3389/fgwh.2023.1267156

Immigration and C-sections incidence: Maternal care and perinatal outcomes in the context of the pandemic in Chile

María Begoña Carroza Escobar[1,2], Nicole Silva[3], Jovita Ortíz-Contreras[2], Rodrigo Villegas[4], Sergio L. Vargas[5], Claudio Núñez[3], Luis Felipe Vergara Maldonado[6] and Loreto Paola Villanueva[2]*

[1]Programa de Doctorado en Salud Pública, Escuela de Salud Pública, Facultad de Medicina, Universidad de Chile, Santiago, Chile, [2]Departamento de Promoción de la Salud de la Mujer y el Recién Nacido, Facultad de Medicina, Universidad de Chile, Santiago, Chile, [3]Servicio de Ginecología y Obstetricia, Complejo Hospitalario San José, Servicio de Salud Metropolitano Norte, Santiago, Chile, [4]Programa de Bioestadística, Escuela de Salud Pública, Facultad de Medicina, Universidad de Chile, Santiago, Chile, [5]Programa de Microbiología, Instituto de Ciencias Biomédicas, Facultad de Medicina, Universidad de Chile, Santiago, Chile, [6]Programa de MBA con Especialización en Salud, Instituto de Salud Pública, Universidad Andrés Bello, Santiago, Chile

Introduction: Immigration has increased significantly in Chile. Despite that all pregnant women, regardless of nationality and immigration status, have the right to access to all healthcare services during pregnancy, childbirth, and postpartum, inequities in health care outcomes and health provision have been reported. During COVID-19 pandemic, these inequities are completely unknown.
Objective: The aim of this study was to compare the incidence of c-sections according to mother's migration status, as well as other maternal care and perinatal outcomes in women giving birth at San José Hospital in Santiago, Chile, during the COVID-19 pandemic.
Methods: A retrospective cohort study was designed including 10,166 registered single births at the San José Hospital between March 2020 and August 2021. To compare between groups, statistical tests such as Chi-square and Fisher's exact were used. Log Binomial regression models were performed adjusted for potential confounding variables. To estimate the strength of association the relative risk was used.
Results: Immigrant mothers account for 48.1% of the registered births. Compared to non-immigrant women, immigrants exhibit a higher proportion of c-section, specifically, emergency c-section (28.64% vs. 21.10%; p-value < 0.001) but a lower proportion of and having a preterm birth (8.24% vs. 13.45%; $p < 0.05$), receiving personalized childbirth care (13.02% vs. 14.60%; p-value < 0.05), companion during labor and childbirth (77.1% vs. 86.95%; p-value < 0.001), And postpartum attachment to newborn (73% vs. 79.50%; p-value < 0.001). The proportion of COVID exposure was not significant between groups, not the severity also. Haitians had a highest risk of undergoing emergency c-section (aRR = 1.61) and Venezuelans had a highest risk of elective c-section (aRR = 2.18) compared to non-immigrants.
Conclusion: This study reports high rates of c-sections in the entire population, but in immigrant populations it is even higher. Additionally, it found gaps in maternal care and perinatal outcomes between immigrants and non-immigrants. More studies are needed to elucidate the possible causes of these differences and establish new regulations to protect the reproductive rights of the immigrant population.

KEYWORDS

COVID, immigrant women, cesarean sections, maternal care, pregnancy, perinatal outcomes

1. Introduction

Immigration has increased significantly in Chile. In 20 years, it went from being 0.8% in 1992, to 7.5% in 2021 (1), however, due to their demographic characteristics, immigrants' mothers account for the 16.4% of live births, with the top five maternal nationalities being Haiti (21.6%), Venezuela (17.1%), Peru (12.5%), Bolivia (7.9%), and Colombia (6.8%) (2). Some international studies have reported higher C-section rates among the immigrant population compared to the local population (3, 4). While the causes for these higher rates remain unknown, certain risk factors have been identified, such as language or communication barriers, inadequate prenatal care even after a shorter stay in the host country, socioeconomic status, and lack of health insurance (5, 6).

Chile is one of the few countries in Latin America and the Caribbean that has reached the advanced stage of the obstetric transition (7). One of the major challenges at this stage is the excessive obstetric interventionism and medicalization of childbirth, as a consequence, Chile has one of the highest rates of c-sections in the region, reaching 43.1% of total births in the public system in 2020 (8). Moreover, an increasing rate of obesity in women of childbearing age (9, 10), delayed pregnancy, and barriers to access to healthcare for the immigrant population (11–13), are urgent priorities to be addressed.

COVID-19 has been associated with an increase in adverse maternal and perinatal health conditions, such as preterm birth and maternal hospitalization (14, 15). According to Haye et al., during the pandemic, there was an observed increase in C-section rates (16). However, it remains unclear whether this increase is due to the perinatal consequences of COVID-19 or changes in medical decision-making regarding C-section practice, or the impact of other factors such as immigration (17).

In Chile, pregnant women, regardless of nationality and immigration status, have access to all healthcare services during their pregnancy, childbirth, and up to 12 months postpartum within the public system (18). Despite immigrants having the same rights as the non-immigrant population, the inequities in health care and health outcomes are unknown.

At the beginning of the pandemic period, hospitals modified protocols to reduce the spread of the virus, so the maternal care provision changed, visitors were prohibited, companionship during labor and childbirth was reduced and the attachment to the baby was restricted in mothers with COVID-19. Due to the concern of hospital collapse because of the excess of COVID-19 cases and high levels of stress or depression observed in mothers giving birth (19), providing a positive birth experience was a challenge.

The aim of this study was to compare the incidence of C-sections, obstetric and neonatal outcomes according to the mother's migration status when giving birth at San José Hospital in Santiago, Chile, during the COVID-19 pandemic.

2. Methods

2.1. Study design and population

A retrospective cohort study was designed including 10,166 registered single births at the *San José Hospital* between March 2020 (pandemic's starting date in Chile) and August 2021 (before the vaccination of pregnant women began) (**Figure 1**). The San José Hospital is a high complexity public's health provider, serving a population of approximately 1.2 million. Nearly 50% of pregnant women are immigrants according to previous reports, with the most common nationalities being Haiti, Venezuela, and Peru. The data was obtained from the systematized clinical records. The diagnosis of COVID-19 was made using Polymerase Chain Reaction (PCR). At the beginning of the pandemic, the PCR test was performed as screening on patients with clinical symptoms. Subsequently, from May 2020 the PCR was taken preventively to all hospitalized patients admitted to the hospital. That means that asymptomatic patients could be undiagnosed, in consequence, a slight underestimation of the parameter within the first two months is expected.

2.2. Instrument and variables

The data was gathered from the hospital's clinical record and the women's health agenda, which includes historical records of pregnancy check-ups.

2.2.1. Exposure variables

The data was analyzed in terms of non-immigrant and immigrant status (non-immigrant = 0, immigrant = 1). Then, specific analyses were conducted considering the most prevalent nationalities, pair comparison such as Haitians with non-immigrants, Venezuelan with non-immigrants, and finally, immigrants from other nationalities were included in comparison to non-immigrants.

2.2.2. Outcome variables

The main outcome variable of this study was the type of delivery, categorized as vaginal birth, forceps-assisted vaginal birth, elective c-section, and emergency c-section. For a separate analysis of elective c-section and emergency c-section categories, vaginal birth (including forceps-assisted births) was used as the reference.

Maternal care variables are personalized childbirth care, labor and childbirth companion, postpartum attachment to newborns (defined as the immediate connection that occurs once the baby is born, involving skin-to-skin contact with the mother and the promotion of the first breastfeeding within the first 30 min and a maximum of one hour) (20). Finally, neonatal variables include newborn sex (female, male, undefined), Apgar score, gestational weeks at birth, and newborn weight and height.

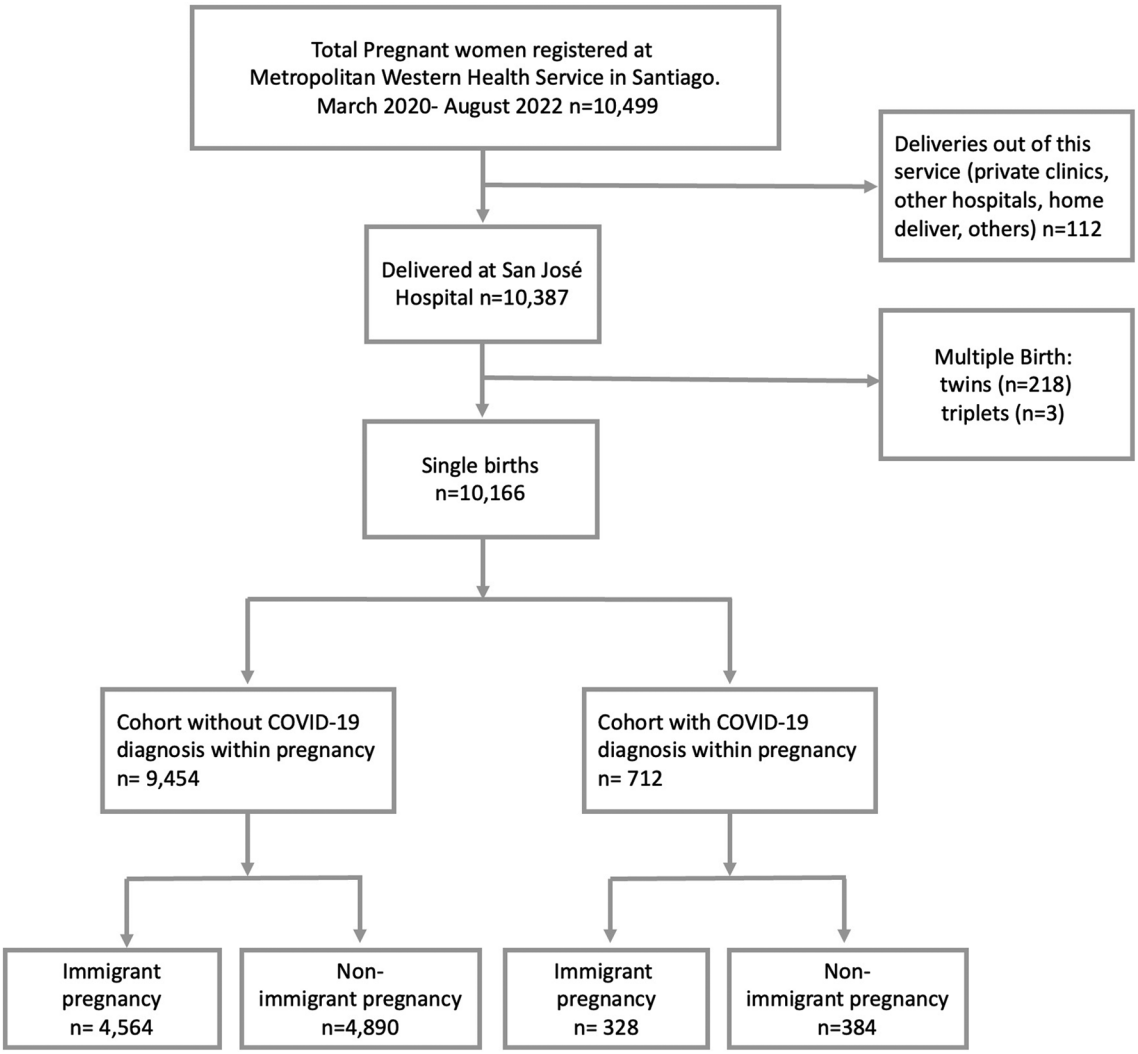


FIGURE 1
Universe and sample included in this cohort study. Santiago, Chile.

2.2.3. Covariables

Clinical variables related to COVID-19 include severity of exposure illness (non-COVID, mild illness, moderate illness, and severe illness) (**Figure 2**), critical patient unit (CPT), pneumonia, mechanical ventilation, prone position, pulmonary embolism (TEP), and hospitalization based on disease severity. Other maternal covariables are maternal obesity and labor induction.

Sociodemographic variables include age (in years) and type of health insurance (FONASA is the State-run health service founded by public taxes and the 7% of the income deduction; private insurance is funded using the contributions of their members).

2.3. Statistical analysis

Categorical variables were presented as frequency and percentage, while quantitative variables were categorized. To compare between groups, statistical tests such as Chi-square and Fisher's exact test (with less than 5 observations) were used, considering a p-value <0.05 as significant. Log Binomial multivariable regression models were used to calculate risk ratios (RRs) crude and adjusted for potential confounding variables to estimate the strength of association between nationality variable and types of c-section (elective and emergency). The data were analyzed using Stata software version 18.

3. Results

10,166 births were registered at the San José Hospital within the study period. The immigrant population was 48.12% ($n = 4,892$), the most prevalent countries of origin were Haiti 36.41% ($n = 1,781$), Peru 24.9% ($n = 1,218$), and Venezuela 19.91% ($n = 974$).

Immigrants have a lower percentage of women under 19 years-old compared to non-immigrant group (4.03% vs. 8.76% respectively; $p < 0.05$) and a higher proportion of women aged 35 years-old and more, although this difference was not statistically significant.

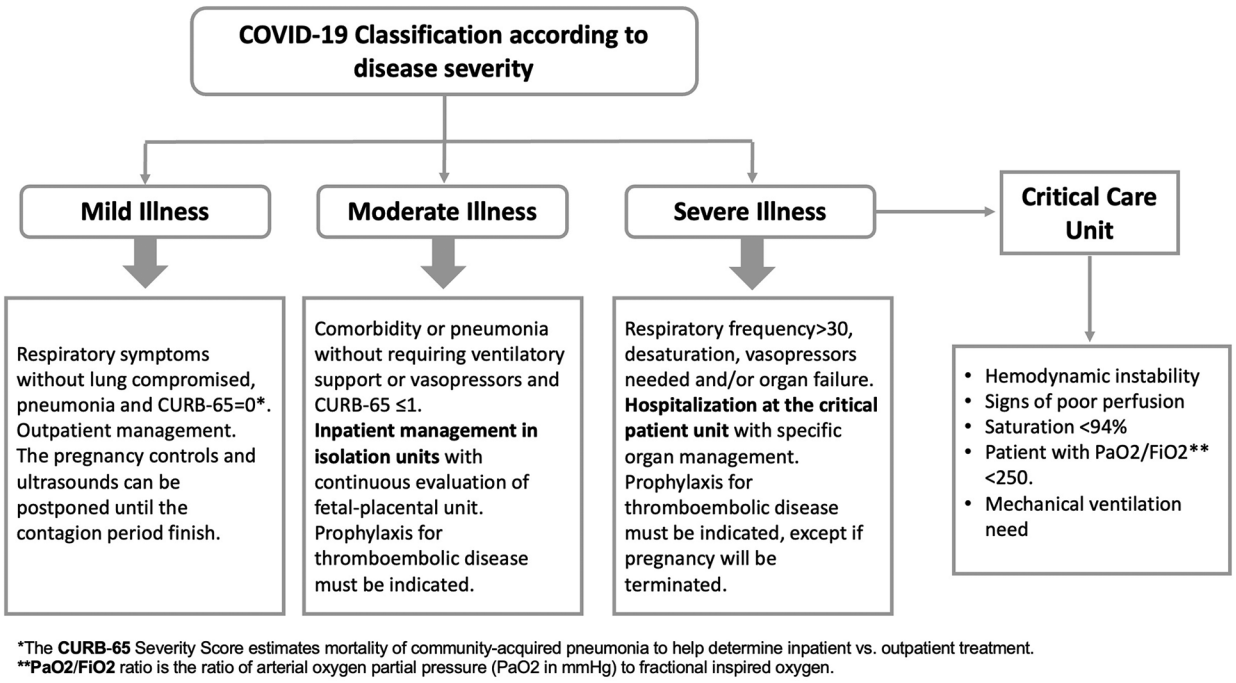


FIGURE 2
Case management protocol of SARS-CoV-2 virus (COVID-19) during pregnancy, puerperium, and mother-baby dyad care at the San José hospital, in Santiago of Chile.

A significant difference was found in the type of health insurance between the two groups. Immigrants register a higher percentage of enrollment to FONASA A compared to non-immigrants (80.09% vs. 55.46%, respectively), but a lower proportion of enrollment to FONASA B and C compared to non-immigrant women. Non-significant differences were found in private health insurance (ISAPRE) between the groups.

Regarding parity, a higher percentage of immigrant women were primiparous compared to non-immigrants (38.88% vs. 30.24% respectively; $p < 0.05$). A significant difference was found in body mass index (BMI) between the two groups. Immigrants has a lower percentage of obesity (BMI 30 or more), compared to non-immigrant women (53.85% vs. 70.05%, respectively; p-value <0.001). No significant differences were found in the prevalence of COVID-19 between both groups (Table 1).

Immigrant women had a higher proportion of c-sections compared to non-immigrant women, specifically emergency c-sections (28.64% vs. 21.10%; p-value <0.001). In contrast, vaginal births were more frequent in non-immigrant women (69.6%).

Regarding maternal care provision, immigrant women registered a significantly smaller percentage of receiving personalized care or having a companion compared to non-immigrant women, and had less postpartum attachment with their babies, compared to immigrant women. Furthermore, immigrants have a lower proportion of preterm births compared with non-immigrants (p-value <0.001) (Table 2).

Regarding the COVID-19 no differences were found in the severity of illness, need for admission to the Intensive Care Unit (ICU), the presence of pneumonia, the use of mechanical ventilation, prognosis complications, pulmonary embolism (PE), between the two groups (Table 3).

As shown in Figure 3, Haitians had the highest proportion of emergency c-section and preterm birth, but the lowest proportion of labor and delivery companion, postpartum attachment to newborn. On the other hand Venezuelans had the highest proportion of elective c-sections and less proportion of maternal care provision variables compared with non-immigrants (Figure 3).

In the pair comparison analysis shown in Table 4, Haitians had a higher risk of undergoing emergency c-section compared to non-immigrants (aRR = 1.61; 95% CI: 1.48–1.75). Venezuelans, had a higher risk of both planned/elective c-section and emergency c-section compared to non-immigrants (aRR = 2.18; 95% CI: 1.81–2.63 and aRR = 1.50; 95% CI: 1.33–1.68, respectively). Women from other nationalities, exhibited a slightly higher risk of emergency c-section was reported but after adjusting by age and health insurance, the risk of emergency c-section disappeared (aRR = 1.09; 95% CI: 0.99–1.19). Both Haitians and Venezuelans had a significant higher risk of not having maternal care provision, however, Haitians had a higher risk of not receiving personalized childbirth care (aRR = 1.03; 95% CI: 1.00–1.05), not having a companion during labor and childbirth (aRR = 2.48; 95% CI: 2.24–2.75), not having postpartum attachment to newborns (aRR = 1.88; 95% CI: 1.73–2.05). Also Haitians has the highest risk of extreme preterm birth (<28 weeks, aRR = 2.09; 95% CI: 1.30–3.36) compared to non-immigrants. (Table 4).

TABLE 1 Sample characterization. Cohort of 10,166 single births at the hospital San José in Santiago of Chile between March 2020 to August 2022.

	Non-immigrant pregnancy ($n = 5,274$)	Immigrant pregnancy ($n = 4,892$)	Total	*p*-value*
	n (%)	*n* (%)	*n* (%)	
Age				
<19 years-old	462 (8.76)	197 (4.03)	659 (6.49)	<0.000*
20 to 34 years-old	3,918 (74.30)	3,756 (76.86)	7,674 (75.53)	
35 and more	893 (16.94)	934 (19.11)	1,827 (17.98)	
COVID				
Non exposed to COVID	4,890 (97.72)	4,564 (93.30)	9,454 (93)	<0.255
Exposed to COVID	384 (7.28)	328 (6.70)	712 (7.0)	
Health Insurance**				
FONASA A	2,924 (55.46)	3,918 (80.09)	6,842 (67.32)	<0.000*
FONASA B	999 (18.95)	347 (7.09)	1,346 (13.24)	
FONASA C	568 (10.77)	347 (7.09)	915 (9.00)	
FONASA D	607 (11.51)	203 (4.15)	810 (7.97)	
Private (ISAPRE)	77 (1.46)	77 (1.57)	154 (1.52)	
Parity				
Primipara	1,595 (30.24)	1,902 (38.88)	3,497 (34.40)	<0.000*
Multipara	3,679 (69.76)	2,990 (61.12)	2,990 (61.12)	
Obesity preganancy				
BMI < 30	436 (29.95)	623 (46.15)	1,059 (37,74)	<0.000*
BMI ≥ 30	1,020 (70.05)	727 (53.85)	1,747 (62.26)	

*Statistically significant *p*-value <0.05 χ^2 test.
**FONASA is the public system and is funded by taxes, providing free or subsidized care for those who cannot afford private health insurance. Classification according to FONASA in 2020. https://www.fonasa.cl/sites/fonasa/noticia/nuevos_tramos_Fonasa_2020 FONASA A (lack income or a formal job); FONASA B (income equal to or less than the minimum wage $319,000 Chilean peso in March 2020); FONASA C (Monthly income greater than $319,000.—and less than or equal to $465,740 Chilean pesos); FONASA D (People who receive a monthly taxable income greater than $465,740 Chilean peso).

4. Discussion

The present study reported significant differences in perinatal outcomes between immigrant and non-immigrant women. The main finding of this study is related to high rates of c-section in the entire population, that in immigrants it exceeds 40% of the total births, which is one of the highest rates reported in the world. Haitian women had the highest risk of emergency c-section and Venezuelan women the highest rate of elective c-section. Additionally, it found a higher risk of not having a companion during labor and not postpartum attachment with the newborn among mothers from Haiti.

TABLE 2 Comparison of obstetric and perinatal outcomes between non-immigrant and immigrant pregnant women in the context of a COVID-19 pandemic. Hospital San José, Santiago of Chile. March 2020 to August 2022.

Birth outcomes	Non-immigrant pregnancy ($n = 5,274$)	Immigrant pregnancy ($n = 4,892$)	Total	*p*-value*
	n (%)	*n* (%)		
Conduct of labor				
No	2,458 (46.61)	2,272 (46.44)	4,730 (46.53)	<0.869
Yes	2,816 (53.39)	2,620 (53.56)	5,436 (53.47)	
Induction of labor				
No	4,367 (82.80)	4,053 (82.85)	8,420 (82.83)	<0.950
Yes	907 (17.20)	839 (17.15)	1,746 (17.17)	
Monitoring of labor				
No	803 (15.23)	727 (14.86)	1,530 (15.05)	<0.607
Yes	4,471 (84.77)	4,165 (85.14)	8,636 (84.95)	
Personalized childbirth care				
No	4,504 (85.40)	4,255 (86.98)	8,759 (86.16)	<0.021*
Yes	770 (14.60)	637 (13.02)	1,407 (13.84)	
Labor and childbirth companion				
No	688 (13.05)	1,120 (22.89)	1,808 (17.78)	<0.000*
Yes	4,586 (86.95)	3,772 (77.11)	8,358 (82.22)	
Birth type of delivery				
Vaginal birth	3,671 (69.61)	3,005 (61.43)	6,676 (65.67)	<0.000*
Forceps-assited birth	64 (1.21)	66 (1.35)	130 (1.28)	
Elective c-section	426 (8.08)	420 (8.59)	846 (8.32)	
Emergency c-section	1,113 (21.10)	1,401 (28.64)	2,524 (24.73)	
Fetal position at birth				
Cephalic	5,054 (95.90)	4,738 (96.91)	9,792 (96.32)	<0.024*
Podalic	193 (3.67)	136 (2.79)	329 (3.24)	
Transverse	23 (0.44)	15 (0.31)	38 (0.37)	
Postpartum attachment to newborns				
No	1,081 (20.50)	1,321 (27.00)	2,402 (23.63)	<0.000*
Yes	4,193 (79.50)	3,571 (73.00)	7,764 (76.37)	
Newborn condition				
Live birth	5,240 (99.36)	4,846 (99.06)	10,086 (99.21)	<0.092
Stillbirth	34 (0.64)	46 (0.94)	80 (0.79)	
Maternal mortality				
No	5,270 (99.92)	4,889 (99.94)	10,159 (99.93)	<0.541
Yes	4 (0.08)	3 (0.06)	7 (0.07)	Fisher's exact
Classification by gestational weeks				
Term (≥37 Weeks)	4,570 (86.65)	4,489 (91.76)	9,059 (89.11)	<0.000*
Moderate (32–36 weeks)	582 (11.04)	304 (6.21)	886 (8.72)	
Very Preterm (28–31 Weeks)	79 (1.50)	43 (0.88)	122 (1.20)	
Extremely (<28 weeks)	43 (0.82)	56 (1.14)	99 (0.97)	
Classification by birthweight				
Normal	4,760 (90.25)	4,485 (91.68)	9,245 (90.94)	<0.001*
Low birthweght	420 (7.96)	311 (6.36)	731 (7.19)	

(*Continued*)

TABLE 2 Continued

Birth outcomes	Non-immigrant pregnancy ($n = 5,274$)	Immigrant pregnancy ($n = 4,892$)	Total	p-value*
	n (%)	n (%)		
Very low birtweight	53 (1.00)	37 (0.76)	90 (0.89)	
Extremely low birthweight	41 (0.78)	59 (1.21)	100 (0.98)	
APGAR at 1 min				
Normal (>7)	5,037 (95.51)	4,604 (94.11)	9,641 (94.84)	<0.006*
Moderate depression (4–6)	120 (2.28)	152 (3.11)	272 (2.68)	
Severe depression (<4)	117 (2.22)	136 (2.78)	253 (2.49)	
Apgar at 5 min				
Normal (>7)	5,188 (98.37)	4,793 (97.98)	9,981 (98.18)	<0.296
Moderate depression (4–6)	30 (0.57)	38 (0.78)	68 (0.67)	
Severe depression (<4)	56 (1.06)	61 (1.25)	117 (1.15)	

*Statistically significant p-value < 0.05 χ^2 test.

TABLE 3 Comparison of COVID clinical severity between non-immigrant and immigrant pregnant women. Hospital San José, Santiago of Chile. March 2020 to August 2022.

Outcomes COVID	Non-immigrant pregnancy ($n = 5,274$)	Immigrant pregnancy ($n = 4,892$)	Total	p-value*
	n (%)	n (%)		
Severity of exposure illness				
Non COVID	4,890 (92.72)	4,564 (93.30)	9,454 (93.00)	<0.457
Mild illness	336 (6.37)	295 (6.03)	631 (6.21)	
Moderate illness	12 (0.23)	10 (0.20)	22 (0.22)	
Severe illness	36 (0.68)	23 (0.47)	59 (0.58)	
Critical Patient Unit (CPT)				
No	5,238 (99.32)	4,869 (99.53)	10,107 (99.42)	<0.159
Yes	36 (0.68)	23 (0.47)	59 (0.58)	
Pneumonia				
No	5,232 (99.20)	4,863 (99.41)	10,095 (99.30)	<0.218
Yes	42 (0.80)	29 (0.59)	71 (0.70)	
Mechanical ventilation				
No	5,255 (99.64)	4,882 (99.80)	10,137 (99.71)	<0.141
Yes	19 (0.36)	10 (0.20)	29 (0.29)	
Prone				
No	5,269 (99.91)	4,891 (99.98)	10,160 (99.94)	<0.221
Yes	5 (0.09)	1 (0.02)	6 (0.06)	Fisher's exact
Pulmonary Embolism				
No	5,264 (99.81)	4,887 (99.90)	10,151 (99.85)	<0.307
Yes	10 (0.19)	5 (0.10)	15 (0.15)	Fisher's exact
Hospitalization				
No	5,154 (97.74)	4,764 (97.40)	9,918 (97.58)	<0.623
Yes	119 (2.26)	127 (2.60)	246 (2.42)	

*Statistically significant p-value < 0.05 χ^2 test.

Regarding biosociodemographic data, the results demonstrate that approximately half of the pregnant women attended at the San José Hospital were immigrants, most prevalent countries of origin were Haiti, Peru, and Venezuela. Significant differences were observed in various demographic and health variables between immigrant and non-immigrant women. These findings are consistent with previous studies that have examined the composition of the immigrant population in Chile (11–13). A study conducted by Veliz et al. supports the presence of a significant proportion of immigrants from the same countries mentioned. This validates and enhances the representativeness of the current study's sample (21).

We found that immigrant women received less personalized attention during labor and had a lower presence of companion at birth compared to non-immigrant women. Additionally, significant differences were observed in postpartum attachment with newborns, prematurity and birth weight. These findings are consistent with previous research that has addressed the unequal impact of the pandemic on the health of migrants and the exercising of their reproductive rights. International studies have reported challenges in establishing the mother-newborn emotional connection in immigrant women, which may be related to factors such as social support, communication barriers, and cultural adaptation. A publication from Fabi and Ludmir (17), suggests that immigrant women, in particular, have experienced difficulties asserting their reproductive rights due to the pandemic. Although the pandemic could have accentuated the differences between the immigrant and non-immigrant population, more studies are required to determine the effect of migration as a social determinant of inequities in childbirth care, independent of the health crisis.

Significant differences were found in the c-section rate. Although other studies have shown higher rates of c-section in immigrant women in different countries (10, 22, 23), Chile has been recognized for its high rates of c-section. Nevertheless, the disparity in cesarean section rates between immigrant and non-immigrant populations was not known. Although it is known that there are determining factors such as access to prenatal care, communication barriers and other social determinants of health, it is urgent to design more studies to elucidate the possible causes and establish new regulations that protect the reproductive rights of the immigrant population.

Significant differences were observed in the distribution of preterm births. Although immigrant women have a higher proportion of full-term births, they also have a higher

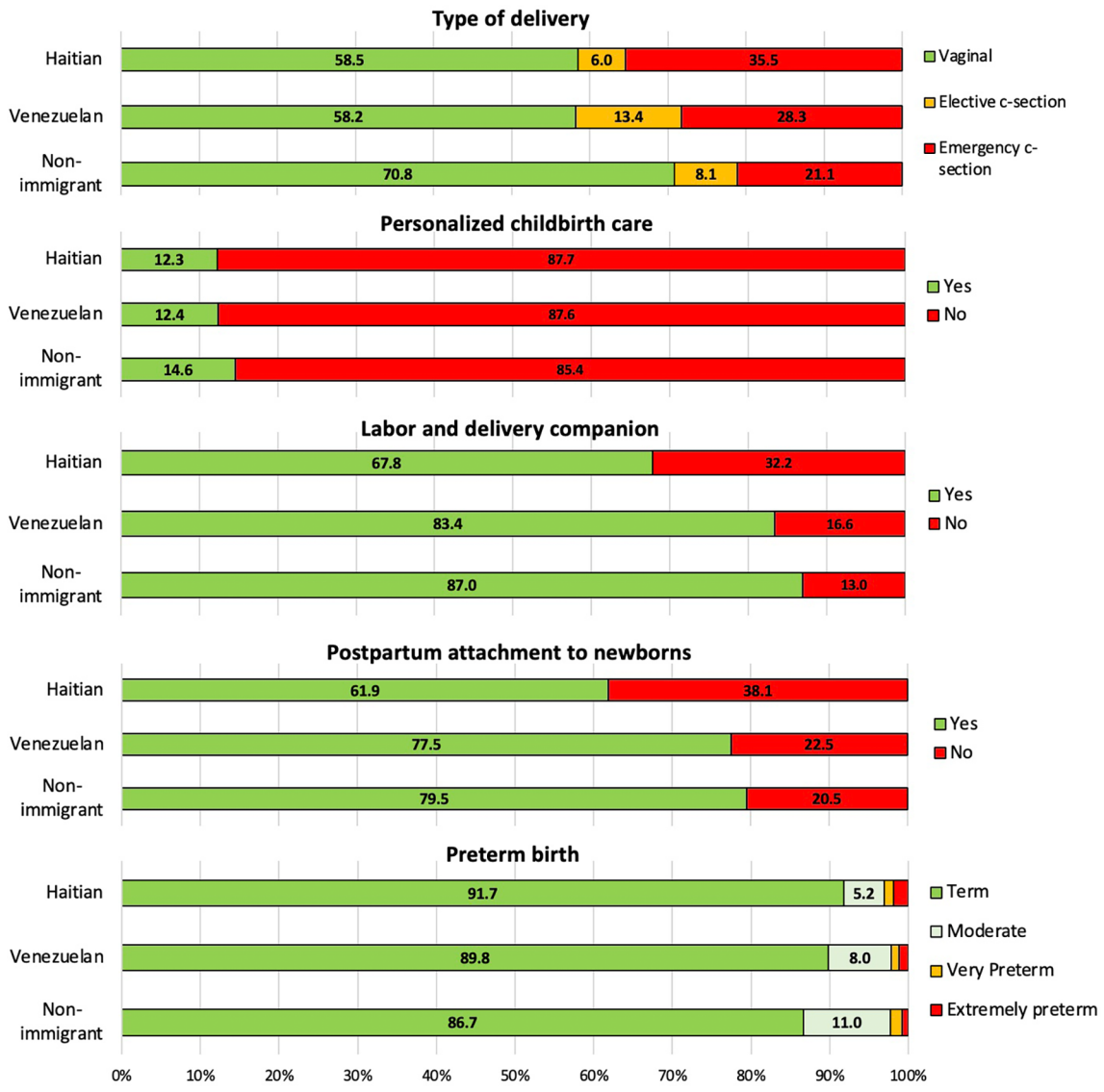


FIGURE 3
Proportion of maternal care indicators and perinatal outcomes by country of origin.

proportion of extremely premature births. Haitians are the ones who exhibit the highest proportion of extreme prematurity. International studies have shown differences in the duration of pregnancy and prematurity in immigrant women, which may be influenced by socioeconomic, health and access to prenatal care factors (10, 17).

Although immigration has been associated with a higher risk of having COVID-19, in this study no differences were found regarding the prevalence of COVID-19 during pregnancy, or in the severity of the disease, admission to Intensive Care Unit, pneumonia, use of mechanical ventilation, prognosis, pulmonary thromboembolism, and hospitalization, between the immigrant and non-immigrant groups. However, these divergent results could be explained by the specific migratory conditions of the country since in Chile migration is a recent phenomenon and better perinatal maternal health indicators have been reported compared to the local population (12, 13). Furthermore, the importance of considering other contextual and sociocultural factors that could influence the observed outcomes is highlighted (7, 24–28).

The main limitations of this study includes a limited ability to extrapolate the results to other populations. Also, it should be noted that there might be a slight subestimation of the parameters, because as asymptomatic pregnant women were not tested within the first two months of the pandemic. Another limitation of the study is the used of secondary data, some relevant variables were not measured, such as maternal education, length of residence in the country, and the presence of pathologies that could influence the results. More studies should be conducted to address the effect of preeclampsia, and gestational diabetes and its impact on obstetric and perinatal outcomes.

TABLE 4 Risk of c-section and other obstetric and perinatal outcomes in Haitian, Venezuelan, and other nationalities, compared to non-immigrant women. Log Binomial multivariable regression models.

Birth outcomes	Non-immigrant pregnancy (*n* = 5,274)	Haitian pregnancy (*n* = 1,781) (A)			Venezuelan pregnancy (*n* = 974) (B)			Other Immigrant pregnancy (*n* = 2,137) (C)		
	n (%)	*n* (%)	RR (IC95%)	RRa (IC95%)	*n* (%)	RR (IC95%)	RRa (IC95%)	*n* (%)	RR (IC95%)	RRa (IC95%)
Birth type of delivery										
Vaginal birth	3,735 (70.82)	1,042 (58.51)	Ref	Ref	597 (58.21)	Ref	Ref	1,462 (68.41)	Ref	Ref
Elective cesarean section	426 (8.08)	107 (6.01)	0.93 (0.74–1.11)	0.96 (0.78–1.18)	131 (13.45)	1.83 (1.53–2.19)	2.18 (1.81–2.63)	182 (8.52)	1.08 (0.92–1.27)	1.11 (0.94–1.31)
Emergency cesarean section	1,113 (21.10)	632 (35.49)	1.64 (1.52–1.78)	1.61 (1.48–1.75)	276 (28.34)	1.43 (1.28–1.59)	1.50 (1.33–1.68)	493 (23.07)	1.09 (1.00–1.20)	1.09 (0.99–1.19)
Personalized childbirth care										
No	4,504 (85.40)	1,562 (87.70)	1.02 (1.01–1.05)	1.03 (1.00–1.05)	853 (87.58)	1.03 (0.99–1.52)	1.03 (1.05–1.06)	1,840 (86.10)	1.01 (0.99–1.03)	1.01 (0.99–1.03)
Yes	770 (14.60)	219 (12.30)	Ref	Ref	121 (12.42)	Ref	Ref	297 (13.90)	Ref	Ref
Labor and childbirth companion										
No	688 (13.05)	574 (32.23)	2.47 (2.24–2.72)	2.48 (2.24–2.75)	162 (16.63)	1.27 (1.09–1.49)	1.32 (1.11–1.56)	384 (17.97)	1.38 (1.23–1.54)	1.35 (1.20–1.52)
Yes	4,586 (86.95)	1,207 (67.77)	Ref	Ref	812 (83.37)	Ref	Ref	1,753 (82.03)	Ref	Ref
Postpartum attachment to newborns										
No	1,081 (20.50)	678 (38.07)	1.86 (1.72–2.01)	1.88 (1.73–2.05)	219 (22.48)	1.09 (0.96–1.25)	1.15 (1.00–1.31)	424 (19.84)	0.97 (0.88–1.07)	0.98 (0.88–1.08)
Yes	4,193 (79.50)	1,103 (61.93)	Ref	Ref	755 (77.52)	Ref	Ref	1,713 (80.16)	Ref	Ref
Classification by gestational weeks										
Term (≥37 Weeks)	4,570 (86.65)	1,634 (91.75)	Ref	Ref	875 (89.84)	Ref	Ref	1,980 (92.65)	Ref	Ref
Moderate (32–36 weeks)	582 (11.04)	92 (5.17)	0.47 (0.38–0.58)	0.51 (0.41–0.64)	78 (8.01)	0.72 (0.58–0.91)	0.85 (0.68–1.08)	134 (6.27)	0.56 (0.47–0.67)	0.59 (0.49–0.71)
Very Preterm (28–31 Weeks)	79 (1.50)	22 (1.24)	0.78 (0.49–1.25)	0.85 (0.52–1.38)	9 (0.92)	0.60 (0.30–1.19)	0.72 (0.36–1.47)	12 (0.56)	0.35 (0.19–0.65)	0.34 (0.21–0.69)
Extremely (<28 weeks)	43 (0.82)	33 (1.85)	2.12 (1.35–3.33)	2.09 (1.30–3.36)	12 (1.23)	1.45 (0.77–2.74)	1.47 (0.75–2.88)	11 (0.51)	0.59 (0.31–1.15)	0.60 (0.30–1.17)
Classification by birthweight										
Normal	4,760 (90.25)	1,589 (89.22)	Ref	Ref	876 (89.94)	Ref	Ref	2,020 (94.53)	Ref	Ref
Low birthweght	420 (7.96)	136 (7.64)	0.97 (0.81–1.17)	1.03 (0.85–1.25)	77 (7.91)	0.99 (0.79–1.26)	1.13 (0.89–1.44)	98 (4.59)	0.57 (0.46–0.71)	0.59 (0.48–0.74)
Very low birtweight	53 (1.00)	24 (1.35)	1.35 (0.84–2.18)	1.63 (0.98–2.69)	7 (0.72)	0.72 (0.33–1.58)	1.18 (0.52–2.71)	6 (0.28)	0.27 (0.12–0.62)	0.32 (0.14–0.76)
Extremely low birthweight	41 (0.78)	32 (1.80)	2.31 (1.46–3.66)	2.35 (1.45–3.83)	14 (1.44)	1.84 (1.01–3.36)	2.06 (1.08–3.92)	13 (0.61)	0.75 (0.40–1.39)	0.78 (0.41–1.48)
APGAR at 1 min										
Normal (>7)	5,037 (95.51)	1,609 (90.34)	Ref	Ref	927 (95.17)	Ref	Ref	2,068 (96.77)	Ref	Ref
Moderate depression (4–6)	120 (2.28)	93 (5.22)	2.35 (1.80–3.06)	2.43 (1.83–3.22)	26 (2.67)	1.17 (0.77–1.78)	1.25 (0.81–1.94)	33 (1.54)	0.68 (0.46–0.99)	0.68 (0.46–0.99)
Severe depression (<4)	117 (2.22)	79 (4.44)	2.06 (1.56–2.73)	1.96 (1.45–2.63)	21 (2.16)	0.98 (0.62–1.54)	1.05 (0.65–1.69)	36 (1.68)	0.75 (0.52–1.09)	0.75 (0.51–1.09)

RR, Crude relative risk; RRa, adjusted relative risk by age and health insurance.
A = Haitians compared to non-immigrants (Haitians = 1, non-immigrants = 0).
B = Venezuelan compared to non-immigrants (Venezuelan = 1, non-immigrants = 0).
C = Other nationalities (except Haitians and Venezuelans), compared to non-immigrantrs (other nationalities = 1, non-immigrants = 0).

10.3389/fgwh.2023.1267156

5. Conclusion

These findings have significant implications for the perinatal care of the immigrant population, indicating that immigrant women may encounter additional barriers in terms of personalized care during childbirth, access to a companion, type of delivery, and establishing an emotional bond with their newborns. These differences could influence perinatal outcomes and underscore the need to address disparities in perinatal care between non-immigrant and immigrant pregnancy groups.

Furthermore, it is essential to consider other contextual and sociocultural factors that may be influencing the observed outcomes. These results should encourage additional investigation into the causes for these disparities in care and the development of targeted programs to enhance maternal health and obstetric care for immigrant women, not just in Chile but also in other nations, considering the specific stage of obstetric transition they are in.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author.

Ethics statement

This study was approved by the Comité de ética del Servicio de Salud Metropolitano Norte and conducted in accordance with local legislation and institutional requirements. Written informed consent was not required from participants or their legal guardians/next of kin because the study used information from clinical records without sensitive data (secondary data).

Author contributions

MC: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Software, Visualization, Writing – original draft, Writing – review & editing. NS: Conceptualization, Data curation, Investigation, Visualization, Writing – review & editing. JO: Conceptualization, Writing – review & editing. RV: Data curation, Formal Analysis, Methodology, Software, Supervision, Writing – review & editing. SV: Supervision, Visualization, Writing – review & editing. CN: Conceptualization, Visualization, Writing – review & editing. LV: Visualization, Writing – review & editing. LV: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Funding

The author(s) declare financial support was received for the research, authorship, and/or publication of this article.

The realization of this project was funded by the Health Research Projects of the Faculty of Medicine at the University of Chile, number CE: 400286.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

1. Instituto Nacional de Estadísticas de Chile (INE). *Demografía*. INE (2021). Available at: https://serviciomigraciones.cl/estudios-migratorios/estimaciones-de-extranjeros/ (Accessed July 20, 2023).

2. Instituto Nacional de Estadísticas de Chile (INE). *Anuario de estadísticas Vitales: Período de información: 2019*. Santiago, Chile: INE (2019). Available at: https://www.ine.cl/docs/default-source/nacimientos-matrimonios-y-defunciones/publicaciones-y-anuarios/anuarios-de-estadísticas-vitales/anuario-de-estadísticas-vitales-2019.pdf?sfvrsn=97729b7b_5 (Accessed July 20, 2023).

3. Poncet L, Panjo H, Andro A, Ringa V. Caesarean delivery in a migration context: the role of prior delivery in the host country. *Sex Reprod Heal Matters*. (2020) 28 (1):373–83. doi: 10.1080/26410397.2020.1763576

4. Gagnon AJ, Merry L, Haase K. Predictors of emergency cesarean delivery among international migrant women in Canada. *Int J Gynecol Obstet*. (2013) 121(3):270–4. doi: 10.1016/j.ijgo.2012.12.017

5. Boerma T, Ronsmans C, Melesse DY, Barros AJD, Barros FC, Juan L, et al. Global epidemiology of use of and disparities in caesarean sections. *Lancet*. (2018) 392 (10155):1341–8.doi: 10.1016/S0140-6736(18)31928-7

6. Abdulla F, Hossain MM, Rahman MM, Rahman MS, Rahman A. Risk factors of caesarean deliveries in urban–rural areas of Bangladesh. *Front Reprod Heal*. (2023) 5:1–12. doi: 10.3389/frph.2023.1101400

7. Souza J, Tunçalp Ö, Vogel J, Bohren M, Widmer M, Oladapo O, et al. Obstetric transition: the pathway towards ending preventable maternal deaths. *BJOG An Int J Obstet Gynaecol*. (2014) 121(1):1–4. doi: 10.1111/1471-0528.12735

8. Departamento de Estadística e Información de Salud (DEIS). *Natalidad*. Ministerio de Salud de Chile (2023). Available at: https://deis.minsal.cl/wp-content/uploads/2020/07/Reporteria_Programa_Mujer.html (Accessed July 24, 2023).

9. Araya Bannout MA, Padilla O, Garmendia ML, Atalah E, Uauy R. Obesidad en mujeres chilenas en edad fértil. *Rev Med Chil*. (2014) 142(11):1440–8. doi: 10.4067/S0034-98872014001100011

10. Carroza Escobar MB, Ortiz Contreras J, Bertoglia MP, Araya Bannout M. Pregestational obesity, maternal morbidity and risk of caesarean delivery in a country in an advanced stage of obstetric transition. *Obes Res Clin Pract*. (2020) 15:73–7. doi: 10.1016/j.orcp.2020.12.006

11. Ortiz Contreras J, Carroza Escobar MB, Quiroz-Carreño J, Díaz Navarrete M, Araya Bannout M. Resultados materno-perinatales de gestantes peruanas en Chile: exploración del efecto del migrante sano. *Rev Peru Med Exp Salud Publica*. (2020) 37(4):654–61. doi: 10.17843/rpmesp.2020.374.6098

12. Ortiz J, Quiroz J, Carroza MB, Díaz M. Condición migratoria y salud materno-perinatal en mujeres inmigrantes en Chile. *Salud, Bienestar y Soc*. (2021) 7(1):16–28. doi: 10.18848/2474-5219/CGP/v07i01/17-27

13. Ortiz J, Diaz M, Araya BM, Quiroz J, Carroza B, Pavez J, et al. Comparison of bio-sociodemographic, obstetric and perinatal characteristics among immigrant and native women in the metropolitan region in Chile. *Midwifery*. (2019) 75:72–9. doi: 10.1016/j.midw.2019.04.008

14. Wei SQ, Bilodeau-Bertrand M, Liu S, Auger N. The impact of COVID-19 on pregnancy outcomes: a systematic review and meta-analysis. *Can Med Assoc J*. (2021) 193(16):E540–8. doi: 10.1503/cmaj.202604

15. Twanow J-DE, McCabe C, Ream MA. The COVID-19 pandemic and pregnancy: impact on mothers and newborns. *Semin Pediatr Neurol*. (2022) 42:100977. doi: 10.1016/j.spen.2022.100977

16. Haye MT, Cartes G, Gutiérrez J, Ahumada P, Krause B, Merialdi M, et al. Maternal and perinatal outcomes in pregnant women with confirmed severe and mild COVID-19 at one large maternity hospital in Chile. *J Matern Neonatal Med*. (2021) 35:1–6. doi: 10.1080/14767058.2021.1902498

17. Fabi RE, Ludmir J. Pregnancy, pandemics, and public health policy: the disparate impact of COVID-19 on pregnant immigrants. *Women's Heal Issues*. (2021) 31 (3):195–7. doi: 10.1016/j.whi.2020.12.001

18. MINSAL. Política de salud de migrantes internacionales. (2018). Available at: https://www.minsal.cl/wp-content/uploads/2015/09/2018.01.22.POLITICA-DE-SALUD-DE-MIGRANTES.pdf (Accessed August 18, 2023).

19. Eri TS, Blix E, Downe S, Vedeler C, Nilsen ABV. Giving birth and becoming a parent during the COVID-19 pandemic: a qualitative analysis of 806 women's responses to three open-ended questions in an online survey. *Midwifery*. (2022) 109:103321. doi: 10.1016/j.midw.2022.103321

20. Hospital San José. Servicio de Salud Metropolitano Norte. Protocolo de contacto piel a piel. Santiago, Chile (2016). p. 7.

21. Veliz F, Ponce MJ, Flores J, Haye MT, Rubio G, Gutiérrez J, et al. Nacimientos en Chile: ¿cuál ha sido el impacto de la última ola de madres migrantes? *Rev Médica Clínica Las Condes*. (2023) 34(1):64–70. doi: 10.1016/j.rmclc.2023.01.008

22. Ferrazzi E, Frigerio L, Savasi V, Vergani P, Prefumo F, Barresi S, et al. Vaginal delivery in SARS-CoV-2 infected pregnant women in northern Italy: a retrospective analysis. *BJOG An Int J Obstet Gynaecol*. (2020) 24:1–6. doi: 10.1111/1471-0528.16278

23. Belizan JM, Althabe F, Barros FC, Alexander S. Rates and implications of caesarean sections in Latin America: ecological study. *Br Med J*. (1999) 319 (7222):1397–400. doi: 10.1136/bmj.319.7222.1397

24. Chaves SdC, Cecatti JG, Carroli G, Lumbiganon P, Hogue CJ, Mori R, et al. Obstetric transition in the world health organization multicountry survey on maternal and newborn health: exploring pathways for maternal mortality reduction. *Rev Panam Salud Publica*. (2015) 37(4–5):203–10. Available at: https://www.ncbi.nlm.nih.gov/pubmed/26208186

25. Timircan M, Bratosin F, Vidican I, Suciu O, Tirnea L, Avram V, et al. Exploring pregnancy outcomes associated with SARS-CoV-2 infection. *Medicina (B Aires)*. (2021) 57(8):796. doi: 10.3390/medicina57080796

26. Roberton T, Carter ED, Chou VB, Stegmuller AR, Jackson BD, Tam Y, et al. Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study. *Lancet Glob Heal*. (2020) 8(7):e901–8. doi: 10.1016/S2214-109X(20)30229-1

27. Karasek D, Baer RJ, McLemore MR, Bell AJ, Blebu BE, Casey JA, et al. The association of COVID-19 infection in pregnancy with preterm birth: a retrospective cohort study in California. *Lancet Reg Heal Am*. (2021) 2:100027. doi: 10.1016/j.lana.2021.100027

28. Alzamora MC, Paredes T, Caceres D, Webb CM, Valdez LM, La Rosa M. Severe COVID-19 during pregnancy and possible vertical transmission. *Am J Perinatol*. (2020) 37(08):861–5. doi: 10.1055/s-0040-1710050

frontiers | Frontiers in Medicine

TYPE Original Research
PUBLISHED 23 November 2023
DOI 10.3389/fmed.2023.1238496

OPEN ACCESS

EDITED BY
Simcha Yagel,
Hadassah Medical Center, Israel

REVIEWED BY
Xavier Espada-Trespalacios,
Ramon Llull University, Spain
Margarita Manresa,
Hospital Clinic of Barcelona, Spain

*CORRESPONDENCE
Ararso Hordofa Guye
✉ ararso.hordofa@yahoo.com

RECEIVED 11 June 2023
ACCEPTED 26 October 2023
PUBLISHED 23 November 2023

CITATION
Guye AH, Kanea EB, Nigussie T, Girma D and Shambi DB (2023) Utilization of immediate postpartum intrauterine device and its associated factors among women who gave birth in public hospitals in West Wollega Zone, Oromia, Ethiopia.
Front. Med. 10:1238496.
doi: 10.3389/fmed.2023.1238496

Utilization of immediate postpartum intrauterine device and its associated factors among women who gave birth in public hospitals in West Wollega Zone, Oromia, Ethiopia

Ararso Hordofa Guye*, Efa Bayissa Kanea, Tadesse Nigussie, Derara Girma and Dame Banti Shambi

Department of Public Health, College of Health Sciences, Salale University, Fiche, Ethiopia

Background: The utilization of an immediate postpartum intrauterine device (IPPIUD) during the postpartum period helps women to realize their desire for birth spacing and prevent unplanned pregnancies. However, many postpartum mothers do not undergo immediate postpartum family planning in developing countries, including Ethiopia, which consequently increases the risk of unplanned pregnancies and pregnancy-related complications.

Objective: To assess the utilization of an IPPIUD and its associated factors among women who gave birth in public hospitals in the West Wollega Zone in 2022.

Methods: An institutional-based cross-sectional study was conducted among 605 postpartum mothers who delivered their baby between 15 April and 15 May 2022 at public hospitals in the West Wollega Zone, Ethiopia. A systematic random sampling technique was used to select study subjects, and the data were collected using an interviewer-administered structured questionnaire, which was then entered into EpiData Entry version 4.6 and exported to the Statistical Package for Social Science version 26 for analysis. The variable with a p-value of ≤ 0.05 with an adjusted odds ratio and 95% confidence intervals was used to declare statistically significant association.

Result: The prevalence of the utilization of the IPPIUD among respondents who gave birth in West Wollega public hospitals within 48 h was 27.2% (95% CI, 23.7–30.9). Age ranging between 25 and 34 years (AOR = 4.27, 95%CI:1.68–10.85), early initiation of antenatal care (ANC; AOR = 1.91, 95%CI: 2.8–10.01), adequate knowledge of IPPIUD (AOR = 4.71, 95%CI: 2.63–6.63), favorable attitude toward family planning (AOR = 3.35, 95%CI: 2.07–5.44), planning of pregnancy (AOR = 2.21, 95%CI: 1.37–4.11), and counseling (AOR = 4.14, 95%CI: 2.60–6.68) were factors that were significantly associated with the utilization of IPPIUD.

Conclusion: According to the 2019 Ethiopia Mini Demographic and Health Survey (mini EDHS 2019), the utilization of an immediate postpartum intrauterine device was low, that is, 35%. Age of respondents, early initiation of antenatal care, favorable attitude toward, planning of pregnancy, adequate knowledge of, and counseling on IPPIUD utilization were significantly associated with the mother's utilization of immediate postpartum intrauterine device. Thus, the zonal health office and health professionals should work toward encouraging all the women who gave birth at public hospitals to the utilization of immediate postpartum

intrauterine devices by improving awareness among the women in that specific zone through counseling to increase the uptake of IPPIUD.

KEYWORDS

intrauterine device utilization, postpartum family planning, post-partum intrauterine device, postpartum contraceptive, West Wollega Zone, Ethiopia

Introduction

An immediate postpartum intrauterine device (IPPIUD) is a postpartum contraceptive inserted into a woman's uterus after delivery of the placenta. It is made up of plastic copper intrauterine device type T380A (CU T-380A) and can be classified into post-placental, immediate postpartum, early postpartum, and extended postpartum intrauterine devices that are inserted within 10 min, 48 h, 48 h to 6 weeks, and 6 weeks to 1 year after birth, respectively (1–3). Postpartum family planning helps women to realize their desire for birth spacing and prevents them from having unplanned and closely spaced pregnancies throughout the first 12 months following childbirth (4). The immediate postpartum intrauterine device (IPPIUD) is safe and effective, with a low expulsion rate when compared to the interval intrauterine devices that are used to avoid unwanted pregnancies (5, 6), and is a highly convenient option for postpartum mothers who want a long-acting, reversible, non-hormonal protection from pregnancy that can be initiated during the critical postpartum period (7, 8).

Globally, in 2020, among the 1.9 billion women of reproductive age group, 57.19% of them had the desire to use family planning, 17% of them had utilized intrauterine devices, and 10% of did not use any contraceptive method (3, 9), and in Eastern and South-Eastern Asia, 18.6% of women utilized IPPIUD in order to avoid pregnancy (10). Family planning (FP) is recognized as a key life-saving intervention for mothers and their children (11), and the IPPIUD can promote the health of women and children by preventing unwanted pregnancies and financial, psychological, obstetric, and other health and health-related complications associated with closely spaced pregnancies, and its insertion does not require repeated healthcare visits for contraceptive refills (12–15).

In Africa, the utilization of IPPIUD is still low; the percentage of mothers who used an immediate postpartum intrauterine device within 48 h of placenta delivery was 4, 3.4, 1.1, and 0.3% in Rwanda, Zambia, Kenya, and Eretria, respectively (10, 16). In Ethiopia, the utilization of IPPIUD remains very low beside the high level of unmet need for postpartum family planning (3), and the report of the Maternal and Child Survival Program (MCSP) project showed that 8.55% of mothers had utilized an immediate postpartum intrauterine device within 48 h of delivery (4). A study conducted in the Bale Zone and the EngenderHealth report of the project of western Oromia revealed that the immediate postpartum intrauterine device was utilized by 12.4 and 8% of women, respectively (9, 17). Immediate postpartum is a critical period for the uptake of family planning to prevent unwanted pregnancy (18). However, given the high emphasis on contraceptive use, contraceptive use by mothers during this period is low (5, 6, 19).

Ethiopia has introduced IPPIUD initiatives to increase access to postpartum family planning and strengthen service provision, responding to women's high unmet need for postpartum family planning (18). The Maternal and Child Survival Program (MCSP) initiated and introduced the postpartum family planning program in Ethiopia (18, 20), continued to extend its support to increase the availability of long-acting family planning and scale-up postpartum family planning (PPFP) at the national and facility levels, integrated IPPIUD services into national and reproductive health policies, trained maternity staff on its insertion and on counseling the mothers, provided on-site mentorship of newly trained healthcare providers, engaged experts in the fields, and advocated its benefits to policymakers (5, 21–23).

Previous studies have reported that the utilization of IPPIUD is significantly associated with sociodemographic characteristics such as age, marital status, educational status, occupation, and residential area and reproductive characteristics such as age at marriage, age at first delivery, number of pregnancies and births, number of antenatal care (ANC) follow-ups, and number of alive children (1, 5, 6, 19, 24, 25). However, notable actions were not taken at the household, community, and facility levels to maximize the possibility of making couples aware of all possible postpartum family planning options available to them, including immediate postpartum intrauterine device, to improve poor communication or a lack of communication between couples, and to encourage women to engage their male partners in postpartum family planning decisions (18, 25). Postpartum women are among those with the greatest unmet need for postpartum family planning (26), and however, they often do not receive the services they need to realize their desire for spacing births and reduce unwanted pregnancy and its consequences (27–29).

Moreover, there is limited evidence and information regarding immediate postpartum intrauterine device utilization, and studies conducted in Ethiopia did not address factors that were important in other African countries such as the number of ANC visits and pregnancy intervals of more than 2 years (29, 30). In general, the primary goal of this study was to provide current information related to IPPIUD utilization in the West Wollega Zone area for mothers, the community, and healthcare providers. Thus, the study was aimed to assess the utilization of immediate postpartum intrauterine device and the factors that affect the utilization of IPPIUD during the postpartum period for the use of IPPIUD among mothers who gave birth in public hospitals in West Wollega Zone, Oromia, Ethiopia.

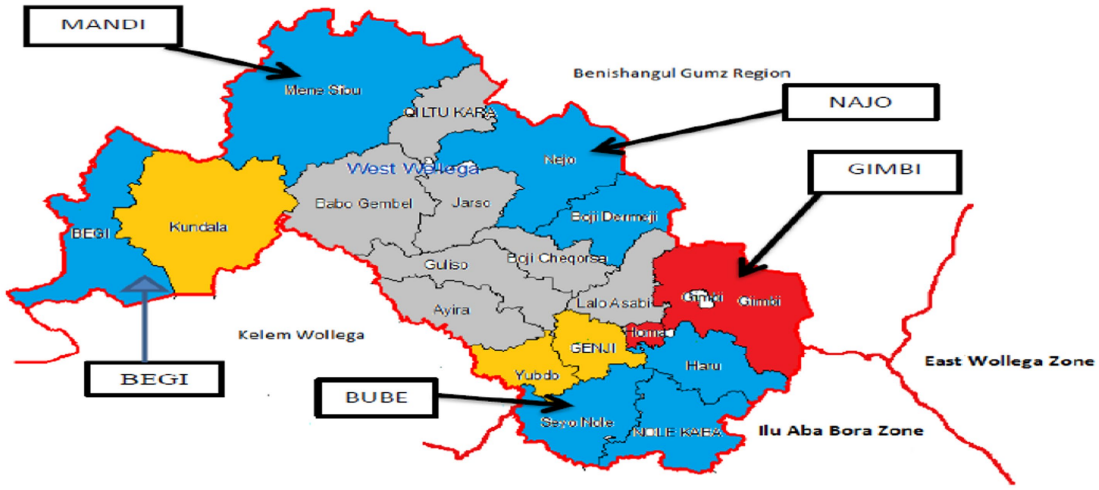


FIGURE 1
Study area map for the study of the immediate postpartum intrauterine device utilization and its associated factors among women who gave birth in hospitals in the West Wollega Zone, Oromia, Ethiopia, 2022.

Materials and methods

Study design, period, and area

The study design was an institution-based cross-sectional design and was conducted among women who gave birth at any one of the five public hospitals in the West Wollega Zone from 15 April to 15 May 2022. The West Wollega Zone is one of the 21 zones of the Oromia National Regional State, and Gimbi Town is the zonal capital city, which is located at a distance of 441 km to the west of Addis Ababa (Figure 1). Based on the 2007 census conducted by the Central Statistical Agency of Ethiopia (CSA), this zone has a total population of approximately 1,741,567 (men = 877,290, women = 864,277) individuals and a total land area of 1,274,501 ha (24). Different governmental and non-governmental health institutions are providing healthcare services for the community, including 5 public hospitals, 2 private hospitals, 67 health centers, 488 health posts, 2 specialty clinics, 22 medium clinics, 212 primary clinics, as well as different private clinics, and drug stores.

The total number of health professionals in the zone is 2,806, among whom there are 60 physicians, 147 health officers, 612 nurses, 257 midwives, 387 pharmacy professionals, 223 laboratory professionals, and 1,120 other professions, including health extension workers (24). The average number of mothers who gave birth in all study area hospitals by both spontaneous vaginal delivery (SVD) and cesarean section (CS) in the previous 3 months before the start of the study were identified as follows: 368 in Gimbi General Hospital, 302 in Najo General Hospital, 250 in Mendi Primary Hospital, 184 in Begi Primary Hospital, and 174 in Bube Primary Hospital.

Generally, major services provided at all hospitals related to Maternal and Child Health (MCH) services are family planning, ANC, and delivery services, and all public hospitals provide these services for free. In addition, all modern contraceptive techniques such as long-acting contraception such as IUCD are available in all hospitals (Source: West Wollega Health Office).

Source population and study population

All women who gave birth in public hospitals in the West Wollega Zone were the source population, and the selected women who gave birth in public hospitals in the West Wollega Zone during the study period were the study population.

Eligibility criteria

Women who gave birth in public hospitals in the West Wollega Zone during the study period and those who fulfilled the eligibility criteria for IUCDs were included in the study. Women who were sick, unable to respond, who had active sexually transmitted diseases, who had ruptured membranes for more than 24 h, who had a ruptured uterus, unresolved postpartum hemorrhage, or uterine tony, and who met the following WHO exclusion criteria were excluded from the study. The exclusion criteria also included those women who showed evidence of puerperal infections such as temperatures (T) >38°C and pulse rates (PR) >100 beats per minute, who were clinically unstable at the time of birth, who had a history of complications during the intrapartum period, who had allergies to the metals used in the CU T380A IUCD, who had stage 4 HIV/AIDS without ARV therapy, and who had opted out following enrolment.

Sample size determination

The sample size was calculated by using Epi Info version 7.2.5 and Stat Calc software programs and determined by using the single population proportion formula with the assumptions of the proportion of women who utilized IPPIUD from the previous study, which was 35.6% ($p = 0.356$) (31), with a 95% confidence level (CL) of 1.96, a margin of error of 4%, and a 10% non-response rate.

Also, the sample size was calculated for the second objective by using EPI-Info version 7.2 and Stat Calc software programs using the

double population proportions formula by considering various factors that were significantly associated with the outcome variables using the following assumptions of a 95% CL and 80% power, where a one-to-one ratio was considered. Then, by comparing the first and second objectives, the factor that gives the maximum sample size was considered and the maximum calculated sample size was 550 for the variable "heard about IPPIUD." After adding a 10% non-response rate, the final sample size was 605.

Sampling procedure

In this study, all five public hospitals in the West Wollega Zone that provide IPPIUD services were selected. The sample size for each hospital was allocated based on the average monthly delivery flow of one quarter. The total population served by those hospitals was 1,278 (Gimbi General Hospital = 368, Mendi Primary Hospital = 250, Nejo General Hospital = 302, Begi Primary Hospital = 184, and Bube Primary Hospital = 174) (Table 1).

The sample of 605 participants was obtained by proportionally allocating those five hospitals by considering their monthly delivery flows for one quarter. Consequently, study subjects were recruited by a systematic random sampling technique at every K interval of 2 (K=N/n = 1278/605 = 2), so every woman who gave birth in the hospital was recruited as a study subject in each hospital until the total sample size for this study was obtained (Figure 2).

Study variables

Immediate postpartum intrauterine device utilization is the dependent variable and the independent variables are as follows: *sociodemographic characteristics*: age of the mother, marital status, educational status of women, husband's educational status, occupation of mothers, husband's occupation, mother's residential area, with whom mothers live, family size, and distance from hospitals; *reproductive health history of mothers on IPPIUD*: age at marriage, age at first delivery, number of pregnancies, number of deliveries, whether current pregnancy was planned, number of births, delivery pregnancy, current birth outcome, weeks at ANC initiation, number of ANC

TABLE 1 Proportional allocation of the study population to the respective public hospitals in the West Wollega Zone, Oromia Region, Ethiopia in the year 2022 (n = 605).

Hospitals	Population	Proportional estimation	Sample taken
Bube	174	174 × 605/1,278	82
Gimbi	368	368 × 605/1,278	174
Najo	302	302 × 605/1,278	143
Mendi	250	250 × 605/1,278	118
Begi	184	184 × 605/1,278	88
Total	1,278	1278 × 605/1,278	605

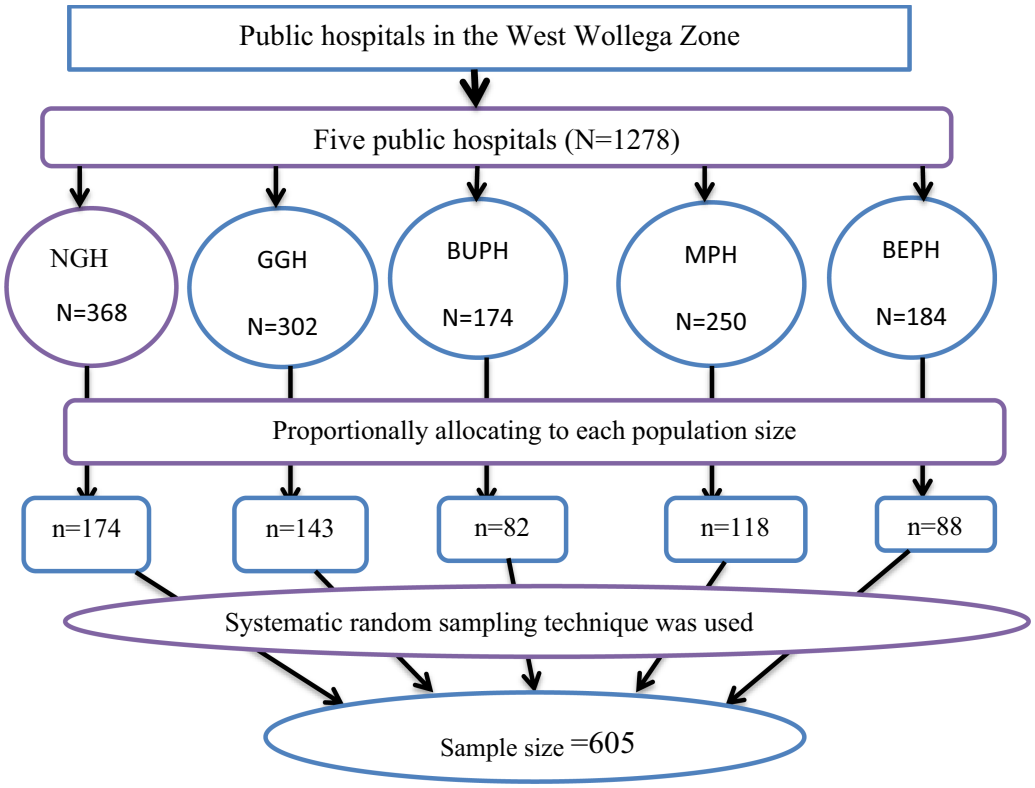


FIGURE 2
Schematic representation of systematic random sampling techniques for the study that was conducted in public hospitals in the West Wollega zone, Oromia, Ethiopia in the year 2022. BPH, Begi Primary Hospital; NGH, Nejo General Hospital; MPH, Mendi Primary Hospital; GGH, Gimbi General Hospital; BPH, Bube Primary Hospital.

follow-ups, number of alive children, desire for future children, and place of delivery; *knowledge of mothers on IPPUCD*: prevents pregnancy for more than 10 years, can be inserted immediately after delivery, used by breastfeeding mothers, causes changes in the menstrual bleeding pattern, does not cause cancer, and can be removed at any time; *the attitude of mothers on PPIUD*: invades privacy during insertion, restricts normal activity, causes damage to the uterus, feeling of moving through the body after insertion, causes severe pain during insertion and removal, feeling of interference during sexual intercourse, and impairing future fertility.

Measurements and operational definitions

Utilization of IPPIUCD

Women who gave their verbal consent to use and who already had inserted in them the intrauterine device after the post-placental period within 10 min to 48 h of delivery (4, 5).

Knowledge of mothers on IPPIUCD

Women were asked 10 knowledge questions about the utilization of IPPIUCD and the correct response was scored 1 and the incorrect one was scored 0. After computing the sum score for each respondent, the mean score was calculated, and those who scored greater than the mean were considered as having "adequate knowledge" and those who scored below the mean as having "inadequate knowledge" about the utilization of IPPIUCD (19, 28, 32).

Attitude toward IPPIUCD

Eight questions were asked to assess the attitude of women in IPPIUCD using the Likert Scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). After computing the sum score for each respondent, the mean score was calculated and those who scored above the mean were considered as having a "favorable attitude" and those who scored below the mean as having an "unfavorable attitude" toward the utilization of IPPIUCD (28, 32).

Data collection tool and procedures

Data were collected through face-to-face interviews using structured questionnaires that were adapted by reviewing different literatures (4, 5, 22, 33). The questionnaire was prepared in English and translated to Afan Oromo by a language expert to better understand both the data collectors and the respondents and then translated back to the English version to check the consistency. A reliability coefficient (Cronbach's alpha) was calculated for Likert scale questions in SPSS, which is $\alpha = 0.914$. The questionnaire has the following parts such as sociodemographic characteristics, reproductive and obstetric characteristics, knowledge of family planning and immediate postpartum intrauterine devices, the attitude of the mother toward IPPIUD, and utilization of immediate postpartum intrauterine devices.

The supervisors together with data collectors were assigned to each hospital. The data collectors were asked to fill out the questionnaires between immediately after delivery of the placenta and within 48 h of the postpartum period and submit them when they were finished. The supervisors organized the filled questionnaires from data collectors and submitted them to the principal investigator each day. Two diploma and three BSc midwives were recruited as data collectors and two BSc midwives as supervisors based on their language skills and supervision experience. There were familiarized with the study area and trained on the study objectives, the method of data collection, and the tools for data collection. Trained data collectors collected the data at all hospitals using a revised version of the data collection tool, and they interviewed the mothers who gave birth in any of the five study hospitals.

Data quality assurance

To ensure the quality of the data, a step-by-step process was applied to minimize bias and errors during the study design, sampling, questionnaire development, data collection, and data processing. To ensure data quality, the data collection tool was developed in English, translated to the local language, Afan Oromo, and then translated back to English by a language expert (an individual who has good knowledge of both English and Afan Oromo languages) to ensure its consistency. A pretest of the questionnaire was conducted at Danbidollo Hospital, which is not included in the study, by taking 5% of the total sample size (30 participants) to assess the consistency and accuracy of the tool. After the pretest of the tools, the necessary modifications were made to the questionnaires before use for actual data collection.

Data collectors and supervisors were given a 2-day training on the study objectives, the method of data collection, and the tools for data collection. During data collection, the data collectors were supervised regularly, and necessary feedback was given. Information was checked for completeness and internal consistency before and during the data processing phase. Incomplete data were discarded. Questionnaires were checked to ensure all data had been filled in to avoid missing data. The investigator checked for the completeness and consistency of questionnaires filled out by the data collectors to ensure the quality of the data.

Data processing and analysis

Filled-in questionnaires were checked for completeness and consistency. The data was coded and entered into Epi-data version 4.6 before being exported to SPSS version 26 for cleaning and analysis. After the gathered data were checked for missing values, outliers, and fulfillment of assumptions, the variables were computed and recoded by the transform function of SPSS. Descriptive statistics were summarized using frequencies, percentages, mean, standard deviation, and interquartile range and were presented in the form of figures, tables, and text.

A bivariable analysis was conducted for all independent variables against each dependent variable separately using binary logistic regression to see their association. Variables that showed a significant association in the bivariable analysis with a p-value of ≤ 0.25 and 95% CI were candidates for multivariable logistic regression and were entered into multiple logistic regression to identify their independent effects. A multivariable logistic

regression analysis was conducted after checking the model fitness test using the Hosmer-Lemeshow goodness-of-fit test. The *p*-value of the Hosmer-Lemeshow goodness-of-fit test of the model was checked, and it was well fitted with $p = 0.867$, and the omnibus test was significant, and the assumption was fulfilled since the *p*-value was greater than 0.05.

Multicollinearity was also checked by standard error for the β-coefficient (a standard error > 2 indicates its presence as a cutoff point), and the backward logistic regression selection method was used to identify the variable remaining for the final. The variables with a *p*-value of ≤ 0.05 with a respective adjusted odds ratio (AOR) and 95% CIs were used to declare the significantly associated factors with immediate postpartum intrauterine device utilization.

Results

Sociodemographic characteristics of study respondents

A total of 599 respondents were interviewed with a response rate of 99% since six participants were not included in the study as a result of non-responses during data collection. The mean and standard deviation of the respondent's age was 27.49 (6.51) years. Of the study respondents, 292 (48.7%) were in the age range of 25–34 years, 130 (21.9%) in the age range of 15–24 years, and 167 (29.4%) in the age range of 34–49 years. Out of the study respondents, the largest proportion, 544 (90.8%), were married. Of the study respondents, 135 (22.5%) had a college degree and above. Regarding the occupational status of women and their husbands, 315 (52.6%) and 193 (32.8%) were homemakers and farmers, respectively. The majority of the study respondents, i.e., 537 (89.6), were living with their husbands. Almost half of the study respondents, 305 (50.9%), were living in urban areas (Table 2).

TABLE 2 Sociodemographic characteristics of women who gave birth in public hospitals of West Wollega Zone in the year 2022 ($n = 599$).

Variables	Category	Frequency (%)
Age (completed years)	15–24	131 (21.9)
	25–34	292 (48.7)
	35–49	176 (29.4)
Area of residence	Rural	294 (49.1)
	Urban	305 (50.9)
Marital status	Single	13 (2.2)
	Married	544 (90.8)
	Divorced	29 (4.8)
	Widowed	13 (2.2)
Mothers' education status	No formal education	185 (30.9)
	Primary education	146 (24.4)
	Secondary education	133 (22.2)
	College and above	135 (22.5)
Mothers' occupational status	Housewife	315 (52.6)
	Government employee	133 (22.2)
	Private employee	71 (11.9)
	Merchants	66 (11)
	Others**	13 (2.3)
Husbands' occupational status	Government employee	204 (34.7)
	Private employee	107 (18.2)
	Merchants	63 (10.7)
	Farmer	193 (32.8)
	Others***	21 (3.6)
Distance from the hospital (km)	≤3	193 (32.2)
	>3	406 (67.8)

** indicates the mother's occupational status in a variable category with others as "Daily laborer, student." The label *** indicates the husband's occupational status in a variable category with others as "Daily laborer, student." Therefore, since the occupational category with others for mothers and husbands is similar we have agreed to use the label ** for booth groups as "Others **= Daily laborer, student".

Reproductive characteristics of the study respondents

The mean and standard deviation of marriage age were 19.28 (2.58) years. Four hundred eighty-two (81.7%) had married at an age greater than or equal to 18 years. The of age 566 (94.5%) mothers at first delivery was 18 years or above. Two hundred eighty-six (54.6%) women had given birth two to four times, and 53 (8.8%) women had given birth five or more times. The mean (SD) number of alive and wanted children in life was 2.46 (1.76) and 4.14 (1.57), respectively. Five hundred twenty-seven (88.0%) mothers had antenatal care follow-up for their then-current pregnancy. One hundred thirty-nine (23.2%) had initiated antenatal care services at less than or equal to 16 weeks for their then-current pregnancy. Four hundred ninety-four (82.5%) mothers had used family planning before this pregnancy. Two hundred thirty-eighty (45.2%) and two hundred fifty-eight (49%) women had made 2–3 and 4 and above ANC visits, respectively. Most mothers, 430 (71.8%), had discussed family planning with their husbands. Approximately 543 (90.7%) women responded that both husbands and wife had decided on the number of children they wanted to have together (Table 3).

Family planning and types of family planning used before this pregnancy by the mothers

A total of 494 respondents (82.5%) had used the family planning method before their then-current birth. The majority of mothers (38.7%) had used injectable contraceptives (Figure 3).

Knowledge of mothers on immediate postpartum intrauterine device

The mean score of the knowledge status of the respondents was 4.32 (±3.35 SD). The study reported that 316 (52.8%) respondents had inadequate knowledge and 283 (47.2%) had adequate knowledge of immediate postpartum intrauterine devices. In total, 252 (58.8%) participants knew that an IUD can prevent pregnancies for more than 10 years, 234 (39.1%) participants knew that an IUD can be inserted

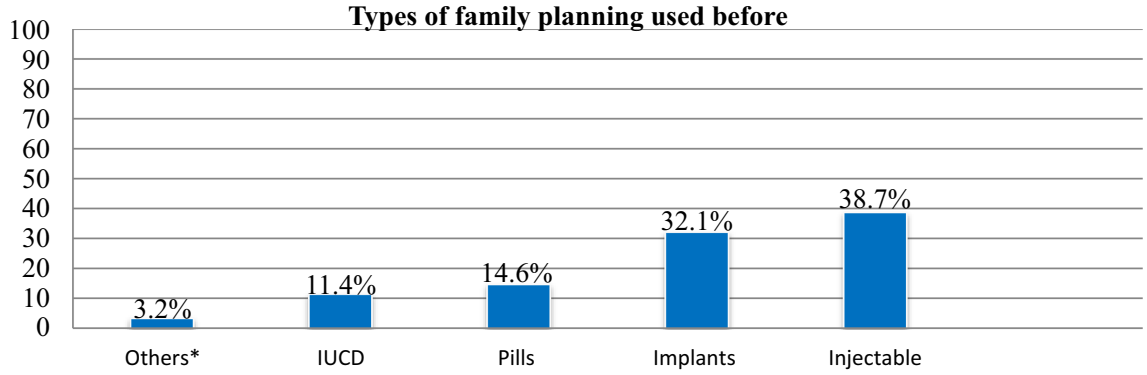


FIGURE 3
Types of family planning used by respondents before their then-current pregnancy in public hospitals in West Wollega Zone in the year 2022. * Condoms and emergency pills.

TABLE 3 Reproductive characteristics of mothers who gave birth in public hospitals of West Wollega Zone, Oromia, Ethiopia ($n = 599$).

Variables	Category	Frequency (%)
Number of pregnancy	1st pregnancy	187 (31.2)
	2nd–4th pregnancy	334 (55.7)
	≥5th pregnancy	78 (13.1)
Antenatal care follow-up ≤16 weeks	No	460 (76.8)
	Yes	139 (23.2)
Interpregnancy interval	≤2 years	200 (47.7)
	>2 years	219 (52.3)
Mode of current delivery	Spontaneous delivery	371 (58.3)
	Breach delivery	70 (8.3)
	Vacuum delivery	158 (23.0)
The outcome of the current birth	Alive	594 (99.2)
	Dead	5 (0.8)
whether their then-current pregnancy was planned	No	107 (17.9)
	Yes	492 (82.1)
number of children that you want to have in your life	≤3	187 (31.2)
	≥4	412 (68.8)
Want to have a child within 2 years	No	102 (17.0)
	Yes	497 (83.0)
Deciding on the number of children you want to have	Respondent only	22 (3.7)
	Husband only	33 (5.51)
	Both of them	543 (90.7)

TABLE 4 Knowledge of the respondents on immediate postpartum intrauterine device utilization among mothers who gave birth in public hospitals in West Wollega Zone, Oromia, Ethiopia in the year 2022 ($n = 599$).

Variables	Category	Frequency (%)
Can prevent pregnancy for more than 10 years	No	247 (41.2)
	Yes	352 (58.8)
Can be inserted immediately after delivery	No	365 (60.9)
	Yes	234 (39.1)
Has no interference with sexual intercourse	No	409 (68.3)
	Yes	190 (31.7)
Is immediately reversible	No	340 (56.8)
	Yes	259 (43.2)
Does not cause cancer	No	397 (66.3)
	Yes	202 (33.7)
Can be used by breastfeeding mothers	No	277 (46.2)
	Yes	322 (53.8)
May cause changes in the bleeding pattern	No	362 (60.4)
	Yes	237 (39.6)
Can be used by HIV-positive mothers who adhere to treatment	No	410 (68.4)
	Yes	189 (31.6)
Given free of charge in the delivered hospital	No	264 (44.1)
	Yes	335 (55.9)
Can be removed any time you want	No	330 (55.1)
	Yes	269 (44.9)

immediately after delivery, 259 (43.2%) knew that an IUD is immediately reversible; and 202 (33.7%) knew that an IUD does not cause cancer (Table 4).

Mother's attitude toward IPPIUD utilization

The mean score (±SD) value of the participant's attitude toward the immediate PPIUD utilization were 20.79 (SD ± 6.65). Using the sum score as the cutoff point, the study showed that 184 (30.7%) mothers had a favorable attitude toward the utilization of immediate postpartum intrauterine devices. In total, 199 (33.2%) mothers disagreed that IUD insertion inside the uterus does not lead to a loss of privacy, while 38 (6.3%) strongly agreed to the loss of privacy. Two hundred fifteen (35.9%) participants agreed that using IPPIUD does not restrict normal activities. Additionally, 192 (32.1%) agreed that IPPIUD does not move through the body after

insertion and 259 (26.5%) agreed and 96 (16%) highly agreed that IPPIUD does not interfere with sexual intercourse. Also, 88 (14.7%) participants highly disagreed with IPPIUD's ability to harm a woman's uterus (Table 5).

Immediate postpartum intrauterine device utilization and the reasons for utilization

The study showed that the prevalence of utilization of immediate postpartum intrauterine devices was 27.2% (95%CI: 23.7–30.9). A total of 111 (52.6%) respondents were counseled for immediate postpartum intrauterine devices. During ANC visits, 53 (32.5%) and 44 (27.0%) mothers had information about immediate postpartum IUD and needed a long-acting, safe, and effective method to use the immediate postpartum IUD, respectively (Table 6).

The reasons for respondents not utilizing an immediate postpartum intrauterine device

The most common reasons mentioned by study respondents to not utilize an immediate postpartum intrauterine device were a lack of awareness for 204 (34.2%) respondents followed by a fear of side effects for 125 (20.9%) respondents (Figure 4).

Factors associated with immediate postpartum intrauterine device utilization

A binary logistic regression was performed to assess the association of each independent variable with immediate postpartum intrauterine device utilization. Of all the assessed factors, 14 variables showed association in the bivariable analysis: age of respondents;

TABLE 5 Attitude of the mothers toward immediate postpartum intrauterine device utilization among women who gave birth in public hospitals in West Wollega Zone, Oromia, Ethiopia in the year 2022 ($n = 599$).

Variables	Category *n* (%)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Inserting IPPIUD inside the uterus leads to a loss of privacy	147 (24.5)	199 (33.2)	171 (28.5)	44 (7.3)	38 (6.3)
IPPIUD does restrict normal activities	112 (18.7)	215 (35.9)	198 (33.1)	60 (10.0)	14 (2.3)
IPPIUD moves through the body after insertion	112 (18.7)	192 (32.1)	215 (35.9)	62 (10.4)	18 (3.0)
IPPIUD can interfere with sexual intercourse	96 (16.0)	159 (26.5)	248 (41.4)	74 (12.4)	22 (3.7)
IPPIUD harms a woman's uterus	88 (14.7)	169 (28.2)	232 (38.7)	78 (13.0)	32 (5.3)
Insertion and removal of IUD did cause extensive pain	69 (11.5)	164 (27.4)	205 (34.2)	117 (19.5)	44 (0.3)
Using IPPIUD can cause irregular bleeding	82 (13.7)	131 (21.9)	232 (38.7)	116 (19.4)	38 (6.3)
Using IPPIUD impairs future fertility	97 (16.2)	97 (16.2)	97 (16.2)	97 (16.2)	97 (16.2)

TABLE 6 Reasons for immediate postpartum intrauterine device utilization among mothers who gave birth in public hospitals in West Wollega Zone, Oromia, Ethiopia in the year 2022.

Variables	Category	Frequency (%)
Utilization of IPPIUD after delivery	Had information on IPPIUD during ANC visits	53 (32.5)
	Husband's and relatives' opinions	17 (10.4)
	Recommended by the service provider	14 (8.6)
	Had side effects from other family planning use	30 (18.4)
	Needed a long-acting, safe, and effective method	44 (27.0)
	Recommended by peers	5 (3.1)
Time counseled for IPPIUD	During antenatal period	111 (52.6)
	On admission while in labor	26 (12.3)
	Immediately after delivery	74 (35.1)

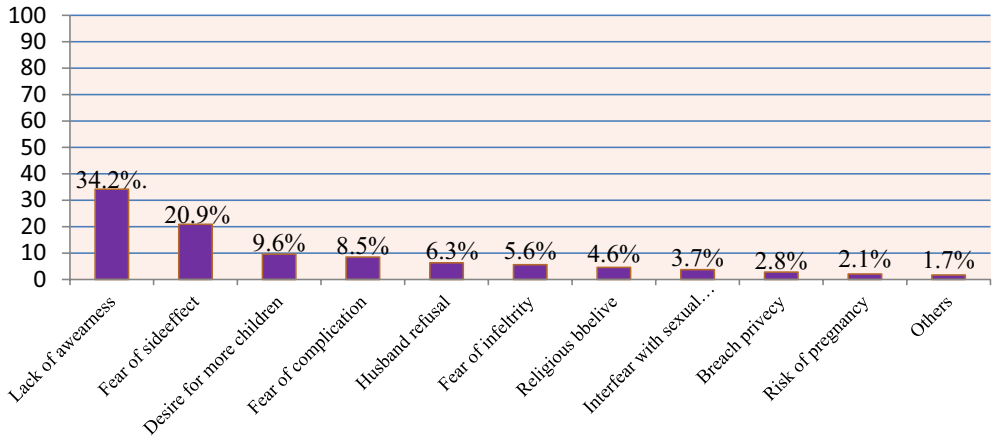


FIGURE 4
The reasons respondents did not utilize immediate postpartum intrauterine devices among women who gave birth in public hospitals in West Wollega Zone, Oromia, Ethiopia in the year 2022. Others: peers or relatives.

educational status of mothers; age at first delivery; antenatal care initiation at or less than 16 weeks; status of pregnancy (planned or not); family planning used before this birth; want to have a child within 2 years; knowledge status; ANC follow-up during current pregnancy; number of children you want to have in your life; discussing with their partner; attitude status; decided on the number of children you want to have; and counseled on immediate postpartum intrauterine device.

The variables with a *p*-value of less than 0.25 were entered into the multivariable logistic regression model after controlling for confounders. The results of the multivariable logistic regression model revealed that age of the respondents, antenatal care initiation at or less than 16 weeks, mothers whose current pregnancy is planned, adequate knowledge of immediate postpartum intrauterine devices, favorable attitude, and mothers who had been counseled on IPPIUD were found to be significantly associated with immediate postpartum intrauterine device utilization at a *p*-value of ≤ 0.05 together with 95% confidence intervals.

According to this study, age of the respondents were associated with immediate postpartum intrauterine device utilization: Mothers in the age groups of 25–34 years (AOR = 2.45, 95% CIs: 1.32–4.89) and 35–49 years (AOR = 1.37, 95% CIs: 1.02–2.81) were 2.45 times and 1.37 times more likely to utilize IPPIUD as compared to those in the age group of 15–24 years, respectively.

The study revealed that antenatal care initiation at or less than 16 weeks was significantly associated with immediate postpartum intrauterine device utilization. The mothers who had started antenatal care visits at an early gestational age were almost two times more likely to utilize IPPIUD than those who started later (AOR = 2.25, 95% CIs: 1.35–3.76). The results of the study revealed that those mothers whose current pregnancy was planned were two times more likely to use immediate postpartum intrauterine devices than mothers whose current pregnancy was unplanned (AOR = 2.21, 95%CIs: 1.37–4.11).

The study showed that mothers who had adequate knowledge of immediate postpartum intrauterine devices after delivery were 4.71 times more likely to use them than their counterparts (AOR = 4.71, 95% CIs: 2.63–6.63). Mothers who had favorable attitudes were three times more likely to utilize immediate postpartum intrauterine devices than mothers who had unfavorable attitudes (AOR = 3.35, 95% CIs: 2.07–5.44). Mothers who had been counseled on IPPIUD were four times more likely to utilize IPPIUD than those who had not been counseled (AOR = 4.14, 95% CIs: 2.60–6.68) (Table 7).

Discussion

This study aimed to assess the prevalence of immediate postpartum intrauterine contraceptive device utilization and identify factors that affect its utilization. The prevalence of immediate postpartum intrauterine contraceptive device utilization within 48 h of delivery was 27.2% (95% CIs: 23.5–30.7). This finding was in line with the studies conducted in public hospitals in Addis Ababa with a prevalence of 26.6% (3), Debre Berhan of 25.4% (5), Gondar of 48.4%, northwest Ethiopia (8), and Bahir Dar of 44% (34) and public health facilities in Gamo Zone of 26.4% (35).

The possible reasons for this similarity might be the level of awareness, early initiation of antenatal care of respondents, adequate knowledge of, and favorable attitude toward IPPIUD in the study areas (31). This finding was also in line with the studies conducted in Rwanda, Malaya of Cameroon, and India with the prevalence of 28.1% (30), 28.4% (16), and 28.33% (10). The possible reason for this similarity might be that women who utilized IPPIUD discuss with unutilized women its utilization benefits, the procedures, and the time taken, which might decrease the fear of women toward IPPIUD utilization.

The finding of the present study regarding the prevalence of IPPIUD utilization was higher than the studies conducted in Bale Zone (12.4%) (17); in Jimma University Medical Center (10.5%) (33); in Dessie Town (7%) (34); in Adama and Olenchiti (12.4 and 4.8% in the intervention and non-intervention groups, respectively) (11); at Saint Paul's Millennium Medical College (7.8%) (23); and in Sidama Zone, south Ethiopia (21.9%) (4). These variations might be attributed to sociodemographic characteristics of the participants among study areas; differences in samples; time differences; misconceptions about

TABLE 7 Factors associated with immediate postpartum intrauterine device utilization among mothers who gave birth in hospitals in West Wollega zone, Oromia, West Ethiopia, 2022 ($n = 599$).

Variables category		Utilization of IPPIUD		COR 95%CIs	AOR 95%CIs
		Yes (%)	No (%)		
Age of respondents	15–24 years	21 (3.5)	110 (18.4)	1	1
	25–34 years	96 (16.0)	196 (32.7)	2.57 (1.52–4.35)	**2.45 (1.32–4.89)***
	35–49 years	46 (7.7)	130 (21.7)	1.85 (1.04–3.30)	**1.37 (1.02–2.81)***
Mothers' education level	No formal education	41 (6.8)	144 (24.0)	1	1
	Primary education (1–8 K)	42 (7.7)	104 (17.4)	1.42 (0.86–2.34)	0.99 (0.53–1.86)
	Secondary education (9–12 K)	38 (6.3)	95 (15.9)	1.41 (0.84–2.34)	1.35 (0.69–2.62)
	College and above	42 (7.0)	93 (15.5)	1.59 (0.96–2.62)	1.18 (0.62–2.27)
Age at first delivery	<18	4 (0.7)	29 (4.8)	1	1
	≥18	159 (26.5)	407 (67.9)	2.83 (0.98–8.18)	0.52 (0.1–1.99)
ANC follow-up during the then-current pregnancy	Yes	156 (26.0)	377 (62.9)	3.49 (1.56–7.81)	0.89 (0.23–3.44)
	No	7 (1.2)	59 (9.8)	1	1
Weeks started at ANC follow-up	≤16	54 (9)	85 (14.2)	2.05 (1.37–3.06)	**2.25 (1.35–3.76)***
	>16	109 (18.2)	351 (58.6)	1	1
Whether pregnancy was planned	Yes	138 (23)	306 (51.1)	2.35 (1.46–3.76)	**2.21 (1.37–4.11)***
	No	25 (4.2)	130 (21.7)	1	1
Number of children you want to have in your life	≤3	57 (9.5)	130 (21.7)	1.27 (0.86–1.85)	1.08 (0.77–2.11)
	≥4	106 (17.7)	306 (51.1)	1	1
Want to have a child within 2 years	Yes	128 (21.4)	369 (61.6)	1	1
	No	35 (5.8)	67 (11.2)	1.53 (0.95–2.37)	1.31 (0.7–2.35)
Used family planning before the then-current birth	Yes	35 (5.8)	61(10.2)	1.68 (1.06–2.67)	1.11 (0.62–1.99)
	No	128 (21.4)	375 (62.6)	1	1
Decided the number of children you want	Yes	129 (21.5)	296 (49.4)	1.79 (1.17–2.75)	1.56 (0.89–2.72)
	No	34 (5.7)	140 (23.4)	1	1
Knowledge of respondents	Inadequate knowledge	41 (6.8)	275 (45.9)	1	1
	Adequate knowledge	122 (20.4)	161 (26.9)	5.08 (3.39–7.61)	**4.71 (2.63–6.63)****
Attitude of respondents	Unfavorable	78 (13)	337 (56.3)	1	1
	Favorable	85 (14.2)	99 (16.5)	3.71 (2.5.43)	**3.35 (2.07–5.44)****
Counseled on IPPIUD	No	76 (12.7)	361 (60.3)	1	1
	Yes	87 (14.5)	75 (12.5)	5.51 (3.71–8.18)	**4.14 (2.60–6.68)****
Partner discussion on family planning	No	99 (16.5)	298 (49.7)	1	1
	Yes	64 (10.7)	138 (23)	1.39 (0.96–2.03)	1.2 (0.74–1.95)

*Statistically significant at a p-value of < 0.05, **p-value < 0.001, 1 = Reference, COR, crude odds ratio; AOR, adjusted odds ratio. We have used the bold values in table 7 to show the statistically significant category of the variables with adjusted odds ratio (AOR) and 95 % confidence interval.

intrauterine devices in the study areas; and to the existence of healthcare provider training and material support from a non-governmental organization in the study area.

The result of this finding was lower than found in a study conducted in Arsi Negele, which found that approximately 33.5% of study respondents had utilized IPPIUD (36), and a study conducted in Gamo Zone, southern Ethiopia, which found 35.6% of them had utilized IPPIUD (35). This inconsistency may be due to differences in the study design, sample size, and improvement of the health facilities on service provision of family planning with time. This result of this finding is also lower than that found in a study conducted in central India in a tertiary care center, in which it was reported that 36% of respondents had utilized IPPIUD (37), a study conducted in Minnesota on Somali immigrants, in which 39.7% of them had utilized IPPIUD (15), and a study conducted in Tanzania, in which 31.6% of them had utilized IPPIUD (38). These variations of immediate postpartum intrauterine device utilization might be attributed to sociodemographic characteristics variations due to the difference in the level of awareness and educational status of respondents, the difference in a sample, cultural beliefs, unfavorable attitudes, and misconceptions about intrauterine devices in the study areas (31, 35).

According to this study, those mothers in age category of 25–34 years and 34–49 years were more likely to utilize immediate

postpartum intrauterine device compared to those within the age group of 15–24 years. The result of the finding is consistent with a study conducted in Gondar, Northwest Ethiopia (8). This might be due to older women being more willing to utilize immediate postpartum intrauterine devices than younger women since the age of the women is associated with increased awareness and understanding. It is well recognized that age plays an important role in women's utilization of immediate postpartum intrauterine device and that maternal age may sometimes serve as a proxy for an accumulated understanding of long-acting family planning services (6). Age may be the factor that may have a positive influence on the accepting of IPPIUD utilization among women.

However, this finding was inconsistent with the study conducted in Debra Tabor (25) and Ambo Town, western Ethiopia (39). This inconsistency may be due to variations in respondents' sociodemographic characteristics of the study area; the time gap between the study and sample size; the difference in awareness of intrauterine devices; the educational status of the study respondents; various misconceptions about IPPIUD in the study areas; differences in the study design; and variations in the health facilities' provision of family planning services over time.

The results of this study revealed that those mothers who had planned their pregnancy were more likely to utilize immediate postpartum intrauterine devices than those mothers who had not planned their pregnancy. This finding is consistent with studies conducted in the Gamo Zone, southern Ethiopia (35); Debre Berhan, Ethiopia (5); and Addis Ababa, Ethiopia (23). This could be due to mothers' understanding and attitude on timing and spacing of births by having a planned pregnancy through the utilization of immediate postpartum intrauterine devices after delivery.

The study also found that those mothers who had adequate knowledge of immediate postpartum intrauterine devices immediately after delivery were more likely to utilize IPPUD than their counterparts. This finding is consistent with studies conducted in Nigeria (40) and Rwanda (30), in Nepal (14), and in Durban, South Africa (28). The possible explanation for this finding is that as mothers get information on immediate postpartum intrauterine device utilization, their awareness of IUDs increases and their acceptance of the immediate postpartum intrauterine device improves.

The mothers who had favorable attitudes toward IPPIUD were more likely to utilize immediate postpartum intrauterine device than those mothers who had unfavorable attitudes. The current finding is in line with the studies conducted in Debre Berhan Town (5), Nigeria (40), and Tanzania (38). This may be due to women who have a favorable attitude toward immediate postpartum intrauterine device utilization having the self-initiative to know about the advantages and disadvantages of these devices.

The result of this study revealed that those mothers who were counseled on IPPIUD were more likely to utilize IPPIUD than those who had not been counseled. The study is consistent with a study conducted in Han Health Center, Bahir Dar, Ethiopia (6), a study conducted in Debre Berhan, Ethiopia (5), a study conducted in Kebri Beyan, Somali Region (25), and a study conducted in Jima University Medical Xenter (33) and a study conducted in the Sidama Zone (4). The possible explanation for this finding is that as mothers get counseling on immediate postpartum intrauterine device utilization at maternal, neonatal, and child health points of contact within the health system, their awareness about the importance of IUDs would be improved.

Strengths and limitations of the study

Only those women who gave a birth at all five public hospitals that provides IPPIUD service in the West Wollega Zone were included in this study. As a limitation, social desirability bias may occur due to the interview time of the questions, i.e., immediate after delivery, on some variables during data collection, and since the study was conducted in public hospitals; women who gave birth at health centers, private health facilities, and at home were not included in the study, which is another limitation.

Conclusion

Immediate postpartum intrauterine device utilization was low when compared to the national targets of Ethiopia predicted during the mini EDHS 2019, which was 35% (41). Age of respondents, initiation of antenatal care at or less than 16 weeks, pregnancy status of women as planned or not, knowledge status, attitude status, and counseling on the immediate postpartum intrauterine device were significantly associated with mothers' utilization of the immediate postpartum intrauterine device.

Recommendation

Health professionals should work toward encouraging all the women who gave birth at public hospitals to utilize an immediate postpartum intrauterine device through the integration of its services in routine maternal, neonatal, and child health service areas to increase the uptake of IPPIUD. Pregnant women should be given awareness about IPPIUD through counseling during their ANC appointments to provide them with a long-acting, safe, and effective protection against unwanted pregnancy, especially younger women. Furthermore, improving the knowledge and attitude of pregnant women toward IPPIUD utilization starting from ANC visit initiation to delivery is recommended to increase the prevalence of IPPIUD utilization.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical approval was obtained from the ethical review committee of College of Health Science, Salale University, Fiche, Ethiopia. Permission letters were obtained from all public hospitals before conducting data collection, and the gathered data were secured at all levels. The data collectors explained the objective of

the study to ensure the willingness of the study participants before filling in the questionnaire and informed the participants on the confidentiality of any information they provide. Informed written consent was obtained from each respondent after explaining the purpose and procedures. Considering the sensitivity of this research, all basic principles of human research ethics (respect of persons, beneficence, voluntary participation, confidentiality, and justice) have been secured.

Author contributions

AHG, EBK, and TN participated in conceptualization, data curation, formal analysis, investigation, funding acquisition, methodology, project administration, resources, software, supervision, validation, visualization, writing original draft, writing review, and editing the manuscript. DG and DBS were involved in data curation, methodology, resources, analysis, investigation, supervision, validation, writing review, and editing the manuscript. All authors contributed to the article and approved the submitted version.

Funding

The financial fund was covered by Salale University on behalf of Oromia Health Bureau (OHB) sponsorship.

Acknowledgments

We would like to thank Salale University for giving us the chance to conduct this research activity and providing all the necessary support. We would like to extend our thanks to the data collectors, supervisors, and study participants. Last but not least, we acknowledge West Wollega Zone health office and all public hospitals for providing us with all important basic data and required information.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

1. Daba G, Deressa JT, Sinishaw W. Assessment of intention to use postpartum intra uterine contraceptive device and associated factors among pregnant women, West Shoa Zone, Ethiopia. *Contracept Reprod Med*. (2018) 2018:1–18. doi: 10.1186/s40834-021-00152-x

2. John W, et al. *Family Planning Managers Hand Book*. HRH Global Resource Center: Management Sciences for Health. (1991). 1–30.

3. Geda YF, Nejaga SM, Belete MA, Lemlem SB, Adamu AF. Immediate postpartum intrauterine contraceptive device utilization and influencing factors in Addis Ababa public hospitals: a cross-sectional study. *Contracept Reprod Med Res*. (2021) 6:1–10. doi: 10.1186/s40834-021-00148-7

4. Tefera LB, Abera M, Fikru C, Tesfaye DJ. Utilization of immediate post-partum intra uterine contraceptive device and associated factors: a facility based cross sectional study among mothers delivered at public health facilities of Sidama Zone, South Ethiopia. *J Preg Child Health*. (2017) 4:326. doi: 10.4172/2376-127X.1000326

5. Demie TG, Demissew T, Huluka TK, Workineh D, Libanos HG. Postpartum family planning utilization among postpartum women in public health institutions of Debre Berhan Town, Ethiopia. *J Women's Heal Care*. (2018) 7:2. doi: 10.4172/2167-0420.1000426

6. Animen S, Lake S, Mekuriaw E. Utilization of intra uterine contraceptive device and associated factors among reproductive age group of family planning users in Han Health Center, Bahir Dar, North West Amhara, Ethiopia, 2018. *BMC Res Notes [Internet]*. (2018) 11:922. doi: 10.1186/s13104-018-4032-z

7. Glasier A, Baird D, Blumenthal P, Cameron S, Fiander A, Gebbie A, et al. Best practice in postpartum family planning. *Int J Sci Study*. (2015) 1:2–4.

8. Abera Y, Mengesha ZB, Tessema GA. Postpartum contraceptive use in Gondar town, Northwest Ethiopia: A community based cross-sectional study. *BMC Womens Health*. (2015) 15:1–8. doi: 10.1186/s12905-015-0178-1

9. Microfinance and rural women's empowerment. *Annual Report Annual Report [Internet]*. Nekemte: Mares (2016) Available at: https://www.pvh.com/-/media/Files/pvh/investor-relations/PVH-Annual-Report-2020.pdf.

10. Da Costa V, Ingabire R, Sinabamenye R, Karita E, Umutoni V, Hoagland A, et al. An exploratory analysis of factors associated with interest in postpartum intrauterine device uptake among pregnant women and couples in Kigali. *Rwanda Clin Med Insights Reprod Heal*. (2019) 13:117955811988684. doi: 10.1177/1179558119886843

11. Befkene Wayessa M, Workineh Abebe T, Mannekulih Habtewold E, Megerso Adilo A, Teklu Meressa A, Garoma Abaya S, et al. Focused family planning counseling increases immediate postpartum intrauterine contraceptive device uptake: a quasi-experimental study. *Open Access J Contracept*. (2020) 11:91–102. doi: 10.2147/OAJC.S246341

12. United Nations Department of Economic and Social Affairs (UN DESA). World Family Planning. Highlights health Key findings. *United Nations [Internet]*. (2020) 2020:2. Available at: https://www.un.org/development/desa/pd/

13. World Health Organization (WHO). *Family Planning, a Global Handbook for providers*. World Health Organization. (2018).

14. Pradhan E, Canning D, Shah IH, Puri M, Pearson E, Thapa K, et al. Integrating postpartum contraceptive counseling and IUD insertion services into maternity care in Nepal: Results from stepped-wedge randomized controlled trial. *Reprod Health*. (2019) 16:1–15. doi: 10.1186/s12978-019-0738-1

15. Millar A, Vogel RI, Bedell S, Looby MA, Hubbs JL, Harlow BL, et al. Patterns of postpartum contraceptive use among Somali immigrant women living in Minnesota. *Contracept Reprod Med*. (2017) 2:1–7. doi: 10.1186/s40834-017-0041-x

16. Tolefac PN, Nana TN, Yeika EV, Awungafac NS, Ntsama Y, Njotang PN. Trends and patterns of family planning methods used among women attending family planning clinic in a rural setting in sub-Sahara Africa: The case of Mbalmayo District Hospital, Cameroon. *BMC Res Notes*. (2018) 11:10–4. doi: 10.1186/s13104-018-3658-1

17. Gonie A, Worku C, Assefa T, Bogale D, Girma A. Acceptability and factors associated with post-partum IUCD use among women who gave birth at bale zone health facilities, Southeast-Ethiopia. *Contracept Reprod Med*. (2018) 3:1–8. doi: 10.1186/s40834-018-0071-z

18. WHO, UNICEF U. Ethiopia basic emergency obstetric. *Fed Democr Repub Ethiop Minist Heal*. (2016) 11:28–40.

19. Assefaw M, Azanew G, Engida A, Tefera Z, Gashaw W. Determinants of postpartum intrauterine contraceptive device uptake among women delivering in public hospitals of South Gondar Zone, Northwest Ethiopia, 2019: an unmatched case-control study. *Obstet Gynecol Int*. (2021) 2021:1–11. doi: 10.1155/2021/1757401

20. Ethiopian Federal Ministry of Health. Opportunities for family planning programming in the postpartum period in India. *FMOH [Internet]*. (2020):2–3. Available at: https://track20.org/download/pdf/PPFP%20Opportunity%20Briefs/english/India%20PPFP%20Opportunity%20Brief%202.pdf

21. World Health Organization (WHO), UNICEF, UNFPA WB. Trends in maternal mortality 2010 - 2015, WHO. *World Heal Organ [Internet]*. (2015):92. Available at: http://www.who.int/reproductivehealth/publications/monitoring/maternal-mortality2015

22. Mihretie GN, Simegn A, Dereje A, Gebrehana H, Getie A, Getnet B, et al. Postpartum modern contraceptive utilization and associated factors among women who gave birth in the last 12 months in addis zemen, south gondar, ethiopia: Community-based cross-sectional study. *Int J Women's Health*. (2020) 12:1241–51. doi: 10.2147/IJWH.S282733

23. Belay L, Birara M. Factors affecting long-term and permanent contraceptive uptake among post-partum mothers at a hospital in Addis Ababa, Ethiopia: a cross-sectional study. *Lancet Glob Heal*. (2018) 6:S34. doi: 10.1016/S2214-109X(18)30163-3

24. Abadiga M, Wakuma B, Oluma A, Fekadu G, Hiko N, Mosisa G. Determinants of preterm birth among women delivered in public hospitals of Western Ethiopia, 2020: Unmatched case-control study. *PLoS One*. (2021) 16:e0245825. doi: 10.1371/journal.pone.0245825

25. Taye EB, Mekonen DG, Debele TZ. Prevalence of post partum modern family planning utilization and associated factors among postpartum mothers in Debre Tabor town, North West Ethiopia, 2018. *BMC Res Notes*. (2019) 12:1–7. doi: 10.1186/s13104-019-4464-0

26. Mulatu T, Sintayehu Y, Dessie Y, Deressa M. Modern family planning utilization and its associated factors among currently married women in rural Eastern Ethiopia: a community-based study. *Hindawi BioMed*. (2020) 2020:1–9. doi: 10.1155/2020/6096280

27. Embafrash G, Mekonnen W. Level and correlates of unmet need of contraception among women in extended postpartum in Northern Ethiopia. *Int J Reprod Med*. (2019) 2019:1–9. doi: 10.1155/2019/6351478

28. Monji Builu P, Naidoo TD. Attitudes towards and knowledge about intrauterine contraceptive devices among women in the reproductive age group in a resource-constrained setting. *S Afr J Obstet Gynaecol*. (2015) 21:27–32. doi: 10.7196/sajog.950

29. Hounton S, Winfrey W, Barros AJD, Askew I. Patterns and trends of postpartum family planning in Ethiopia, Malawi, and Nigeria: Evidence of missed opportunities for integration. *Glob Health Action*. (2015) 8:29738. doi: 10.3402/gha.v8.29738

30. Kanakuze CA, Kaye DK, Musabirema P, Nkubito P, Mbalinda SN. Factors associated with the uptake of immediate postpartum intrauterine contraceptive devices (PPIUCD) in Rwanda: a mixed methods study. *BMC Pregnancy Childbirth*. (2020) 20:1–15. doi: 10.1186/s12884-020-03337-5

31. Gebremedhin M, Alemayehu A, Yihune M, Melis T, Fikadu Y, Arja A, et al. Utilization of immediate postpartum intrauterine contraceptive device and associated factors among women who gave birth at government hospitals of Gamo Zone, Southern Ethiopia, 2019. *Austin J Preg Child Birth*. (2021) 2:1–7

32. Gupta N, Sinha R, Mangal A. Knowledge, attitude and practice study on immediate postpartum intrauterine contraceptive device method of family planning. *Int J Commu Med Public Heal*. (2017) 4:2981. doi: 10.18203/2394-6040.ijcmph20173357

33. Arero W, Teka W, Jarso H. Prevalence, and pattern of LARC use in immediate postpartum Period at Jimma University Medical Center, Ethiopia [18F]. *Obstet Gynecol*. (2018) 131:68S–S. doi: 10.1097/01.AOG.0000533328.55352.1b

34. Masresha Tegegn MA, Arefaynie M, Tiruye TY. Unmet need for modern contraceptives and associated factors among women in the extended postpartum period in Dessie town, Ethiopia. *Contracept Reprod Med*. (2017) 2:21. doi: 10.1186/s40834-017-0048-3

35. Jemal Mohammed S, Gebretsadik W, Endashaw G, Shigaz Shimbre M, Assfa Mossa K, Nuriye Metebo K, et al. Determinants of postpartum IUCD utilization among mothers who gave birth in gamo zone public health facilities, Southern Ethiopia: a case-control study. *Open Access J Contracept*. (2020) 11:125–33. doi: 10.2147/OAJC.S257762

36. Hibstu DT, Alemayehu A. Long acting reversible contraceptives utilization and associated factors among women of reproductive age in Arsi Negele town, Southeastern Ethiopia. *Contracept Reprod Med*. (2020) 5:6. doi: 10.1186/s40834-020-00109-6

37. Jairaj S, Dayyala S. A cross sectional study on acceptability and safety of IUCD among postpartum mothers at tertiary care hospital, Telangana. *J Clin Diagnostic Res*. (2016) 10:LC01–6. doi: 10.7860/JCDR/2016/16871.7020

38. Pearson E, Senderowicz L, Pradhan E, Francis J, Muganyizi P, Shah I, et al. Effect of a postpartum family planning intervention on postpartum intrauterine device counseling and choice: Evidence from a cluster-randomized trial in Tanzania. *BMC Womens Health*. (2020) 20:1–13. doi: 10.1186/s12905-020-00956-0

39. Tesfaye J. assessment of intention to use postpartum intrauterine contraceptive device and associated factors among pregnant women attending antenatal clinics in ambo town public health institutions, Ethiopia, 2018. *J Gynecol Womens Heal*. (2020) 19:1–9. doi: 10.19080/JGWH.2020.19.556012

40. Bolarinwa O. Principles and methods of validity and reliability testing of questionnaires used in social and health science researches. *Niger Postgrad Med J*. (2015) 22:195. doi: 10.4103/1117-1936.173959

41. Ethiopian Public Health Institute Addis Ababa. Ethiopia mini demographic and health survey. *Federal Democratic Republic of Ethiopia*. (2019):1–35.

10.3389/fmed.2023.1238496

Glossary

ANC	Antenatal care
AOR	Adjusted odds ratio
CI	Confidence interval
COR	Crude odds ratio
DHS	Demographic and Health Survey
EDHS	Ethiopian Demographic and Health Survey
FMOH	Federal Ministry of Health
FP	Family planning
HSTP	Health Sector Transformation Plan
IUD	Intrauterine device
IPPIUCD	Immediate Postpartum Intrauterine Device
LBW	Low birth weight
MCH	Maternal and child health
MCSP	Maternal and child survival program
MNCH	Maternal, newborn, and child health
NGOs	Non-governmental organizations
PPF	Postpartum family planning
PPIUD	Postpartum intrauterine device
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization

frontiers | Frontiers in Global Women's Health

TYPE Original Research
PUBLISHED 30 November 2023
DOI 10.3389/fgwh.2023.1234013

OPEN ACCESS

EDITED BY
Loreto Pantoja,
University of Chile, Chile

REVIEWED BY
Juan Carlos Higuero,
Hospital Costa del Sol, Spain
Maañón Claudio,
Hospital Costa del Sol, Spain

*CORRESPONDENCE
Solomon Seyife Alemu
✉ soleseifa@gmail.com

RECEIVED 13 July 2023
ACCEPTED 09 November 2023
PUBLISHED 30 November 2023

CITATION
Alemu SS, Agago MT, Ukumo EY and Hadero TS (2023) Knowledge and practice of obstetric care providers on prevention of obstetric fistula 2023: an institution-based cross-sectional study.
Front. Glob. Womens Health 4:1234013.
doi: 10.3389/fgwh.2023.1234013

Knowledge and practice of obstetric care providers on prevention of obstetric fistula 2023: an institution-based cross-sectional study

Solomon Seyife Alemu[1]*, Mahlet Tesfaye Agago[2], Eshetu Yisihak Ukumo[3] and Tesfahun Simon Hadero[3]

[1]Department of Midwifery, Shashemenne Campus College of Health Science, Madda Walabu University, Shashemenne, Ethiopia, [2]Department of Midwifery, College of Health Science, Mattu University, Mattu, Ethiopia, [3]Department of Midwifery, College of Medicine and Health Science, Arba Minch University, Arbaminch, Ethiopia

Background: Obstetric fistula is a preventable devastating condition that is mostly caused by obstructed labour. About 22% of obstructed labor is complicated by obstetric fistula. Skilled birth attendants during delivery are essential for the prevention of obstetric fistula. However, little is known about the status of the knowledge and practice of obstetric fistula prevention in the Gamo zone.
Objective: We aimed to assess the knowledge, practice, and associated factors of obstetric caregivers on the prevention of obstetric fistula in public health facilities of the Gamo zone in southwest Ethiopia 2023.
Method: A cross-sectional study was employed among 372 obstetric caregivers in selected public health facilities of the Gamo zone in southwest Ethiopia from 1 December 2022 to 30 January 2023. Study participants were selected by a simple random sampling technique, and data were collected by using a pre-tested and self-administered questionnaire. The collected data were coded and entered into Epi-Data version 4.6 computer software and exported to SPSS version 27 for analysis purposes. Bivariable and Multivariable Logistic analyses were applied. The level of significance was declared at a *P*-value ≤0.05 and a 95% confidence interval.
Results: About 57% [95% CI (53.00–62.00)] of participants had good knowledge, and about 55.4% [95% CI (50.00–60.00)] of obstetric caregivers showed good practice for obstetric fistula prevention. The factors significantly associated with knowledge were service year [AOR = 2.50, 95% CI = (1.12–6.73)], types of a health facility [AOR = 1.99, 95% CI = (1.01–3.92)], age [AOR = 2.38, 95% CI = (1.03–5.49)], and in-service training [AOR = 4.61, 95% CI = (2.35–9.05)]. In-service training [AOR = 14.86, 95% CI = (12.75–18.73)], service year [AOR = 3.58, 95% CI = (1.24–10.29)], and knowledge [AOR: 13.24, 95% CI = (6.18–14.34)] were factors which were significantly associated with the practice of obstetric caregivers towards obstetric fistula prevention.

Abbreviations
ANC, antenatal care; AOR, adjusted odds ratio; COR, crude odds ratio; BEmoNC, basic emergency obstetric and newborn care; HCW, health care workers; NGO, non-government organization; OF, obstetric fistula; RVF, recto-vaginal fistula; SNNPR, south nation and nationalities people region; SPSS, statistical package for social sciences; UNFPA, united nation fund for population agency; VVF, vesico vaginal fistula; WHO, world health organization.

Conclusion: The knowledge and practice of obstetric caregivers on the prevention of obstetric fistula was low in public health facilities of the Gamo zone. In this study, practicing at a hospital was a factor significantly associated with the knowledge of obstetric caregivers. Having in-service training, advanced service year, and age were factors significantly associated with the knowledge and practice of obstetric caregivers. Regular in-service training of health professionals can enhance their knowledge and practice of obstetric fistula prevention.

KEYWORDS

knowledge, practice, obstetric fistula, obstetric caregivers, Gamo zone

1. Background

Obstetric fistula (OF) is an abnormal communication between the vagina and the bladder or between the vagina and the rectum or both that leads to uncontrollable leakage of urine and feces through the openings (1). There are many classifications for OF, but the most common are vesicovaginal fistula (VVF) and rectovaginal fistula (RVF). Since there is improved obstetric care, OF is not prevalent in high-income countries, but it remains a prevalent cause of maternal morbidity and mortality in low-income countries (2–4).

According to World Health Organization (WHO) estimates, over 2 million females are living with untreated OF worldwide, with 50,000–100,000 new cases reported each year. Of these, about 1 million women live in northern Nigeria, over 70,000 women live in Bangladesh, and around 26,000–40,000 women live in our country, Ethiopia (1, 3, 5). But these figures are likely to be underestimated because they include only those mothers who seek care (1, 3, 6).

Worldwide, about 2–3 million young women are living with obstetric fistula, and 50,000–10,000 new cases per year were reported. In sub-Saharan Africa, about 30,000–13,000 new cases are registered and reported (1, 7). According to the EDHS 2016 report, in Ethiopia, only 4 in 10 women aged 15–49 (39%) have heard of obstetric fistula (5). In Ethiopia, many thousands of women are still living with fistula (1, 8–10). A population-based survey in Ethiopia using a questionnaire as a proxy to estimate obstetric fistula prevalence in 2005 showed that the prevalence of Obstetric Fistula in the South Nation and Nationalities People Region (SNNPR) was 1.5% (7).

Obstetric fistula is a serious, long-term, life-altering obstetric complication in developing countries and is considered a marker of poor basic health care service. The consequence of obstetric fistula is not only the physical trauma and future birth complications; women face Psycho-social problems like being abandoned by families and friends and being stigmatized and discriminated against, which has led to depression, loneliness, and loss of self-esteem, self-worth, and identity. In addition, their fate is extreme poverty. It usually follows prolonged and neglected obstructed labor, which accounts for 8% of maternal deaths and 22% of obstructed labor complicated with obstetric fistula (11–14).

Even though obstetric fistula is preventable with simple and effective technology for monitoring the progress of labor that is readily available in health facilities, observational studies revealed that it is either not being used at all or incorrectly used by obstetric caregivers; they prefer to write words instead of using the partograph for decision making during labor and delivery (15, 16). In addition, healthcare providers keep laboring mothers at public health centers beyond the limited time for normal labor and refer them after it is too late with a full bladder, which contributes to obstetric fistula (17).

Ethiopia has made great strides in combating obstetric fistula, for example, expanding the primary health care system, expanding free maternity care at governmental health facilities, increasing transportation systems, and providing access to skilled birth attendants. However, the problem still affects the physical, social, and economic factors of women as well as the country. In 2014, the government initiated a 5-year campaign against obstetric fistula. Non-Government Organizations (NGOs) support the government's efforts to provide thousands of Ethiopian women with the obstetric healthcare they need. Chief among these organizations is the Hamlin Fistula Hospital, the global leader in fistula care (18, 19). The United nation fund for population agency (UNFPA) collaborates with both governmental and non-governmental stakeholders and launched a global campaign in 2003 to end obstetric fistula by 2020 with the aim of treatment and social rehabilitation for those women with obstetric fistula. Even though strategies exist, they need further development of prevention strategies rather than treatments (17, 20). Assessing the knowledge and practice of obstetric care providers regarding obstetric fistula prevention provides valuable insights regarding obstetric fistula prevention in the region. There were a few pockets of studies conducted regarding the prevention of obstetric fistula in Ethiopia. In contrast to the preceding studies, the study participants in these studies were enrolled from both urban and rural health facilities. So this study aimed to assess the knowledge, practice, and associated factors of obstetric care providers on obstetric fistula prevention.

2. Methods and materials

2.1. Study area and period

This study was conducted in selected public health facilities of the Gamo Zone, Southwest Ethiopia. Arba Minch is located 505 kms from the South of Addis Ababa, the capital city of Ethiopia, and about 275 km from Hawassa, the capital of the

SNNP region. The Gamo people are an Ethiopian ethnic group located in the Gamo Highlands of Southwest Ethiopia. They are found in more than 40 communities, including Chencha, Bonke, Kucha, Garbansa, Zargula, Kamba, Dorze, Birbir, Ochello, Boroda, Ganta, Gacho Baba, Eligo, Shella, Kolle, Dita, Kogo, and Daramalo. The population of the Zone was 1,544,753 people of which 51% were women in 2020 (21). The Gamo Zone has 15 woredas (districts) and two town administrations, each being directly accountable to the zone. The zone has six hospitals and 57 health centers, and the zone also had 88% and 77% of ANC coverage and family planning coverage, respectively, in 2013 (21). According to the zonal health office report, the total number of health professionals serving health facilities in the Gamo zone were 606. The study was conducted from 1 December 2022 to 30 January 2023.

2.2. Study design

An institution-based cross-sectional study was employed.

2.3. Population

2.3.1. Source population

Our source population was all obstetric caregivers who were employed and currently working in public health facilities in the Gamo Zone.

2.3.2. Study population

Our study population consisted of selected obstetric caregivers who were working in selected public health facilities of the Gamo Zone.

2.4. Eligibility criteria

Individuals who have worked for at least 6 months in public health facilities located in the Gamo Zone were included in this study whereas individuals who were on maternity leave were excluded.

2.5. Sample size determination and sampling techniques

2.5.1. Sample size determination

The sample size was determined using a single population proportion formula by taking the proportions of 67% and 66.2% for knowledge and practice, respectively, from a study conducted in Addis Ababa, Ethiopia, with a confidence level of 95% and a margin of error of 5%; the sample size was 340 for knowledge and 345 for practice for obstetric caregivers on prevention of obstetric fistula (22).

$$n = \frac{Z^2 p[1-P]}{d^2} = \mathbf{340}$$

$$n = \frac{Z^2 p[1-P]}{d^2} = \mathbf{345}$$

By adding a 10% non-response rate, the final sample size (n) was **380**.

2.5.2. Sampling technique and procedure

The study was conducted among obstetric caregivers found in Gamo zone public health facilities. According to the zonal health bureau information, the Gamo zone has a total of 63 public health facilities with 606 health care providers working in the obstetrics unit. By taking WHO's recommendation on sampling techniques, 40% of health facilities were included in the study. So, from the total of 63 public health facilities found in the zone, 25 (40%) health facilities were selected by using the lottery method. The total number of healthcare providers that are working at an obstetric unit in selected public health facilities that was obtained from the zonal health bureau was 413. Before the selection of study participants, proportionate allocations to each health facility were carried out. Subsequently, the list of obstetric caregivers was obtained from the head of the maternity department of each health facility. Lastly, the simple random sampling lottery method was used at each health facility to select a proportionate number of obstetric caregivers (**Figure 1**).

2.6. Variables of the study

2.6.1. Dependent variable

Knowledge of the prevention of obstetric fistula and practice on prevention of obstetric fistula.

2.6.2. Independent variables

Factors associated with knowledge and practice on prevention of obstetric fistula include the following: socio-demographic characteristics, such as age, sex, marital status, and religion, and occupational characteristics, such as professional qualification, service year, working part-time, and the level of the profession. In addition, training- and health-facility-related factors include pre-service training, in-service training on prevention of Obstetric Fistula [Partograph, family planning, and Basic Emergency Obstetric and Newborn Care (BEmONc)], and types of health facility.

2.7. Data collection procedures and tools

Data were collected using a structured self-administered questionnaire to assess knowledge and an observational checklist for practice assessment. The data collection tools were adopted from Prevention and Management of Obstetric Fistula: A Curriculum for Nurses and Midwives 2012, East, Central, and Southern African Health Community (ECSA-HC) and Engender Health/Fistula Care (23).

The questionnaire has three parts. The first part contained socio-demographic information including professional qualifications and years of service. The second part of the questionnaire contained variables to assess the knowledge and predisposing factors to obstetric fistula. The final part of the

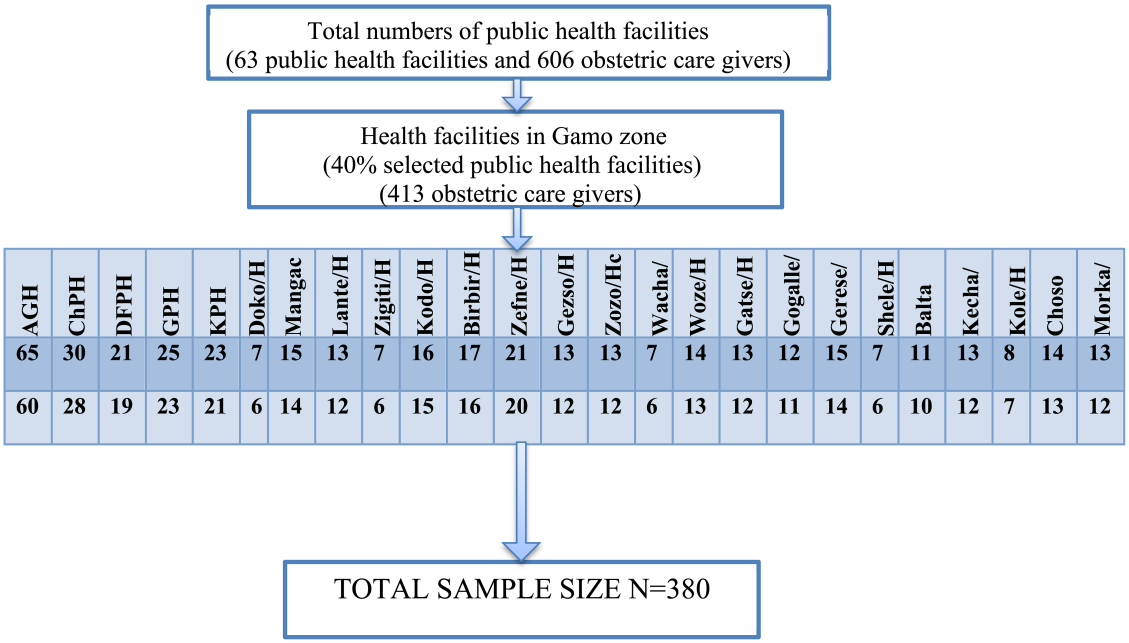


FIGURE 1
A schematic illustration of sample allocation in selected public health facilities of the Gamo zone, southwest Ethiopia, 2023.

checklist concerned the practice of the participants. In data collection and supervision, four clinical midwifery masters and two public health masters participated, respectively. Re-visit and call-back arrangements were made in situations where there was a high workload during data collection.

2.8. Data quality assurance

To assure the quality of the data, a pre-test was carried out on a sample of 38 obstetric caregivers (10% of the sample size) in the Wolaita Sodo Otona referral hospital. The internal consistency of the tool was assessed by the reliability test (Cronbach's alpha). The values of Cronbach's alpha were 0.906 and 0.919 for knowledge and practice questions, respectively.

The training was given for 2 days for data collectors and supervisors on the objective and issues of confidentiality and privacy. Supervisors oversaw the data collection process daily. At the end of every data collection day, each questionnaire was examined for completeness and consistency by the supervisors and the principal investigator, and pertinent feedback was given to the data collectors and supervisors.

2.9. Data processing and analysis

The collected data were coded and entered into Epi-Data version 4.6 software and exported to SPSS statistical software version 27 for data cleaning and further analysis. Errors related to the inconsistency of data were checked and corrected during data cleaning. The test of Normality was checked to select the appropriate statistical summary measure. Descriptive statistical analyses such as simple frequencies, percentages, mean, and standard deviation were used to describe the characteristics of participants. For further analysis, the association between an outcome variable and each independent variable was seen separately in a binary logistic regression model. Variables with a *p*-value of less than 0.25 in Bivariable analyses were retrieved and entered for multivariable logistic regression analyses. Multi-colinearity was checked to see the linear correlation among the independent variables by correlation coefficient and variance inflation factors. The degree of association between an outcome variable and independent variables was determined using an adjusted odds ratio along with 95% CI and *p*-value. The level of statistical significance was declared at a *p*-value less than 0.05. The fitness of the model was tested by Hosmer–Lemeshow's goodness-of-fit test model; the values were 0.89 and 0.95 for knowledge and practice, respectively. Finally, the result was presented by text, table, and graph.

2.10. Operational definitions

Good Knowledge: there were 11 questions and their responses to assess knowledge of obstetrical fistula; the average number of knowledge questions that respondents answered correctly was calculated, and those who scored the mean or above were considered knowledgeable (22).

Poor knowledge: there were 11 questions and their responses to assess knowledge of obstetrical fistula; the average number of

knowledge questions that respondents answered correctly were calculated, and those who scored the below mean were considered as having poor knowledge (22).

Good Practice: the average number of practice items that participants practiced correctly were calculated, and those who scored 100% were considered to show good practice.

Poor Practice: the average number of practice items that the participants practiced correctly were calculated, and those who scored below 100% were considered to show poor practice.

In-service training: a regular process to refresh and update the skills, competence, and knowledge of health care providers in key areas like BEmoNC and partograph at least once, which is basic obstetrics fistula prevention (22).

Pre-service training: this indicates the site where they trained as health care providers in terms of private or governmental institutions (22).

3. Results

3.1. Socio-demographic characteristics of the study participants

In this study, 372 obstetric caregivers volunteered to give information making a response rate of 97.9%. The mean age of the respondents was 29 years [SD ± 3]. Regarding marital status, 166 (44.6%) of the study participants were married, and 148 (39.8%) of respondents were single. Among the total respondents, 59.9% were protestant religious followers (Table 1).

TABLE 1 Socio-demographic characteristics of the obstetric care providers in selected public health facilities of the Gamo zone, southwest Ethiopia 2023 (*n* = 372).

Socio-demographic characteristics	Frequency	Percent (%)
Age in years categories		
<25	52	14
26–34	266	71.5
>35	54	14.5
Sex		
Male	113	30.4
Female	259	69.6
Marital status		
Single	148	39.8
Married	166	44.6
Widowed	58	15.6
Religion		
Protestant	223	59.9
Orthodox	104	28
Muslim	45	12.1

3.2. Occupational-related characteristics

In this study, about two-thirds of the 273 (73.4%) obstetric caregivers were midwives. Regarding the level of profession (cadre), 197 (53%) respondents had a Bachelor of Science degree. Among all obstetric caregivers, 111 (29.8%) were working in a private clinic. Concerning the year of service, 125 (33.6%) of respondents had fewer than 3 years of experience (Table 2).

TABLE 2 Occupational-related characteristics of the obstetric caregivers in selected public health facilities of the Gamo zone, southwest Ethiopia 2023 (*n* = 372).

Occupational-related characteristics	Frequency	Percent (%)
Professional qualification		
General practitioner	50	13.4
Midwifery	273	73.4
Nurse	49	13.2
Level of profession		
Diploma	175	47
Degree	197	53
Service year		
<3	125	33.6
3–6	104	28
6–10	92	24.7
>11	51	13.7
Working part-time		
Yes	111	29.8
No	261	70.2

3.3. Training and health facility-related characteristics

In terms of the training-related characteristics of respondents, almost three-fourths were trained as a Health Care Provider (HCP) in government universities and colleges. A total of 176 respondents experienced in-service training regarding BEmoNC and partograph. Among all obstetric caregivers, 151 (40.6%) respondents were working in public hospitals (Table 3).

TABLE 3 Training and health facility-related characteristics of the obstetric caregivers in selected public health facilities of the Gamo zone, southwest Ethiopia 2023 (*n* = 372).

Training and health facility-related factors	Frequency	Percent
Pre-service training		
Government	265	71.2
Private	107	28.8
In-service training		
Yes	176	47.3
No	196	52.7
Health facility		
Hospital	151	40.6
Health center	221	59.4

3.4. Knowledge of obstetric caregivers on prevention of obstetric fistula

In terms of the knowledge about obstetric fistula prevention, 212 (57%) participants had good knowledge about obstetric fistula prevention. Several of the respondents, 160 (43%), knew the use of partograph during labor. About 269 (72.3) respondents knew the duration of normal labor (Table 4).

TABLE 4 Knowledge of obstetric caregivers towards prevention of obstetric fistula in ($n = 372$) selected public health facilities of the Gamo zone, southwest Ethiopia 2023.

Items to assess knowledge	Responses	Frequency	Percent
Duration of normal labor	More than 24 h	269	72.3
	Less than 24 h	103	27.7
Use of partograph prevents OF	Yes	160	43
	No	212	57
Early identification of obstructed labor prevents OF	Yes	159	42.7
	No	213	57.3
Younger age is a factor	Yes	258	69.4
	No	114	30.6
Early marriage is a factor	Yes	260	69.9
	No	112	30.1
Childhood malnutrition is a factor	Yes	266	71.3
	No	106	28.5
Rehydration is useful to prevent OF	Yes	266	28.5
	No	106	71.5
The use of family planning prevents the occurrence of obstetric fistula	Yes	256	68.8
	No	116	31.2
Access to maternity services prevents OF	Yes	145	61
	No	227	39
Obstetric caregivers have a role to prevent	Yes	141	37.9
	No	231	32.1
Adequate coverage of topic during pre-service training	Yes	148	39.8
	No	224	60.2

3.5. Practice of obstetric caregivers on prevention of obstetric fistula

In terms of the practice of obstetric fistula prevention, 206 (55.4%) participants showed good practice of obstetric fistula prevention.

3.6. Factors associated with knowledge of obstetric caregivers

The model fitness test was checked using Hosmer–Lemeshow goodness-of-fit with a *P*-value of 0.89. In this study, seven variables were a candidate for multivariable analysis. Four variables, age, types of health facility, in-service training, and service year, were significantly associated with obstetric caregivers having knowledge of obstetric fistula prevention.

The odds of having good knowledge among participants who are working at hospitals were 2 times [AOR: 1.99; 95% CI 1.01–3.92)] higher compared to those who are working in public health centers. The other significant variable was in-service training regarding the partograph and BEmONc. The odds of having good knowledge among respondents who have in-service training were 4.6 times [AOR: 4.61; 95% CI 2.35–9.05] higher than for those who have no in-service training. Similarly, the odds of having good knowledge among participants who have >11 years of experience were 2.5 times [AOR: 2.50, 95% CI 1.12–6.73] higher than for those who have <3 years of experience (**Table 5**).

3.7. Factors associated with the practice of obstetric caregivers

The model fitness test was checked using Hosmer–Lemeshow goodness-of-fit with a *P*-value of 0.95. In this study, 9 variables were a candidate for multivariable analysis. In-service training, service year, age, and knowledge were significantly associated with obstetric caregivers having practice with obstetric fistula prevention. The odds of showing good practice among participants who have in-service training were 15 times [AOR: 14.86; 95% CI (12.75–18.73)] higher than for those who have no in-service training, and the odds of showing good practice among participants who have good knowledge were 13 times [AOR = 13.24; 95% CI (6.18–14.34)] higher than for those who have poor knowledge. Similarly, the odds of showing good practice among participants who have >11 years of experience were 3.6 times [AOR = 3.58; 95% CI (1.24–10.29)] higher than for those who have <3 years of experience (**Table 6**).

4. Discussion

The overall knowledge level of obstetric care providers in this study was 57% [95% CI (53.00–62.00)]. This study shows higher knowledge levels than the studies conducted in Addis Ababa, Ethiopia (22), Eastern Nepal (24), Ibadan Nigeria (25), and Nigeria Calabar Teaching Hospital (26), which were 67.7%, 35%, 38.1%, and 13.5%, respectively. The discrepancy of this study from the Addis Ababa, Ethiopia, study might be due to the former study being conducted in a town where more experienced staff and advanced infrastructure existed. Furthermore, the differences from the Nepal and Nigeria studies might be attributed to differences in the study areas, which might be explained by differing strategies in and commitments to implementing the health policy at the various levels throughout the countries, and the infrastructure, health setup, and obstetric care providers for the prevention of obstetric fistula is varied.

The knowledge of obstetric caregivers in this study is lower than in the study conducted in Ghana, which was 86.7% (27). The discrepancy could be due to the difference in the study setting and study participants; the preceding studies were conducted among midwives only whereas this study was conducted among obstetric caregivers including other professions. Additionally, the previous study was conducted in an area with a fistula center, and awareness of obstetric fistula could therefore be higher in this population.

The overall practice of obstetric care providers in this study was 55.4% [95% CI (50.00–60.00)]. The value in this study is lower than that of the research conducted in Addis Ababa, Ethiopia, which was 66.2% (22). This might be due to the difference in the study setting and differences in methods by which practice was assessed. In the previous study, the practice was assessed by using self-administered questionnaires, whereas ours is through study.

Service year was one of the factors associated with knowledge of obstetric caregivers. Obstetric caregivers who have >11 years of

TABLE 5 Bivariable and multivariable logistic regression analysis of the knowledge of obstetric caregivers on prevention of obstetric fistula in public health facilities of the Gamo zone, southwest Ethiopia 2023 ($n = 372$).

Variables	Knowledge		Crude odds ratio (95% CI)	Adjusted odds ratio 95% CI)	*P*-Value
	Good	Poor			
Age					
<25	15 (7.1%)	37 (23.1%)	1	1	
26–34	167 (78.8%)	99 (61.9%)	4.16 (2.17–7.96)	**2.38 (1.03–5.49)**	**0.04***
>34	30 (14.2%)	24 (15%)	3.08 (1.37–6.89)	1.91 (1.32–4.99)	0.87
Marital status					
Single	110 (51.9%)	38 (23.8%)	1	1	
Married	78 (36.8%)	88 (55%)	0.30 (0.19–0.49)	0.54 (0.27–0.82)	0.08
Divorced	24 (11.3%)	34 (21.3%)	0.24 (0.15–0.46)	0.57 (0.23–0.98)	0.2
Health facility					
Hospital	108 (50.9%)	43 (26.9%)	2.83 (1.82–4.39)	**1.99 (1.01–3.92)**	**0.047***
Health center	104 (49.1%)	117 (73.1%)	1	1	
Professional qualification					
General practitioner	39 (18.4%)	11 (6.9%)	3.69 (1.54–8.83)	1.39 (1.11–8.84)	0.14
Midwifery	149 (70.3%)	124 (77.5%)	1.25 (1.08–2.30)	1.05 (1.03–6.90)	0.1
Nurse	24 (11.3%)	25 (15.6%)	1	1	0.1
Working part-time					
Yes	52 (24.5%)	59 (36.9%)	0.55 (0.35–0.81)	0.86 (0.44–0.96)	0.65
No	160 (75.5%)	101 (63.1%)	1	1	
In-service training					
Yes	150 (70.8%)	26 (16.3%)	12.46 (7.00–20.00)	**4.61 (2.35–9.05)**	**<0.001***
No	62 (29.2%)	134 (83.8%)	1	1	
Service year					
<3	60 (28.3%)	65 (40.6%)	1	1	
3–6	68 (32.1%)	36 (22.1%)	2.04 (1.19–3.49)	1.54 (1.24–8.94)	0.1
6–10	45 (21.2%)	47 (29.4%)	1.03 (1.01–5.99)	1.02 (1.01–3.77)	0.8
>11	39 (18.4%)	12 (7.5%)	3.52 (1.68–7.35)	**2.50 (1.12–6.73)**	**<0.001***

*Bolded means variables with *p*-values <0.05.

experience were 2.5 times more likely to have good knowledge compared to those who have <3 years of experience This is supported by the study conducted in Ibadan, Nigeria (25). This might be due to experienced healthcare providers exposing themselves to different daily cases, updating themselves via training, which they may do more than their juniors, as well as acquiring knowledge through informal (from their colleagues and seniors) and formal learning (updating their rank of education) throughout their years of service.

Participants who are working at hospitals were two times more likely to have good knowledge compared to those who are working in health centers. This is supported by the study conducted in Ibadan, Nigeria (25). The possible reason for this could be that obstetric caregivers in hospitals have more training than in health centers, and they communicate with their seniors on the different cases they have faced. Furthermore, hospital staff have experience because they are challenged daily by the referral cases.

Another significant factor in this study was in-service training regarding the partograph and BEmONc. Respondents who have in-service training were 4.6 times more likely to have good knowledge compared to their counterparts. This is supported by the study conducted in Addis Ababa, Ethiopia and a study conducted in Ibadan, Nigeria (22, 25). This might be because individuals who have on-job training had an opportunity to update their knowledge.

Knowledge about obstetric fistula prevention was significantly higher among obstetric care givers within the age group 26–34 years compared to those younger than 25 years. It might be because as the age of an individual increases, the probability of acquiring comprehensive knowledge of obstetric fistula prevention should also increase. This could be related to experience or in-service training on obstetric fistula prevention having a positive relationship with knowledge of obstetric fistula prevention.

This study also revealed that participants who have in-service training were 15 times more likely to display good practice compared to those who have no in-service training. This is supported by the study conducted in Addis Ababa, Ethiopia (22). This finding points to the need for obstetric caregivers to receive periodic on-job refresher training on obstetric fistula prevention.

The odds of good practice among participants who have good knowledge were 13 times higher compared to their counterparts. This is supported by the study conducted in Addis Ababa, Ethiopia (22). The observed finding is expected because the higher the level of a person's awareness the better chance they have of implementing their knowledge.

The odds of good practice among participants who have >11 years of experience were 3.6 times higher compared to those who have <3 years of experience. This is supported by the study conducted in Addis Ababa, Ethiopia (22). This might be due to the fact that the experienced health care providers can improve their status of practice through informal and formal learning, and the longer they stay in their profession the more chances they have of getting in-service training, which contributes to developing their skills.

TABLE 6 Bivariable and multivariable logistic regression analysis of the practice of obstetric caregivers of prevention of obstetric fistula in public health facilities of the Gamo zone, southwest Ethiopia 2023 ($n = 372$).

Variables	Knowledge		Crude odds ratio (95% CI)	Adjusted odds ratio 95% CI)	*P*-Value
	Good	Poor			
Age					
<25	5 (2.4%)	47 (28.3%)	1	1	
26–34	176 (85.4%)	90 (54.2%)	18.38 (7.06–27.83)	12.59 (9.09–18.71)	0.13
>34	25 (12%)	29 (17.5%)	8.10 (2.79–13.52)	**2.76 (2.00–10.6)**	**<0.001***
Marital status					
Single	103 (50%)	45 (27.1%)	1	1	
Married	74 (36.8%)	92 (55.4%)	0.35 (0.22–0.56)	0.23 (0.18–0.87)	0.2
Divorced	29 (14.1%)	29 (17.3%)	0.44 (0.23–0.81)	0.34 (0.26–0.99)	0.8
Level of profession					
Diploma	50 (24.3%)	125 (75.3%)	1	1	
Degree	156 (75.7%)	41 (24.7%)	9.51 (5.91–15.30)	1.84 (1.06–4.13)	0.13
Health facility					
Hospital	112 (54.4%)	39 (23.5%)	3.88 (2.47–6.09)	1.87 (1.04–4.06)	0.1
Health center	94 (45.6%)	127 (76.5%)	1	1	
Professional qualification					
GP	39 (18.9%)	11 (6.6%)	4.00 (1.67–9.59)	2.80 (1.23–4.09)	0.9
Midwifery	144 (69.9%)	129 (77.7%)	1.26 (1.08–2.32)	1.08 (1.02–9.95)	0.6
Nurse	23 (11.2%)	26 (15.7%)	1	1	
Working part-time					
Yes	45 (21.8%)	66 (39.8%)	1	1	
No	161 (78.2%)	100 (60.2%)	0.42 (0.26–0.66)	0.24 (0.14–0.95)	0.8
In-service training					
Yes	159 (77.2%)	17 (10.2%)	29.65 (16.30–35.92)	**14.86 (12.75–18.73)**	**<0.001***
No	47 (22.8%)	149 (89.8%)	1	1	
Service year					
<3	39 (18.9%)	86 (51.8%)	1	1	
3–6	73 (35.4%)	31 (18.7%)	5.19 (2.45–9.14)	3.02 (2.20–13.84)	0.46
6–10	56 (27.2%)	36 (21.7%)	3.43 (1.95–6.03)	2.42 (2.00–14.33)	0.49
>11	38 (18.4%)	13 (7.8%)	6.44 (3.09–13.43)	**3.58 (1.24–10.29)**	**0.018***
Knowledge					
Good	174 (84.5%)	38 (22.9%)	18.31 (10.86–23.89)	**13.24 (6.18–14.34)**	**<0.001***
Poor	32 (15.5%)	128 (77.1%)	1	1	

*Bolded means variables with *p*-values <0.05.

The odds of good practice among obstetric care givers within the age group of those >34 years old were 2.76 times higher compared to those who are in the age group of <25. This could be related to the fact that, as the age of an individual increases, they might become experienced and become the only one to be consulted by their junior obstetric caregivers, and thus it might enable them to update their knowledge and skills.

4.1. Strength and limitations

Unlike the previous study conducted in Ethiopia, where the method of data collection to assess practice to prevent obstetric fistula was a self-filled checklist, this study used multiple observations to assess the practice and helps to minimize observational bias. However, there was scarcity of similar studies despite the efforts made, and the study was exposed to the Hawthorne effect, which occurs when a participant's behavior changes as a result of being observed, varying from their actual practices. To overcome this challenge as much as possible, experienced data collectors and supervisors were used.

5. Conclusions and recommendations

The knowledge and practice of obstetric caregivers on the prevention of obstetric fistula is low in the public health facilities of the Gamo Zone. In this study, service year, practicing at a hospital, advanced age, and having in-service training were factors significantly associated with knowledge of obstetric caregivers. On the other hand, having in-service training, advanced service year, advanced age, and having good knowledge were factors significantly associated with the practice of health care providers.

Obstetric caregivers with little professional experience would receive more attention through the provision of in-service training related to obstetric fistula prevention to increase their level of knowledge and practice towards obstetric fistula during their year of practice and they would also emphasize the proficient composition of staff among those who are working in

health centers. Non-Government Organizations and professional associations would support and contribute to updating the knowledge and practice of obstetric caregivers through the provision of in-service training on the topics that contribute to the prevention of obstetric fistula. In addition, the Gamo zonal health office and other concerned bodies bring attention to the need to enhance prevention of obstetric fistula by providing a chance for training, resource allocation, and collaboration with different stakeholders. Furthermore, we would like to recommend that upcoming researchers should incorporate intra-operation and post-operation obstetric fistula prevention studies for more generalizable information.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical clearance was obtained from the "Institutional Research Ethics Review Board (IRB) of the College of Medicine and Health Sciences, Arba Minch University, with reference number IRB/1173/2023". A letter of permission was obtained from the Arba Minch town Health Department. All the methods were performed following the principles of the Helsinki Declaration. A further permission letter was obtained from a respective districts health department and institutions. Respondents were approached with respect, and they were asked for their consent. All the possible efforts were made during and after the data collection to ensure the respondent's privacy. The study's anonymous coding was applied to ensure confidentiality, and the names of the participants were not written on the survey questionnaire. Moreover, respondents were ensured that their participation in the study is voluntary and that they were free to interrupt or discontinue the interview at any time. Written informed consent was obtained from all the study participants after they were informed of the purpose, scope, and nature of the topic before data collection.

Author contributions

All the authors have contributed equally to the proposal development, development of the tool, data collection process, and analysis. MTA, SSA, EYU, TSH: conceptualization, data curation, formal analysis, investigation, methodology, validation, visualization, writing – review and editing. MTA: funding acquisition, project administration, resources, software, writing – original draft. All authors contributed to the article and approved the submitted version.

Funding

The author(s) declare financial support was received for the research, authorship, and/or publication of this article.

The research was funded by Arba Minch University College of Medicine and Health Sciences for data collections and stationary materials. The organization had no role in the study design, data collection, and analysis. In addition, the organization had no role in decision to publish and prepare the manuscript. The authors were not funded for this research process by this organization.

Acknowledgments

First, our deepest gratitude is for our study participants for their time and information. In addition, our data collectors and supervisors have our greatest thanks. Our heartfelt thanks also go to Arba Minch University for providing us with an ethical clearance letter. Finally, we would like to thank the Gamo zone health bureau for their support with the necessary information and letter.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

1. De Bernis L. Obstetric fistula: guiding principles for clinical management and programme development, a new WHO guideline. *Int J Gynecol Obstet*. (2007) 99 (SUPPL. 1):117–21.

2. Bashah DT, Worku AG, Mengistu MY. Consequences of obstetric fistula in sub Sahara African countries, from patients 'perspective: a systematic review of qualitative studies. *BMC Women Health*. (2018) 18:1–12.

3. Donnay F, Weil L. Obstetric fistula: the international response. *Lancet*. (2004) 363:71–2.

4. Kasamba N, Kaye DK, Mbalinda SN. Community awareness about risk factors, presentation and prevention and obstetric fistula in Nabitovu village, Iganga district, Uganda. *BMC Pregnancy Childbirth*. (2013) 13:229. doi: 10.1186/1471-2393-13-229

5. CSA and ICF. *Ethiopia demographic health survey*. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF (2016).

6. Ahmed S, Tunçalp Ö. Burden of obstetric fistula : from measurement to action. *Lancet Glob Heal.* (2013) 3(5):e243–4. doi: 10.1016/S2214-109X(15)70105-1

7. Biadgilign S, Lakew Y, Reda AA, Deribe K. A population based survey in Ethiopia using questionnaire as proxy to estimate obstetric fistula prevalence: results from demographic and health survey. *Reprod Health*. (2013) 10(1):1. doi: 10.1186/1742-4755-10-14

8. Gedefaw G, Getie AWA, Bimerew M, Demis A. Estimating the prevalence and risk factors of obstetric fistula in Ethiopia: results from demographic and health survey. *Int J Womens Health*. (2021) 13:683–90. doi: 10.2147/IJWH.S306221

9. Muleta M, Rasmussen S, Kiserud T. Obstetric fistula in 14,928 Ethiopian women. *Acta Obstet Gynecol Scand*. (2010) 89(7):945–51. doi: 10.3109/00016341003801698

10. Zeleke BM, Ayele TA, Woldetsadik MA, Bisetegn TA, Adane AA. Depression among women with obstetric fistula, and pelvic organ prolapse in northwest Ethiopia. *BMC Psychiatry*. (2013) 13:236. doi: 10.1186/1471-244X-13-236

11. Ayenew AA. Incidence, causes, and maternofetal outcomes of obstructed labor in Ethiopia: systematic review and meta-analysis. *Reprod Health*. (2021) 18(1):1–14. doi: 10.1186/s12978-021-01103-0

12. Dolea C, Abouzahr C. Global burden of obstructed labour in the year 2000. *WHO*. (2003) 13:1–17.

13. Dswanson. Module_6_Obstetric_fistula_causes_and_factors_Fistula_Care. Available from: https://www.fistulacare.org/wp-fcp/wp-content/uploads/pdf/Training/Module_6_Obstetric_fistula_causes_and_factors_Fistula_Care.pdf

14. Ahmed S, Holtz SA. Social and economic consequences of obstetric fistula: life changed forever? *Int J Gynecol Obstet*. (2007) 99(SUPPL. 1):10–5.

15. Adler AJ, Fox S, Campbell OMR, Kuper H. Obstetric fistula in southern Sudan: situational analysis and key informant method to estimate prevalence. *BMC Pregnancy Childbirth*. (2013) 13:64. doi: 10.1186/1471-2393-13-64

16. Abebe F, Birhanu D, Awoke W, Ejigu T. Assessment of knowledge and utilization of the partograph among health professionals in Amhara region, Ethiopia. *BMC Pregnancy Childbirth*. (2015) 15(1):193. 2015;1(2):26–41. doi: 10.1186/s12884-015-0592-2

17. Banke-Thomas AO, Wilton-Waddell OE, Kouraogo SF, Mueller E. Current evidence supporting obstetric fistula prevention strategies in sub Saharan Africa: a systematic review of the literature. *Afr J Reprod Health*. (2014) 18(3):118–27.

18. Wright J, Ayenachew F, Ballard KD. The changing face of obstetric fistula surgery in Ethiopia. *Int J Womens Health*. (2016) 8:243–8. doi: 10.2147/IJWH.S106645

19. Donnay F, Ramsey K. Eliminating obstetric fistula: progress in partnerships. *Int J Gynecol Obstet*. (2006) 94(3):254–61. doi: 10.1016/j.ijgo.2006.04.005

20. Bello OO, Lawal OO. Healthcare workers knowledge and attitude towards prevention of obstetric Fistula. *Int J Res Reports Gynaecol*. (2018) 1(1):1–9.

21. Gamo Zone Health Bureau, Ethiopia, Jan, 2020

22. Legese M. Knowledge and practice of skilled birth attendantes on prevention of obstetric fistula in Addis Abeba Ethiopia. *Google Sch*. (2016) 122:15–9.

23. East T, African S, Community H, Care F. A Curriculum for Nurses and Midwives 2012, East, Central, and Southern African Health Community (ECSA-HC) and Engender Health/Fistula Care.

24. Heera KC, Pokharel N, Shrestha M, Rai G, Parajuli SB. Knowledge on genitourinary Fistula among nurses in a tertiary hospital of eastern Nepal. *J Coll Med Sci*. (2019) 15(2):132–8.

25. Bello OO, Morhason-Bello IO, Lawal OO, Abdussalam RA, Ojengbede OA. Knowledge of front-line health workers on the role of urethral catheterization for primary prevention of obstetric fistula in Ibadan, Nigeria. *Transl Androl Urol*. (2019) 8(4):379–86. doi: 10.21037/tau.2019.03.11

26. Agan T, Akpan U, Okokon I, Oku A, Asibong U, Opiah M, et al. Assessment of the knowledge and utilization of the partograph among non-physician obstetric caregivers in the university of Calabar teaching hospital, Calabar, Nigeria. *Br J Med Med Res*. (2014) 4(36):5741–55. doi: 10.9734/BJMMR/2014/10853

27. Azanu WK, Dassah ET, Agbeno EK, Ofori AA, Opare-Addo HS. Knowledge of obstetric fistula among prenatal clinic attendees and midwives in Mfantsiman municipality, Ghana. *Int J Gynecol Obstet*. (2020) 148(S1):16–21. doi: 10.1002/ijgo.13034

frontiers | Frontiers in Global Women's Health

TYPE Original Research
PUBLISHED 30 November 2023
DOI 10.3389/fgwh.2023.1237098

OPEN ACCESS

EDITED BY
Lorena Binfa,
University of Chile, Chile

REVIEWED BY
Anne Karin Lindahl,
University of Oslo, Norway
Reena Sethi,
Independent Researcher, Columbia, MD,
United States

*CORRESPONDENCE
Ahmedin Aliyi Usso
ahmedinfozan@gmail.com

RECEIVED 06 July 2023
ACCEPTED 31 October 2023
PUBLISHED 30 November 2023

CITATION
Usso AA, Adem HA, Alemu A and Mohammed A (2023) Disrespect and abuse during childbirth in East Hararghe Zone public health facilities, eastern Ethiopia: a cross-sectional study. Front. Glob. Womens Health 4:1237098. doi: 10.3389/fgwh.2023.1237098

Disrespect and abuse during childbirth in East Hararghe Zone public health facilities, eastern Ethiopia: a cross-sectional study

Ahmedin Aliyi Usso[1]*, Hassen Abdi Adem[2], Addisu Alemu[2] and Aminu Mohammed[3]

[1]School of Nursing and Midwifery, College of Health and Medical Sciences, Haramaya University, Harar, Ethiopia, [2]School of Public Health, College of Health and Medical Sciences, Haramaya University, Harar, Ethiopia, [3]Department of Midwifery, College of Medicine and Health Sciences, Dire Dawa University, Dire Dawa, Ethiopia

Background: Compassionate and respectful maternity care during childbirth has been identified as a potential strategy to prevent and reduce maternal mortality and morbidity. Despite its importance, there is a paucity of information on the level of disrespect and abuse meted out to mothers in eastern Ethiopia. This study assesses the level of disrespect and abuse suffered by women during childbirth, and the associated factors, in public health facilities in the rural East Hararghe Zone in eastern Ethiopia.

Methods: A cross-sectional study was conducted among 530 women who gave birth in 20 public health facilities in the East Hararghe Zone during the period between 1 April and 30 April 2020. Data were collected using a validated questionnaire. Bivariable and multivariable binary logistic regression analyses were employed to identify the factors associated with disrespect and abuse during childbirth. Adjusted odds ratio (AOR) (95% CI) was used to report this association, and statistical significance was set at $P < 0.05$.

Results: Overall, 77% (95% CI: 73%–81%) of women reported at least one type of disrespect and abuse during childbirth in the East Hararghe Zone public health facilities. In this study, factors such as households having an average monthly income of below 57.22 USD (AOR = 2.29, 95% CI: 1.41–3.71), mothers residing at more than 30 min away from a nearby health facility (AOR = 2.10, 95% CI: 1.30–3.39), those not receiving antenatal care (AOR = 4.29, 95% CI: 2.17–8.52), and those giving birth during nighttime (AOR = 2.16, 95% CI: 1.37–3.41) were associated with at least one type of disrespect and abuse during childbirth.

Conclusion: More than three in every four women who gave birth in the East Hararghe Zone public health facilities were disrespected and abused during childbirth. Encouraging all pregnant women to pay attention to antenatal care visits and improving the quality of healthcare service during nighttime in all health facilities will be essential for preventing and reducing disrespect and abuse and its negative consequences.

KEYWORDS

disrespect and abuse, respectful maternity care, childbirth, health facilities, Ethiopia

Introduction

Respectful maternity care is a basic human right for every woman and should be provided in every health facility to any woman in a way that protects her dignity, privacy, and confidentiality and safeguards her from harm and mistreatment while ensuring informed choice and continuity of healthcare (1, 2). It is, in fact, an element of the

quality of maternity care (3). Disrespect and abuse constitute any form of inhumane behavior applied in the care of women during childbirth. It is a violation of women's human rights and an aspect of poor quality of care, which negatively influences the coverage of institutional birth (1, 4) and indirectly increases the risks of maternal and neonatal mortality worldwide, particularly in sub-Saharan African (SSA) countries.

The proportion of births attended by skilled professionals increased in higher-income countries in the last decade; yet, the coverage of skilled birth attendance remained low in low- and middle-income countries (LMIC) (5, 6). For instance, in 2018, the proportion of skilled birth attendance was 81% globally, almost 100% in higher-income countries, 82% in Southeast Asia, 60% in SSA (6), and 48% in Ethiopia (7). Providing poor quality service and mistreatment by providers in health facilities may contribute to a low coverage of skilled birth attendance (8, 9).

Maternal mortality is a major public health problem in developing countries, particularly in SSA (10). Ensuring skilled birth attendance during childbirth is the basic strategy for preventing and reducing maternal mortality in these countries (11–13). According to data provided in 2020, an estimated 287,000 maternal deaths occurred worldwide every year because of birth-related complications; 95% of these deaths occurred in LMIC, and more than 70% of these deaths occurred at a ratio of 545 maternal deaths per 100,000 live births in SSA; 267 maternal deaths per 100,000 live births occurred in Ethiopia in 2020 (14). These higher rates of maternal mortality were associated with a low rate of skilled birth attendance in these countries (6, 10).

The Ethiopian government's health-sector transformation based on the Sustainable Development Goals (SDGs) plans to reduce the maternal mortality rate to 70 per 100,000 by 2030 (15, 16), which can be achieved only by improving the quality of maternal healthcare services by ensuring that respectful maternity care service is provided to all women at every level of contact with health facilities (17). Improving respectful maternity care has already been identified as a potential strategy to prevent and reduce maternal mortality, which can be achieved only by improving the coverage of skilled birth attendance (3, 18).

The burden of disrespect and abuse was noted to be higher in developing countries (9), being much higher in SSA, including Ethiopia, ranging from 20% to 98% in SSA (9, 19–21) and 40%–92.5% in Ethiopia (22–24).

Sociodemographic factors such as the age of women, their area of residence, marital status, educational status, wealth status, and their HIV seropositive status are those that influence the level of disrespect and abuse caused to mothers during childbirth in health facilities (22, 25, 26).

Despite the extent and magnitude of the problem, little is known about the level of disrespect and abuse suffered by women during childbirth in health facilities in Ethiopia. A few previous studies were conducted among women from only their urban residences (22, 24) and hospitals (23, 27), which cannot sufficiently address the main problem of disrespect and abuse in a public health facility. Overall, there is limited information on disrespect and abuse during childbirth in rural eastern Ethiopia. Therefore, this study assesses the level of disrespect and abuse meted out to women during childbirth in a specific setting, that is, in public health facilities in the East Hararghe Zone of eastern Ethiopia.

Methods and materials

Study design and setting

This is an institution-based cross-sectional study conducted among 530 women who gave birth in randomly selected public health facilities in the East Hararghe Zone during the period between 1 April 2020 and 30 April 2020. East Hararghe Zone is one of the 24 zones of the Oromia region located in eastern Ethiopia. Administratively, the East Hararghe Zone separates into 25 districts and four towns and has an estimated total population of 3,821,021, with 845,592 women in the reproductive age group and 132,590 pregnant women, as reported in the year 2019. According to the zonal health office annual report 2019, there are five hospitals and 120 health centers. However, there were 85 accessible public health facilities (five hospitals and 80 health centers) in the zone during the study period. Twenty public health facilities (two hospitals and 18 health centers) were selected using a simple random sampling method.

Study participants

All women who give birth in all public health facilities in the East Hararghe Zone comprised the source population. Women who gave birth in randomly selected public health facilities in the zone during the study period constituted the study population. Women who gave birth in randomly selected public health facilities during the data collection period and who were 18 years old and above were included in the study. Women who were critically ill and unable to respond to interviews, who gave birth through cesarean section, and who were referred to other health facilities were excluded from the study.

Sample size determination and sampling procedures

The sample size was calculated by using Epi Info version 7.1 considering the assumptions for single (prevalence of disrespect and abuse) and double (predictor factors of disrespect and abuse) population proportion formulas. Accordingly, the maximum sample size ($n = 542$) was obtained from a single population proportion formula, considering a 78.6% proportion of mothers who suffered disrespect and abuse, with the following assumptions: a confidence level of 95%, a margin of error of 5%, and a proportion of women who experienced disrespect and abuse (78.6%) in Addis Ababa, Ethiopia (22), using a design effect of 2 and a 5% non-response rate. Study participants were selected using a multistage stratified sampling technique. We stratified facilities as hospitals and health centers, and two hospitals out of five and 18 health centers out of 80 were selected using a simple

random sampling technique. Then, the estimated sample size was proportionally allocated to each facility (based on the average birth attendance flow in the previous 3 months). Eligible women were selected consecutively from each selected health facility. After obtaining written informed consent from them, an exit interview was conducted during the time of discharge.

Data collection tool and measurement

Data were collected using a pretested structured questionnaire adapted from validated scales and relevant published literature (9, 22, 23, 28–30). We pretested the adapted questionnaire on 5% of the total sample (27 women) to check its validity in a separate non-selected public health facility (Ugas Health Center) in the East Hararghe Zone, and changes were made accordingly before the actual data collection process. The questionnaire consisted of sociodemographic characteristics, reproductive health conditions, healthcare-related factors, and disrespect and abuse during childbirth. Disrespect and abuse were measured using a framework developed by Bowser and Hill (29) and categorized into seven domains (physical abuse, non-confidential care, non-informed consent care, non-dignified care, abandonment of care, discrimination, and detention). Each category had more than one verification criteria with dichotomized (yes/no) responses, and a total of 24 verification criteria were used to measure these seven categories. The women were considered to have been disrespected and abused if they reported "Yes" to at least one verification criterion of these categories (22, 28).

Data quality control

The quality of the data was maintained using standard questionnaires adapted from validated scales and relevant published literature. The questionnaire, first prepared in English, was translated into the local language (Afan Oromo) and back to English by two experts having a good command of both languages. Twelve diploma nurses who were not employees of the selected health facilities were trained to collect the data under the supervision of five supervisors after receiving training for one day on the objectives of the study and the data collection technique to be employed.

Data processing and analysis

After checking for completeness, the data were entered into EpiData version 3.1 and analyzed using SPSS version 24. Descriptive statistics such as the frequency and measure of central tendency were used to characterize the study participants. Before conducting the analysis, the internal consistency of the items was checked for the presence of composite index variables using reliability analysis (Cronbach $\alpha = 0.92$). Bivariable and multivariable logistic regression analyses were conducted to identify the factors associated with disrespect and abuse during childbirth. Multivariable binary logistic regression analyses were fitted to determine significant risk factors, and the Hosmer and Lemeshow goodness of fit test at a p-value > 0.05 was used to confirm the overall adequacy of the model. Adjusted odds ratio (AOR) with its 95% confidence interval (CI) was used to report the strength of association and the statistical significance declared at a p-value < 0.05.

Results

Sociodemographic characteristics

A total of 542 eligible women who gave birth in selected public health facilities were invited to participate in the study, and 530 of them enrolled in the study with a 97.8% response rate. The mean age of the participants was 26.1 (±5.4) years. The majority, 402 (75.8%) of the respondents, were from rural residences, and almost all (97.5%) women were married. With regard to occupational status, most (88.3%) of the participants were housewives, followed by 32 (6.0%) government employees and 16 (3.0%) merchants. More than half (53.5%) of the participants, had no formal education, followed by 195 (36.8%) primary school and 51 (9.6%) secondary school education and above. With regard to parity status of the participants, approximately 131 (24.3%) of them were grand multiparous mothers. In terms of average monthly income, a majority (51.3%) of the participants had an average monthly income of less than 57.22 United States Dollar (USD) (**Table 1**).

Reproductive health and healthcare service characteristics

The means (+SD) of gravidity and parity were 3.7 (±2.5) and 3.4 (±2.3), respectively. Approximately 399 (75.3%) women had a parity status less than or equal to four childbirths. Less than one-fourth (21.7%) of women experienced at least one abortion. The mean (+SD) of alive children was 3.2 (±2.1). The majority (83.2%) of the participants gave birth through spontaneous vaginal delivery (SVD), and more than nine in every 10 childbirths (93.8%) were delivered alive. With regard to the gender of the main birth attendance, half (50.4%) of the participants were attended by females. Approximately 70.6% of participants traveled for more than 30 min on foot to reach the nearby health facility. A majority (70.4%) of the women attended antenatal care (ANC) visit at least once. Seven out of ten women (69.6%) gave birth during nighttime (**Table 2**).

Disrespect and abuse during childbirth

In this study, the magnitude of disrespect and abuse experienced by women during childbirth in a public health facility could be gauged from the actual figures; the overall rate was 77.0% (95% CI: 73%–81%). Based on the type of health facilities, the rates of disrespect and abuse were 72.0% and 78.0% among women who gave birth in hospitals and health centers, respectively. Among

TABLE 1 Sociodemographic characteristics of women who gave birth in East Hararghe Zone public health facilities, eastern Ethiopia, 2020 ($n = 530$).

Variables	Categories	Frequency	Percent
Type of health facility	Health center	434	81.9
	Hospital	96	18.1
Residence area	Urban	128	24.2
	Rural	402	75.8
Age (in years)	18–24	176	33.2
	25–34	297	56.0
	≥35	57	10.8
Marital status	Married	517	97.5
	Single	13	2.5
Religion	Muslim	471	88.9
	Orthodox	44	8.3
	Protestant	15	2.8
Ethnicity	Oromo	458	86.4
	Amhara	34	6.4
	Guraghe	18	3.4
	Other[a]	20	3.8
Women's occupation	Housewife	468	88.3
	Merchant	16	3.0
	Employee	32	6.0
	Other[b]	35	2.7
Partner's occupation	Farmer	387	74.6
	Merchant	50	9.6
	Employee	60	11.6
	Other[b]	21	4.2
Education of women	No formal education	284	53.5
	Primary education	195	36.8
	Secondary and above	51	9.6
Education of partner	No formal education	203	39.3
	Primary education	237	45.8
	Secondary and above	77	14.9
Average monthly income (in USD)[c]	≤57.22	272	51.3
	>57.22	258	48.7
Time to reach nearby public health facility (min)	≤30	156	29.4
	>30	374	70.6

[a]Somali or Orgoba.
[b]Daily laborers or students; USD, United States Dollar.
[c]1 USD = 34.95ETB during the study period.

TABLE 2 Reproductive characteristics of women who gave birth in East Hararghe Zone public health facilities, eastern Ethiopia, 2020 ($n = 530$).

Variables	Categories	Frequency	Percent
Parity	≤4	399	75.3
	>4	131	24.7
Visited ANC facility	Yes	373	70.4
	No	157	29.6
Mode of delivery	SVD	441	83.2
	Not SVD[a]	89	16.8
Birth outcome (of newborn)	Alive	497	93.8
	Stillbirth	33	6.2
Gender of main birth attendant	Male	263	49.6
	Female	267	50.4
Delivery time	Daytime	161	30.4
	Nighttime	369	69.9
Current pregnancy intention	Planned	415	78.3
	Unplanned	115	21.7

[a]Induced vaginal delivery and/or assisted vaginal delivery.

disrespected and abused women, the category of non-informed consent care was the most prevalent one, with the figure standing at 259 (48.9%). Under these categories, the most commonly reported type of disrespect and abuse was that the provider did not introduce themselves to the woman and her companion, 259 (48.9%). The second most reported category of disrespect and abuse was non-confidential care, 252 (47.5%). Among the verification types of non-confidential care, 177 (33.4%) of women reported that care providers did not use drape or cover to protect their privacy. The third most reported category was physical abuse, reported by 142 (26.8%) women, followed by non-dignified care, 135 (25.5%), abandonment care, 53 (10.0%), discrimination, 29 (5.5%), and detention, 13 (2.5%) (Table 3).

Factors associated with disrespect and abuse during childbirth

In the bivariable analysis, the area of residence, age of women, average monthly income, distance from a nearby public health facility, parity, visiting ANC facilities, and time of delivery were the factors associated with disrespect and abuse during childbirth.

In the multivariable analysis, average monthly income, distance from a nearby public health facility, parity, visiting ANC facilities, and time of delivery were the factors independently associated with disrespect and abuse during childbirth. Women who received an average monthly income of less than 57.22 USD were two times more likely to be disrespected and abused (AOR = 2.29, 95% CI: 1.41–3.71) than those who had an average monthly income greater than or equal to 57.22 USD. Women living in residences at distances greater than 30 min from nearby health facilities were two times (AOR = 2.10 95% CI: 1.30–3.39) more likely to experience disrespect and abuse during childbirth at these facilities than those who lived less than or equal to 30 min away from the health facilities. Women with a parity status of less than or equal to four faced an approximately 1.7 time increase in the risk of disrespect and abuse than those with a parity status of more than four childbirths (AOR = 1.70, 95% CI: 1.02–2.84). Women who never paid a visit to an ANC facility during their current pregnancy were four times (AOR = 4.29, 95% CI: 2.17–8.52) more likely to be disrespected and abused during childbirth than their visiting counterparts. Women who delivered during nighttime were approximately two times more likely to be disrespected and abused (AOR = 2.16, 95% CI: 1.37–3.41) than those who delivered during daytime (Table 4).

Discussion

This study assessed the magnitude and associated factors of disrespect and abuse during childbirth among women who gave birth in East Hararghe Zone public health facilities in eastern

TABLE 3 Categories of disrespect and abuse during childbirth by verification criteria among women who gave birth in East Hararghe Zone public health facilities, eastern Ethiopia, 2020 ($n = 530$).

Reported types of disrespect and abuse during childbirth	Frequency	Percentage
Physical abuse	**142**	**26.8**
Health provider physically hit or slapped the mother	99	18.7
Health provider verbally insulted the mother	120	22.6
Care provider separated the mother from the baby without indication	50	9.4
Supportive staff insulted the mother and her companion	50	9.4
Provider denied the mother food or fluid without indication	89	16.8
Provider did not permit the mother to choose a position for birth	96	19.1
Non-confidential care	**252**	**47.5**
Care providers did not use covering to protect the mother's privacy	177	33.4
Providers discussed the mother's private parts in a way others could hear	105	19.8
Non-informed consent care	**259**	**48.9**
Provider did not introduce him/herself to the mother	259	48.9
Providers did not explain the findings to the mother	67	12.6
Providers did not explain to the mother what was done or what to expect	67	12.6
Providers did not encourage the mother to ask questions	86	16.2
Provider did not respond to the mother's question with politeness	99	18.7
Provider did not obtain consent before a procedure	233	44.0
Non-dignified care	**135**	**25.5**
Health providers shouted at or intimidated the mother	135	25.5
Health providers made negative comments about the mother	111	20.9
Providers did not allow the mother's companion into the delivery room	115	21.5
Abandonment of care	**53**	**10.0**
Providers ignored or abandoned the mother when called for help	53	10
The mother gave birth alone because providers were not present	11	2.1
Discrimination	**29**	**5.5**
Provider discriminated against the mother on educational or economic status	29	5.5
Provider discriminated against the mother on residential area	16	3.0
Providers discriminated against the mother because of her age	10	1.9
Detention in health facilities	**13**	**2.5**
The mother's discharge was postponed until facility bills were paid	9	1.7
The mother was detained in the health facility because of damage to property	4	0.8

The bold value indicates the overall prevalence of each category of disrespect and abuse, while the no-bold value indicates the frequency of items under respective categories.

Ethiopia. We found that more than three in every four women who gave birth in these facilities were disrespected and abused during childbirth. Low average monthly incomes, living at far-off distances from nearby health facilities, low parity, a lack of ANC attendance, and delivery during nighttime were independent predictors of disrespect and abuse during childbirth.

This study found that the rate of disrespect and abuse suffered by women was 77.0% (95% CI: 73.0%–81.0%), which is in line with those found in studies conducted in Addis Ababa, Ethiopia (78%) (22) and western Ethiopia (74.8%) (28). However, this rate was higher than those found in studies conducted in Bale, Ethiopia (37.5%) (23); Addis Ababa, Ethiopia 17.5% (31); Bahirdar, Ethiopia (67.1%) (24); Kenya (20%) (21); and Tanzania (15%) (30). These differential rates might be attributed to sociodemographic differences: almost all study participants were urban residents (24, 31), compared with three-fourths of our study participants who were rural residents. In addition, the difference in the type of health facilities might be another possible explanation for the differential rates because our study included both hospitals and health centers, while a previous study conducted in Bale excluded health centers. Moreover, the sociocultural status of women, their general attitude toward maternity care, and infrastructural problems in health facilities may increase the rate of prevalence. For instance, the number of institutional deliveries has increased in rural eastern Ethiopia without corresponding increases in infrastructure, staff, and supplies, which compromises the parameters of respectful maternity care.

Conversely, the rate of disrespect and abuse suffered by women was lower than those found in the studies conducted in Jimma, southern Ethiopia (91.7%) (27), Malawi (93.7%) (32), Nigeria (98%) (9), and Pakistan (97%) (33). This variation might be a result of the different verification criteria used to measure disrespect and abuse; 24 verification items were used for seven domains of disrespect and abuse in our study, while comparable studies used 48 or more verification criteria (34, 35), which might result in over-reporting. In addition, this difference might be attributed to methodological differences; in our study, we used face-to-face interviews during data collection, while a comparable study used direct observation of labor and delivery to assess the prevalence of disrespect and abuse (32).

This study showed that women who received an average monthly income of less than 57.22 USD were two times more likely to be disrespected and abused than those who had an

TABLE 4 Factors associated with disrespect and abuse during childbirth among women who gave birth in East Hararghe Zone public health facilities, eastern Ethiopia, 2020 ($n = 530$).

Variables	Categories	Disrespected and abused		COR (95% CI)	AOR (95% CI)
		Yes, *n* (%)	No, *n* (%)		
Residential area	Urban	77 (60.2)	51 (39.8)	1	1
	Rural	331 (82.3)	71 (17.7)	**3.09 (1.99–4.78)*****	1.33 (0.65–2.72)
Age (in year)	18–24	146 (83.0)	30 (17.0)	**2.84 (1.46–5.53)****	1.78 (0.71–4.42)
	25–34	226 (76.1)	71 (23.9)	**1.86 (1.02–3.38)***	1.58 (0.74–3.34)
	≥35	36 (63.2)	21 (36.8)	1	1
Monthly income (in USD)	<57.22	238 (87.5)	34 (12.5)	**3.62 (2.33–5.64)*****	**2.29 (1.41–3.71)*****
	≥57.22	170 (65.9)	88 (34.1)	1	1
Distance from nearby health facility (min)	≤30	94 (60.3)	62 (39.7)	1	1
	>30	314 (84.0)	60 (16.0)	**3.45 (2.26–5.27)*****	**2.10 (1.30–3.39)****
Types of health facility	Health center	339 (78.1)	95 (21.9)	1.40 (0.85–2.30)	1.07 (0.60–1.92)
	Hospital	69 (71.9)	27 (28.1)	1	1
Parity	≤4	313 (78.4)	86 (21.6)	1.38 (0.88–2.17)	**1.70 (1.02–2.84)***
	>4	95 (72.5)	36 (27.5)	1	1
Mode of delivery	SVD	338 (76.6)	103 (23.4)	1.12 (0.65–1.95)	0.88 (0.46–1.70)
	No SVD[a]	70 (78.7)	19 (21.3)	1	1
Birth outcome	Alive	380 (76.5)	117 (23.5)	1	1
	Dead	28 (84.8)	5 (15.2)	1.72 (0.65–4.57)	1.01 (0.32–3.15)
Antenatal care attendance	Yes	262 (70.2)	111 (29.8)	1	1
	No	146 (93.0)	11 (7.0)	**5.62 (2.93–10.79)*****	**4.29 (2.17–8.52)*****
Delivery time	Daytime	101 (62.7)	60 (37.3)	1	1
	Nighttime	307 (83.2)	62 (16.8)	**2.94 (1.93–4.48)*****	**2.16 (1.37–3.41)*****
Gender of main birth attendance	Male	203 (77.2)	60 (22.8)	1.02 (0.68–1.53)	1.15 (0.73–1.81)
	Female	205 (76.8)	62 (23.2)	1	1

COR, crude odds ratio.
The bold value indicates for variable having p-value < 0.05, while the non-bold value indicates variable having p-value > 0.05.
[a]Induced vaginal delivery and/or assisted vaginal delivery.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

income of more than or equal to 57.22 USD. The economic status of a woman is a significant barrier to compassionate and respectful maternity care in public health facilities. This implies that poor women were more likely to experience disrespect and abuse during childbirth in health facilities (36). This finding was in agreement with that of other studies conducted in Ethiopia (22, 24, 34, 28) and might be attributed to providers prioritizing women with higher incomes over those with lower incomes; affluent women received more timely care than poor women, regardless of the severity of their medical condition (28, 37).

Women living at greater distances from public health facilities were more likely to be disrespected and abused during childbirth. This could be attributed to the fact that such women had comparatively limited knowledge, involvement, and decision-making abilities, which makes them passive and powerless in the care they receive. Hence, such category of women not receiving respectful maternity care during childbirth is a problem that needs to be addressed. It is important to improve the coverage of both the quality of healthcare and the access of healthcare services to ensure respectful maternity care.

The parity status of less than or equal to four childbirths was approximately 1.7 times more likely to increase the risks of disrespect and abuse during childbirth in health facilities. This finding was in agreement with that in the study conducted in Kenya (21); multiparous women are more familiar with maternity care services provided in health facilities and may ask for missed services during childbirth.

This study indicated that women who did not attend ANC visits during pregnancy were four times more likely to experience disrespect and abuse during childbirth. This finding was supported by that in the studies conducted in Bale, Ethiopia (23), and Bahirdar, Ethiopia (38). Good maternity care utilization habits could improve women's awareness about the health system, which would empower them to defend themselves from disrespect and abuse during childbirth. In addition, availing of ANC facilities in a timely manner might help create a strong bond between women and care providers. This means that providing access to ANC facilities to all pregnant women in health facilities is important for reducing mistreatment during childbirth.

Women who delivered during nighttime were approximately two times more likely to be disrespected and abused than those who delivered during daytime. This finding was supported by those in studies conducted in Central Ethiopia (39), Northwest Ethiopia (40), and Kenya (21), which indicated that women who delivered during the day were more likely to receive respectful maternity care than those who delivered during the night. This could be attributed to an inadequate number of care providers assigned during nighttime, resulting in healthcare providers

becoming tired because of work overload (40). On the other hand, the trend of providing poor quality maternity care during nighttime might be associated with low staff numbers assigned to obstetric cases during nightshift (41). Infrastructural problems such as power interruption might be another challenge for women receiving respectful maternity care during nighttime (42, 43). It is a worrisome fact that women in the labor ward during nighttime were more disrespected and abused than their daytime counterparts. It is important to put in place mechanisms to ensure respectful maternity care during nighttime, which can be achieved by increasing the number of care providers assigned and considering nighttime supervision in all health facilities.

The strength of this study is that recall bias was minimized because of an exit interview conducted during discharge. Moreover, hospitals and health centers that provide women with different maternity care services were included in the study and could be generalized to eastern Ethiopia and beyond. However, disrespect and abuse were measured using interviews alone, and this might be considered a limitation of the study; because of labor pain, the women in labor were less stable when providing care, and the reported extent may deviate from the actual value.

Conclusion

More than three in every four women who delivered in public health facilities in the East Hararghe Zone reported at least one type of disrespect and abuse during childbirth. Average monthly income, distance from nearby health facilities, attendance at ANC facilities, and nighttime delivery were the factors significantly associated with disrespect and abuse during childbirth. Encouraging all pregnant women to pay attention to ANC visits and improving the quality of healthcare service provided in all health facilities by assigning adequate staff and fulfilling supplies required during the night are essential for reducing and preventing disrespect and abuse. In addition, specific strategies and interventions should be designed to ensure equitable access to quality maternity care during childbirth for women living at far-off distances from health facilities. Furthermore, we recommend that future researchers conduct further studies using direct observation during the provision of maternity care service.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material, and further inquiries can be directed to the corresponding author.

Ethics statement

The ethical clearance for this study was obtained from the Institutional Health Research Ethical Review Committee of the College of Health and Medical Sciences, Haramaya University, Ethiopia (Ref. No: IHRERC/075/2020). All study procedures followed the Helsinki Declaration on human research. The objective of the study and its procedures were explained to all respondents. Written informed consent was obtained from all participants after explaining the purpose and benefits of the study.

Author contributions

AU and HA conceptualized the study and wrote the original article draft. AU performed data collection, analysis, and interpretation. HA and AA supervised the proposal development, data collection, research, and interpretation of data. AU, HA, AA, and AM reviewed the draft of the article for intellectual content and revised the final version of the manuscript. AU acted as the guarantor of the study. All authors contributed to the article and approved the submitted version.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

Acknowledgments

We thank all study participants, data collectors, and supervisors for their support. We also thank the officials at the East Hararghe Health Office for providing the necessary facilities for performing this study.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

1. World Health Organization. *The prevention and elimination of disrespect and abuse during facility-based childbirth*. Geneva: WHO, HNN Team (2017).

2. World Health Organization. *WHO recommendations intrapartum care for a positive childbirth experience*. Geneva: World Health Organization (2018).

3. Sheferaw ED, Mengesha TZ, Wase SB. Development of a tool to measure women's perception of respectful maternity care in public health facilities. *BMC Pregnancy Childbirth*. (2016) 16(67):1–8. doi: 10.1186/s12884-016-0848-5

4. World Health Organization. *Quality of care for maternal and newborn health: a monitoring framework for network countries*. Genève: WHO (2019).

5. Bohren MA, Vogel JP, Hunter EC, Lutsiv O, Makh SK, Souza JP. The mistreatment of women during childbirth in health facilities globally: a mixed-methods systematic review. *PLoS Med*. (2015) 12(6):e1001847. doi: 10.1371/journal.pmed.1001847

6. World Health Statistics. *Monitoring health for the SDGs, sustainable development goals*. Geneva: World Health Organization (2019).

7. Ethiopia Mini Demographic and Health Survey (EMDHS). Ethiopian Public Health Institute (EPHI) [Ethiopia] and ICF. *Ethiopia mini demographic and health survey 2019: key indicators*. Rockville, MD: EPHI and ICF (2019).

8. Iloh G, Ofoedu J, Njoku P, Odu F, Ifedigbo C, Iwuamanam K. Evaluation of patients' satisfaction with quality of care provided at the national health insurance scheme clinic of a tertiary hospital in south-eastern Nigeria. *Niger J Clin Pract*. (2012) 15(4):469–74. doi: 10.4103/1119-3077.104529

9. Okafor I, Ugwu EO, Obi SN. Disrespect and abuse during facility-based childbirth in a low-income country. *Int J Gynaecol Obstet*. (2015) 128(2):110–3. doi: 10.1016/j.ijgo.2014.08.015

10. WHO, UNICEF U, WB. Trends in maternal mortality: 1990 to 2015. In: WHO U, UNFPA, World Bank Group, the United Nations Population Division, editors. *Trends in maternal mortality: 1990 to 2015*. Geneva: WHO (2015).

11. Amouzou A, Ziqi M, Carvajal–Aguirre L, Quinley J. Skilled attendant at birth and newborn survival in sub-Saharan Africa. *J Glob Health*. (2017) 7(2):e020504. doi: 10.7189/jogh.07.020504

12. Goldenberg RL, McClure EM, Saleem S. Improving pregnancy outcomes in low- and middle-income countries. *Reprod Health*. (2018) 15(1):7–14. doi: 10.1186/s12978-017-0442-y

13. Nyfløt L, Sitras V. Strategies to reduce global maternal mortality. *Acta Obstet Gynecol Scand*. (2018). 97(6):639–40. doi: 10.1111/aogs.13356

14. World Health Organization. *Trends in estimates of maternal mortality ratio (MMR; maternal deaths per 100,000 live births) maternal deaths and lifetime risk of maternal death, 2000–2020*. In: WHO U, UNFPA, World Bank Group, UNPD (MMEIG), editors. Geneva: World Health Organization (2023).

15. Ministry of Health. Health sector transformation plan 2015/16-2019/20 (2008-2012 EFY). Addis Ababa, Ethiopia: Federal Democratic Republic of Ethiopia (2015).

16. World Health Organization. *SDG target 3.1, maternal mortality by 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births*. Geneva: World Health Statistics (2023).

17. Chukwuma A, Wosu AC, Mbachu C, Weze K. Quality of antenatal care predicts retention in skilled birth attendance: a multilevel analysis of 28 African countries. *BMC Pregnancy Childbirth*. (2017) 17(152):1–10. doi: 10.1186/s12884-017-1337-1

18. World Health Organization. Strategies towards ending preventable maternal mortality (EPMM). Geneva, Switzerland: World Health Organization (2015).

19. Sando D, Abuya T, Asefa A, Banks KP, Freedman LP, Kujawski S. Methods used in prevalence studies of disrespect and abuse during facility based childbirth: lessons learned Prof. Suellen Miller. *Reprod Health*. (2017) 14(1):1–18. doi: 10.1186/s12978-017-0389-z

20. Kruk ME, Kujawski S, Mbaruku G, Ramsey K, Moyo W, Freedman LP. Disrespectful and abusive treatment during facility delivery in Tanzania: a facility and community survey. *Health Policy Plan*. (2018) 33(1):e26–33. doi: 10.1093/heapol/czu079

21. Abuya T, Warren CE, Miller N, Njuki R, Ndwiga C, Maranga A, et al. Exploring the prevalence of disrespect and abuse during childbirth in Kenya. *PLoS One*. (2015) 10(4):e0123606. doi: 10.1371/journal.pone.0123606

22. Asefa A, Bekele D. Status of respectful and non-abusive care during facility-based childbirth in a hospital and health centers in Addis Ababa, Ethiopia. *Reprod Health*. (2015) 12(33):1–9. doi: 10.1186/s12978-015-0024-9

23. Mekonnen A, Fikadu G, Esmeal A. Disrespectful and abusive maternity care during childbirth in bale zone public hospitals, southeast Ethiopia: crosssectional study. *Clin Pract*. (2019) 16(5):1273–80. doi: 10.4172/clinical-practice.1000475

24. Wassihun B, Deribe L, Worede N, Gultie T. Prevalence of disrespect and abuse of women during child birth and associated factors in Bahir Dar town, Ethiopia. *Epidemiol Health*. (2018) 40:e2018029. doi: 10.4178/epih.e2018029

25. Garedew M, Kerie M, Walle A. Choice of healthcare providing facility and associated factors among government employees in Nekemte town, western part of Ethiopia. *Health Syst Policy Res*. (2019) 6(2):p83. doi: 10.21767/2254-9137.100100

26. Sheferaw ED, Bazant E, Gibson H, Fenta HB, Ayalew F, Belay TB, et al. Respectful maternity care in Ethiopian public health facilities. *Reprod Health*. (2017) 14(60):1–12. doi: 10.1186/s12978-017-0323-4

27. Siraj A, Teka W, Hebo H. Prevalence of disrespect and abuse during facility based child birth and associated factors, Jimma University Medical Center, southwest Ethiopia. *BMC Pregnancy Childbirth*. (2019) 19(185):1–9. doi: 10.1186/s12884-019-2332-5

28. Tekle BF, Kebebe KH, Etana B, Woldie M, Feyissa TR. Disrespect and abuse during childbirth in western Ethiopia: should women continue to tolerate? *PLoS One*. (2019) 14(6):e0217126. doi: 10.1371/journal.pone.0217126

29. Bowser D, Hill K. Exploring evidence for disrespect and abuse in facility-based childbirth: report of a landscape analysis. USAID/TRAction Project. Harvard School of Public Health (2010).

30. Sando D, Ratcliffe H, Mcdonald K, Spiegelman D, Lyatuu G, Mwanyika-sando M. The prevalence of disrespect and abuse during facility-based childbirth in urban Tanzania. *BMC Pregnancy Childbirth*. (2016) 1(10):1–6. doi: 10.1186/s12884-015-0735-5

31. Kitaw M, Tessema M. Respectful maternity care and associated factors among mothers in the immediate post-partum period, in public health facilities of Addis Ababa. *Int J Pregnancy Child Birth*. (2019) 5(1):10–7. doi: 10.15406/ipcb.2019.05.00140

32. Sethi R, Gupta S, Oseni L, Mtimuni A, Rashidi T, Kachale F. The prevalence of disrespect and abuse during facility-based maternity care in Malawi: evidence from direct observations of labor and delivery. *Reprod Health*. (2017) 14(111):1–10. doi: 10.1186/s12978-017-0370-x

33. Hameed W, Avan BI. Women's experiences of mistreatment during childbirth: a comparative view of home- and facility-based births in Pakistan. *PLoS One*. (2018) 13(3):e0194601. doi: 10.1371/journal.pone.0194601

34. Adinew YM, Hall H, Marshall A, Kelly J. Disrespect and abuse during facility-based childbirth in central Ethiopia. *Glob Health Action*. (2021) 14(1):e1923327. doi: 10.1080/16549716.2021.1923327

35. UkkeID GG, GuraraID MK, Boynito WG. Disrespect and abuse of women during childbirth in public health facilities in Arba Minch town, South Ethiopia—a cross-sectional study. *PLoS One*. (2019) 14(4):e0205545. doi: 10.1371/journal.pone.0205545

36. Adinew YM, Assefa NA. Experience of facility based childbirth in rural Ethiopia: an exploratory study of women's perspective. *J Pregnancy*. (2017) 2017:7938371. doi: 10.1155/2017/7938371

37. Bayo P, Belaid L, Tahir EO, Ochola E, Dimiti A, Greco D, et al. "Midwives do not appreciate pregnant women who come to the maternity with torn and dirty clothing": institutional delivery and postnatal care in Torit county, South Sudan: a mixed method study. *BMC Pregnancy Childbirth*. (2020) 20:1–14. doi: 10.1186/s12884-020-02910-2

38. Wassihun B, Zeleke S. Compassionate and respectful maternity care during facility based child birth and women's intent to use maternity service in Bahir Dar, Ethiopia. *BMC Pregnancy Childbirth*. (2018) 18(294):1–9. doi: 10.1186/s12884-018-1909-8

39. Bulto GA, Demissie DB, Tulu AS. Respectful maternity care during labor and childbirth and associated factors among women who gave birth at health institutions in the West Shewa Zone, Oromia region, central Ethiopia. *BMC Pregnancy Childbirth*. (2020) 20(443):1–12. doi: 10.1186/s12884-020-03135-z

40. Yosef A, Kebede A, Worku N. Respectful maternity care and associated factors among women who attended delivery services in referral hospitals in Northwest Amhara, Ethiopia: a cross-sectional study. *J Multidiscip Healthc*. (2020) 13:1965–73. doi: 10.2147/JMDH.S286458

41. Amsalu B, Aragaw A, Sintayehu Y, Sema A, Belay Y, Tadese G, et al. Respectful maternity care among laboring women in public hospitals of Benishangul Gumuz region, Ethiopia: a mixed cross-sectional study with direct observations. *SAGE Open Med*. (2022) 10:1–11. doi: 10.1177/20503121221076995

42. Lagebo BW, Mekonnen SM. Challenges and approaches to scaling and standardizing health information infrastructure in developing countries: case studies from Ethiopia. [master's thesis]. (2005).

43. Nigusie A, Endehabtu BF, Angaw DA, Teklu A, Mekonnen ZA, Feletto M, et al. Status of compassionate, respectful, and caring healthcare service delivery: scoping review. *JMIR Hum Factors*. (2022) 9(1):e30804. doi: 10.2196/30804

frontiers | Frontiers in Global Women's Health

TYPE Original Research
PUBLISHED 30 October 2024
DOI 10.3389/fgwh.2024.1261040

OPEN ACCESS

EDITED BY
Ramon Escuriet,
Blanquerna Ramon Llull University, Spain

REVIEWED BY
Adelle McArdle,
Monash Rural Health Churchill, Australia
Lorena Binfa,
University of Chile, Chile
Cristina Franco Antonio,
Universidad de Extremadura, Spain

*CORRESPONDENCE
Andrea Jimenez-Zambrano
✉ Andrea.jimenez-zambrano@cuanschutz.edu

RECEIVED 18 July 2023
ACCEPTED 25 September 2024
PUBLISHED 30 October 2024

CITATION
Jimenez-Zambrano A, Avery M, Feller K, Rivera C, Marchin A, Bolaños AG, Asturias E, Rodas H and Harrison MS (2024) Exploring the acceptability of a decision aid for rural women with a history of prior cesarean birth regarding subsequent mode of birth in Coatepeque, Guatemala.
Front. Glob. Womens Health 5:1261040.
doi: 10.3389/fgwh.2024.1261040

Exploring the acceptability of a decision aid for rural women with a history of prior cesarean birth regarding subsequent mode of birth in Coatepeque, Guatemala

Andrea Jimenez-Zambrano[1,2]*, Morgan Avery[3], Kathryn Feller[4], Claudia Rivera[5], Angela Marchin[4], Antonio Guillermo Bolaños[2,5], Edwin Asturias[1,2], Hector Rodas[6] and Margo S. Harrison[2,4]

[1]Department of Pediatrics, University of Colorado, Aurora, CO, United States, [2]Colorado School of Public Health, Center for Global Health, Aurora, CO, United States, [3]Physician Assistant Program, University of Colorado, Aurora, CO, United States, [4]Department of Obstetrics & Gynecology, University of Colorado, Aurora, CO, United States, [5]Center for Human Development, Ritalhuleu, Guatemala, [6]Department of Obstetrics and Gynecology, Coatepeque Hospital, Coatepeque, Guatemala

Background: Decisions regarding mode of delivery in the context of a prior cesarean birth is complicated because both trial of labor after cesarean and elective repeat cesarean birth have risks and benefits.
Purpose: The objective of this study was to understand the perspective of women and obstetricians in Coatepeque, Guatemala, to guide the development of a decision aid about mode of birth for women with a history of prior cesarean.
Methods: We conducted in-depth semi-structured interviews with obstetricians at Coatepeque Hospital and women at the Center for Human Development in the southwest Trifinio region of Guatemala in February 2020. Using qualitative content analysis, we recorded, transcribed, translated, and analyzed qualitative data for the meaning of themes and concepts exploring the acceptability of counseling with a decision aid regarding mode of delivery.
Results: A total of 30 qualitative interviews were conducted with women and physicians. Three themes emerged from the qualitative interviews: Having a decision aid for women with a prior cesarean birth will be useful and helpful. Content of the decision aid should include benefits and risks for women and babies as well as figures. Women described the need of tailoring the content surrounding family's role in their decisions. They felt that a trusted provider from the healthcare system should facilitate the use of the decision aid for counseling.
Conclusions: These findings emphasize the support and need for innovative approaches to patient education around mode of delivery after a prior cesarean in the southwest region in Guatemala. There is a need to improve the educational information given to women regarding their mode of delivery after a cesarean birth. Finally, an effective decision aid needs to be tailored to not only the women's needs but also the engagement of the family unit for its successful implementation.

KEYWORDS

beliefs, attitudes, decision aid, mode of birth after cesarean birth, TOLAC counseling

Introduction

Latin America has the highest cesarean birth rates in the world (1). Rates have risen in Guatemala from 16%–26%, over the past decade (2, 3). From 2015–2017 cesarean birth rates increased from 30%–45% in the southwest Trifinio region (1–3). Once a woman has a scarred uterus from a cesarean, she might be able deliver by elective repeat cesarean or attempt a trial of labor (vaginal birth) (4). As cesarean birth increases in this population, so does the population of women with a history of prior cesarean birth having to choose a method of delivery for their next delivery. For women who are well-suited for it, attempting a vaginal birth after a cesarean is a safe and evidence-supported option. Estimates suggest that 60%–80% of these women would successfully have a vaginal delivery if they choose to try (4). In 2019, a study found that in the United States rates of trial of labor after a cesarean (TOLAC) have increased from 14.4% in 2010 to 19.6% (5). However, a systematic review found that in Latin America (Argentina, Brazil and Chile) there was a higher preference for a repeated cesarean in comparison to high income countries (6). In Guatemala, women with a history of a prior cesarean who choose elective repeat cesarean birth account for the largest proportion of the overall cesarean birth rate (7, 8).

Prior research has found that increased maternal age, education, information given to patients after the prior cesarean birth, the lack of privacy and the delivery of high-quality respectful care have been associated with a repeat cesarean birth (9, 10). Based on our previous research in Guatemala, reduced parity, delivering at a facility (as compared to home), and delivering by a physician were found to be associated with repeat cesarean births (11). While there are clear data from high-income countries on the risks and benefits of elective repeat cesarean delivery (ERCD) compared to trial of labor after cesarean section, the decision about method of delivery is still very personal in terms of what risks women are willing to assume for themselves and their babies. Many communities have turned to decision tools to help them interact with women on making this decision (12–20). There are also some data about when in pregnancy it is best to have these conversations (21). However, there is limited information about women's general perspective regarding decision making in mode of delivery in Latin America (22).

Little research has explored the needs and values of this Guatemalan population with respect to accessing a decision aid for deciding on mode of birth after cesarean. Therefore, what is available does not meet women's needs, limits women's ability to understand their choice on method of delivery, as well as the physician's ability to counsel patients. To fill this gap, we explored the views and opinions of women regarding a decision aid for women with a history of prior cesarean birth as well as the perspective of the providers for this community. Specifically, we identified factors to help shape the decision aid content and method of delivery within the hospital setting. We intended for this study to provide context for any future decision aids that might be developed in this region to counsel patients on mode of birth after a prior cesarean birth. This information is vital not only for shaping future clinical practice guidelines and decision-making processes related to the mode of delivery during pregnancy but also for guiding the broader implementation of shared decision-making in Latin America to address other women's health issues.

Methods

We conducted a qualitative content analysis study using in-depth semi-structured interviews. These interviews examined the perceptions of women who had previously undergone a cesarean section, as well as those of resident and attending obstetrician-gynecologists, regarding delivery methods in subsequent pregnancies complicated by a prior cesarean.

Setting

In the Southwest region of Guatemala, the Trifinio is located at the intersection of three coastal lowland departments: San Marcos, Retalhuleu, and Quetzaltenango. This region exports primarily bananas and palm oil owned by substantial agribusiness enterprises. The more than 20 small communities that make up the Trifinio have an impoverished rural population of 30,000 (23). These communities lack access to health services, education, and reliable clean water. A partnership between the University of Colorado and local agricultural businesses in the lowlands of Southwestern Guatemala resulted in the creation of the Center for Human Development (CHD) in 2011 (24). The CHD operates a family clinic, dental clinic, clinical laboratory, pharmacy and community-based maternal, child, and adolescent health programs. Madres Sanas is a maternal health program which includes a community-based home visitation service delivered by specially trained nurses during the prenatal and postnatal periods (24). This program includes regular prenatal visits, postpartum visits, and additional unscheduled visits as needed. The nurses also provide education on topics such as danger signs of pregnancy, nutrition, breastfeeding, and contraceptive use. Participants in this program are typically multiparous, married or living with a partner, have received elementary school education, and are not employed (11).

Study participants

Between November 2019 and February 2020, eligible participants were recruited for this qualitative study. The women who participated in our study were recruited from community outreach programs within the CHD. These programs provide maternal and child health to pregnant women and children in the surrounding area. The study coordinator, the nursing supervisor of the Madres Sanas program (24), approached women who recently delivered at their 40-day postpartum visit by cesarean birth and

invited them to participate. Interviews with women took place in a consultation room at the CHD. To obtain the convenience sample, nurses who visited women for their postpartum visits offered participation in the study. Obstetricians (residents and attendings) engaged in clinical care at the Coatepeque Hospital in Coatepeque were recruited and were invited to participate in our study.

Data collection

All participants were consented and interviewed by the study team in a private conference room. Our interview guide was designed using the socioecological model which we used for analysis (25). Prior to analysis, we divided our codebook into the needs and values of this population with respect to accessing a decision aid for birth after cesarean. Based on the sociological framework developed in designing our own study, we placed a special emphasis on social considerations in the codebook (26).

The interview guide for women focused on understanding their ideal subsequent birth and their attitudes and beliefs about mode of delivery after a prior cesarean birth using the same framework. The interview guides for the obstetricians focused on knowledge, attitudes, and practices related to mode of delivery for women with a history of prior cesarean birth, including clinical indications and social considerations. Furthermore, questions related to the opinions and perspective regarding a decision aid tool were asked of women and providers. These questions focused on what type of information women would like to receive after a cesarean birth, how the information should be delivered in that context, and who is the best person to deliver the information. The interview guides were not revised over the course of the study. All interviews lasted between 15 and 45 min and were audio recorded. A native Spanish speaker took detailed interview notes during the interviews. We aimed to recruit 20–30 participants, as this number would allow us to reach saturation of relevant themes.

Data analysis

A HIPAA-certified professional transcriptionist in the language of the interview transcribed the Spanish audio recordings verbatim. The transcripts were then professionally translated into English. When the data were prepared, they were sent securely to the senior professional research assistant who stored the data on password-protected servers. All translated transcripts were validated by the interviewer, who listened to the audio file and verified both the transcription and translation for accuracy. Validated transcripts were reviewed for integrity and uploaded into ATLAS.ti (ATLAS.ti Scientific Software Development, Berlin, Germany) in preparation for analysis in a de-identified format, with interviews saved as a combination of numbers and letters, allowing for anonymization of the content. The codebook was then applied to all transcripts by the members of the research team. Two members of the research team (AJ-Z and MA) read the same two transcripts and through consensus agreed upon additional inductive codes. If consensus could not be reached, MSH read the same two transcripts to facilitate discussion and achieve consensus. To establish coding standards, sections of a third transcript were double-coded to assess intercoder reliability. When the codebook was finalized, the remaining transcripts were coded by the same two members of the research team. Next, the coded data was analyzed within and between participant types (women and physicians) to identify the major themes and illustrative quotes that captured the participants' perspectives (27). Study participants did not provide feedback on the findings.

Results

All the interviews were conducted in February 2020 in Spanish by a native speaker. We conducted a total of $n = 30$ interviews with physicians ($n = 10$) and with women who had a prior cesarean birth ($n = 20$). Study participant characteristics are presented in Table 1, only participants with complete demographic data were included. Three recurrent themes related to decision aid implementation were identified through the analysis. Verbatim quotations are used to illustrate themes as well as a range of views expressed in the interviews. Qualitative analysis of interviews of women and providers indicated key themes that emerged from the data: (1) decision aids will be a helpful tool, (2) content of the decision aid should include culturally tailored risk and benefit information, and (3) trusted providers should share and facilitate the decision aid discussion.

TABLE 1 Demographic characteristics of the study participants.

	Women ($n = 20$)	Providers ($n = 8$)[a]
Age, yr		
Mean (Standard Deviation)	23.03 (5.8)	35.44 (8.6)
Marital Status, *n*(%)		
Single/Divorced/Separated/ Widowed	18 (90.0%)	4 (50.0%)
Married/living with partner	2 (10.0%)	4 (50.0%)
Education, *n*(%)		
No formal education	1 (5.0%)	
Primary School (1–6)	13 (65.0%)	
Secondary School (7–10)	3 (15.0%)	
Diversified Secondary (+11)	1 (5.0%)	
University	2 (10.0%)	
Parity		
1	9 (45.0%)	
2	8 (40.0%)	
3	3 (15.0%)	
Gender (Female)	20 (100%)	4 (50.0%)
Year of graduation of Medical School		
2006		1 (12.5%)
2014		1 (12.5%)
2015		2 (25.0%)
2016		1 (12.5%)
2018		2 (25.0%)
2019		1 (12.5%)

[a]Table of participants with non-missing data.

Practicality of decision aids

In general, all participants spoke positively about the concept of decision aids and considered that having a decision aid for women with a prior cesarean birth would be useful not only for women but also for physicians. One said, "Yes, it would help them a lot because they think that if they had a C-section, I can't have vaginal delivery." A different physician shared a similar opinion: "The truth is that it would help a lot, because there are many risk factors, not only economic, social, environmental, family." Another one said, "That would be a useful tool." Women shared similar opinions. One women reported, "Yes, I would like to know more– more information on what a c-section can give [offer] you, [in comparison] of a normal delivery. It would be great to learn more." Similarly, another participant said "Oh, well yes, [a decision aid will] give me the information to see what [options] I can do later."

Decision aid content

Participants agreed that the content of the decision aid tool should include benefits and risks for women and baby. One mother shared, "*I think that every woman should be informed about how the baby is coming, if the position is appropriate to have a vaginal delivery; if it's not sideways or in a breech position because if the baby is in that position, you will need a C-section delivery. You should also know if the baby's weight is correct because sometimes when they are too small many complications could arise during vaginal delivery. It would also be helpful to know if the baby's heart rate is normal because when you have a vaginal delivery the baby's heart rate can speed up or slow down. I think that information is crucial to know.*"

Similarly, a physician emphasized the importance of including this information, "*because the [patients] think that if they had a C-section, can't have vaginal delivery. But if they are told the advantages of a vaginal delivery, the faster healing, the risk of infection is less, that is, all that…the patients would understand and maybe they would like vaginal births more.*" Another physician added, "*[the decision aid should] explain what are the benefits and what are the complications that could also have and what are also the benefits of a vaginal delivery, which will have a faster recovery period, you will not be exposed to anesthesia, you will not have problems with something else that could happen.*"

An additional important topic was related to their preference of how the content should be displayed. Participants were aware that the decision aid tool should have more graphic content than written material due to the literacy limitations of the population. One physician explained, "With figures, so they understand better, because we explain them in a way, in their language so that they can understand better, but it would be quite supportive to have a visual material…So, where there would be images of the uterus, the scar, the incisions that are made." A women explained, "*what a C-section delivery is like and what a normal one is like, I have it all the pictures here… because there are some moms who have not yet finished their education, that have no education. And in reality, it's difficult for them to get help with letters, they can't read or can't write*".

During our interviews, we also explored the influence of women's families on their decisions regarding spacing and delivery. One women reported, "my husband and I said that we wanted to have the baby at home, but as I had complications, I was unable to have the baby at home. So, he said, 'We'd better go because the baby—I don't want you or the baby to die because there's a risk that you could die, so what's the point of having you and not my baby.' So, that's why [my husband] took me to where I had the C-section." Other women share a similar experience, "Yes, they were sending me back home but my husband said no, to stay there until they took me in. And I had to stay. And that's when the doctor said that I needed to have a C-Section."

Physicians also reported seeing this dynamic with their patients. One said, "*for example, I explain something to her [the woman], but the mother-in-law explains otherwise, the neighbor explains something else, the husband explains something else. So, sometimes what we deal with is, she came with her husband or mother-in-law, or with her mother, and we can explain: 'Look—maybe that would be another person's opinion, because that is what happens most of the time.*" One explains, "and then, not anymore, because the mother-in-law decided otherwise." Another physician responded, "many patients who say: 'I don't want to have surgery because my husband does not want to,' or 'my husband [will] beat me,' or 'my husband this.' So, there are some patients who do want [surgery], but because of the fear of her husband they do not [have it]. Therefore, I think [using the decision aid] as a couple, not only the mother, but as a couple, so that this can also come and make the husband aware".

Facilitation to implementation of decision aids

Most participants agreed that a trusted provider from the healthcare system should facilitate decision aid discussion. Most physicians reported that the hospital personnel were the most qualified to implement the decision aid tool. One physician shared, "I think all the staff [doctors and nurses], I think it's all the staff that is involved in this situation." Another physician shared a similar opinion, "I think that it is not only the doctor's responsibility, but something that can be shared with all the staff, all the staff who has contact with the pregnant women should know what are their advantages, their disadvantages, why yes, why not, and what can we offer."

Women also share similar opinions. One women said, "It would be with a doctor or a nurse if that were the case." Another participant reported, "[I will want] a doctor." However, among women, some shared that they would also like the community traditional birth attendant (comadronas) to also be involved in the decision. One explained "Maybe the traditional birth attendant can have that information…But a doctor would be better." Another one said she "[would like to discuss decision aid] with a traditional birth attendant."

Discussion

The topic of using a decision-making support tool for the mode of delivery after a previous C-section remains largely unexplored in Latin America. Our study highlights several critical aspects regarding the development and implementation of a decision aid tool for women considering a trial of labor after a C-section (TOLAC). Both physicians and women who participated in our study expressed strong support for the concept of a decision-aid tool. They acknowledged its potential to facilitate informed decision-making by clearly presenting the risks and benefits associated with different delivery options, a perspective supported by previous literature (28, 29). One key insight from our findings is the consensus on the need to address not only the medical aspect of this type of birthing decision, but the risks and benefits of this decision-making process.

Physicians and women alike emphasized the importance of incorporating content that is comprehensible to a broad audience, including those with low literacy. The inclusion of visual aids such as graphs and figures, alongside clear written content, emerged as crucial for enhancing understanding. This aligns with existing literature that underscores the necessity of tailoring decision aids to meet the diverse needs of the target population (30, 31). Furthermore, the shared responsibility of decision-making between the patient and the family unit was a notable theme. Participants agreed that the decision aid should not only inform the woman but also engage her family members, reflecting a more holistic approach to decision-making, similar to the strategies explored in decision aid tools for hospice care (32).

This finding underscores the need for the tool to be adaptable to different family dynamics and to provide guidance that can be discussed and deliberated upon within the family context. Physicians in our study were unanimous in their opinion that the presentation of the decision aid should be managed by a healthcare professional, such as a provider or nurse. This is likely due to the need for expert guidance to address questions and provide personalized support. Women in our study supported this viewpoint but also suggested that traditional birth attendants, who are trusted community figures, could play a valuable role in disseminating the information. This suggestion points to the importance of integrating community-based perspectives into the development and implementation of decision aids, particularly in settings where traditional birth attendants have significant influence.

Our findings build on previous research by extending the discussion to the specific context of TOLAC and the unique considerations it entails. While previous studies have highlighted the general acceptance and effectiveness of decision aids in similar contexts (13, 33), our research introduces a novel perspective on the necessity of including family dynamics and community-based figures in the decision-making process. This approach not only enhances the relevance of the decision aid but also acknowledges the social and cultural dimensions of childbirth. To our knowledge, this is the first paper that highlights the importance of tailoring a decision aid tool for trial of labor after a C-section focusing on a shared decision-making process between the women and the entire family unit. In addition, participants also suggested the inclusion of traditional birth attendants as trusted community members capable of the dissemination of a decision aid tool.

Limitations

Despite the significant insights gained from these findings, several limitations must be considered. First, one limitation is our study was limited by the convenience sampling of our populations both in the hospital and in the community setting. Therefore, the findings, however informative, may not be representative of the experiences of those participants declined to participate, those who were not a part of the Madres Sanas program or those providers who declined participation. Thus, the findings may not be generalizable to the entire rural Guatemalan population.

Second, even when the lead interviewers were a native and fluent Spanish speaker, their status as outsiders may have influenced the responses of women in the Trifinio as well as physicians in the hospital. Future research should examine the perspectives of rural women who have previously had a C-section by recruiting women who either did not engage with a maternal health program or those who dropped out. Additionally, to gain a comprehensive understanding of providers' perspectives, medical students as well as support staff (nurses and medical assistants) should be considered. This approach will provide a holistic view of all medical personnel involved with patients delivering children after a previous C-section. Although we believe that a decision aid would be well received and integrated into standard care, it remains essential to create an implementation module. We need to observe its association with maternal birth planning, including the desired method of delivery, the ultimate method of delivery, location of delivery, and neonatal intensive care unit admission as primary health outcomes, and compare these with historical data to assess effectiveness and efficacy.

Conclusions

Decision aid tools around mode of birth are needed to narrow the birthing education gap for women with a prior cesarean. Such decision aids on the options for the mode of birth after a cesarean should be based on what is medically available and women's personal experiences. Findings from this study suggest that decision aids might be well accepted among this population and might be useful as long as their content is tailored to participant's literacy level and target the entire family unit. These findings highlight the importance of developing an inclusive and innovative approach to patient messaging and education around mode of delivery after a prior cesarean. This approach could improve the quality and dissemination of information given to support women and providers regarding mode of birth in the facility setting. Finally, the implementation of evidence-based practices around natural labor after cesarean could potentially assist in further improving the quality of care at Coatepeque Hospital.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the study was approved by the Colorado Multiple Institutional Review Board (COMIRB #19-0615), INCAP (CIE-REV 088/2019), and the Guatemalan Ministry of Health (#50-2019). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

AJ-M: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. MA: Formal Analysis, Writing – original draft, Writing – review & editing. KF: Data curation, Project administration, Writing – review & editing. CR: Data curation, Supervision, Writing – review & editing. AM: Project administration, Writing – review & editing. AB: Writing – review & editing. EA: Conceptualization, Writing – review & editing. HR: Investigation, Writing – review & editing. MH: Conceptualization, Funding acquisition, Investigation, Supervision, Writing – review & editing.

Funding

The author(s) declare financial support was received for the research, authorship, and/or publication of this article. Funding for this project comes from the *Eunice Kennedy Shriver* National Institutes of Child Health and Human Development Women's Reproductive Health Research K12 award (5K12HD001271-18) and the University of Colorado Department of Obstetrics and Gynecology Academic Enrichment Fund.

Acknowledgments

We want to thank all the community involved in collection of the data analyzed in this work and all the women who participated in the study—their health, well-being, empowerment, and successful pregnancy outcomes are the motivation for performing this work.

Conflict of interest

The authors have no relationships to disclose that may be deemed to influence the objectivity of this paper and its review. The authors report no commercial associations, either directly or through immediate family, in areas such as expert testimony, consulting, honoraria, stock holdings, equity interest, ownership, patent-licensing situations or employment that might pose a conflict of interest to this analysis. Additionally, the authors have no conflicts such as personal relationships or academic competition to disclose. The findings presented in this paper represent the views of the named authors only, and not the views of their institutions or organizations.

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The author(s) declared that they were an editorial board member of Frontiers, at the time of submission. This had no impact on the peer review process and the final decision.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

1. Harrison MS, Scarbro S, Juarez-Colunga E, Jimenez-Zambrano A, Bunge-Montes S, Bolanos GA, et al. Trends in the mode of delivery of pregnant women in rural Guatemala from a quality improvement database. *Matern Child Health J*. (2019) 23 (4):435–42. doi: 10.1007/s10995-018-2655-2

2. Ministerio de Salud P´blica y Asistencia Social MG, Instituto Nacional de Estadĺstica INEG, Secretarĺa de PlanificaciÛn y ProgramaciÛn del la Presidencia SnG, International ICF. *Encuesta Nacional de Salud Materno Infantil 2014–2015: Informe Final*. Rockville, Maryland, USA: MSPAS, INE, Segepl·n and ICF International (2017).

3. Unicef. *The State of the World's Children 2013*. New York: UNICEF (2013).

4. ACOG practice bulletin No. 154: operative vaginal delivery. *Obstet Gynecol*. (2015) 126(5):e56–65. doi: 10.1097/AOG.0000000000001147

5. Pineles BL, Buskmiller CM, Qureshey EJ, Stephens AJ, Sibai BM. Recent trends in term trial of labor after cesarean by number of prior cesarean deliveries. *AJOG Glob Rep*. (2023) 3(3):100232. doi: 10.1016/j.xagr.2023.100232

6. Mazzoni A, Althabe F, Liu NH, Bonotti AM, Gibbons L, Sanchez AJ, et al. Women's preference for caesarean section: a systematic review and meta-analysis of observational studies. *BJOG: Int J Obstet Gynaecol*. (2011) 118(4):391–9. doi: 10.1111/j.1471-0528.2010.02793.x

7. Vogel JP, Betran AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J, et al. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. *Lancet Glob Health*. (2015) 3 (5):e260–70. doi: 10.1016/S2214-109X(15)70094-X

8. Harrison MS, Bunge Montes S, Rivera C, Nacht A, Zambrano AJ, Lamb M, et al. Mode of delivery among women with a history of prior cesarean in rural Guatemala: results from a quality improvement database. *Eur J Obstet Gynecol Reprod Biol*. (2020) 245:212–5. doi: 10.1016/j.ejogrb.2019.12.014

9. Triunfo S, Minciotti C, Burlon B, Giovannangeli F, Danza M, Tateo S, et al. Socio-cultural and clinician determinants in the maternal decision-making process in the choice for trial of labor vs. elective repeated cesarean section: a questionnaire comparison between Italian settings. *J Perinat Med*. (2019) 47(6):656–64. doi: 10.1515/jpm-2019-0041

10. Shirzad M, Shakibazadeh E, Betran AP, Bohren MA, Abedini M. Women's perspectives on health facility and system levels factors influencing mode of delivery

in Tehran: a qualitative study. *Reprod Health*. (2019) 16(1):15. doi: 10.1186/s12978-019-0680-2

11. Feller K, Rivera C, Nacht AS, Bunge-Montes S, Jimenez-Zambrano A, Lamb M, et al. Use of postpartum birth control in rural women in southwest Guatemala: analysis of a quality-improvement database. *Obstet Gynecol Res*. (2021) 4(4):203–13. doi: 10.26502/ogr069

12. Shorten A, Chamberlain M, Shorten B, Kariminia A. Making choices for childbirth: development and testing of a decision-aid for women who have experienced previous caesarean. *Patient Educ Couns*. (2004) 52(3):307–13. doi: 10.1016/S0738-3991(03)00106-X

13. Shorten A, Shorten B, Keogh J, West S, Morris J. Making choices for childbirth: a randomized controlled trial of a decision-aid for informed birth after cesareana. *Birth*. (2005) 32(4):252–61. doi: 10.1111/j.0730-7659.2005.00383.x

14. Sakala C, Mayberry LJ. Vaginal or cesarean birth? Application of an advocacy organization-driven research translation model. *Nurs Res*. (2006) 55(2 Suppl): S68–74. doi: 10.1097/00006199-200603001-00011

15. Emmett CL, Shaw AR, Montgomery AA, Murphy DJ, Di Asg. Women's experience of decision making about mode of delivery after a previous caesarean section: the role of health professionals and information about health risks. *BJOG: Int J Obstet Gynaecol*. (2006) 113(12):1438–45. doi: 10.1111/j.1471-0528.2006.01112.x

16. Eden KB, Dolan JG, Perrin NA, Kocaoglu D, Anderson N, Case J, et al. Patients were more consistent in randomized trial at prioritizing childbirth preferences using graphic-numeric than verbal formats. *J Clin Epidemiol*. (2009) 62(4):415–24 e3. doi: 10.1016/j.jclinepi.2008.05.012

17. Schoorel E, Vankan E, Scheepers H, Augustijn B, Dirksen C, De Koning M, et al. Involving women in personalised decision-making on mode of delivery after caesarean section: the development and pilot testing of a patient decision aid. *BJOG: Int J Obstet Gynaecol*. (2014) 121(2):202–9. doi: 10.1111/1471-0528.12516

18. Eden KB, Perrin NA, Vesco KK, Guise JM. A randomized comparative trial of two decision tools for pregnant women with prior cesareans. *J Obstet Gynecol Neonatal Nurs*. (2014) 43(5):568–79. doi: 10.1111/1552-6909.12485

19. Shorten A, Fagerlin A, Illuzzi J, Kennedy HP, Lakehomer H, Pettker CM, et al. Developing an internet-based decision aid for women choosing between vaginal birth after cesarean and planned repeat cesarean. *J Midwifery Women's Health*. (2015) 60 (4):390–400. doi: 10.1111/jmwh.12298

20. Torigoe I, Shorten A. Using a pregnancy decision support program for women choosing birth after a previous caesarean in Japan: a mixed methods study. *Women Birth*. (2018) 31(1):e9–e19. doi: 10.1016/j.wombi.2017.06.001

21. Dumont A, Betrán AP, Kaboré C, De Loenzien M, Lumbiganon P, Bohren MA, et al. Implementation and evaluation of nonclinical interventions for appropriate use of cesarean section in low- and middle-income countries: protocol for a multisite hybrid effectiveness-implementation type III trial. *Implement Sci*. (2020) 15(1):1–14. doi: 10.1186/s13012-020-01029-4

22. Lazo-Porras M, Bayer AM, Acuna-Villaorduna A, Zeballos-Palacios C, Cardenas-Montero D, Reyes-Diaz M, et al. Perspectives, decision making, and final mode of delivery in pregnant women with a previous C-section in a general hospital in Peru: prospective analysis. *MDM Policy Pract*. (2017) 2 (2):2381468317724409. doi: 10.1177/2381468317724409

23. Domek GJ, Cunningham M, Jimenez-Zambrano A, Dunn D, Abdel-Maksoud M, Bronsert M, et al. Designing and implementing an early childhood health and development program in rural, Southwest Guatemala: lessons learned and future directions. *Adv Pediatr*. (2017) 64(1):381–401. doi: 10.1016/j.yapd.2017.04.003

24. Asturias EJ, Heinrichs G, Domek G, Brett J, Shick E, Cunningham M, et al. The center for human development in Guatemala: an innovative model for global population health. *Adv Pediatr*. (2016) 63(1):357–87. doi: 10.1016/j.yapd.2016.04.001

25. Betrán AP, Temmerman M, Kingdon C, Mohiddin A, Opiyo N, Torloni MR, et al. Interventions to reduce unnecessary caesarean sections in healthy women and babies. *Lancet*. (2018) 392(10155):1358–68. doi: 10.1016/S0140-6736(18)31927-5

26. Jimenez-Zambrano A, Feller K, Rivera C, Marchin A, Bolanos AG, Asturias E, et al. Perspectives of obstetricians and women with a history of prior cesarean birth regarding subsequent mode of birth in Trifinio and Coatepeque. *Guatemala Obstet Gynecol Res*. (2022) 5(1):10–9. doi: 10.26502/ogr074

27. Starks H, Trinidad SB. Choose your method: a comparison of phenomenology, discourse analysis, and grounded theory. *Qual Health Res*. (2007) 17(10):1372–80. doi: 10.1177/1049732307307031

28. Little MO, Lyerly AD, Mitchell LM, Armstrong EM, Harris LH, Kukla R, et al. Mode of delivery: toward responsible inclusion of patient preferences. *Obstet Gynecol*. (2008) 112(4):913–8. doi: 10.1097/AOG.0b013e3181888fd8

29. Gagliardi AR, Dunn S, Foster A, Grace SL, Green CR, Khanlou N, et al. How is patient-centred care addressed in women's health? A theoretical rapid review. *BMJ Open*. (2019) 9(2):e026121. doi: 10.1136/bmjopen-2018-026121

30. O'Connor AM, Tugwell P, Wells GA, Elmslie T, Jolly E, Hollingworth G, et al. Randomized trial of a portable, self-administered decision aid for postmenopausal women considering long-term preventive hormone therapy. *Med Decis Making*. (1998) 18(3):295–303. doi: 10.1177/0272989X9801800307

31. Muscat DM, Smith J, Mac O, Cadet T, Giguere A, Housten AJ, et al. Addressing health literacy in patient decision aids: an update from the international patient decision aid standards. *Med Decis Making*. (2021) 41(7):848–69. doi: 10.1177/0272989X211011101

32. Tate CE, Venechuk G, Pierce K, Khazanie P, Ingle MP, Morris MA, et al. Development of a decision aid for patients and families considering hospice. *J Palliat Med*. (2021) 24(4):505–13. doi: 10.1089/jpm.2020.0250

33. Venkatesh KK, Brodney S, Barry MJ, Jackson J, Lyons KM, Talati AN, et al. Patient decision aid for trial of labor after cesarean (TOLAC) versus planned repeat cesarean delivery: a quasi-experimental pre-post study. *BMC Pregnancy Childbirth*. (2021) 21(1):650. doi: 10.1186/s12884-021-04119-3

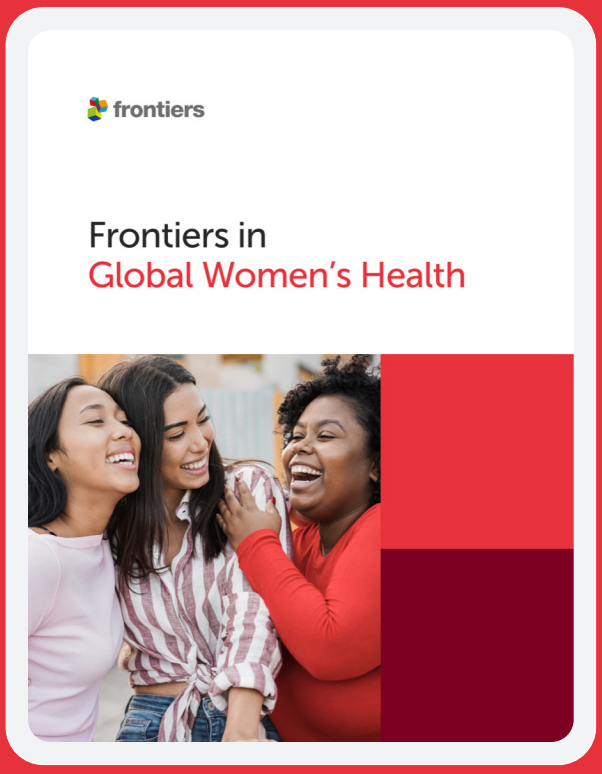
Frontiers in
Global Women's Health

Highlights physical and mental health problems women face around the world

Advances our understanding of the health issues for women globally, especially in low-middle income countries. It aligns with the UN Sustainable Development Goals and promotes physical and mental wellbeing for women.

Discover the latest Research Topics

See more →



Frontiers

Avenue du Tribunal-Fédéral 34
1005 Lausanne, Switzerland
frontiersin.org

Contact us

+41 (0)21 510 17 00
frontiersin.org/about/contact