UNDERSTANDING URBAN HEALTH DISPARITIES: FAMILY PLANNING ACCESS AND USE AMONG THE URBAN POOR IN LOW- AND MIDDLE-INCOME COUNTRIES

EDITED BY: Moses Tetui, James Duminy, Onikepe Oluwadamilola Owolabi, and Moazzam Ali

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UNDERSTANDING URBAN HEALTH DISPARITIES: FAMILY PLANNING ACCESS AND USE AMONG THE URBAN POOR IN LOW- AND MIDDLE-INCOME COUNTRIES

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EDITORIAL
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Editorial: Understanding Urban Health Disparities: Family Planning Access and Use Among the Urban Poor in Low- and Middle-Income Countries

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Editorial on the Research Topic

Understanding Urban Health Disparities: Family Planning Access and Use Among the Urban Poor in Low- and Middle-Income Countries

With a growing majority of the world's population living in towns and cities, the future of the planet is increasingly urban. Indeed, urban processes in low- and middle-income countries (LMICs) will shape the future of global health and sustainability. For every 10 people added to the global urban population by 2050, nine will live in towns or cities of sub-Saharan Africa and Asia (1). Much of this growth will take place in conditions of material deprivation and weak public governance, often within the slums and informal settlements that dominate the public and policy imagination (2). Globally, around one billion people already live in slum-like conditions (3).

Recognizing the scale of this urban challenge, the Sustainable Development Goals (SDGs) include targets (under SDG 11: the "urban goal") to promote more sustainable and inclusive urbanization and urban growth, involving a reduction in the proportion of urban residents living in slums and informal settlements. However, unless the urbanization of poverty—the trend for poverty to be concentrated in urban rather than rural areas—and the deepening of urban inequalities in LMICs are urgently addressed, both global and national targets for health and wellbeing will be derailed (4).

A starting point for this Research Topic is the conviction that improved access to safe and effective family planning (FP) services can make a major contribution to promoting health and wellbeing, economic development, gender equality, and environmental sustainability in towns and cities of LMICs, and in populations more generally. However, we currently lack adequate and detailed knowledge on the dynamics of FP access and use in urban areas of LMICs. This Research Topic contributes to this growing body of knowledge. All the articles address critical knowledge gaps by examining spatial inequalities in FP access and use, or by conducting studies of vulnerable urban groups.

SPATIAL INEQUALITIES IN FP ACCESS AND USE

The articles included in this issue include several studies of geographic inequalities in FP supply, access and use, in some cases examining the links between geographic and economic inequalities. The authors investigate these distributions and inequalities at a range of scales. The study by Ross, for example, uses Demographic and Health Survey (DHS) data to compare urban and rural patterns of contraceptive use, access to methods, and fertility in six geographic regions. Providing the broader context for more detailed studies of urban contraception and fertility change, Ross helpfully points to the difficulties of making firm conclusions about either "urban advantage" or "urban penalty" when rural/urban dynamics and discrepancies vary so significantly between regions and, indeed, individual countries.

Other articles consider the relationship between FP use and the economic characteristics of urban populations across a range of countries. In their study, Akinyemi et al. find consistent associations between higher levels of women's deprivation and lower rates of contraceptive prevalence in five countries of West Africa—although that picture is far less consistent with respect to long-acting reversible methods in particular. Meanwhile, Hellwig et al. uncover significant differences in the links between economic inequality and the satisfaction of FP demand among a wide range of African countries. Both studies reveal that poorer urban women tend to enjoy lower levels of FP access and use than wealthier groups, but also that the nature of this trend can differ significantly between national contexts, both overall and in relation to specific FP methods.

Several articles offer a more localized and granular understanding of FP access and use by analyzing intra-urban distributions and differences. Tetui et al. analyze urban geographic distributions of FP supply *via* a survey of healthcare facilities in informal settlements of Kira Municipality, north-east of Kampala (Uganda). There, as in many other African settings (see the review by Duminy et al. in this Research Topic), poor urban residents tend to rely on private facilities that provide relatively low levels of access to long-acting contraceptive methods. In the same area, Lukyamuzi et al. focus on differences in the FP quality of care offered in formal and informal settlements, showing that informal residents tend to experience a lower quality of service, and express less satisfaction with that service, than those living in formally-developed areas.

STUDIES OF VULNERABLE GROUPS

With most FP research in LMICs focusing on large urban centers (see the paper by Duminy et al.), we urgently require more knowledge on FP supply and demand in rapidly changing urban contexts, including secondary or medium-sized cities and peri-urban areas.

Three articles in this Research Topic provide insights into dynamics of a particular peri-urban site in the outskirts of Kampala (Uganda). Using a cross-sectional survey design, Birabwa et al. investigate knowledge and information exposure among women living in informal settlements, and conclude that high levels of awareness are not directly associated with rates of FP use. Tetui, Baroudi et al. examine FP demand, use and unmet need in the same area, demonstrating that local levels of unmet need are far higher than those presented by national urban estimates. Using focus group data, Mulubwa et al. focus on understanding the motivations to use contraceptives among young adults and adolescents in informal settlements, noting that motivations vary according to sources of information about contraceptives as well as social norms that deem contraceptive use unacceptable for unmarried adolescents.

In a different vein, Bose et al. offer their reflections on initiatives introduced by the Challenge Initiative in South Asia and Sub-Saharan Africa to improve access to contraception among young people living in urban slums. This was done by offering coaching programmes and the creation of an online learning platform to support city governments. Their work links to ongoing programmatic and research efforts to improve the organization of supply systems to improve FP supply in urban areas (5–7). The paper highlights that capacity building to secure trained and competent personnel to make and implement decisions is a critical precondition for improving the accessibility and use of critical services, like FP, in poorer urban contexts (8, 9).

Two articles in this issue present studies focusing on youthful populations in Conakry (Guinea). A qualitative study by Bangoura et al., drawing upon in-depth interviews and focus groups, provides insights into the experiences and decision-making processes of young people. Taking a similar approach, Dioubaté et al. examine the barriers to contraceptive use facing the youth. Collectively, these findings add to our existing knowledge of the wide range of dilemmas and competing influences that urban residents, especially young people, face in deciding whether or not to employ particular contraceptive methods. In contributing to this knowledge base, this work presents policymakers with specific factors that can be targeted to influence young people's preferences and motivations for FP uptake and use.

THE WAY FORWARD

All the articles assembled in this Research Topic offer insights into under-researched places, groups and phenomena. However, as noted by Duminy et al., significant gaps in our knowledge remain. They argue that future research should prioritize themes such as neighborhoods and poverty, governance, migration and displacement, and resilience. Moreover, there is a need for work examining specific issues such as health systems responsiveness, innovative uses of technology, and cultural dynamism. Meeting these challenges demands an interdisciplinary approach that can inform a closer alignment between the FP and urban

development sectors. This Research Topic of articles is one step in that direction.

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JD led draft writing and revision. OO, MA, and MT reviewed and commented on drafts and approved final submission. All authors contributed to the article and approved the submitted version.

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ORIGINAL RESEARCH
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Geospatial Distribution of Family Planning Services in Kira Municipality, Wakiso District, Uganda

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Introduction: Access to family planning (FP) services remains a challenge, particularly in informal urban settlements. The unmet need for FP in these settings is high, with a correspondingly high prevalence of unintended pregnancies that may lead to unsafe abortions. However, there is a paucity of quality data on the distribution of FP services in such settings in Uganda. This paper described the geospatial distribution of FP services in Kira Municipality, Wakiso District, Uganda.

Methods: This was a cross-sectional study in which we determined the availability and distribution of FP services in Kira Municipality. Community mapping and analysis were conducted using ArcGIS (version 10.1) and ArcGIS Online. Stata version 13.1 was used for data analysis. Chi-square test was used to compare the contraceptive provision and availability among facilities from informal and formal settlements.

Results: Of the 176 healthcare facilities surveyed, only 42% ($n = 74$) offered contraceptives in informal settlements. The majority of the facilities were privately owned small clinics (95%). At least 80% of the facilities provided three or more modern contraceptive methods, with no difference ($p = 0.107$) between facilities in informal and formal settlements. Only 30.7% ($p = 0.001$) of the facilities provided at least one long-acting contraceptive. Similarly, 20 and 12% ($p = 0.001$) of the facilities had implants and intrauterine devices (IUDs) on the day of the survey. Almost 25% of the facilities did not offer contraceptive services (counseling and commodities) to unmarried adolescents.

Conclusions: Most facilities were small privately-owned clinics, offering at least three modern contraceptive methods. The unavailability of long-acting reversible methods in the informal settings may affect the quality of FP services due to limited

choice. The inequity in service provision that disfavors the unmarried adolescent may increase unwanted/unintended pregnancies. We recommend that local governments and partners work toward filling the existing commodities gap and addressing the discrimination against unmarried adolescents in such settings.

Keywords: urban poor, family planning, informal settlements, Kira Municipality, Uganda

INTRODUCTION

Family planning (FP) entails a conscious effort by a couple to limit or space the number of children they have through the use of contraceptive methods. The use of contraceptives is known to lower both maternal and infant mortality risks (1–6). The use of contraceptives also has the potential to reduce disabilities related to complications of pregnancy and childbirth (7). On the other hand, failure to meet the contraceptive needs often results in unintended pregnancies (2, 8). Nonetheless, globally, access to FP services remains a public health challenge. In 2018, it was reported that over 214 million women of reproductive age in developing countries still lacked access to a modern contraceptive method (9).

In 2015, <75 and <50% of the total demand for modern contraceptives in 76 countries and 54 countries (34 of which were in Africa), respectively, were met (10). The unmet need for FP remains the highest in low-income countries (5), with 22% of sexually active women not using a modern contraceptive method even when they desire to (10). Uganda is no exception in terms of the disparities in accessing FP services. Over 28% of currently married women and 32% of sexually active unmarried women have an unmet need for FP (11, 12). This figure falls below the country's commitment to reduce the unmet need for FP to below 10% by 2020 (12, 13). In addition, at least 48% of those who demand for FP in Uganda are not satisfied with modern contraceptive methods, whereas 43% stop using FP methods within 12 months of starting, mainly due to health concerns or fear of side effects and desire to return of fertility (12).

Country-level estimates also indicate that 52% of pregnancies in Uganda are unwanted or mistimed. Over 43% of unintended pregnancies are attributable to the unmet need for FP (11, 12). Unintended pregnancies often result in unplanned births, unsafe abortions, and maternal injury and death (14–17). Despite the negative consequences of unplanned pregnancies (18), women who want to avoid pregnancy still have an unmet need for FP (13).

The limited utilization of modern contraceptives stems from religious and socio-cultural barriers such as uncooperative spouses; perceptions of poor quality of services, limited choice and access to contraceptives (5, 19, 20), users and providers perceptions, and gender-based barriers (9, 21) and fear or experience of side effects (17, 22). Such constraints affect vulnerable populations disproportionately. People living in informal settlement settings are often poor and more vulnerable to adverse health events compared with their other urban counterparts (23).

Increasing urbanization creates a heavy toll on the urban social services that are already severely constrained, owing to a less than proportionate growth of the needed urban planning for the increasing number of residents (23). For example, public health facilities have not increased in number in most urban spaces despite the increasing urbanization. This has created a gap that the private sector has exploited to provide the needed services, including modern contraceptives. With a very mixed health care system that has a weakly regulated private sector in the lead, urban residents often suffer stark quality issues, which often affect the urban poor more severely (24). Ironically, people living in urban places are always assumed to have better access to services and information; hence, interventions targeting urban places are often fewer (25). They are often caught in a series of trial care-seeking practices, which makes them even more vulnerable financially in what (26) called "Money for nothing" in their paper on dire medical practices, especially among the private practitioners. Additionally, existing evidence indicates that the urban poor are faced with even more complex issues related to health care services, including sanitation, reproductive health services in general, and FP specifically (27, 28).

Failure to implement impactful FP programs has led to an increase in infertility rates with its associated outcomes in informal settings (29, 30). An increase in fertility rates is also associated with a reduction in household income (29). To put this into context, over 70% of all urban residents in the Sub-Saharan Africa (SSA) live in informal settlements. These settlements are characterized by extreme poverty and have poor economic, maternal, and child health indicators (29). Mberu et al. (29) point out that child residents in these areas are at a higher risk of suffering from childhood illnesses and malnutrition and bear a disproportionately much higher mortality burden than their counterparts in other urban and rural settings. Within the urban poor, adolescents face unique challenges with regard to access to FP services. Societal norms and beliefs, for instance, limit their access and utilization of FP services, thereby leaving them at an elevated risk of teenage pregnancy and sexually transmitted infections (31).

In addition, existing literature indicates that the cost of transport, misinformation and misconceptions, religious opposition, and provider biases further inhibit access to FP services in informal settlements. However, there is still limited evidence on the availability and distribution of FP services within informal settlements. Yet, geographical information systems (GISs) can be used to improve health service programming in such challenging environments (32, 33). This study, therefore, sought to illustrate the geospatial distribution of FP providers, as well as the different FP services, in Kira Municipality with a

special focus on informal settlements. These findings can be used to inform programs that aim at scaling up access and utilization of FP services.

MATERIALS AND METHODS

Study Setting

The study was undertaken in Kira Municipality in Wakiso District, Uganda. Wakiso District is composed of four municipal councils (Entebbe, Nansana, Kira, and Makindye Sabagabo), nine town councils (Kasanje, Kakiri, Kasangati, Kajjansi, Katabi, Kyengera, Masulita, Namayumba, and Wakiso), and six sub-counties (Bussi, Kakiri, Masulita, Namayumba, Mende, and Wakiso). The study was conducted in Kira Municipality, which was randomly selected from the four municipalities that form Wakiso District. Although the four municipalities are similar in some aspects, such as population, composition, population size, and social economic activities, just like all other urban settings, differences still exist across all social, economic, and political structures (34). Nonetheless, lessons drawn from Kira among the urban poor will still be relevant across other poor urban residents elsewhere. Kira Municipality has a growing population of over 400,000 residents (11). The municipality is divided into three divisions, Namugongo, Bweyogerere, and Kira Divisions. The Bweyogerere and Namugongo Divisions contain the informal settlements within Kira Municipality (**Figure 1**).

Study Design and Data Collection

This was a cross-sectional study in which mapping and data collection was undertaken to locate the FP service points across the entire Kira Municipality. All FP service points in the municipality were targeted for the survey; all those whose caretakers consented (5/181 declined) were included in the study. Our study population therefore, was all FP service points at different levels of service, these included; general hospitals, health centers at levels IV, III, and II, pharmacies, clinics, and drug shops (35) and their caretakers. The data were collected by trained research assistants, who were familiar with Kira Municipality. In addition, local guides who worked at the municipality supported the research assistants to easily identify the facilities for the mapping exercise. KoboCollect, a mobile data collection application, was used to collect the data. Before data collection, the questionnaire was initially pre-tested around the Makerere University area, the area has both formal and informal settlements, which made it ideal, given its similarities with the actual study site. Following the pre-test, to ensure quality, the data entry screen was designed with skips and more restrictions added to ensure the completeness of entry. In addition, secondary mapping data (shapefiles for the administrative units) were obtained from the Uganda Bureau of Statistics spatial data portal (https://www.ubos.org/data-portals-2/).

The general aim of the maps was to show the spatial distribution of the health facilities in addition to producing information that could respond to specific questions, i.e., under what category of ownership are the health facilities that provide FP services?, and what is the level of facilities that provide FP services?

On a daily basis, the completed questionnaires were uploaded to a remote server to which only the principal investigator (PI) and study coordinator had access. The data were kept strictly confidential and later shared with an ArcGIS expert for analysis after removing all possible identifiers.

Data Analysis

The data were downloaded into an Excel spreadsheet from the remote server. The Excel spreadsheet was then exported into a GIS environment as a comma-delimited (.csv) file and later into a vector file that was used to generate the required maps.

Data mapping and analysis were conducted using ArcGIS (version 10.1). Ground-truthing was carried out to relate the features on the ground with those on the satellite image in order to establish the location of informal settlements within Kira Municipality. This involved capturing geographic coordinates of sample spots within the municipality. These coordinates, as well as the shapefile, of Kira Municipality were later overlaid on the base map from ArcGIS that showed the area extent of Kira Municipality. Together with secondary data from the Uganda Bureau of Statistics and the ground-truth data, digitization was done within the GIS environment to create vector data that showed the extent of the informal settlements. Digital forms were designed to collect locational data as well as selected attribute datasets. After data collection, these data were exported to the GIS platform where further spatial analyses were executed using the overlay, buffer, and site selection tools, thus resulting in maps. Additional data on the specific services provided and availability on the day of the survey were analyzed in Stata for Macs version 13.1. Chi-square test was used to compare the contraceptive provision and availability among facilities from informal and formal settlements by assessing the (i) proportion of facilities providing modern contraceptives, (ii) availability of modern contraceptives in facilities, (iii) provision of at least one long-acting reversible modern contraceptives, (iv) provision of at least one short-acting modern contraceptive, (v) availability of intrauterine devices (IUDs) in facilities on the day of the survey, (vi) availability of the implant in facilities on the day of the survey, and (vii) proportion of facilities providing contraceptive services to unmarried adolescents.

RESULTS

Distribution of Healthcare Facilities That Offer Modern Contraceptive Methods in Kira Municipality

About 42% (74/176) of the facilities that offer contraceptives in Kira Municipality are found in informal settlements. In terms of the level of care of the facilities, the majority were small 1–3 roomed facilities or drug shops as indicated in **Figure 2**. Informal settlements had more of the 1–2 roomed (68.4%, 39/57) facilities, whereas formal settlements generally had more of the 3 roomed or bigger facilities (70.6%, 84/119). Over 94% (167/176)

FIGURE 1 | Map of Kira Municipality indicating its geographical demarcations.

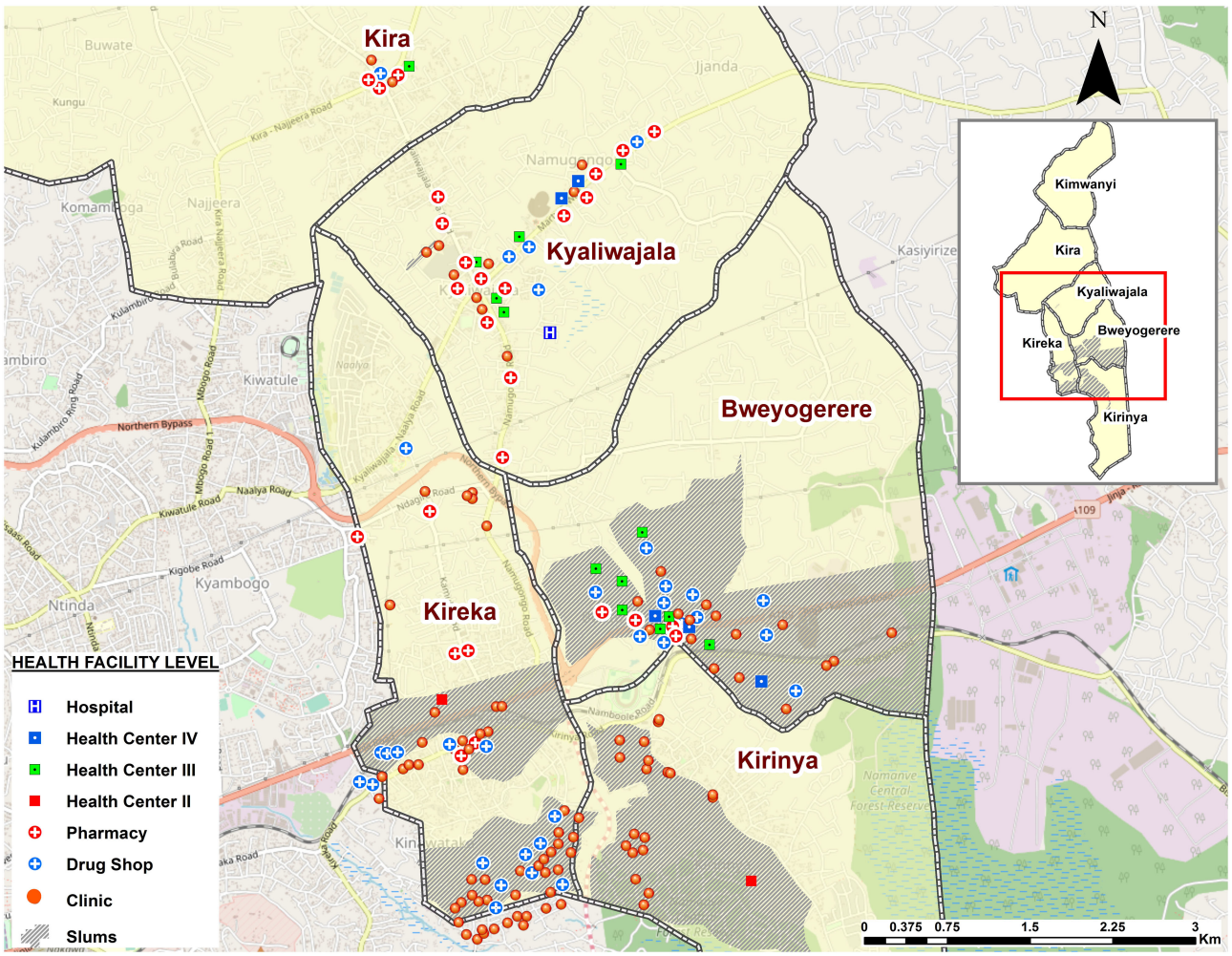

FIGURE 2 | Map illustrating the type of health facilities found in Kira Municipality by level of care.

of the facilities were privately owned, of which 41.9% (70/167) were found in informal settlements. Additionally, 77% reported providing services on every day of the week, out of which 44.9% (79/176) were found in formal settlements, and only 32.4% (57/176) were found in informal settlements.

Delivery of Family Planning Services

The facilities were geographically clustered, with clinics and drug shops in close proximity to each other and off the primary roads and deeper into informal settlements (**Figure 3**), whereas public health facilities (HC-III and -IV) were more in close proximity with pharmacies, especially in and along primary roads (**Figure 2**). In terms of mode of FP service delivery, over 90% (160/176) of the facilities did not provide outreach services as indicated in **Figure 3**. Of these, 43% (69/160) were found in informal settlements. Relatedly, more than 48% (86/176) of the facilities denied the researchers access to their examination rooms and premises for observation. Of the facilities that granted access for observations (51.1%, 90/176) to take place, <30% (25/90) of them had cues for action, such as information, education, and communication (IEC) materials related to FP displayed in their premises of operation. Of the 25 facilities, 56% (14/25) were found in informal settlements.

Provision of Modern Contraceptives

The 81.3% of the facilities reported to providing three or more modern contraceptives. While there was no difference between the facilities in informal and formal settlements in terms of provision of contraceptives, there was a significant difference when it came to the provision of long-acting revisable contraceptives (implants and IUDs). Fewer facilities in informal settlements provided long-acting revisable methods (**Table 1**). Additionally, only three facilities provided permanent methods; all of them were found in formal settlements. The provision of short-acting modern contraceptives was similar in informal and formal settlements (see **Table 1**).

Provision of Modern Contraceptive Services to Unmarried Adolescent Women

In terms of the provision of services to unmarried adolescents, a significant number (24.4%) of facilities did not offer contraceptive services to this group of people. The facilities

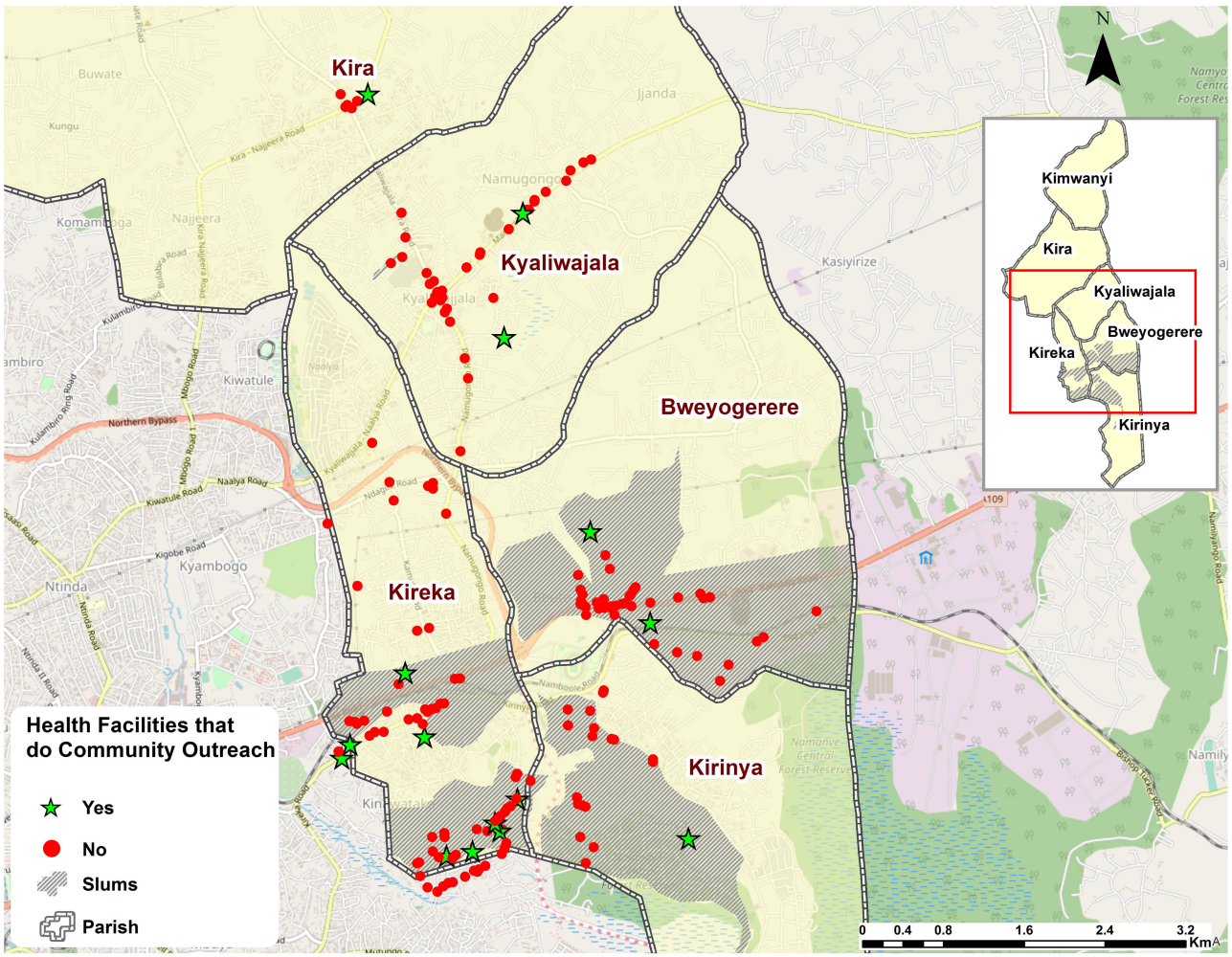

FIGURE 3 | Map showing the facilities that provide out reaches for family planning services.

TABLE 1 | Contraceptive provision and availability among facilities found in informal settlements compared with those in formal settlements.

Variables		Informal settlements	Formal settlements	Overall	Chi2 (*p*-value)
Proportion of facilities providing modern contraceptives	Less than three methods	18 (24.3%)	15 (14.7%)	33 (18.8%)	2.6044 (0.107)
	Three or more methods	56 (75.7%)	87 (85.3%)	143 (81.3%)	
Availability of modern contraceptives in facilities	Less than three methods	40 (54.1%)	46 (45.1%)	86 (48.9%)	1.3767 (0.241)
	Three or more methods	34 (45.9%)	56 (54.9%)	90 (51.1%)	
Provision of at least one long-acting reversible modern contraceptive	No	61 (82.4%)	61 (59.8%)	122 (69.3%)	**10.3235 (0.001)**
	Yes	13 (17.6%)	41 (40.2%)	54 (30.7%)	
Provision of at least one short-acting modern contraceptive	No	8 (10.8%)	7 (6.9%)	15 (8.5%)	0.8574 (0.354)
	Yes	66 (89.2%)	95 (93.1%)	161 (91.5%)	
Availability of the IUD in facilities on the day of the survey	No	20 (90.9%)	82 (54.0%)	102 (58.6%)	**10.8240 (0.001)**
	Yes	2 (9.1%)	70 (46.1%)	72 (41.4%)	
Availability of the implant in facilities on the day of the survey	No	29 (82.9%)	73 (52.5%)	102 (58.6%)	**10.6098 (0.001)**
	Yes	6 (17.1%)	66 (47.5%)	72 (41.4%)	
Proportion of facilities providing contraceptive services to unmarried adolescents	No	19 (25.7%)	24 (23.5%)	43 (24.4%)	0.1070 (0.744)
	Yes	55 (74.3%)	78 (76.5%)	133 (75.6%)	

Statistically significant values are bold.

did not offer counseling about nor the modern contraceptives to these unmarried adolescents. While the majority (75.6%) provided the service to unmarried adolescents, a significant number did not. No significant difference was found between the facilities in the different settlement areas regarding the provision of modern contraceptive services to unmarried adolescents (**Table 1**).

Availability of Modern Contraceptives

On the day of the survey, nearly half (48.9%, 86/176) of the facilities had less than three methods in stock as reported by the respondents. There was no significant difference noted between the areas of settlement when all the methods were put into consideration. However, a look at the availability of long-acting revisable methods indicated that fewer facilities in the informal settlements had both the implant and IUD available on the day of the survey (**Table 1**).

DISCUSSION

This section reflects on the distribution of facilities that provide FP service in and outside informal settlement settings, FP provision infrastructure, mode of delivery of FP services, and types of FP services provided and available on the day of the survey. This study indicates that informal settlements are mainly serviced by drug shops and small clinics. This may not be surprising given the insecure land tenure system that characterizes most informal settlements. Insecure land tenure systems in informal settlements could deter the government and the greater private sector players from investing in the construction of bigger infrastructure, such as hospitals or bigger health centers (36). Besides insecure land tenure systems, investments in such areas may not be as profitable mainly due to the lower socio-economic status of the residents, thereby limiting prospective investors (37–40).

Conversely, much bigger healthcare facilities if constructed in informal settlements would require a large number of staff and higher remuneration. Therefore, due to these operational challenges, service providers often resort to renting small rooms that they use as clinics, or drug shops rather than establishing permanent infrastructure to serve as higher level healthcare facilities, particularly hospitals and health center IVs. Lower-level healthcare facilities can easily enable them to break-even compared with higher level and bigger healthcare facilities. Failure to establish high level healthcare facilities, such as hospitals and health center IVs, has implications on contraceptive choice and the unmet need for FP. For instance, permanent FP methods, such as tubal ligation, vasectomy, and the long-acting revisable methods (IUD and implants), may only be provided in a healthcare facility with an operating room/theater and appropriately trained medical personnel. This is in contrast with the *status quo* in the drug shops and clinics that are widely spread in informal settlements and largely lacking these facilities and personnel.

In this study, majority of healthcare facilities that offer FP services are privately owned. Privately owned healthcare facilities often aim at maximizing profits implying that people residing in these informal settlements have to pay to access contraceptive services, hence limiting accessibility. The majority of the healthcare facilities in informal settlements only offer static FP services, a model that limits access to those who do not have sufficient time to access healthcare facilities, particularly for long-acting contraceptive methods. Having the possibility of offering outreach services could be inhibited by resource constraints given the nature of providers in informal settlements. Outreach services could theoretically increase access to knowledge on the use of contraceptive services given the highly mobile nature of informal settlement residents and the infrastructurally inaccessible locations of the settlements (41, 42).

Dissemination of information regarding the use of the different contraceptive methods remains poor in most low- and middle-income settings. Informal settlements in Kira Municipality are no exception, almost a third of the surveyed healthcare facilities did not display any IEC materials related to FP displayed in their premises of operation. Displaying IEC materials on FP is often an indicator to the clients that a facility offers a particular service (43). In addition, displaying such materials can boost the confidence of the client seeking a contraceptive and may act as a catalyst for further engagement. Having IEC materials displayed in a healthcare facility may also reduce stigma among clients, particularly among adolescents and young people who are often scared of asking for particular FP services. Healthcare facilities that lack such materials are often shunned by adolescents and young people, as well as those who cannot use native languages, such as refugees.

This study reaffirms that contraceptive choice among urban residents is still a big challenge, and more so among people living in informal settlements. Majority of the healthcare facilities in informal settlements offer more than three contraceptive methods. However, the contraceptive method mix was limited, which is in agreement with a finding of Ochako et al., (44), which indicated that the contraceptive choices of women living in Kenyan informal settings were constrained. Limited access to a wide range of contraceptive methods, particularly long-acting revisable and permanent methods, implies that residents of informal settings often have constrained access to contraceptive choices, which could discourage use (45).

Additionally, this limitation to contraceptive choice for women living in formal settings implies that they often have to use short-acting contraceptives, these are known to offer limited protection and increased chances of discontinuation by the users (44). The limited availability of long-acting revisable contraceptive methods in informal settlements could be attributed to their low demand and a low level of knowledge on these methods (46). Which further demonstrates disparities in access between the rich and the poor (47, 48). The use of long-acting revisable contraceptive methods has been found to be more efficacious compared to short-acting methods. An increase in their use is more likely to reduce costs associated with abortions, unwanted pregnancy, and unintended births. Ultimately, increased access to long-acting contraceptives will increase protection and reduce total fertility, therefore giving people living in informal settlements a chance to fight the vicious

circle of poverty that is often exacerbated by large unplanned families (49).

Lastly, a considerable number (25%) of facilities indicated that they do not provide contraceptives to unmarried adolescents. Failure to provide contraceptives to adolescents worsens their vulnerabilities, a situation that is even worse among those living in informal settlements given their social-economic status (50, 51). Because of their comparatively poorer social-economic status, unmarried adolescents living in informal settlements will be more prone to sexual assault and would engage in more risky sexual behavior (52). These risks expose them to unwanted pregnancies and could consequently lead to unsafe abortions and ultimately poorer maternal and neonatal health outcomes, including death (50). Besides, failure to provide counseling services limits adolescents from making informed contraceptive choices and increases chances of increased fertility and its associated lowered standards of living.

Study Limitations

The study did not examine the demand side aspects of contraceptive use in this setting, thereby making it difficult to assess the actual effect of the geographical distribution of FP services on modern contraceptive use.

CONCLUSION AND RECOMMENDATION

Small privately owned service delivery points (clinics), offering at least three modern contraceptive methods, were common in informal urban settings. However, the unavailability of long-acting reversible methods, the inequity in service provision that disfavors the unmarried adolescent, and the clustering of service delivery services may be clear indicators of poor FP quality services that affect choice and physical access. Such quality challenges can increase unwanted/unintended pregnancies in poor settings, especially among the unmarried sexually active adolescents.

Our findings are suggestive of the need for the different FP stakeholders (implementing partners and the ministry of health) to take into account the need to provide a wide range of contraceptives. Similarly, paying keen attention to the access disparities that mainly affect the urban poor and special groups, such as unmarried adolescents, will be imperative.

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 Makerere University School of Public Health Higher Degrees and Research Ethics Committee (HDREC), and the Uganda National Council of Science and Technology (UNCST). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MT conceptualized the study. MT and TS participated in the data collection and drafted the manuscript. JS participated in the data collection, management, and analysis. PA and OF-R supported the data analysis process. LA contributed to the conceptualization of the study. FM provided overall technical guidance to the conceptualization process and participated in drafting the manuscript. All authors reviewed the manuscript, provided substantial input, and approved the final manuscript.

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Knowledge and Information Exposure About Family Planning Among Women of Reproductive Age in Informal Settlements of Kira Municipality, Wakiso District, Uganda

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Introduction: A high unmet need for family planning (FP) prevails in sub-Saharan Africa. Knowledge, awareness creation, and ensuring accessibility are frequently used to increase FP uptake. However, evidence on knowledge or information dissemination about FP among marginalized populations in urban settings in Africa is limited. This study explored the knowledge of FP methods, media exposure, and contact with FP providers among women from an informal settlement in Uganda.

Methods: Using a cross-sectional study design, we interviewed 626 women aged 15–49 years living in informal settlements of Kira municipality, selected through multistage sampling. Using a standard questionnaire, data was collected on socioeconomic characteristics, knowledge of FP methods, and access to media FP messages among others. Binomial log-linear regression was used to assess disparities in exposure to media FP messages or provider information. Data were analyzed using STATA version 14, at a 5% level of statistical significance.

Results: Nearly all women in the survey were aware of FP methods (99.7%). On average, each woman was aware of 10 FP methods. The most commonly known methods were male condoms (98.2%), injectables (97.4%), and the oral contraceptive pill (95.2%). Use of any contraceptive was found among 42.7% of respondents. Exposure to media was found in 70.6% of the respondents, mostly through television (58.5%) and radio (58.3%). Discussing FP with a provider was significantly associated with media exposure (aPR 1.4, 95% CI: 1.24–1.56). Less than 50% of women who were not using FP had contact with an FP provider. Women in union (aPR 1.6, 95% CI: 1.01–2.68) and those with access

to media messages (aPR 2.5, 95% CI: 1.37–4.54) were more likely to have contact with a provider to discuss FP.

Conclusion: There is high general awareness about FP methods and media exposure, but method use was low. Further exploration of women's understanding of FP methods and the fit between existing education programs and FP knowledge needs in this urban setting should be conducted. The potential for mobile health solutions in this urban population should be explored. Future studies should focus on the knowledge and understanding of FP among unmarried and nulliparous women and those with no access to media information.

Keywords: knowledge, media exposure, family planning, informal settlements, Uganda

INTRODUCTION

The world is fast urbanizing, and it is estimated that, by 2050, two thirds of the global population will be urban (1, 2). Sub-Saharan Africa is the fastest urbanizing region in the world, yet about 70% of its urban population resides in informal settlements (3, 4). Urban areas have conventionally been reported to have higher modern contraception use and lower unmet need for family planning (FP), attributable to better exposure to, proximity to, and diversity of services (5, 6). However, previously reported rural–urban differences are decreasing, and growing intra-urban inequalities are driving poor outcomes among urban residents (7). The poor in informal urban settlements suffer the greatest brunt of health inequity occasioned by a poor living environment, social exclusion, and fewer opportunities for socioeconomic empowerment (8, 9). Unfortunately, most health indicators, including FP measures, of this subpopulation are often masked in general urban averages (5).

In Uganda, the urban population has grown over the years and is currently estimated at 9.4 million (10). This, in part, is attributed to high fertility coupled with an unmet need for FP of about 23% and rural–urban migration (6). Furthermore, poor contraceptive behaviors, such as FP discontinuation, and missed opportunities for counseling and promoting FP uptake have also been reported to limit effectiveness of FP (11). Fertility among residents of informal settlements is high with poorer birth outcomes compared with well-off urban dwellers or rural counterparts (3, 12–14). Studies also indicate that living in informal settlements negatively affects women's ability to control their fertility (15–17). Therefore, access to and utilization of FP information and services is important to persons living in informal settlements. This is critical in the quest for universal access to sexual and reproductive health information, education, and services for the 2030 Agenda (18).

Knowledge of FP is nearly universal in Uganda at more than 98% in urban or rural areas, and health providers are the most trusted source of FP information (6, 19). Some studies show positive correlation between FP knowledge and sociodemographic factors, such as marital status and gender (20), although others indicate no such association (6). Having knowledge of FP is expected to modify contraceptive behaviors, and earlier studies report a positive relationship between knowledge and media exposure to FP messages with increased acceptance and use of contraceptives (21–24). Media exposure to FP information among Ugandans is mainly through radio, television, and newspaper at 65, 20, and 11%, respectively (6). Residing in urban areas, age, and being educated or employed are associated with higher media exposure (6, 25, 26). However, few studies have explored knowledge of and information dissemination for FP in residents of informal settlements in Uganda. Lack of such context-specific information limits the capacity of programming and policy making to effectively meet the unmet need for FP in these vulnerable subpopulations.

The aim of this study was to assess the knowledge of FP methods and the level and determinants of FP information dissemination through mass media among all women and FP providers among non-users of contraception in an informal urban settlement in Wakiso, Uganda. This information informs efforts geared toward creating demand and strengthening women's ability to independently make and act on decisions regarding contraceptive use (contraceptive autonomy) through information.

MATERIALS AND METHODS

Study Design and Setting

We used a cross-sectional study design among informal settlements in Kira municipality, Wakiso district, Uganda. Kira municipality is located ∼5.3 km by road, East of Kampala, and is made up of three divisions, namely; Kira, Bweyogerere, and Namugongo, which occupy a total land area of about 98.83 km^2. The municipality is characterized by a high population, which has, in turn, compromised physical planning and effective delivery of social services, including health care. The rapid population growth in Kira municipality has resulted in the growth of informal settlements, whose inhabitants have low socioeconomic status and reside in poor household structures.

Study Population and Data Collection

The survey targeted sexually active women of reproductive age (15–49 years) who were living in the informal settlements of Kira. Women who were not residents of Kira municipality and those who had not stayed in Kira for at least 6 months prior to the survey were not included. A sample size of 627 was computed

using the Kish Leslie formula for cross-sectional studies. A prevalence of 52.1% for modern contraceptive use in an urban setting was used (6) at a 95% level of confidence and 5% margin of error. This yielded a minimum sample size of 377. This was adjusted for 10% non-response, bringing the sample size to 418. In addition, a design effect of 1.5 was applied to cater to the distribution of the sample across two divisions that had informal settlements in Kira municipality, giving a final sample size of 627 participants. However, data was collected from 626 respondents on whom analysis was performed.

Participants were selected through multistage sampling. Two divisions were purposely selected based on the presence of informal settlements. Within these two divisions, eight villages were found within the informal settlements of which four were randomly selected to be study sites. A list of enumeration areas (EAs) used by the Uganda Bureau of Statistics was then used to identify EAs that fell within the four selected villages. A total of 65 EAs were obtained of which 13 were randomly selected. Within these EAs, a listing of all households with eligible women was obtained. A simple random sample of households, equal to the required sample size, was selected from the listed households. The sample size was equally distributed across the 13 EAs, giving an average of about 49 respondents from each.

A standard questionnaire by Performance Monitoring and Accountability (PMA) was used. This PMA questionnaire is consistent with the demographic health survey women's questionnaire, which has already been validated. Data on sociodemographic characteristics of women, birth history, pregnancy, sexual and contraception history, and women's contraceptive decision-making power was collected. Contraception history captured data on knowledge of FP methods, ever and current use of contraception, knowledge of source and reported exposure to FP information through media channels, and community/facility counseling services, among other information. The tool was uploaded on the KoboCollect mobile application, which was used by the data collectors. The research assistants uploaded the collected data to the server daily. Upon submission of the data to the server, the investigators and the data managers conducted quality control checks on key variables, such as age to ascertain their correctness.

Quality Control

Research assistants were trained on the research protocol and ethical issues surrounding the study to ensure quality data collection. A pretest of the data collection tools was conducted in Katanga, an informal settlement located in Uganda's main city of Kampala. Katanga was selected as the ideal pretest site because it has similar characteristics as the selected EAs in Kira municipality, such as being densely populated with a majority of inhabitants living below the poverty line in poor housing structures.

Measures

Knowledge of FP was defined as ever hearing about at least one (any) FP method. Women were asked if they had ever heard about 13 methods of FP, coded as one (yes) and zero (no). Exposure to FP information was assessed for the general population of women surveyed and also specific for women who were not using FP. Among all women surveyed, media exposure was defined as the percentage of all women who had heard or seen an FP message on the radio, television, in a newspaper or magazine, or on a mobile phone in the past few months prior to the interview or in none of the four media sources. A dichotomous variable was generated and coded as being exposed (one) or not exposed (zero). For the women who were not using FP, contact with FP providers was used to assess reach of FP information. This was defined as the percentage of women who were not using contraception, who were visited by a field worker who discussed FP, who visited a health facility and discussed FP, who visited a health facility but did not discuss FP and who did not discuss FP with a field worker during the 12 months preceding the survey.

We also included sociodemographic and other factors to examine variations in access to FP information through media. These were woman's age, education, marital status and decision-making power, ever giving birth, parity, fertility preferences, and wantedness of the last birth the woman had as well as contact with an FP provider. The woman's decision-making power was measured by her ability to (1) tell her partner about contraception use and (2) tell her partner if she did not desire to have sexual intercourse as well as her ability (3) to use contraception when desired and (4) to avoid sexual intercourse if she did not desire to have it. Women were categorized as empowered if they were able to do all four actions. Contact with FP providers included being visited by a field FP worker and discussing FP with a health worker when the woman visited a health facility.

Contraceptive use and discontinuation as well as intention to use FP were explored in relation to media exposure. Contraceptive use was measured as women who reported use of FP at the time of the survey (currently using FP). Discontinuation referred to women who had stopped using their current method of FP at the time of the survey, and intention to use FP was defined as women who reported not using FP at the time of the survey but were planning to use FP in the future.

Data Analysis

Descriptive statistics, including frequencies and proportions, were used to summarize the categorical variables and examine their distribution by level of media exposure to FP messages. Media exposure was assessed by specific channel and as a composite of all channels. The composite variable was used to assess disparities in access to FP information through media and to explore the relationship between exposure to FP information through media and contraceptive use, demand for FP, contraceptive intentions, and discontinuation. Bivariate and multivariate binomial log-linear regression analysis (27) was performed using prevalence ratios to examine the relationship between media exposure and selected variables at a 5% level of significance. The multivariable model included variables that were significant in the bivariate analysis. Variation in contact of women who were not using contraception with FP providers was assessed using binomial log-linear regression. All analyses were conducted using STATA 14.

TABLE 1 | Characteristics of the study population.

Variable	Category	Number (%)
Currently using FP	No	359 (57.3)
	Yes	267 (42.7)
Intention to use	No	25 (18.5)
	Yes	110 (81.5)
Discontinued FP use	No	229 (56.8)
	Yes	174 (43.2)
Age (years)	15-24	226 (36.1)
	25–34	270 (43.1)
	35–49	130 (20.8)
Education level	No education	39 (6.3)
	Primary	235 (37.8)
	Secondary and higher	347 (55.9)
Marital status	Formerly/never in union	158 (25.4)
	Currently married/in union	463 (74.6)
Ever given birth	No	117 (18.7)
	Yes	509 (81.3)
Parity	Only 1	138 (27.1)
	2–3	235 (46.2)
	>3	136 (26.7)
Wantedness of last birth	No child	66 (12.97)
	Later	96 (18.86)
	Then	344 (67.58)
Fertility preference	No child/can't get pregnant	142 (24.5)
	Another child/undecided	424 (73.1)
Contact with FP	No	293 (46.8)
provider	Yes	333 (53.2)
Woman's decision-making power	No power	61 (9.7)
	Have power	565 (90.3)

TABLE 2 | Knowledge of contraceptive methods and where to access contraceptive methods.

Method	Number (percent)
Any FP method	**624 (99.7)**
Any FP method besides condoms	623 (99.5)
Any modern method	624 (99.7)
Long-acting reversible contraceptives	**574 (91.7)**
Intra-uterine device	508 (81.2)
Implant	564 (90.1)
Short-acting reversible contraceptives	**623 (99.5)**
Injectables	610 (97.4)
Oral contraceptive pill	596 (95.2)
Male condom	615 (98.2)
Female condom	446 (71.3)
Spermicides (foam/jelly)	91 (14.5)
Permanent methods	
Female sterilization	446 (71.3)
Male sterilization	388 (61.98)
Other modern methods	
Lactational amenorrhea	407 (65.0)
Diaphragm	139 (22.2)
Emergency contraception	472 (75.4)
Standard days/beads	357 (57.0)
Traditional methods	
Rhythm	394 (62.9)
Withdrawal	545 (87.1)
Mean number of methods known per woman	10.7
Know where to get FP services	
No	50 (7.99)
Yes	576 (92.0)
Number of women interviewed	626

The bold values are overall percentages for knowledge of any method, long and short acting methods.

RESULTS

Background Characteristics of Respondents

A total of 626 women were interviewed in the survey. The mean age of the participants was 28.1 (±7.6) years. The youth, aged 15–24 years, represented 36.1% of all women in the survey (**Table 1**). Most (55.9%) respondents had attended secondary or a higher level of education, and nearly 75% were currently married or living with a man.

Knowledge of FP Methods and Source

Nearly all (99.7%) women in the survey reported ever hearing about at least one (any) FP or modern contraceptive method (**Table 2**). After removing use of condoms (given their dual role of FP and prevention of HIV/STIs), awareness of FP methods remained high at 99.5%. On average, each woman had ever heard of 10 methods of FP. The most commonly known methods were male condoms (98.2%), injectables (97.4%), oral contraceptive pills (95.2%), and implants (90.1%), and the least known were spermicides (14.5%) and the contraceptive diaphragm (22.2%). More than 90% of all women reported to know where they could obtain modern FP methods.

Exposure to FP Information

Seventy percent of all women in the survey had been exposed to FP messages, mainly through radio (58.3%) and television (58.5%) (**Table 3**). The media channel with the lowest exposure was mobile phones at 10%. Women who were using FP at the time of the survey had mostly (67.0%) been exposed through television, and those who had intentions of using FP had been exposed through radio (61.8%). Adolescents and young women (15–24 years) had mostly (53.1%) been reached through television, and women who had contact with FP providers had largely (71.5%) been exposed through radio.

Contact of Non-users With FP Providers

The study included 222 women who were not using FP at the time of the survey or ever. Of these, 109 (49.1%) were aged between 15 and 24 years, 107 (48.2%) were sexually active, 120 (54.1%) had attained a secondary or higher education level, and 130 (58.56%) were married or in a union at the time of the survey.

TABLE 3 | Exposure to FP information by channel and respondent characteristics.

Covariate	Radio			Television			Newspaper/magazine			Mobile phone			Overall*	
	No	Yes	NA	No	Yes	NA	No	Yes	NA	No	Yes	NA	No	Yes
Currently using FP														
No	53 (38.7)	81 (59.1)	3 (2.2)	47 (34.3)	70 (51.1)	20 (14.6)	99 (72.3)	26 (19.0)	12 (8.8)	121 (88.3)	12 (8.8)	4 (2.9)	39 (28.5)	98 (71.5)
Yes	104 (39.0)	154 (57.7)	9 (3.4)	68 (25.5)	179 (67.0)	20 (7.5)	188 (70.4)	45 (16.9)	34 (12.7)	248 (92.9)	7 (2.6)	12 (4.5)	71 (26.6)	196 (73.4)
Intention to use FP														
No	12 (48.0)	11 (44.0)	2 (8.0)	10 (40.0)	12 (48.0)	3 (12.0)	17 (68.0)	4 (16.0)	4 (16.0)	22 (88.0)	2 (8.0)	1 (4.0)	10 (40.0)	15 (60.0)
Yes	41 (37.3)	68 (61.8)	1 (0.9)	37 (33.6)	56 (50.9)	17 (15.5)	82 (74.5)	20 (18.2)	8 (7.3)	99 (90.0)	8 (7.3)	3 (2.7)	29 (26.4)	81 (73.6)
Discontinued FP use														
No	89 (38.9)	137 (59.8)	3 (1.3)	59 (25.8)	157 (68.6)	13 (5.7)	160 (69.9)	42 (18.3)	27 (11.8)	208 (90.8)	12 (5.2)	9 (3.9)	55 (24.0)	174 (76.0)
Yes	68 (39.1)	97 (55.7)	9 (5.2)	56 (32.2)	91 (52.3)	27 (15.5)	126 (72.4)	29 (16.7)	19 (10.9)	160 (92.0)	7 (4.0)	7 (4.0)	55 (31.6)	119 (68.4)
Age (years)														
15–24years	109 (48.2)	111 (49.1)	6 (2.7)	82 (36.3)	120 (53.1)	24 (10.6)	165 (73.0)	32 (14.2)	29 (12.8)	194 (85.8)	20 (8.8)	12 (5.3)	82 (36.3)	144 (63.7)
25–34years	94 (34.8)	168 (62.2)	8 (3.0)	78 (28.9)	165 (61.1)	27 (10.0)	194 (71.9)	52 (19.3)	24 (8.9)	242 (89.6)	19 (7.0)	9 (3.3)	68 (25.2)	202 (74.8)
35–49years	39 (30.0)	86 (66.2)	5 (3.8)	36 (27.7)	81 (62.3)	13 (10.0)	70 (53.8)	39 (30.0)	21 (16.2)	102 (78.5)	23 (17.7)	5 (3.8)	34 (26.2)	96 (73.8)
Education level														
No education	15 (38.5)	21 (53.8)	3 (7.7)	12 (30.8)	22 (56.4)	5 (12.8)	27 (69.2)	7 (17.9)	5 (12.8)	3 2(82.1)	5 (12.8)	2 (5.1)	14 (35.9)	25 (64.1)
Primary	97 (41.3)	130 (55.3)	8 (3.4)	69 (29.4)	138 (58.7)	28 (11.9)	151 (64.3)	38 (16.2)	46 (19.6)	208 (88.5)	13 (5.5)	14 (6.0)	71 (30.2)	164 (69.8)
Secondary and higher	128 (36.9)	211 (60.8)	8 (2.3)	112 (32.3)	204 (58.8)	31 (8.9)	247 (71.2)	77 (22.2)	23 (6.6)	294 (84.7)	43 (12.4)	10 (2.9)	97 (28.0)	250 (72.0)
Marital status														
Formerly/never in union	68 (43.0)	83 (52.5)	7 (4.4)	61 (38.6)	80 (50.6)	17 (10.8)	117 (74.1)	21 (13.3)	20 (12.7)	136 (86.1)	14 (8.9)	8 (5.1)	61 (38.6)	97 (61.4)
Currently married/in union	171 (36.9)	280 (60.5)	12 (2.6)	132 (28.5)	284 (61.3)	47 (10.2)	309 (66.7)	100 (21.6)	54 (11.7)	399 (86.2)	46 (9.9)	18 (3.9)	120 (25.9)	343 (74.1)
Ever given birth														
No	49 (41.9)	62 (53.0)	6 (5.1)	43 (36.8)	60 (51.3)	14 (12.0)	77 (65.8)	22 (18.8)	18 (15.4)	94 (80.3)	17 (14.5)	6 (5.1)	45 (38.5)	72 (61.5)
Yes	193 (37.9)	303 (59.5)	13 (2.6)	153 (30.1)	306 (60.1)	50 (9.8)	352 (69.2)	101 (19.8)	56 (11.0)	444 (87.2)	45 (8.8)	20 (3.9)	139 (27.3)	370 (72.7)
Parity														
Only 1	56 (40.6)	81 (58.7)	1 (0.7)	43 (31.2)	86 (62.3)	9 (6.5)	107 (77.5)	22 (15.9)	9 (6.5)	119 (86.2)	14 (10.1)	5 (3.6)	34 (24.6)	104 (75.4)
2–3	91 (38.7)	141 (60.0)	3 (1.3)	70 (29.8)	146 (62.1)	19 (8.1)	153 (65.1)	60 (25.5)	22 (9.4)	201 (85.5)	27 (11.5)	7 (3.0)	62 (26.4)	173 (73.6)
>3	46 (33.8)	81 (59.6)	9 (6.6)	40(29.4)	74 (54.4)	2 2(16.2)	92 (67.6)	19 (14.0)	25 (18.4)	124 (91.2)	4 (2.9)	8 (5.9)	43 (31.6)	93 (68.4)
Wantedness of last birth														
No child	21 (31.8)	41 (62.1)	4 (6.1)	21 (31.8)	36 (54.5)	9 (13.6)	35 (53.0)	22 (33.3)	9 (13.6)	47 (71.2)	18 (27.3)	1 (1.5)	23 (34.8)	43 (65.2)
Later	37 (38.5)	58 (60.4)	1 (1.0)	30 (31.2)	55 (57.3)	11 (11.5)	73 (76.0)	17 (17.7)	6 (6.2)	79 (82.3)	14 (14.6)	3 (3.1)	27 (28.1)	69 (71.9)
Then	134 (39.0)	202 (58.7)	8 (2.3)	100 (29.1)	214 (62.2)	30 (8.7)	243 (70.6)	60 (17.4)	41 (11.9)	316 (91.9)	12 (3.5)	16 (4.7)	89 (25.9)	255 (74.1)
Fertility preference														
No child/can't get pregnant	58 (40.8)	77 (54.2)	7 (4.9)	41 (28.9)	84 (59.2)	17 (12.0)	92 (64.8)	24 (16.9)	26 (18.3)	130 (91.5)	5 (3.5)	7 (4.9)	48 (33.8)	94 (66.2)
Another child/undecided	159 (37.5)	256 (60.4)	9 (2.1)	130 (30.7)	254 (59.9)	40 (9.4)	294 (69.3)	85 (20.0)	45 (10.6)	359 (84.7)	49 (11.6)	16 (3.8)	114 (26.9)	310 (73.1)
Contact with FP provider														
No	150 (51.2)	127 (43.3)	16 (5.5)	113 (38.6)	136 (46.4)	44 (15.0)	209 (71.3)	27 (9.2)	57 (19.5)	270 (92.2)	3 (1.0)	20 (6.8)	124 (42.3)	169 (57.7)
Yes	92 (27.6)	238 (71.5)	3 (0.9)	83 (24.9)	230 (69.1)	20 (6.0)	220 (66.1)	96 (28.8)	17 (5.1)	268 (80.5)	59 (17.7)	6 (1.8)	60 (18.0)	273 (82.0)
Woman's decision-making power														
No power	27 (44.3)	30 (49.2)	4 (6.6)	24 (39.3)	28 (45.9)	9 (14.8)	42 (68.9)	11 (18.0)	8 (13.1)	47 (77.0)	10 (16.4)	4 (6.6)	27 (44.3)	34 (55.7)
Have power	215 (38.1)	335 (59.3)	15 (2.7)	172 (30.4)	338 (59.8)	55 (9.7)	387 (68.5)	112 (19.8)	66 (11.7)	491 (86.9)	52 (9.2)	22 (3.9)	157 (27.8)	408 (72.2)

**Percentage of all women who heard, saw, or read an FP message on the radio, television, or in a newspaper/magazine, or mobile phone.*

TABLE 4 | Contact of non-users of contraception with FPg providers by respondent characteristics.

Background characteristics	Visited by a field worker		Visited HF and discussed FP		Overall contact	
	Yes *n* (%)	No *n* (%)	Yes *n* (%)	No *n* (%)	Yes *n* (%)	No *n* (%)
Overall	57 (25.7)	161 (72.5)	96 (83.5)	19 (16.5)	107 (48.2)	115 (51.8)
Age (years)						
15–24	21 (19.3)	85 (77.98)	45 (83.3)	9 (16.7)	51 (46.8)	58 (53.2)
25–34	14 (22.95)	47 (77.1)	28 (87.5)	4 (12.5)	29 (47.5)	32 (52.5)
35–49	22 (42.3)	29 (55.8)	23 (79.3)	6 (20.7)	27 (51.9)	25 (48.1)
Education level						
No education	6 (35.3)	11 (64.7)	6 (85.7)	1 (14.3)	7 (41.2)	10 (58.8)
Primary	21 (26.3)	58 (72.5)	29 (80.6)	7 (19.4)	34 (42.5)	46 (57.5)
Secondary and higher	28 (23.3)	91 (75.8)	59 (84.3)	11 (15.7)	64 (53.3)	56 (46.7)
Marital status						
Formerly/never in union	10 (11.4)	76 (86.4)	27 (72.97)	10 (27.0)	28 (31.8)	60 (68.2)
Currently married/in union	46 (35.4)	83 (63.9)	68 (88.3)	9 (11.7)	78 (60.0)	52 (40.0)
Sexually active						
No	24 (20.9)	88 (76.5)	48 (80.0)	12 (20.0)	53 (46.1)	62 (53.9)
Yes	33 (30.8)	73 (68.2)	48 (87.3)	7 (12.7)	54 (50.5)	53 (49.5)
Ever given birth						
No	15 (19.2)	61 (78.2)	24 (80.0)	6 (20.0)	28 (35.9)	50 (64.1)
Yes	42 (29.2)	100 (69.4)	72 (84.7)	13 (15.3)	79 (54.9)	65 (45.1)
Parity						
Only 1	10 (18.5)	42 (77.8)	30 (96.8)	1 (3.2)	30 (55.6)	24 (44.4)
2–3	27 (44.3)	34 (55.7)	33 (82.5)	7 (17.5)	39 (63.9)	22 (36.1)
>3	5 (17.2)	24 (82.8)	9 (64.3)	5 (35.7)	10 (34.5)	19 (65.5)
Media exposure						
No	7 (9.5)	63 (85.1)	14 (58.3)	10 (41.7)	18 (24.3)	56 (75.7)
Yes	50 (33.8)	98 (66.2)	82 (90.1)	9 (9.9)	89 (60.1)	59 (39.9)
Woman's decision-making power						
No power	9 (22.5)	30 (75.0)	16 (72.7)	6 (27.3)	19 (47.5)	21 (52.5)
Have power	48 (26.4)	131 (71.98)	80 (86.0)	13 (13.98)	88 (48.4)	94 (51.6)

Table 4 shows that only 26% of the women who were not using FP were reached by a field worker in regard to FP, and 84% of the 115 women who were not using contraception and had visited a health facility reported discussing FP with a health worker. More than 50% of women not using FP were neither reached by a field worker nor told about FP when they visited a health facility.

Factors Associated With Exposure to FP Information

From the bivariate analysis, the woman's age, marital status, history of ever giving birth, discussing FP with a field or health worker, and the woman's decision-making power were significantly associated with a higher prevalence of being exposed to FP messages through media (**Table 5**). After adjusting for statistically significant factors from the bivariate analysis (age, marital status, ever giving birth, receiving FP counseling from a field or health worker, and the woman's decision-making power), only discussing FP with a field or health worker remained significant. The proportion of women who have been exposed to FP messages through media was 1.4 times higher if the woman had discussed FP with a field or health worker (aPR 1.4, 95% CI: 1.24–1.56).

Factors Associated With Contact of Non-contracepting Women With FP Providers

Table 6 shows the relationship between overall contact of non-contracepting women with either a field or health worker and sociodemographic factors. The bivariate analysis shows higher prevalence of FP provider counseling among women who were married or in union, women that had ever given birth, and those that had been exposed to media messages. After controlling for the woman's age, education level, marital status, ever giving birth, parity, media exposure, and decision-making power, counseling by an FP provider was associated with marital status and having been exposed to media messages. Prevalence of being counseled by FP providers was 1.6 times higher among women who were married or in union (aPR 1.6, 95% CI: 1.01–2.68) and 2.5 times higher among women who reported receiving FP messages through media (aPR 2.5, 95% CI: 1.37–4.54) compared with those

TABLE 5 | Factors associated with exposure to family planning messages through media*.

Variable	Category	Crude PR (CI)	Adjusted PR
Current using FP	No	Ref	
	Yes	1.0 (0.90–1.17)	
Intention to use FP	No	Ref	
	Yes	1.2 (0.87–1.72)	
Discontinued use of FP	No	Ref	
	Yes	0.9 (0.80–1.02)	
Age (years)	15–24	Ref	Ref
	25–34	**1.2 (1.04–1.32)**	1.1 (1.00–1.28)
	35–49	**1.2 (1.01–1.34)**	1.1 (0.99–1.32)
Education level	No education	Ref	
	Primary	1.1 (0.85–1.40)	
	Secondary and higher	1.1 (0.88–1.43)	
Marital status	Formerly/never in union	Ref	Ref
	Currently married/in union	**1.2 (1.05–1.38)**	1.1 (0.93–1.23)
Ever given birth	No	Ref	Ref
	Yes	**1.2 (1.01–1.38)**	0.97 (0.82–1.16)
Parity	Only 1	Ref	
	2–3	0.98 (0.86–1.10)	
	>3	0.9 (0.78–1.05)	
Wantedness of last birth	No child	Ref	
	Later	1.1 (0.89–1.37)	
	Then	1.1 (0.94–1.37)	
Fertility preference	No child/can't get pregnant	Ref	
	Another child/ undecided	1.1 (0.97–1.26)	
Contact with FP provider	No	Ref	Ref
	Yes	**1.4 (1.27–1.59)**	**1.4 (1.24–1.56)**
Woman's decision-making power	No power	Ref	Ref
	Have power	**1.3 (1.03–1.63)**	1.2 (0.95–1.48)

PR, prevalence ratio; CI, confidence interval.
**Includes all four media channels of radio, television, newspaper/magazine, and mobile phone.*
Bold values are the significant values.

TABLE 6 | Factors associated with FP counseling among non-users of contraception.

Variable	Category	Crude PR (CI)	Adjusted PR
Age (years)	15–24	Ref	Ref
	25–34	1.0 (0.73–1.42)	0.8 (0.57–1.14)
	35–49	1.1 (0.80–1.54)	0.99 (0.67–1.49)
Education level	No education	Ref	Ref
	Primary	1.0 (0.55–1.92)	1.0 (0.60–1.71)
	Secondary and higher	1.3 (0.72–2.34)	1.1 (0.69–1.85)
Marital status	Formerly/never in union	Ref	Ref
	Currently married/in union	**1.9 (1.35−2.64)**	**1.6 (1.01–2.68**)
Sexually active	No	Ref	
	Yes	1.1 (0.83–1.44)	
Ever given birth	No	Ref	
	Yes	**1.5 (1.10–2.13)**	
Parity	only 1	Ref	Ref
	2–3	1.2 (0.85–1.56)	1.0 (0.75–1.44)
	>3	0.6 (0.36–1.08)	0.7 (0.37–1.23)
Media exposure	No	Ref	Ref
	Yes	**2.5 (1.62–3.77)**	**2.5 (1.37–4.54)**
Woman's decision-making power	No power	Ref	Ref
	Have power	1.0 (0.71–1.46)	0.8 (0.59–1.20)

PR, prevalence ratio; CI, confidence interval.
Bold values are the significant values.

who were not married or in union and those who reported no exposure to media FP messages, respectively.

DISCUSSION

A household survey was conducted to explore knowledge and use of FP among women living in an informal settlement in Uganda. In this study, we assessed the knowledge of the women about FP methods and the prevalence of media exposure to FP messages. We also examined FP counseling for women who were not using contraception at the time of the survey by FP providers. Findings reveal high levels of knowledge of FP methods and where to obtain them but a low prevalence of use and high levels of exposure to media-based FP information but low utilization of a mobile phone channel. In addition, we found low provider-based dissemination of FP information among non-contracepting women, particularly unmarried women and those with no media exposure to FP information.

Increasing knowledge of FP is continuously emphasized in many FP programs as a strategy for increasing uptake or creating demand for FP. Indeed, it has been posited as a key component in effecting behavior change (28, 29). Knowledge about contraception influences perceived benefits or barriers of contraception use, which, in turn, influence contraceptive behaviors of individuals, including method choice (30). The high percentage of all women who knew any FP method and supply source for modern contraceptives found in this study suggests the presence of some cognitive accessibility to FP services in this urban population. This may be explained by the exposure to media messages about FP or discussion of FP by health care workers during client encounters. Also, informal discussions in the women's networks, including discussions with their partners, are potential catalysts to women's knowledge of FP methods. High knowledge of FP methods among users has been widely reported in sub-Saharan Africa (31–33). Our study results also show higher awareness of short-acting compared with long-acting reversible contraceptives. This presents a potential risk for increased occurrence of unintended pregnancies secondary to inconsistent use of short-acting methods (34).

Similar to our finding, studies assessing knowledge and use of contraception have shown a much lower percentage of all women using any contraceptive compared with those who report

knowing any FP method (32, 33, 35). However, assessment of knowledge in this study was limited to a woman ever hearing about a specific method, which may not be a complete reflection of the women's understanding of the methods. Contraceptive use is influenced by a wide range of factors, including misconceptions and sociocultural norms (36, 37). The recurrently observed difference between knowledge and use of any contraception calls for further exploration of users' understanding of FP methods and the fit between existing education programs and users' knowledge needs on FP (28). This would involve assessing issues such as content of information disseminated to the women and capacity of women to process, translate, and use the information. Obtaining such information would help design improved programs to support uptake and correct use of FP. Sustainable Development Goal 3.7 aims at ensuring universal access to sexual and reproductive health, including FP. According to the United Nation's population division, the target is to have 75% of existing demand for FP being satisfied by modern methods (18). Tilahun et al. (35) highlight the inadequacy of awareness about contraceptives in meeting FP need and indicate that formal education increases the likelihood of having good knowledge of contraceptives.

Nonetheless, we acknowledge that achieving behavior change requires more than increasing people's knowledge and understanding of FP. Thus, implementation of other complementary strategies such as community group engagement (CGE) and training user groups to impart skills for correct use, as well as creating an enabling environment to support adoption of desirable behaviors, should also be considered (38, 39). With a focus on perceived local drivers and barriers, CGE in dialogue and action is a recognized high-impact practice in FP for behavior change that has the promise to improve women's and men's FP knowledge, improve women's decision-making power, and fostering family or social changes (40). Specifically looking at adolescents and young people within urban spaces, they face various FP challenges and play a wide range of roles, including students, laborers, spouses, or parents (41–43). Besides strengthening the provision of youth-friendly services in marginalized urban areas, the use of benefit cards/vouchers could be used to facilitate equitable access to more contraceptive options through both public and private providers. The vouchers/benefits cards can also be used to enable access to other complementary services, such as pregnancy testing and HIV counseling and testing among others. Some considerations for implementation of benefits cards/vouchers include having clear eligibility criteria, integrating the voucher/cards system into social behavior change strategies, and ensuring equitable distribution. In addition, youth engagement through health and socioeconomic activities may contribute to demand generation and increase uptake of FP in young people (44–46). Additionally, the literature also shows that youths are commonly influenced by peers and other key influential individuals who can be trained and used to disseminate and impart accurate knowledge or inspire positive behavior in adolescents and young people (45, 47). A study by Catwright and colleagues further highlights the use of younger providers and increasing the opening hours for FP clinics, which can motivate this subpopulation to access FP services or methods (47).

Mass media has the potential to influence the contraceptive behaviors of a wide range of individuals by providing a stimulus for considering contraception use (30). About 7 in 10 women in this study had been exposed to FP messages through media, predominantly television and radio. This may explain the high level of awareness observed in the study population. However, the results show no significant association between exposure to media FP messages and contraceptive use or intentions. Although some earlier studies report increased likelihood of using FP with access to media (32, 48, 49), others indicate very weak, inverse, or no relationship between exposure to media and use of FP (50, 51). This study further explores disparities in exposure to FP information through media and finds higher prevalence of exposure among women that had contact with an FP provider. This may be explained by potential support and encouragement given to women during discussions with the providers that motivates them to continue educating themselves through media or general awareness creation by the providers about the different messages in the media. However, in this study population, the proportion of women who had been visited by a field worker with regard to FP was only 22.5%, and the proportion visiting a health facility in the prior year for care for themselves or their children was just over 50%. Also, the bivariate analysis showed lower proportions of exposed women among adolescents and young women, women who had never been married or were not in a union at the time of the survey, women who had never given birth, and those with no decision-making power. These may need to be targeted in demand-creation activities.

The study found a low prevalence of exposure to mobile phone FP messages. We argue that this low proportion is a missed opportunity in meeting the need for FP exposure and linkage to services among these urban residents. People living in informal settlements of urban areas are highly mobile and have inequitable access to FP services (52). Mobile health (mhealth) interventions can help address some of these challenges by providing appropriate information and linkage to care. Studies have explored the potential for mhealth interventions regarding different elements of FP (53–57), and lessons from these can be used to design tailored models for this urban population to boost their capability and provide support for contraception use. The content for these mobile phone–based messages may include information on the benefits and expected side effects of different contraception options, availability of FP methods and services, guidance on reporting and managing common side effects associated with FP use, guidance on initiation or safe switching between methods and sexual and reproductive health rights among others (56–58). The duration and frequency of the messages as well as content should be tailored to the targeted population to improve usefulness or effectiveness, including use of translated voice messages (56). The design may also consider incorporation of motivational messaging and allow for interactive communication (59). Ownership of mobile phones is increasing, at a prevalence of 71% in Uganda (60–62). The adoption of mhealth strategies for FP, however, raises some ethical concerns, such as confidentiality or data security. These can be addressed at different phases using various strategies, such as anonymization, understanding pathways through which risks arise, and effective monitoring for real-time adaptation (63).

The low coverage of mobile phone messages may also be due to language barriers, whereby messages are sent in a language that is poorly understood by the users or limited capacity of users to utilize internet-based services.

At least 50% of women in this study were not using any contraception (and were not pregnant), and the results show low reach of this subpopulation by field FP workers. This points to possible missed opportunities in expanding reach of FP services in this urban setting. The usefulness of field FP workers, commonly termed community health workers (CHWs), in supporting FP through education and distribution of commodities has been demonstrated (64–67). The integration of CHWs into the health system is considered a high-impact practice for FP, and this needs to be leveraged in this urban setting (65). CHWs are able to provide contraceptive information and services to underserved or hard-to-reach subpopulations, resulting in improved knowledge and attitudes as well as increased access to and demand for FP services. The results also show lower likelihood of contact with an FP provider among women who were not married/in union and those who had no exposure/access to mass media. This suggests potential bias in the provision of FP information or other services or misperceptions by which not being in a union is perceived as not being at risk of becoming pregnant. A similar finding was reported in Niger, where CHWs were less likely to visit nulliparous women (64). These results have implications for the uptake of FP.

This study contributes to the knowledge base on knowledge about FP among residents of informal settlements in urban areas in Africa. It provides useful insights for design of demand-creation strategies targeting urban populations. Nonetheless, the study is limited by the depth or meaning of knowledge assessed. The assessment of knowledge only asked if the respondent had ever heard about the method, which does not necessarily mean that the person knows what the method actually is or its appropriate use. Also, assessment of media exposure only reported if a respondent had received/read/watched/heard an FP message through media channels within the last few months prior to the survey. This does not include specifics of when the exposure happened, dose of messages delivered/accessed, or in what forms/language the messages are conveyed, which would enable better exploration of the relationship between contraceptive behaviors and media exposure.

CONCLUSIONS AND RECOMMENDATIONS

There is high general awareness about FP methods and prevalence of exposure to media-based FP information. Further exploration of women's understanding of FP methods and the fit between existing education programs and FP knowledge needs in this urban setting should be conducted. Tailored education programs should target adolescents and young women, women who do not often visit formal health facilities, nulliparous women, and those living on their own. There is need for innovative solutions to optimize potential of mass media in accelerating progress in reproductive health toward universal access. In addition, health worker contact should be encouraged to enhance the knowledge on contraceptive methods among residents of informal settlements.

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 approval was obtained from Makerere University School of Public Health Higher Degrees and Research Ethics Committee (HDREC-684). The study was also registered with the Uganda National Council of Science and Technology (HS382ES). Permission to interview participants was sought from Wakiso District local government and the Kira Municipality officials. Prior to any interviews, informed written consent to participate in the study was sought from all adults above 18years, the legal age in Uganda. For minors (15–17 years), informed consent to participate in the study was first obtained from their parents/guardians, as well as assent from the respondents. Minors who were pregnant or those who had given birth at the time of the interviews were considered emancipated and thus consented on their own.

AUTHOR CONTRIBUTIONS

MT conceptualized the study. MT and TS participated in data collection. CB conducted the data analysis and led manuscript development. DC participated in the manuscript development process. MB and JA supported the data analysis process. LA contributed to the conceptualization of the study and reviewing the manuscript. FM provided overall technical guidance to the conceptualization process. MOS provided technical guidance to the manuscript development process. All authors reviewed the manuscript and provided substantial input and approved the final manuscript.

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Women Deprivation Index and Family Planning Utilisation in Urban Geography of West African Countries

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Inequalities in health care utilisation and outcomes vary significantly across geographies. Though available evidence suggests disparity in contraceptive uptake in favour of urban compared with rural geographies, there are unassessed nuances among women in urban communities. This study examines some of these disparities within the context of socioeconomic deprivations and family planning utilisation among urban women in West Africa. A secondary analysis of the most recent Demographic and Health Survey dataset of five selected West African countries was conducted, using pooled data of 21,641 women aged 15–49 years. Associations between family planning utilisation and women's deprivation status were investigated using a binary logistic regression model. The findings show that more than one-quarter of the women were severely deprived across the countries except Senegal (17.4%), and the severely deprived consistently have relatively low contraceptive prevalence rates (CPR) (16.0–24.3%) compared with women with no/low deprivation across the countries except Senegal (39.8%). The results for long-acting reversible contraceptives (LARC) were not consistent across the five countries: whereas, LARC utilisation was lower among severely deprived women in Nigeria (9.1%), Guinea (9.6%), and Mali (19.3%), utilisation was similar across the deprivation groups in Benin and Senegal. In the multivariable analyses, the log-odds of modern contraceptive utilisation decreases by 0.27 among the moderately deprived ($\beta = -0.27$, SE $= 0.05$, $p < 0.01$) and by 0.75 among the severely deprived women ($\beta = -0.75$, SE $= 0.05$, $p < 0.01$) compared with those with no/low deprivation, with variations across the countries. Similarly, the log-odds of LARC utilisation decreases by 0.44–0.72 among the severely deprived women compared with those with no/low deprivation across the countries except Senegal. This study concluded that family planning intervention programmes and policies need to underscore the deprivation context of urban geographies, particularly among women living in informal settlements.

Keywords: family planning, deprivation, urban, contraception, long-acting reversible contraceptives, Africa

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INTRODUCTION

Sub-Saharan Africa (SSA) is regarded as the world's most rapidly urbanising region (1). With the growing urban population, there are concerns about the quality of life, and sexual and reproductive health outcomes in the region. Family planning has been identified as a major intervention in improving maternal and child health outcomes as well as that of the family (2–5). However, available evidence across the region suggests that contraceptive uptake is still very low (6–9) and disproportionately in favour of urban geographies (2, 10–12).

Studies relating women empowerment and socioeconomic status to family planning utilisation have focused more on women's economic and educational status (13, 14). However, the urban living condition and configuration suggest multiple levels of deprivation beyond the narrow concepts of economic and educational status. There are very high variations in contraceptive uptake within the urban geographies that are related to space and communities (3, 4, 15–18). Though individual factors play important roles in poor uptake of contraceptives, intended users may lack access to the desired method due to lack of information and intense poverty associated with their geographical location. Studies have shown wide differentials in family planning utilisation among urban dwellers (19) and by women's empowerment levels (9). The analysis of the United States Agency for International Development (USAID) on 47 developing countries attested to the wide inequalities in service use due to women's inability to access and afford services, low status of the females, and cultural norms (20). Despite several initiatives and investment to improve family planning uptake, these inequalities have significant influence on service utilisation.

However, the urban setting presents different typologies and contexts, which are erroneously assumed as homogenous in most analysis (21). The context for women living in urban areas in West African countries differs and varies across the extent of deprivation. For instance, women living in informal urban settings are usually associated with extreme poverty, low level of education, poor health care services (15, 22), among others. Obviously, health care utilisation of residents in the informal setting is incomparable with that of their counterparts in formal urban areas.

The underpinning analytical framework is guided by the need to expand the social analysis of health behaviour beyond the limited individual factors (23). Deprivations experienced in urban areas span across institutional deficiencies, poor governance, environmental degradation, and lack of social and economic infrastructures (24–28). With the general poor state of infrastructures and social amenities in most of the SSA urban centres, some typical deprivations experienced by urban women in SSA may include water, sanitation, housing conditions, physical and living environment, and access to health services (29). Available evidence suggests a pathway that multiple dimensions of women's socio-economic disadvantage may have significant influence on family planning utilisation (30).

This study, therefore, aimed to investigate the extent to which women's deprivation status may influence modern family planning utilisation among urban women in West African countries adjusting for potential correlates and confounders. Our approach is guided by existing literature that have established the utility and validity of the index of social and economic deprivations in healthcare utilisation and health outcome research (31, 32).

MATERIALS AND METHODS

Data Source

The study utilised a secondary analysis of the most recent Demographic and Health Survey (DHS) of sexually active women of reproductive age 15–49 years in five West African countries conducted after the inauguration of the Sustainable Development Goals (SDGs). This is a reasonable cut-off time in order to be able to compare results within the same time interval. The analysis was conducted on the pooled sample of 21,641 women of reproductive ages 15–49 years residing in an urban setting in the selected countries: Benin 2017–2018 (n = 4,388), Guinea 2018 (n = 2,119), Mali 2018 (n = 2,013), Nigeria 2018 (n = 9,457), and Senegal 2017 (n = 3,664). For this study, we adopted DHS classification of urban settings as applicable to each country and defined in the respective country's DHS report. Details of the sampling and data collection techniques are available in the DHS report of each country (33–37).

Variable Measurements

Outcome Variables

Two outcome variables—current use of modern contraceptives (CUMC) and long-acting reversible contraceptives (LARC) use—were examined in this study as binary outcomes, which allowed for assessment of two of the principal dimensions of the family planning programme and utilisation in urban West Africa in the context of relative socioeconomic disadvantages. Though CUMC encompasses all contraceptive methods, this study separately considers LARC use based on the perspective that correct usage and effectiveness of LARC are less dependent on the user's attributes such as educational level, unlike the short-acting reversible methods, which are highly dependent on the attributes (38, 39). Since our study is based on West African women characterised with low levels of education, it is imperative to independently examine the LARC utilisation that accommodates the women's socioeconomic attributes. The first outcome, CUMC, was measured based on the DHS definition as the utilisation of any modern method of family planning such as the pills, IUD, injectables, male condom, female condom, female sterilisation, male sterilisation, implants/Norplant, lactational amenorrhoea, emergency contraception, other modern methods, and standard day method. The second outcome (i.e., LARC) is measured based on whether a respondent who was practising family planning was utilising any of the IUD and implants/Norplant at the time of the survey. Accordingly, those who were using these methods were coded as 1, while those using other methods and non-users were broadly coded as 0. The analyses excluded all sexually active urban women who were not exposed to the risk of pregnancy at the time of

the survey including women who were pregnant, infecund, and menopausal.

Explanatory Variable

The main explanatory variable is women's deprivation status. A factor score of deprivation index was derived, using principal component analysis, based on 11 indicators: living in poorest/poorer households, having no/primary education, being unemployed; never heard about family planning on radio in the last few months, never heard about family planning on television in the last few months, never read about family planning in newspaper/magazine in the last few months, owns no mobile telephone, never used the Internet, indicating that getting permission for medical treatment is a big problem, getting money for medical treatment is a big problem; and distance to health facility is a big problem. Our approach is guided by existing literature on social and economic deprivations in healthcare utilisation and health outcomes research (31, 32). A reliability analysis test with the Cronbach alpha ($\alpha = 0.65$) of the indicators indicated an acceptable measure of the deprivation index. Evidence suggests that a reliability test with an alpha value of 0.6–0.7 is acceptable in social and exploratory research (40, 41). The factor scores constituting the extent of deprivation that a respondent is subjected were then classified into three quantile groups in the lower, middle, and upper classes.

Other covariates and confounding factors were also included to obtain the adjusted effect of the respondent's deprivation status on the outcomes. These include respondent's age groups, union status, age at first union, parity, birth intention, religion, and partner's level of education.

Statistical Analysis

Data were analysed using univariate, bivariate, and multivariable analytical methods. At the univariate level, we used frequency and percentage distributions to examine the prevalence of the outcomes. At the bivariate and multivariable levels, binary logistic regression was used to examine the unadjusted effect of women's deprivation status on the outcomes in model 1, while the adjusted effect was assessed in model 2 by controlling for the potential confounding effects of other selected covariates on the association. The strengths of the associations were assessed using regression coefficients and the standard error. We excluded observations with missing information from the analyses and applied appropriate sample weights as provided in the DHS. Analysis was done using R statistical computing software version 4.0.5 developed and maintained by R Core Team (42).

Ethical Considerations

This study is based on an analysis of secondary datasets from national household surveys with no respondents' identifiers. The surveys were approved by the countries' National Ethics Committees and implemented by the ICF International in conjunction with relevant agencies in each country. Permission to use the datasets was obtained from the ICF International.

RESULTS

The background information is presented in **Table 1**. More than two-fifths of the respondents were in the age groups 25–34 except in Mali (38.2%). Majority (68.2–82.3%) were currently in a union, and more than one-quarter had their first union before their 18th birthday. More than half of the women were multiparous with two or more children, and 7–8 in 10 of them want an additional child later or no more. Muslim women were in the majority in Guinea (88.1%), Mali (98.0%), and Senegal (95.0%), while non-Muslims, mainly the Christians (result not shown), were in the majority in other countries. Except for Nigeria (53.8%), a fewer proportion (24.6–39.4%) of the women's partners had secondary/higher education.

Table 2 presents the socioeconomic deprivation status and the component indicators. Overall, about 3 in 10 of the women were severely deprived with considerable variations among countries. The constituent indicators of the aggregate deprivation measure show that 1 in 10 of the women lives in poor households, about 47.5% attained less than secondary education, while 28.5% were unemployed. More than half of the women had not heard/read about family planning in the few weeks prior to the survey, whereas about one-fifth has no mobile phone, and more than two-thirds had no access to the Internet. Results also indicated that minority of the respondents considered as a big problem getting permission for medical treatment, getting money for treatment, and distance to a health facility.

Prevalence of Modern Contraceptive and Long-Acting Reversible Contraceptive Use by Deprivation Status of West African Women

The result in **Table 3** indicates the modern contraceptive and LARC utilisation prevalence rates among urban women with deprivation status. Overall, less than one-quarter of the urban women were using modern contraceptive (Guinea 30.1%, Mali 31.2%, and Senegal 45.7%). Across the deprivation levels, contraceptive prevalence rates (CPRs) of the modern methods were lowest among the women who were severely deprived: Nigeria (16.0%), Benin (16.5%), Guinea (23.9%), Mali (24.3%), and Senegal (39.8%), and were quite lower than the average urban rate in each country. Women with no/low deprivation had the highest CPR and was higher than the urban averages across the countries.

Variations in the prevalence of LARC also follow a similar pattern. Overall, about 12.1–13.5% of the urban women were currently using LARC except in Mali (24.6%) and Senegal (33.1%). By levels of deprivation, women with severe deprivation had the least proportion of users of LARC except in Senegal. However, the disparities between severe deprivation and no/low deprivation groups were substantial in Guinea (9.6 vs. 16.9%) and Mali (19.3 vs. 31.8%), unlike in other countries with negligible differences. The prevalence of LARC among the moderate deprivation group compared with other groups was rather mixed; it was generally higher compared with the severely deprived but lower than the no/low deprivation group in Guinea and Mali.

TABLE 1 | Sociodemographic distribution of the study samples in the selected West African countries.

	Benin *N* = 4,388	Guinea *N* = 2,119	Mali *N* = 2,013	Nigeria *N* = 9,457	Senegal *N* = 3,664	Pooled data *N* = 21,641
Age group						
15–24	33.5	38.7	37.6	22.8	19.7	26.8
25–34	40.9	40.6	38.2	43.2	42.0	41.9
35–49	25.6	20.7	24.1	34.0	38.3	31.3
Union status/type						
In union	73.6	68.2	78.2	74.8	82.3	75.5
Not in union	26.4	31.8	21.8	25.2	17.7	24.5
Age at first union						
18+/Single	73.0	66.9	61.8	74.5	74.2	72.5
Before 18	27.0	33.1	38.2	25.5	25.8	27.5
Parity						
0–1	34.5	46.6	35.4	32.3	32.6	34.4
2–3	30.2	26.8	29.4	29.6	31.2	29.7
4+	35.2	26.6	35.2	38.0	36.2	35.9
Birth intention						
Later/no more	79.9	69.2	73.2	75.4	75.9	75.6
Sooner	20.1	30.8	26.8	24.6	24.1	24.4
Religion						
Muslim	29.6	88.1	98.0	42.7	95.0	57.7
Non-Muslim	70.4	11.9	2.0	57.3	5.0	42.3
Partner's education						
None	27.9	32.1	34.0	10.2	30.1	20.7
Primary	15.7	4.8	8.5	9.6	17.3	11.5
Secondary/Higher	24.7	29.3	30.2	53.8	24.6	39.4
Not in union/Do not know	31.7	33.9	27.2	26.3	28.0	28.4
Total	**4,388 (20.3)**	**2,199 (10.8)**	**2,013 (9.3)**	**9,457 (43.7)**	**3,664 (16.9)**	**21,641**

Values are in percentages.

TABLE 2 | Percentage distribution of the respondents by deprivation status and the indicators of the deprivation index in West African countries.

Socioeconomic deprivation and the indicators	Benin	Guinea	Mali	Nigeria	Senegal	Pooled data
Deprivation status						
No/Low	24.4	30.6	35.2	40.1	47.3	37.3
Moderate	29.0	38.1	37.0	33.2	35.2	33.5
Severe	46.6	31.2	27.8	26.7	17.4	29.2
Indicators of the deprivation index						
% in poor household	20.3	2.2	0.2	9.6	6.6	9.6
% with < secondary education	65.5	60.7	55.3	29.4	67.6	47.5
% unemployed	22.4	32.9	42.7	24.7	36.6	28.5
% heard no FP information via radio	52.3	61.2	66.6	54.8	38.9	53.0
% read no FP information via mobile phone	69.7	68.5	59.0	65.4	24.9	59.0
% read no FP information via newspaper/magazine	85.8	92.6	92.3	91.7	86.0	89.8
% with no own mobile phone	31.1	9.3	14.4	19.0	13.4	19.0
% with no access to internet	85.0	61.1	60.8	67.4	59.5	68.2
% getting permission for medical treatment a big problem	19.5	17.6	26.3	8.3	3.2	11.6
% getting money for medical treatment a big problem	49.8	46.7	32.4	37.3	38.0	40.2
% distance to health facility a big problem	25.0	23.3	15.6	17.2	8.4	17.6

TABLE 3 | Percentage distribution of modern contraceptive use among urban women in West African countries.

	Benin *N* = 4,388		Guinea *N* = 2,119		Mali *N* = 2,013		Nigeria *N* = 9,457		Senegal *N* = 3,664		Pooled data *N* = 21,641	
	CPR	LARC	CPR	LARC	CPR	LARC	CPR	LARC	CPR	LARC	CPR	LARC
Deprivation status												
No/Low	29.9	13.7	39.6	16.9	40.7	31.8	29.6	13.2	45.3	30.0	34.7	18.6
Moderate	21.9	14.1	27.4	14.0	27.4	21.8	23.8	13.1	49.0	37.5	28.8	18.5
Severe	16.5	11.5	23.9	9.6	24.3	19.3	16.0	9.1	39.8	32.6	20.0	13.0
Urban average	21.4	12.8	30.1	13.5	31.2	24.6	24.1	12.1	45.6	33.1	28.4	16.9

CPR, current contraceptive prevalence; LARC, long-acting reversible contraceptive.

Multivariable Analyses

Effects of Women Deprivation on Modern Contraceptive Utilisation Among Urban Women in Selected West African Countries

The unadjusted (Model 1) and adjusted (Model 2) regression results of the multivariable analysis in **Table 4** present the effect of deprivation on modern contraceptive use, using the pooled and country-specific data. In the pooled data, contraceptive utilisation was significantly and inversely associated with the level of deprivation. Overall, the unadjusted model indicates that the log-odds of using modern contraceptives reduced by 0.27 among the moderately deprived (ß = −0.27, SE = 0.05, $p < 0.01$) and by 0.75 among the severely deprived women (ß = −0.75, SE = 0.06, $p < 0.01$) relative to their counterparts with no/low deprivation (the reference group). This pattern in the unadjusted models of the pooled data is similar across the countries with about 0.30–0.62 decrease in the log-odds of using modern contraceptive among the moderately deprived and about 0.73–0.80 decrease among the severely deprived women compared with the no/low deprivation group, except in Senegal. Adjusting for the covariates (age, union status, age at first union, parity, birth intention, religion, and partner's education) in Model 2, the same patterns of association and statistical significance were sustained in the pooled data and across the countries, except in Senegal where the severely deprived women became associated with 0.43 decrease in the log-odds of using modern contraceptive (ß = −0.43, SE = 0.14, $p < 0.05$), holding other variables in the adjusted model constant.

Examining the roles of the covariates in the adjusted model of the pooled data, the log-odds of modern contraceptive use decreases by 0.13 for women who are of the age group 15–24 (ß = −0.13, SE = 0.06 $p < 0.05$), by 1.00 for women who want another child sooner (ß = −1.00, SE = 0.06, $p < 0.01$), but increases by 0.24–0.43 for multiparous women (parity 2–3: ß = 0.24, SE = 0.06, $p < 0.01$; and parity 4+: ß = 0.43, SE = 0.08, p<0.01), by 0.15 for the non-Muslims (ß = 0.15, SE = 0.05, $p < 0.05$), and by 0.34–0.42 for the women whose husbands were educated (primary: ß = 0.34, $p < 0.01$; and secondary/higher: ß = 0.42, $p < 0.01$) relative to their counterparts in the respective reference groups. However, the results across countries are mixed. While the predicted log-odds of contraceptive use among women who want another child sooner compared with those who want later/no more consistently decrease across the countries, that of other covariates were significant only in a few countries.

Effects of Women Deprivation on Long-Acting Reversible Contraceptive Utilisation Among Urban Women in Selected West African Countries

The results of the multivariable analysis of the association between women deprivation and LARC utilisation in **Table 5** follow similar patterns with that of the modern contraceptive use in **Table 4**, with a few exceptions. As indicated, severe deprivation had negative effect on LARC use among the respondents. In the unadjusted model (Model 1) of the pooled data, severely deprived women had 0.42 decrease in the log-odds of using LARC (ß = −0.42, SE = 0.07, $p < 0.05$) compared with the no/low deprivation group. Except in Benin and Senegal, this pattern in the unadjusted model is consistent in other countries with 0.42–0.67 decrease in the log-odds of LARC use by the severely deprived women compared with those with no/low deprivation. Adjusting for the covariates in Model 2, the severely deprived women sustained the reduced log-odds of using LARC in the pooled data (ß = −0.44, SE = 0.07, $p < 0.01$), and across the countries with 0.42–0.72 decrease, except Senegal.

The table also indicates a few covariates, which play important roles in the adjusted model of the pooled data, though in different ways. While union status and birth intention are inversely related to LARC use, parity and partner's education were positively related. On one hand, in the pooled data, the log-odds of using LARC decreases by 0.52 among the women who were not in union (ß = −0.52, SE = 0.13, $p < 0.01$) and by 1.03 for women who wanted another child sooner (ß = −1.03, SE = 0.07, $p < 0.01$) compared with their respective reference groups. This pattern of LARC use is significant for women who are not in union only in Senegal (ß = −1.25, SE = 0.20, $p < 0.01$), whereas, women who wanted another child sooner had similar odds across the countries. On the other hand, multiparous women had about 0.58–1.47 decrease in the log-odds of using LARC in the pooled data (parity 2–3: ß = 0.58, SE = 0.08, $p < 0.01$; parity 4+: ß = 0.86, SE = 0.09, $p < 0.01$) and across the countries except Guinea and Mali. Women with educated partner had similar odds in the pooled data and in a few countries: Nigeria and Senegal.

TABLE 4 | Binary logistic regression of the effects of women deprivation on the use of modern contraceptive among urban women in selected West African countries using the pooled data and individual country data.

Characteristics		Pooled data		Benin		Guinea		Mali		Nigeria		Senegal	
		Model 1 ß(SE)	Model 2 ß(SE)	Model 1 ß(SE)	Model 2 ß(SE)	Model 1 ß(SE)	Model 2 ß(SE)	Model 1 ß(SE)	Model 2 ß(SE)	Model 1 ß(SE)	Model 2 ß(SE)	Model 1 ß(SE)	Model 2 ß(SE)
Deprivation status	No/Low	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Moderate	−0.27 (0.05)**	−0.30 (0.05)**	−0.42 (0.11)**	−0.46 (0.11)**	−0.55 (0.13)**	−0.40 (0.13)*	−0.60 (0.16)**	−−0.62 (0.16)**	−0.30 (0.07)**	−0.33 (0.07)**	0.15 (0.11)	−0.02 (0.10)
	Severe	−0.75 (0.06)**	−0.65 (0.06)**	−0.77 (0.11)**	−0.77 (0.12)**	−0.73 (0.18)**	−0.61 (0.18)*	−0.76 (0.17)**	−−0.80 (0.17)**	−0.80 (0.10)**	−0.68 (0.11)**	−0.23 (0.13)	−0.43 (0.14)*
Covariates													
Age group	25–34		0.00		0.00		0.00		0.00		0.00		0.00
	15–24		−0.13 (0.06)*		−0.26 (0.13)*		0.001 (0.19)		−0.14 (0.18)		−0.25 (0.10)*		−0.15 (0.17)
	35–49		0.01 (0.06)		0.01 (0.11)		0.23 (0.16)		−0.20 (0.17)		0.09 (0.09)		−0.15 (0.12)
Union status/type	In union		0.00		0.00		0.00		0.00		0.00		0.00
	Not in union		−0.17 (0.12)		0.42 (0.26)		0.67 (0.36)		−0.15 (0.33)		0.50 (0.42)		−1.07 (0.22)**
Age at first union	18+/Single		0.00		0.00		0.00		0.00		0.00		0.00
	Before 18		−0.09 (0.05)		0.16 (0.11)		0.03 (0.12)		−0.18 (0.14)		−0.000 (0.09)		−0.26 (0.12)*
Parity	0–1		0.00		0.00		0.00		0.00		0.00		0.00
	2–3		0.24 (0.06)**		0.22 (0.12)		−0.11 (0.20)		0.26 (0.21)		0.17 (0.09)		0.51 (0.13)**
	4+		0.43 (0.08)**		0.51 (0.15)**		0.06 (0.24)		0.54 (0.26)*		0.28 (0.11)*		0.76 (0.19)**
Birth intention	Later/No more		0.00		0.00		0.00		0.00		0.00		0.00
	Sooner		−1.00 (0.06)**		−0.54 (0.13)**		−0.32 (0.16)*		−1.02 (0.18)**		−1.09 (0.10)**		−1.47 (0.12)**
Religion	Muslim		0.00		0.00		0.00		0.00		0.00		0.00
	Non-Muslim		0.15 (0.05)*		0.04 (0.11)		−0.04 (0.21)		−0.04 (0.31)		0.20 (0.07)*		0.43 (0.27)
Partner's education	None		0.00		0.00		0.00		0.00		0.00		0.00
	Primary		0.34 (0.08)**		0.19 (0.16)		−0.46 (0.30)		−0.11 (0.19)		0.35 (0.18)		0.74 (0.16)**
	Secondary/Higher		0.42 (0.07)**		0.39 (0.15)*		0.20 (0.16)		0.42 (0.18)*		0.62 (0.17)**		0.29 (0.16)
	Not in union/Do not know		0.25 (0.11)*		0.26 (0.24)		0.24 (0.35)		0.38 (0.28)		−0.46 (0.41)		0.26 (0.18)
Country	Benin		0.00		na		na		na		na		na
	Guinea		0.69 (0.12)**		na		na		na		na		na
	Mali		0.64 (0.11)**		na		na		na		na		na
	Nigeria		−0.01 (0.07)		na		na		na		na		na
	Senegal		1.13 (0.09)**		na		na		na		na		na
Model diagnostics													
	Observations	21,641		4,388		2,119		2,013		9,457		3,664	
	Log Likelihood	−12,862.00	−12,047.00	−2,231.20	−2,184.40	−1,353.60	−1,291.70	−1,188.80	−1,135.10	−5,257.60	−4,995.00	−2,408.80	−2,130.20
	Akaike Inf. Crit.	25,730.00	24,130.00	4,468.40	4,396.70	2,713.10	2,611.40	2,383.60	2,298.20	10,521.00	10,018.00	4,823.60	4,288.40

*$p < 0.05$; **$p < 0.001$; na, not applicable.*

TABLE 5 | Binary logistic regression of the effects of women deprivation on use of long-acting reversible contraceptives (LARC) among urban women in selected West African countries, using the pooled data and individual country data.

Characteristics		Pooled data		Benin		Guinea		Mali		Nigeria		Senegal	
		Model 1 ß(SE)	Model 2 ß(SE)	Model 1 ß(SE)	Model 2 ß(SE)	Model 1 ß(SE)	Model 2 ß(SE)	Model 1 ß(SE)	Model 2 ß(SE)	Model 1 ß(SE)	Model 2 ß(SE)	Model 1 ß(SE)	Model 2 ß(SE)
Deprivation status	No/Low	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Moderate	−0.003 (0.06)	−0.10 (0.06)	0.03 (0.14)	−0.15 (0.14)	−0.22 (0.17)	−0.07 (0.18)	−0.52 (0.15)*	−0.52 (0.16)*	−0.01 (0.11)	−0.18 (0.11)	0.34 (0.12)*	0.15 (0.12)
	Severe	−0.42 (0.07)**	−0.44 (0.07)**	−0.21 (0.14)	−0.42 (0.15)*	−0.65 (0.21)*	−0.53 (0.22)*	−0.67 (0.18)**	−0.72 (0.18)**	−0.42 (0.12)**	−0.61 (0.13)**	0.12 (0.13)	−0.14 (0.15)
Covariates													
Age group	25–34		0.00		0.00		0.00		0.00		0.00		0.00
	15–24		−0.11 (0.07)		−0.53 (0.18)*		0.02 (0.20)		−0.11 (0.17)		−0.15 (0.15)		−0.21 (0.17)
	35–49		−0.04 (0.05)		0.08 (0.11)		0.47 (0.20)*		−0.25 (0.19)		0.05 (0.09)		−0.33 (0.12)*
Union status/type	In union		0.00		0.00		0.00		0.00		0.00		0.00
	Not in union		−0.52 (0.13)**		−0.02 (0.28)		0.42 (0.46)		0.10 (0.37)		−0.39 (0.51)		−1.25 (0.20)**
Age at first union	18+/Single		0.00		0.00		0.00		0.00		0.00		0.00
	Before 18		−0.02 (0.06)		0.30 (0.12)*		−0.07 (0.18)		−0.07 (0.16)		0.15 (0.11)		−0.17 (0.12)
Parity	0–1		0.00		0.00		0.00		0.00		0.00		0.00
	2–3		0.58 (0.08)**		0.61 (0.17)**		−0.14 (0.23)		0.19 (0.23)		1.21 (0.19)**		0.58 (0.16)**
	4+		0.86 (0.09)**		0.78 (0.21)**		0.03 (0.27)		0.43 (0.29)		1.47 (0.20)**		0.92 (0.18)**
Birth intention	Later/No more		0.00		0.00		0.00		0.00		0.00		0.00
	Sooner		−1.03 (0.07)**		−0.57 (0.15)**		−0.45 (0.19)*		−0.97 (0.18)**		−1.06 (0.13)**		−1.31 (0.13)**
Religion	Muslim		0.00		0.00		0.00		0.00		0.00		0.00
	Non-Muslim		−0.06 (0.08)		−0.22 (0.14)		0.15 (0.21)		−0.68 (0.45)		0.08 (0.10)		−0.002 (0.36)
Partner's education	None		0.00		0.00		0.00		0.00		0.00		0.00
	Primary		0.26 (0.08)*		0.15 (0.18)		−0.30 (0.38)		−0.53 (0.25)*		0.23 (0.21)		0.37 (0.14)*
	Secondary/Higher		0.33 (0.07)**		0.25 (0.17)		0.36 (0.20)		0.23 (0.17)		0.36 (0.17)*		0.16 (0.14)
	Not in union/Do not know		0.17 (0.13)		0.12 (0.25)		0.36 (0.47)		0.27 (0.30)		−0.52 (0.49)		0.14 (0.19)
Country	Benin		0.00		na		na		na		na		na
	Guinea		0.22 (0.13)		na		na		na		na		na
	Mali		0.80 (0.13)**		na		na		na		na		na
	Nigeria		−0.23 (0.09)*		na		na		na		na		na
	Senegal		1.12 (0.11)**		na		na		na		na		na
Model diagnostics													
	Observations	21,641		4,388		2,119		2,013		9,457		3,664	
	Log Likelihood	−9,872.70	−8,888.00	−1,682.20	−1,598.10	−895.42	−863.12	−1,078.10	−1,034.40	−3,564.00	−3,174.40	−2,219.10	−1,976.00
	Akaike Inf. Crit.	19,751.00	17,812.00	3,370.40	3,224.20	1,796.80	1,754.20	2,162.10	2,096.70	7,134.10	6,376.90	4,444.20	3,980.10

*$p < 0.05$; **$p < 0.001$; na, not applicable.

DISCUSSION

This study reiterates the importance of social inequalities in health care utilisation and outcomes among urban women in West Africa. It highlights the key findings with respect to women deprivation in the urban geographies in relation to family planning utilisation among urban women in the selected West African countries. This underscored the deprivation context of urban geographies, particularly among women within the urban space, in family planning intervention programmes and policies.

Our findings showed that substantial urban women in the West African sub-region are still largely socially and economically disadvantaged, even though they are erroneously assumed to be better than those in rural geographies (22, 43). Although, there is convergence of evidence that urban geographies fair better in terms of health care utilisation and outcomes compared with rural areas (21), our findings show that such dichotomy beclouds some of the realities particularly among women in urban locations. Women deprivations exerts some limitation on women's ability to utilise health services including family planning. Rapid urbanisation in the West African sub-region, with associated pressures on the socioeconomic and ecological resources, may have dire consequences on the worsening urban inequalities (44).

Our findings showed that the utilisation of modern family planning is still low in the urban centres of the sub-region. Non-utilisation, as observed in the existing studies, may be linked to several reasons including some myths and ideational factors (45–47), which may be further heightened by deprivation and lack of access to correct information. Although, many scholars in the sub-region have advocated for policies targeted toward improved family planning uptake in the rural areas (48–50), our findings suggest the need for more intense attention on urban centres where the relatively better social and health care services are accessed disproportionately.

We found that the social and economic inequalities among urban women play important roles in family planning utilisation. Not only was a strong association observed between the women's deprivation levels and modern contraceptive use, but also the hypothesised dose-response relationship between the extent of deprivation and contraceptive use was remarkably discernible in both the pooled samples and for each country. Our findings further confirmed previous findings that deprived women tend to have low contraceptive uptake (31) and adverse health outcomes (32). Women who are deprived in basic social and economic indicators—household wealth status, employment, access to family planning information, autonomy, and access to a healthcare facility—have often been equally deprived of access to quality and adequate reproductive health care services (51, 52).

Though our study did not consider the individual effects of the deprivation components, the results strongly echo their negative influence on contraceptive uptake as having been extensively documented in previous studies (53–57). For instance, studies have shown significant disparities in the use of modern contraceptives favouring women from rich households over those from poor households (53, 54, 57). Moreover, low contraceptive use have also been found among women who reported financial and geographic impediments to family planning services (58, 59). More importantly, education and family planning message exposure increases women agency, facilitate diffusion of information, expands women's choices, promote behavioural changes, and improve participation in the use of modern contraceptives (53, 54, 57, 60, 61). Education and targeted information dispel myths, misinformation, and fears held against contraceptives.

Our findings further indicate that the severely deprived women were less likely to utilise LARC, though the contraceptive methods are more effective than the short-acting ones. This may imply failed contraceptive experiences, resulting in unintended pregnancy. LARCs are more expensive than the short-acting methods and may be unaffordable for the poor, thus, the low utilisation among the severely deprived urban women. Poor LARC utilisation in our study also suggests some interplay between contraceptive demand and supply. Demand for and supply of contraceptive methods are often positively related (62). Hence, more expensive contraceptive methods may have lower demand and, consequently, low supply, which worsens low LARC uptake in a disadvantaged setting.

We also observed country disparities in the effect of women's deprivation status on LARC utilisation. Remarkably, while moderate or severe deprivation among the women showed a significant adjusted effect on LARC utilisation in other West African countries, no significant effect was observed in Senegal (**Table 5**). This disparity may be linked to the higher prevalence of modern contraceptive utilisation among Senegalese women compared with other West African countries included in this study. We attribute the lack of consistencies in the region's prevalence of modern contraceptive use to possible effects of age at marriage.

We found that, apart from women deprivation, some demographics such as age, union status, birth intention, and parity also influence family planning uptake among urban women. Some of the demographics importantly play the role of sustaining the deprivation status of the women. For instance, women aged 15–24 were found to have low contraceptive uptake, which may have significant implication in the region with a booming youth population.

Interestingly, we found that women who were not in union were less likely to use modern contraceptive in Senegal. This finding is divergent from the existing studies, which associated higher contraceptive use to unmarried women compared with the married (63). The low contraceptive uptake among the Senegalese women who were not in union is expected, based on the lower proportion of the deprived women in the country. In addition, the estimate may be linked to the reduced sexual activities among the unmarried Senegalese whose premarital sexual activities are being censored by the country's cultural and religious norms (64). Also, the proportions of urban women that are utilising modern contraceptives are higher among those whose partners have higher education. This further ascertain men's role in women achieving desired fertility (65, 66).

Our findings support existing evidence on the myriads of sexual and reproductive health challenges confronting

disadvantaged women populations in urban settings in sub-Saharan Africa (5, 67, 68). Coupled with their high concentration in the informal urban settlements, the highly deprived urban women often had to contend with unequal access to and high unmet needs for modern family planning services, especially the long-acting reversible methods that offer better protection against unwanted pregnancies and unsafe abortion (5, 69).

For instance, a recent study by Tetui et al. (68) in Kira Municipality of Uganda contextualises the gross spatial inequalities in access, distribution, and quality of modern family planning services between formal and informal settings with a greater disparity in access to long-acting reversible methods. Nonetheless, the dominance of the private sector in family planning service provision in informal settlements and the attendant higher out-of-pocket service fees might impose serious constraints not only on the uptake but also on the sustained use of modern family planning among the highly deprived urban women (5). Such supply-side constraints usually coexist with other knowledge, attitude, and sociocultural barriers operating on the demand side.

Study Limitations

This study is not without limitations. Being a cross-sectional study, causation could not be established between the explanatory variables, the women deprivation, as well as the covariates and the outcome variables. Also, since the study was based on secondary data sources, no additional variables could be added beyond what the data contained. For instance, other relevant covariates that could be included in the model but were not available in the datasets include reasons for not using LARC methods. Besides, the study was based on only five West African countries with post-SDG standard demographic and health survey data addressing the outcome variables of interest. These limitations, however, do not in any way compromise the validity and reliability of the study; they only suggest the need for caution in the interpretation of the findings.

There are noticeable programs and policy changes in some of these countries that may influence some positive changes in the nearest future. Many countries in the region are making more commitments to support family planning with a dedicated budget since the London Family Planning Summit 2017 (70). Also, there are increasing funder support and new innovative initiatives toward improving family planning in urban geographies particularly with the Challenge Initiatives and a few other programs (71). There is the prospect of improvement in family planning utilisation and access with sustained government commitment and partner's support.

CONCLUSION

Inequalities among women in urban areas constitute a major factor in health care utilisation. The combined effect of women deprivation and other sociodemographic gradients have significant effect on family planning utilisation among urban women, particularly those living in informal settlements. Programmes and policy efforts need to factor in these disparities.

DATA AVAILABILITY STATEMENT

The dataset presented in this study can be found in the online repository of the DHS program: https://dhsprogram.com/data/available-datasets.cfm.

AUTHOR CONTRIBUTIONS

AA, JM, and OI formulated the background for the study. JM and EI formulated the Materials and Methods for the study, as well as the Results, and with JA wrote the Discussion. AA, JM, and EI reviewed the manuscript. EI performed data analysis. JA and OI reviewed the literature and OI created the references. All authors contributed to the article and approved the submitted version.

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Barriers to Contraceptive Use Among Urban Adolescents and Youth in Conakry, in 2019, Guinea

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Background: Despite efforts to improve access to family planning, contraceptive prevalence remains relatively low among adolescents and youth in Guinea. The objective of this study was to understand the barriers to the use of modern contraceptive methods among urban adolescents and youth (15–24 years) in Conakry, Guinea.

Methods: This was a qualitative study using an exploratory design. It was conducted in the capital city of Guinea, Conakry in 2019. Respondents included adolescents and youth aged 15–24 years, health care providers, and parents of adolescents and youth. In-depth individual interviews (IDIs) and focus group discussions (FGDs) were used to collect the data. Sixty IDIs and ten FGDs were planned in Conakry. These data were recorded and transcribed, when applicable, from the local languages into French in an anonymous manner. The data were analyzed using a mixed (inductive and deductive) thematic approach following the elements of the socio-ecological model.

Results: Overall, 56 IDIs and 10 FGDs were conducted with 136 participants and included in this analysis. Respondents were adolescents (16%), youth (30%), and key informants (54%) who were health care providers (public and private), decision-makers, parents of adolescents and youth, and neighbors. Among adolescent respondents, 75% were female, and of the youth, 61% were female. Our analysis indicates various and interrelated barriers that limit the access and use of contraceptives by adolescents and youth. These included the individual (fear of side effects, cost, and rumor-related misinformation), interpersonal or family (spouse perception and sexuality taboo and perception of sexual activity before marriage), sociocultural (religious prohibitions and ethnicity), and health care system (breakdown of contraceptive methods in public health facilities, perception of service delivery, provider attitudes, visiting hours, geographic proximity of services, and quality of training received by health care providers) barriers.

Conclusion: In our context, the use of modern contraceptive methods by adolescents and youth is influenced by an interaction of various barriers, including individual, interpersonal, sociocultural, and health care system factors. Strengthening contraceptive

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uptake interventions by involving different stakeholders, including adolescents, parents, religious, and community leaders, and improving the quality of sexual and reproductive health services would help in reducing barriers to contraceptive use among adolescents and youth.

Keywords: barriers, contraceptive, urban, adolescents and youth, family planning, Guinea

BACKGROUND

Sexual and reproductive health issues, including unwanted pregnancies, remain a significant public concern in sub-Saharan Africa (1, 2). According to a report published in 2016 on the "Costs and Benefits of Meeting the Contraceptive Needs of Adolescents," an estimated 21 million girls between the ages of 15 and 19 become pregnant each year in developing countries, and about 12 million of them give birth to children (3, 4). At least 10 million of these young people face unwanted pregnancies each year in these countries (3). However, complications during pregnancy and childbirth are the leading cause of death for girls aged 15–19 worldwide (5, 6).

In 2019, more than 842 million women of childbearing age were using contraceptive methods, and 270 million women worldwide did not have access to contraceptive methods they needed (7, 8). However, less than half of the need for family planning (FP) was met in sub-Saharan African countries (3).

In addition, adolescents and youth often face difficulties in accessing contraceptive services (9, 10). The results of some studies conducted, particularly in developing countries, on the obstacles related to the use of modern contraceptive methods among adolescents and youth suggest that particular attention should be paid to individual difficulties, interpersonal, community, or cultural influences (11–20). Adolescent girls also face many barriers, including fear, embarrassment, lack of knowledge, and cost of services, limiting the use of these methods (11, 12, 21, 22). Furthermore, factors such as quality of and access to health services or age restrictions when seeking FP services influence adolescents and youth access and use of contraceptive methods (23–26).

It is also possible that with the demographic explosion and rapid urbanization of African capitals, young people find it more difficult to access health services in these areas because of the low adaptive capacity of health systems, including low geographic access in health areas, poor quality of services due to the lack of training and equipment, inadequate services for adolescents and youth, shortages of contraceptive methods, especially in private health facilities, etc. (27). Studies have also reported health care provider bias, and community judgment toward adolescents and youth when seeking FP services, as well as concerns about confidentiality (13, 14, 28, 29).

In Guinea, adolescence is defined as the period of age between 15 and 19 years. This period corresponds to the moment that sexuality begins (30, 31). Out of the 12 million inhabitants that the country accounted for in 2019, about 2 million live in Conakry, and of these, 16% are adolescents and youth, making it a significant subpopulation (31). In the past years, many efforts have been undertaken to improve FP in Guinea, including the creation of FP access points in health areas by integrating FP into reproductive health services (post-partum care, post-abortion care, expanded program of immunization, nutrition, etc.), the extension of the community-based service approach to rural and peri-urban areas, the organization of special FP days and integrated campaigns, the strengthening of the training program and equipment, and the reinforcement of the capacity of 25% of the providers to be able to offer FP services adapted to teenagers and young people. Despite these efforts, modern contraceptive prevalence is low in Guinea (11%). This prevalence varies among sexually active young women, ranging from 10.3% among those aged 15–19 to 11.4% among those aged 20–24 in 2018 (30). However, in the same year, 20% of 15–24-year-olds had an unmet need for family planning (27, 30).

It is therefore relevant to understand the barriers to the use of modern contraceptive methods among adolescents and youth. This information can help to significantly reduce unwanted pregnancies and their consequences, but also promote their well-being and improve their living conditions not only now but also in the future (32). The purpose of this study is to explore the perception of personal, interpersonal, community, and health system barriers that influence the use of modern contraceptive methods among sexually active urban adolescents and youth in Conakry, Guinea.

METHODS

Study Framework

The socio-ecological model was used to deconstruct our finding on barriers of contraceptive use among adolescents and youth in urban Guinea (32). This model describes the access and utilization of modern contraceptives as a result of four inter-related factors. The first comprises individual factors such as age, gender, and economic status. The second layer includes interpersonal factors such as the nature of the relationship between two or more people, including friends, parents, communities, and health workers. The third includes sociocultural factors such as religion, customs/cultural behavior. The last layer is related to organizational and health system factors such as the availability and quality of services, including contraceptive methods.

These different factors interact in complex ways and influence access to modern contraceptives and the behavioral outcome of their use among adolescents and youth (13).

Study Design

This was a qualitative study using an exploratory design. Data were collected for six months from June to December 2019.

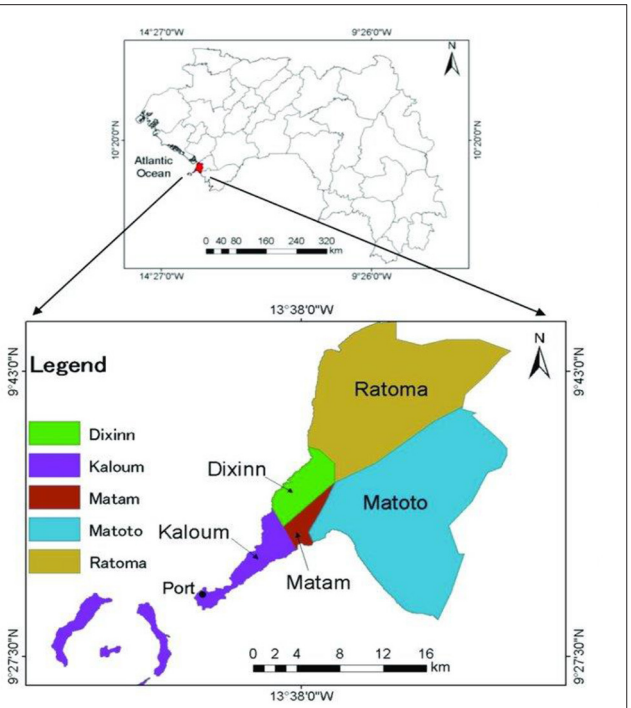

FIGURE 1 | Study sites, Conakry, Guinea (33).

Study Site

This study took place in the five communes of the capital city of Guinea, Conakry. Guinea is a country located in West Africa with a population estimated at 12 million inhabitants in 2012, 52% of whom are women (31). The city of Conakry has 2 million inhabitants (16%) of the national population, 26% of whom are between 15 and 24 years (15, 31). The Guinean capital is subdivided into five communes (Kaloum, Dixinn, Matam, Ratoma, and Matoto). This study was carried out in all five communes (**Figure 1**).

Sampling and Recruitment of Study Participants

Study data were collected from adolescents and youth aged 15–24, and stakeholders, including national FP program managers either working in public and private institutions, parents, or relatives of adolescents and youth.

The selection of participants was done to ensure a maximum variation; for instance, adolescents and youth were selected based on their profile (marital status, level of education, etc.). Meanwhile, the selection of stakeholders was based on their involvement in sexual and reproductive health programs for adolescents and youth in Conakry. These key informants included health care providers (gynecologist, physician, midwives, nurses, etc.) from the public and private sectors and managers of FP programs.

The selection of participants with diverse profiles helped the research team capture the perspectives and experiences of participants and, therefore, strengthen the data quality. The selection process began with stakeholder mapping for key informants, while the snowball sampling technique was used to recruit adolescents, youth, and parents (fathers, mothers, guardians, and neighbors) (34). Providers and other community influencers (leaders of women and youth associations) were first identified, interviewed, and then asked to help the research team select and conduct interviews with adolescents and youth in their community. Adolescents and youth were also asked, if possible, to introduce the research team to other groups of adolescents and youth.

Data Collection

A total of 60 in-depth interviews (IDIs) and 10 focus groups (FGDs) with eight to ten participants per FGD were planned for this study.

Thirty IDIs were planned with adolescents aged 15–19 and young people aged 20–24, six of which were conducted in each commune. The distribution took into account some socio-demographic characteristics (marital status, age group, and education level). To understand the barriers to the use of modern contraceptive methods, 30 additional IDIs were conducted with key informants, including 20 providers (public and private), four national policymakers (two of each sex), two FP program managers (public and NGO and one of each sex), and four parents (two mothers, one father, and one neighbor). 10 focus groups ($n = 80$) were conducted with adolescents and youth from different backgrounds (two FGDs per commune). The distribution of FGDs was gender-sensitive (1 FGDs per gender per commune). The selection of these different groups was necessary to capture a wide range of perspectives and experiences, to allow for the maximum variation in the information collected, and to achieve information saturation.

Four research assistants (all of them were women) trained and experienced in conducting qualitative research collected the data. They were from health research programs and continuing education institutions. They were fluent in local dialects and used the language easy for respondents to understand (in French or local languages). The study principal investigator, a medical doctor with PhD-level training in public health, supervised the work of the research assistants.

The detailed guides (IDIs and FGDs) for the semi-structured interviews were designed using the pre-requisites of knowledge from the literature and information gathered during pre-testing of these guides (15, 27, 30, 32). The guides were then pre-tested with university students and adapted. They were first designed in French and then translated into the three main local languages spoken in Conakry (Soussou, Malinké, and Pular). The questions were designed to explore perceptions of barriers to contraceptive access and use by adolescents and youth. All participants in IDIs and FGDs were interviewed in their preferred and chosen locations (homes, schools, health facilities, offices, or youth centers).

Data Analysis

The data collected during the IDIs and FGDs were transcribed from the local languages into French, and then the transcripts were all anonymized to ensure confidentiality. We then

TABLE 1 | Characteristics of participants in individual in-depth interviews (IDIs) in the five communes of Conakry urban area.

Socio-demographic characteristics	Number ($n = 26$)	Percentage (%)
Types of participants		
Adolescents	9	16.1
Youth	17	30.4
Key informants ($n = 30$)		
Health care providers	22	39.3
Decision-makers	4	7.1
Parents (fathers/mothers/guardians)	4	7.1

TABLE 2 | Characteristics of adolescents and youth participants in individual in-depth interviews (IDIs) in the five communes of Conakry urban area.

Socio-demographic characteristics	Number ($n = 26$)	Percentage (%)
Ages groups: adolescents and youth		
15–19	9	34.6
20–24	17	65.4
Age group of male vs. female		
Male (n = 8)		
15–19	2	25
20–24	6	75
Female (18)		
15–19	7	38.9
20–24	11	61.1
Sex		
Men	8	30.8
Women	18	69.2
Residence: adolescents and youth		
Kaloum	6	23.1
Dixinn	6	23.1
Matam	4	15.4
Ratoma	5	19.2
Matoto	5	19.2
Schooling: adolescents and youth		
Attended formal school	16	61.5
Did not attend formal school	10	38.5
Marital status:- adolescents and youth		
Married	14	53.8
Unmarried	12	46.2

proceeded to the thematic content analysis of the transcripts and interpretation of the results. Two researchers manually coded the interviews separately and agreed upon the subthemes through a team consultation meeting.

Ethical Considerations

The research protocol was approved by the National Committee of Ethics for Health Research in Guinea (CNERS) and the Institutional Review Board (IRB) of the Institute of Tropical Medicine (ITM) in Antwerp, Belgium. Prior to data collection, study objectives were explained to the participants (in French or in the local language of their convenience), then a written consent was obtained from all adult participants. For those under 18 years of age, assent was obtained after written consent from parents or guardians. Fingerprinting was done for all participants (adolescents, youth, and key informants) unable to read and write while community health workers in the area served as witnesses.

RESULTS

Description of the Sample

A total of 136 people took part in the study, 56 of whom participated in the IDIs and 80 in the FGDs. In the IDIs, we interacted with 26 adolescents and youth (46%) and 30 key informants (54%). Among the participants, the adolescents (9) and youth (17) were predominantly female (65.4%) and had attended school (61.5%). Among adolescent respondents, 75% were female, and of the youth, 61% were female. More than half of the adolescents and youth were married (53.8%). Key informants were composed of nurses, midwives, medical doctors, gynecologists, parents (father, mother, or relative), and decision-makers (national, regional, and communal health directorate levels). In addition to the IDIs, 80 adolescents and youth participated in 10 FGDs, including two FGDs held in each commune of Conakry, taking into account gender (five males and five females), education level, and marital status of participants (**Tables 1**, **2**).

Following the theoretical framework, the study results were organized according to the categories of individual, interpersonal, community, and health system barriers. Perceptions of the different types of barriers to contraceptive use among adolescents and youth were presented, taking into account the variation in these perceptions among types of participants, gender, age group, marital status, type of health facility (public or private), and residence (urban commune).

Individual or Personal Barriers

Factors on individual barriers to contraceptive use vary from age group, marital status, and gender of respondents (adolescents and youth). These findings were contextualized by adding perceptions of key informants. Thus, three subthemes related to personal barriers to contraceptive use emerged from the interviews: costs of accessing contraceptive methods, fear of contraceptive side effects, and lack of information.

Costs Related to the Use of Contraceptive Methods and Their Social Consequences

The cost of contraceptive methods was the first challenge mentioned by participants—both adolescents and youth and key informants. They cited the lack of financial independence of adolescents and youth as a barrier to accessing contraceptive methods. At this age, urban adolescents and youth depend on their elders. Married participants mentioned the same challenges, and the reasons given were their husbands' poor perception of the methods and of the users and their refusal to provide financial support.

In addition, consultation fees or incentives for health care providers were also mentioned by participants as a barrier to contraceptive use among adolescents/youth. In addition, geographical barriers to accessing health facilities were also mentioned, given the cost of transportation to a health facility that is located far from home.

> ≪*... The financial difficulties of adolescents and youth constitute a main barrier to their access to contraceptive methods since these methods are not free of charge. From condoms... implants cost more than 100,000 GNF ($10), the IUD is more expensive... you see they can't afford it [buy]...* ≫. (IDIs, Man Doctor, Public Health Structure, Commune of Kaloum).

For some participants, this financial inaccessibility to contraceptive methods is fueled by the reluctance of parents of adolescents and youth to support them financially. This parental reluctance was reportedly due to their perception that putting adolescents and youth on contraception would encourage them to engage in active and "uncontrolled" sexuality and expose them to sexually transmitted infections, including HIV/AIDS.

> ≪*As a father, I would never give money to one of my sons to pay for a rubber [condom]. By doing this, you encourage him to do stupid things (got a girl pregnant) outside and then bring you problems. So I look at all this, maybe when they start working...* ≫. (IDIs, Father of Adolescents and Youths, Commune of Matoto).

Some adolescents and youth reported that this financial inaccessibility often pushed them to give up using their preferred contraceptive method and to switch to traditional methods such as the calendar method, abstinence, or the "necklace method" (cycle beads).

Fear of Side Effects and Perceived Health Risks of Using Contraceptive Methods

According to adolescents and youth, and health care providers, fear of the side effects of FP was an important barrier to the use of these methods. For adolescents and youth, the onset or management of these effects, which were sometimes unknown to some, could often be perceived by their family members and thus exposed them to (negative) judgments from them. The mentioned side effects included general fatigue, nausea, insomnia, or menstrual disorders that could according to participants, last up to 10 days. For others, the consequences of these effects were infertility and therefore directly related to the possibility of having children in the future, and difficulties related to the pregnancy of the users, in particular complications during childbirth (dystocic delivery, abdominal pain, or episiotomy). This is illustrated below by an educated teenager:

> ≪*Because sooner or later these women will be married and they are used to taking the pills or anti ball (implant), it could become chronic and therefore they will not have children. So there are effects*≫. (FIDs, P06 Educated Adolescent, Commune of Dixinn).

However, the perception of the health risks associated with contraceptive use differs between the two age and gender groups. For some participants (adolescents), the main personal barrier to contraceptive use was a negative perception of modern contraceptive methods. Both girls and boys said that modern methods have a negative impact on the health of users (temporary or permanent infertility). This point was particularly emphasized by an unmarried teenager who stated the following:

> ≪*Sometimes I talk to people who say that contraceptive methods are not good for women. You see, they say that they can get sick because of these methods, for others too, if you take it, a few days or a few months later, the method can disappear, if it disappears from your arm, you can have sterility problems*≫. (IDIs, unmarried Adolescent man, Commune of Kaloum).

As for the participants (young single and married men), the use of one of the modern contraceptive methods may push adolescents to have multiple sexual partners. This may lead them to opt for a life that they described as easy, a life of debauchery (frivolity), and it was this aspect that they (single and married young men) disapproved of the use of contraceptive methods. This view is illustrated in the following verbatim:

> ≪ *I would say that we have to organize educational focus groups to be able to give advice to our sisters, their ambition pushes them to sell themselves... it is there that they get the idea of going out with a lot of men, as they take medication there, the fear of falling (pregnant) no longer exists, so we have to advise them to keep an eye on our sisters*≫. (FGDs, Young Literate Men, Commune of Kaloum).

However, from the point of view of other respondents (young unmarried women), although the use of modern contraceptives is relevant because it has allowed them to avoid unwanted pregnancies and has encouraged them to have control over their sexual life, they needed more information on it.

Lack of Information and Their Consequences (Rumors)

The lack of knowledge and information among adolescents and youth was also reported by participants as a factor that encourages the spread of rumors that negatively influence contraceptive use. Considering the educational level of community members, their main source of information was word-of-mouth. This source was the basis for countless (negative) rumors circulating in the study site. The rumors cited included: "Implants can disappear from the body of their users and not be found," "Implants can cause difficulty in childbearing," "Contraceptive methods are designed to make young African women sterile." These two quotes from two types of stakeholders highlight this statement:

> ≪*We learn this (modern contraceptive method) often in the neighborhoods when we talk among ourselves wives and also with our husbands in the bedroom that when you take the medication you are not going to have children and that it can even cause illness in some people. If your daughter gets married and she can't get pregnant, her home will not be stable at all and right away it will be said that she had a life of debauchery.... I will never let my*

daughters take this filth (with a scornful pout) ≫. (IDIs, Mother of adolescents and youth, Commune of Matoto).

≪ *In my opinion, implants are not good, because it is one thing when you take you don't know if you are going to have children or not. You see no! So why wear something that will prevent you from having children in the long run. So if you wear it and then you don't have children, it's not someone else's fault, it's your own fault* ≫. (IDIs, Literate adolescent girl, Commune of Kaloum).

Interpersonal and Family Barriers

Three subthemes emerged from interviews with participants on interpersonal barriers to contraceptive use: perceptions of spouses of contraceptive use; the taboo nature of sexuality; and perception of any sexual activity before marriage. The results were presented by addressing different perceptions of the types of respondents included in this study.

Perceptions of Spouses of the Use of Contraceptive Methods

Negative perceptions about the use of contraceptive methods are reflected in the sometimes outright refusal of some men to support their partners (financially or psychologically) in using a contraceptive method, often resulting in arguments within the couple. However, the participants explained that the favorable opinion and support of their partners gave them peace of mind and ease in the couple since it is generally the men who have the power to decide. Thus, many adolescents and youth (married, single, or in a relationship) stated that it is vital for them to have the approval of their partners and support to avoid possible conflict.

≪ *Yes, for example, there are partners who discourage their partners from using planning methods. My husband doesn't want to hear about it (referring to planning), so I hide to take my injections every three months. If he ever finds out about this, I will have big problems in my couple*≫. (IDIs, young married woman, Commune of Dixinn)

According to this provider, it is the men (husbands) themselves who constitute the barrier to the use of contraception by women, especially among those who wear Hijabs to cover their face for religious reason.

≪ *It is the men who constitute a barrier to the use of FP among Wahhabis*≫. (IDIs, Male Doctor, Private Clinic in Koloma, Commune of Ratoma).

The Taboo Nature of Sexuality

According to the participants, any topic related to sexuality should be avoided in parent–child discussions, including contraceptive methods. According to adolescents and youth, they refrain from discussing such topics with parents (fathers, mothers, sisters) and sometimes with their spouses because they feel that this avoids any suspicion of any sexual activity or life. However, the school (for educated respondents) and discussions between peers (friends) helped fill this gap.

≪*There is the religious side of things, and it is not part of our culture to teach children about sex and how to behave, except for those who are lucky enough to go to school, if not, they are unlikely to have information about planning*≫. (IDIs, young married woman, Commune of Matam)

In the opinion of some parents, discussions about sexuality and contraception are inappropriate with children. According to them, their children should be spared by such discussions to avoid their early exposure to sexuality.

≪ *We don't want the child (youth or teenager) to be confronted with all this before they are old enough to start a family.... We have to be careful with them about these things, so it's something (sexuality and contraception) that we have to hide from them*≫. (IDIs, mother of adolescent girls, Matoto commune).

Perception of Any Sexual Activity Before Marriage

According to the participants (adolescents and youth), there was a consensus that the preservation of the virginity of girls until marriage is an honor for the family and the community. Consequently, it is inappropriate and "indecent" to engage in conversations about contraceptive methods, they said.

≪*... In our culture, girls must keep their virginity until marriage... it's a source of pride for the whole family and proof to the community that you come from a good family and are well educated...* ≫ (FGDs, young married women, commune of Ratoma).

However, parents, especially mothers, put forward another point of view concerning the beginning of sexual activity among unmarried adolescents and young. According to them, "the new generation" is in a hurry to initiate sexual activities, so advising the use of condoms (for young men) or implants (for women) to avoid pregnancies is necessary although it may have adverse implications (like reported above).

≪ *You know the kids there are all in a hurry now (pointing to young people outside a tea shop). They all use plastics (referring to condoms). I have five girls at home..., to avoid disappointment I don't ask them this kind of question. All I ask them is not to bring pregnancies or even the disease (HIV-AIDS) to my house....This new generation there are all taking "anti-bale" (Implant)* ≫. (IDIs, Mother of adolescents and youth girl, commune of Matoto).

Social and Community Barriers

Different perceptions were presented in this section, and two subthemes emerged from the interviews about social and community barriers to contraceptive use. These were described in the following.

The Prohibitions of Religion

Religious norms that "having a child is God's gift" or "sexual relations among unmarried adolescents and youth are forbidden" were perceived by participants as barriers to contraceptive use. On the other hand, some participants reported that using

contraceptive methods to avoid pregnancy, even for newlyweds, is an act of "homicide" because "having a child is a gift from God" but for that, you have to wait until you are married.

> ≪ *The Muslim religion does not accept it; it is purely clear in the religion that trying to reduce the number of children (through the use of contraceptive methods) "equals killing the children.... The use of condoms, injections, or other contraceptive methods is not permitted because the religion prohibits premarital sex... Anyone who fails to do so, will be responsible for his or her actions in the afterlife..., no, among Muslims planning is forbidden*≫. (FGDs, Educated Adolescents Men, commune of Dixinn)

However, other participants reported that using family planning methods is not a religious prohibition (Muslim religion) but rather a social prohibition (imposition).

> ≪ *It is on the religious side, they must be told that religion does not prohibit the use of planning methods among the bride and groom. And also on the social side, it is necessary to review*≫. (IDIs, Man Doctor, Public Heath Structure, Commune of Kaloum).

Also from a religious point of view, the virginity of an unmarried adolescent or young woman was considered sacred, an act of purity and a symbol of good education for her parents; it represents a source of happiness and pride that automatically confers them respect and great consideration in their community. Thus, the use of modern methods of contraception would be contradictory to virginity.

> ≪ *Yes speaking of the Muslim religion, it is not recommended because it is strictly forbidden for a teenager to go through all these means. As long as you are not married, even as a bride, it is not recommended*≫. (IDIs, Unemployed Young Woman, Commune of Matoto).

Cultural (Ethnic) Barrier to Contraceptive Use

According to some adolescents and youth, the use of contraception and the users are not well seen in the majority of ethnic groups (e.g., the Malinke or Peulh), especially if they are adolescents or unmarried youth. The reasons given for this were that all practices related to sexuality are taboo and that unmarried people are supposed to be pious and chaste and must therefore keep their virginity until marriage. The same opinion was shared among the key informant group, especially the health providers, but the latter emphasized the case of female sex, and therefore, those who could not wait for marriage would hide to use a contraceptive method. The two quotes below shed light on this passage.

> ≪ *I am Malinke, not even among the Malinke only, but among the Peulhs it is also forbidden because they say to themselves that the girl must go virgin at home and being at home the decision rests with the husband*≫. (FGDs, Literates Adolescents Girls, Commune of Dixinn).
>
> ≪ *One of the difficulties in this matter (referring to the use of contraception) is the rejection of society, especially in the Peulh ethnic group where virginity is considered sacred. So for those who can't wait (until marriage), they hide and come to us for planning*≫. (IDIs, Male doctor, Hamdallaye Private Clinic, Commune of Ratoma).

Barriers Related to the Health Care System

Views on barriers to contraceptive use related to health systems vary according to the different profiles (health providers, adolescents, and youth), experiences, and gender of the respondents in this study. They include the breakdown of contraceptive methods in public health facilities, perception of FP service provision in public health facilities, provider attitudes, the barrier of consultation time, geographic proximity to the facility, and the influence of the quality of training received by health providers.

The Breakdown of Contraceptive Methods in Public Health Facilities

A delay in the supply chain of contraceptive methods was mentioned, which often leads to a shortage of contraceptives in public facilities offering FP services. From the users' point of view, the consequences of this unavailability were linked to the capacity of these health facilities to meet the contraceptive needs of users. However, this inability is even more important for the providers than if it were an adolescent or young person who often hid to obtain this service. The repercussion of this unavailability was the possibility for this group to abandon contraception. The following citation supports this statement.

> ≪ *As soon as there is a breakup it's not good, you lose the person concerned. He comes once, he doesn't have the condoms, once, twice, three times. So he won't come anymore*≫. (IDIs, Woman Doctor, Gbessia Port 1 Heath Center, Commune of Matoto).

Perception of Service Delivery in Public Health Facilities

Some adolescents and youth have a negative perception of the quality of FP services offered in public health facilities and, therefore, stated that they prefer using private health facilities. The reasons given were that they are well received in private facilities as opposed to public ones; they are less likely to meet a relative in private health facilities; they find an intimacy that allows them to express their concerns without fear; they are given time and interest, and most importantly; they are not judged in private facilities

However, some participants said that they used public FP services, but always on the recommendation of a friend who had already been satisfied. In this case, appointments were usually made in the evening to avoid meeting a relative in the health facility. Here is a quote from one provider who said:

> ≪ *They, they, when they have money, they wait until the evening in the hospital, there is less attendance. When they go to some doctors, they can answer outright.... In the evening now, you will find that the hospital is quieter even if there are patients, everyone will be in his room. So, you can come and do what you have to do in*

the ward and leave≫. (IDIs, educated young woman _Commune of Dixinn)

Providers in private facilities mentioned that they wanted to actively participate in improving FP services for adolescents and youth and that the authorities should take their cases into account. Here is a quote from a provider at a private facility that supports this:

≪ *Well, I would say that we are much more marginalized in the context of FP while youth and adolescents attend the outreach facilities better than the public facilities*≫. (IDIs, Gynecologist, CSA in Kamelya, Commune of Dixinn).

Attitudes and Perceptions of the Health Care Provider

Among the difficulties related to health providers, some adolescents and youth first mention the lack of training of providers on FP. In their view, the religious or even personal beliefs of a trained provider, especially a woman, should not interfere with the health service she is supposed to provide. In general, their negative perceptions of users and contraceptive methods were barriers to satisfaction and often led to reprimands and criticism. Adolescents and young people said that negative perceptions of users are behind some of the rumors about FP.

≪ *If it was possible to tell the doctors at the hospital not to corner people about this, that is to say not to ask why you want to do it, if you are married or not, if you have the opinion of your parents and sometimes even when we go to the hospital, there are some doctors who look at us badly*≫. (IDIs, Illiterate adolescent girl, Commune of Ratoma).

According to the health providers, the attitude of some of their colleagues, especially women, constituted a barrier to the use of contraceptive methods for these "young users," especially if they were unmarried. The reasons attributed to this were the non-adherence to the concept of the use of contraceptive methods by unmarried people, which is sometimes reinforced by the latter's religious conviction or belief. The illustration of this provider supports this statement.

≪ *You know, a lot of our colleagues especially those who work in the public do not buy into the idea of these young people using contraceptive methods (referring to adolescents and youth). When a client comes to them (female provider) asking to be planned, if it's young people; they often tell them to study and leave FP and focus on their studies*≫. (IDIs, Nurse, CSA Berney Foteba of Tannerie, Commune of Matoto).

Also, the negative perception of the providers was often influenced by age and marital status. Another difference was perceived in the way the rich and poor were treated. Some male providers, due to a lack of training and "common sense," used the challenges they faced (lack of money) to satisfy their personal needs, such as getting into a relationship with a female user in exchange for the free method.

≪ *For example, I met a girl, there is a doctor who wanted her. He told her that if she is afraid, he can put a contraceptive method on her arm or give her an injection, so that she doesn't get pregnant. He said that if she agreed, he would give her the medication she would choose for free* ≫. (IDIs, Single Male Teenager, Commune of Kaloum).

Barrier of Consultation Time

Adolescents and youth mentioned their preference to access health facilities in the evenings rather than during the day. The reasons they cited were that in the evening they could only find the health care team, and the facility was less frequented by clients. This reduces the risk of meeting a relative or acquaintance on the premises of the facility.

≪*When they have the money, they wait until the evening, at the hospital, there is less attendance. . . . . In the evening now, you will find that the hospital is quieter even if there are sick people, everyone will be in their own room. So you can come and do what you have to do in the ward and leave* ≫. (IDIs, Unmarried Young Woman, Commune of Ratoma).

Geographical Proximity of the Structure

Another factor influencing contraceptive use, according to some participants, was the proximity of a health care facility to their homes. They said they preferred to go to a facility in a different neighborhood than their own because they were afraid to meet a family member, acquaintance, or even a doctor that their family frequented.

≪ *Some don't want to do things in their neighborhood, so they can go to a friend's house in another neighborhood to plan ahead*≫. *(*IDIs, Illiterate female Teenager, Commune of Matoto).

Influence of the Quality of Training Received by Health Providers

According to some providers (nurses and midwives), training in adolescent and youth sexual and reproductive health, including FP, was lacking in their academic training. The reasons provided included the high number of health schools in Conakry (nurses and midwives) resulting in low recruitment and teaching standards with some health topics not taught to students. This, to them, explained the inadequate practices (bad reception, even in the services offered including FP) observed in some public health facilities.

≪*I don't even remember receiving any training on adolescent or youth sexual health since I finished health school and even then (shaking his head negatively)!* ≫ (IDIs, midwife, CSA Berney Foteba of Tannerie, Commune of Matoto)

≪*The information we have is through our readings in*

documents≫. (IDIs, Doctor, Center Medical Communal Bernard KOUCHNER, Commune of Kaloum)

In addition to the lack of training, other providers reported the influence of personal values that interfered with the quality of FP services offered to married users, which were described as better than those provided to single users.

DISCUSSION

This study provides interesting insights into understanding the individual, family, community, and health system barriers that negatively influence the decision of adolescents to use modern contraceptive methods. Our results suggest that despite persistent negative perceptions of modern contraceptive methods of participants, individual and community norms, and health system barriers, adolescents continue their quest for knowledge and use of modern methods over traditional methods that have not been proven effective in preventing unwanted pregnancies.

Among individual barriers, study participants cited fear of side effects and consequences (infertility), cost, and misinformation related to rumors as major obstacles to using modern contraceptive methods. Fear of side effects of FP products (including health risks and consequences) was perceived as a limiting factor in the decision of girls to engage in modern contraceptive use. Also, parents or other relatives or people sometimes view this group of FP users as individuals living a "promiscuous life." Other studies have reported that adolescents often face many barriers (fear, embarrassment, cost, and lack of knowledge) that limit the use of modern contraceptive methods (6, 11, 12, 21). In our study, side effects were closely related to the ability of users to be fertile in the future. Thus, individual and mass communication strategies that include information about the types of contraceptives, their mode of action, product-related side effects, and how to manage them may help reduce such individual barriers (15). Moreover, adolescents and youth access to contraceptive methods is a complex phenomenon, which requires the alleviation of the financial accessibility barriers in health care settings (e.g., free access to methods). In addition, some of the mothers we met argued that modern contraceptive methods are made for birth spacing among married women. Thus, parents, especially mothers of adolescents and youth, have a negative influence on their use of modern contraceptive methods. In our context, the discussion of sexuality, including the use of contraceptive methods by young (especially unmarried) girls, remains taboo. According to some parents, especially mothers, discussing sexuality or contraceptive use with their unmarried daughters may encourage them to initiate premarital sex. For some parents, for example, their culture recommends that girls keep their virginity until marriage. This may be because, in our context, where the foundations of social life are essentially built on religious and cultural norms, it is a great pride and honor for parents when their daughters keep their virginity until marriage. To ensure that parents, especially fathers, use financial dependence on this group as a means of enforcing chastity and a way to avoid unwanted pregnancies, which they describe as "nonsense and a source of financial problems and dishonor" for the family.

Interpersonal and family barriers, dominated mainly by the negative influences of women's spouses, are also a source of barriers to contraceptive use by young married women. The power of the spouse in married women's decision to use modern planning methods has been documented in other studies in Guinea (30) and elsewhere in the subregion (6, 35–37). In the plan to reposition FP in Guinea, the strategies put in place did not consider the influence of this decision-making power (27). Therefore, we recommend that men be included in strategies to improve the use of modern contraception and that both sexes (men and women) have a say in FP policies.

In addition to individual and family barriers, social and community barriers have an equally important impact on the ability of adolescents and young people to decide to use modern planning methods. We found that adherence to certain religious and community norms was a barrier to autonomy of women, particularly for adolescents and youth. These norms designate people who choose to limit births as acting against religious prescriptions. Also, they describe FP users as perpetrators of infidelity or homicide. This reflects a lack of communication between parents and their children on sexuality and reproductive health topics. For example, some parents, particularly mothers, feel very uncomfortable discussing sexuality and contraception with their own children who are of childbearing age due to cultural norms. Similar findings have been documented by Samandari et al. in Niger in 2019, Ezenwaka et al. in Nigeria in 2020, and Sanchez et al. in Nigeria also in 2021, who found barriers such as religious beliefs and lack of autonomy in contraceptive use by adolescents and youth (28, 37, 38).

STUDY LIMITATIONS

One of the main limitations of our study is its qualitative nature, so it cannot be generalized to the entire population of adolescents and youth in Guinea. Thus, the various barriers identified are specific to the urban area of Conakry. In addition, because of the sensitivity of the topic on sexual and reproductive health in our context, there may be a response bias among some participants. Future studies, particularly ethnographic studies, should also be undertaken in other regions, including rural areas, to examine better the community and individual factors that negatively influence the adoption and use of modern contraceptive methods by adolescents and youth.

CONCLUSION

In our context, the results of this study demonstrate that there are many barriers that adolescents and youth face in seeking a contraceptive method. To reduce the impact of these perceptions,

which are still alive in popular beliefs and perpetuated in communities, priority action areas should include training of health care providers, involvement of spouses (husbands), and religious or community leaders in sexual and reproductive health and right programs. Also, adapting FP services to meet urban adolescents and youth needs must be a priority in promoting contraceptive use.

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/s.

AUTHOR CONTRIBUTIONS

ND analyzed the data and drafted the paper which was approved and commented by all authors. All authors contributed to the article and approved the submitted version.

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Framing Contraceptive Use Motivations Among Adolescents and Young Adults Living in Informal Settlements in Kira Municipality, Wakiso District, Uganda

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Introduction: The use of contraceptives among adolescents and young adults is one of the most cost-effective strategies to address many sexual and reproductive health (SRH) challenges, including unintended pregnancies, early marriages, and sexually transmitted infections. Despite a high burden of SRH challenges, uptake and unmet needs of modern contraceptives remain low in Uganda, especially among adolescents and young adults in informal settlement settings. This study aimed to explore the motivations of adolescents and young people to use modern contraceptives (or not).

Methods: We analysed qualitative data from eight focus group discussions with 88 adolescents and young people aged 18–24 years residing in informal settlements of urban communities in Kira Municipality of Wakiso district, Uganda.

Results: Motivations for use (or not) of modern contraceptives were framed by two interrelated constructs, sources of information on contraception and the unacceptable use of contraceptives among adolescents widespread in the community. These two, in turn, formed the scope of knowledge upon which adolescents and young people based their decision on whether or not to access and use modern contraceptives.

Conclusion: To be more effective, sexual and reproductive health programs and interventions that aim to motivate the use of modern contraceptives among adolescents and young people in informal settings should be more comprehensive and focused

on alleviating individual, health systems, social, religious factors that reinforce negative health-seeking behaviours towards contraceptive use. In addition, there is a need to support adolescents and young people with socio-economic empowering strategies that equip them with sufficient resources to choose contraceptives of their choice.

Keywords: contraceptives, informal settlement, motivation, adolescents and young adults, sexual and reproductive health

INTRODUCTION

The use of contraception among adolescents and young people (AYP) is an issue of immense concern (worldwide) and a priority in the global agenda for achieving universal access to sexual reproductive health and rights (SRHR) services by 2030 (1). Although many countries have met substantial milestones towards improving access to SRHR services (2, 3), there remains a critical gap towards meeting contraceptive needs for AYP (3–5). In Sub-Saharan Africa (SSA), unmet needs for contraceptives among adolescents remain high. In contrast, the use of available contraceptive services remains low. Drivers of low access and use of modern contraceptives among AYP are multifarious, including feeble health and political systems (6), lack of knowledge regarding contraceptives (1), economic factors, misconceptions on the side effects of contraceptives, socio-cultural norms, and lack of adolescents friendly SRHR services (7). Consequently, AYP continue to experience several SRH challenges, including unplanned pregnancies, which sometimes end in unsafe abortion or pregnancy-related complications.

Contraceptives have long been considered one of the most cost-effective strategies to many of the SRH challenges, including reducing the burden of mother-to-child HIV transmission among women living with HIV who wish to prevent unintended pregnancy (8); lowering the risk of both maternal and infant mortality (9–14) and reducing the risk and complications related to pregnancy and childbirth (15). However, Uganda and other countries in SSA continue to face several AYP related SRH challenges, such as low contraceptive use. According to the 2016 demographic health survey, 25% of adolescents aged 15–19 years in Uganda had begun childbearing. Although uptake of contraceptives among unmarried women has increased gradually over the last decade, only 10% of adolescents aged 15–19 and 30.9% of young people aged 20–24 years use any form of contraceptives.

In Uganda, the challenges associated with low contraceptive use are more prominent in rural and low-income urban communities. Previous studies show that access to modern contraceptives among AYP in low-income urban communities is poorer than in the middle- and high-income urban communities (16). According to Satterthwaite and Owen (17), low-income urban communities tend to have worse health outcomes due to poverty, poor access to health services, and poor education than individuals in middle and high-income communities. Similarly, low access and uptake of modern contraceptives in informal settlements have been exacerbated by lower literacy levels, language barriers, heterogeneity of cultures, and the cost of the services (14, 18–21). In addition to low socio-economic status (SES), previous studies have attributed the significant differences in contraceptive use and family planning to marital status, parity, and gender (22, 23). For example, access and use of contraceptives by unmarried adolescents have been poorer than their married counterparts due to norms that promote sexual activity only in marriage settings. Similarly, other settings require adolescents who are married to have children soon after marriage to prove fertility.

Hence, reducing SRH challenges and achieving universal access to SRHR services (including modern contraceptives) requires concerted multi-sectoral efforts to reach everyone not reached by available SRHR services, including AYP in low-income communities (2, 24). A review of DHS data from Zambia, Uganda, Namibia, Ghana, and Zimbabwe showed a positive association between women's empowerment scores and the use of contraceptives (25). The negative associations between low SES and the use of SRHR services among AYP have been extensively documented and cannot be overemphasised (26–28). Low SES has been one of the underlying causes of early sexual debut and risky sexual behaviours (27, 29). For example, AYP from low-income families often engages in risky sex to obtain financial and material favours. Such AYP often lack the autonomy to negotiate for safer sex which further exposes them to unplanned pregnancies, school dropout, and early marriages (28, 30). A recent review by Hussein (31) highlights that access to SRHR, including contraceptives, has been worsened by the COVID-19 pandemic, resulting in disruption of SRHR services and resource allocation, with most resources being re-directed from essential resources needed to improve uptake of SRHR including contraceptive use to fight COVID-19. It is anticipated that such effects will be seen more among poor populations such as poor urban communities compared to middle- and high-income urban communities.

Few studies have been conducted on the prevalence of modern contraceptive use and the unmet need for modern contraceptive use among AYP residents in low-income urban settlements. In one study conducted among AYP aged 18–24 years, the unmet need for contraceptives was reported to be as high as 69% (23). Further, we found no studies reporting on motivation for using contraceptives among AYP in poor urban communities (including slums and informal settlements), likewise, most studies that have explored contraceptive use have blanketed adolescents in the "rural" and "urban" subgroups forgetting the different needs of the various sub-groups of AYP that exist within each setting. However, evidence from qualitative data shows that some of the factors affecting access and uptake

of contraceptives among AYP in the general population include parental disapproval, peer influence, the potential negative outcome of contraceptives and inadequate knowledge, socio-cultural barriers, and stigma (32, 33). Therefore, in this article, we aim to address some of these knowledge gaps by exploring the motivations that adolescents and young people living in informal settlements have for using (or not) modern contraceptives in Uganda from the perspectives of community members. The results presented in this article could be useful for understanding the obstacles faced by AYP in informal settlements when accessing modern contraceptives and could guide implementers in overcoming SRHR and contraceptive needs in informal settings in Uganda and other similar contexts.

TABLE 1 | Selected participants and number of FGDs.

Group of participants	Number of focus groups	Number of participants in each FGD	Total number of participants
Males age (18–24)	2	11	22
Males (25+)	2	11	22
Females age (18–24)	2	11	22
Females (25+)	2	11	22
Total	**8**		**88**

FGD, focus group discussion.

MATERIALS AND METHODS

Study Design and Setting

This qualitative study was conducted among informal settlement residents in Kira Municipality, Wakiso district, Uganda. Wakiso district is found in central Uganda surrounding the country's main capital city Kampala. Wakiso is one of the most urbanised districts in Uganda, with 70% of its population living in urban areas. Wakiso was purposively selected to provide a specific site for studying urbanisation challenges, including understanding the framing of contraceptive use motivations among the poor urban AYP and a perfect setting for understanding intra-urban differential (34). In 2016, Wakiso was ranked as one of the districts with a high unmet need for family planning (35). The district is characterised by a highly heterogeneous population with residents from all parts of Uganda and beyond. Wakiso has four municipalities, and one of the informal settlements, Kira Municipality, was randomly selected as the study site. A detailed geospatial description of the facility planning services in Kira Municipality, Wakiso district, has been published elsewhere (36). Briefly, only ∼42% ($n = 74/176$) of the total facilities in Kira offer facility planning services. Delivery of family planning services, including modern contraceptives, is affected mainly by two things: availability of contraceptives and inequity in services provision that disfavours unmarried adolescents (36).

Data Collection

Data collection took place in October 2019. The participants were purposively selected from all the informal settlements in Kira municipality based on their age and (in)experience in using modern contraceptives. Eight focus group discussions (FGD) were conducted across four informal settlements in Kira Municipality, Wakiso district. As our interest was to collect group perceptions and experiences, we adopted the FGD approach to collecting data. FGDs are suited for addressing public experiences and understanding health issues created by social environments or made within a social context (37). The FGDs consisted of 10–12 participants selected across four informal settlements. The participants were selected by four different community health workers to ensure a diversity of participants. We made sure that at least two participants were selected from each of the informal settlements. We segregated the FGDs by gender to enhance participation, resulting in four FGDs with female adolescents and young women while the other four were with male adolescents and young men. The FGDs were further sub-divided into participants aged 18–24 and participants aged 25 years and older (**Table 1**).

Focus group discussions were conducted in community spaces that were convenient and comfortable for the participants, such as health facilities and schools. The discussion in each of the sessions was led by two research assistants. The research assistants exchanged roles in different FGDs. At any one point, one played the role of the lead facilitator. At the same time, the other took detailed notes of the discussion, including physical expressions, and provided support with probing in case some issues were missed. After obtaining informed consent, before starting the discussions, a formal introduction of the subject matter and self-introductions were undertaken. This increased the rapport-building process between the researcher and the participants and among the participants themselves. All the interviews were voice recorded using a tape recorder.

The focus group discussions were conducted in the most commonly used local language Luganda. However, some participants at times would discuss in English, which was generally acceptable to all participants. Participants chose which language they were most comfortable using during the discussions.

Initially, one FGD was done in each category of participants, followed by a debrief that involved the lead researcher (MT) and two other research members (LA and TS). The debriefing was useful in quickly identifying patterns in the data, any challenges, and getting a sense of data saturation. At the end of the debrief, a decision was made to undertake one more FGD in each category. And after a second debriefing meeting, a decision was reached that full saturation was achieved, and data collection was halted.

Data Analysis

First, audio files were transcribed into text by the same research assistants who collected data. The text was directly translated into English and double checked by the co-authors MT and TS, which involved listening to the audios while reading the text to ensure that the transcription was done verbatim. This process also aided the researchers in familiarising themselves with the data. HN then led the open-coding process with the aid of a qualitative analysis software, NVivo version 10. Thematic

analysis approach (38) was used and it started with an open coding process led by HN. HN worked closely with MT in this process to ensure that the open codes were grounded in the data. An iterative process of reviewing the codes and discussing their meanings was undertaken to support this cyclic process which involved looking for connexions within the themes by going back and forth between the codes and the data itself. Eventually, the interrelationship between the themes was established and depicted in **Figure 1** through a process that involved all the authors.

RESULTS

The results depict a framing of AYP's motivations for using modern contraceptives. As indicated in **Figure 1**, the AYP's motivations are framed by two interrelated constructs: the sources of information on contraception and the unacceptable use of contraceptives among adolescents that is widespread in the community. These two, in turn, form the scope of knowledge upon which AYP acts concerning contraceptive use. The box shape of the figure depicts a sense of being boxed into these framings that AYP felt are determined by others in the community.

Sources of Contraceptive Information for Adolescents

This category presents the source of contraceptive information for AYP. It was reported that the AYP received information mainly through three sources (a) peers, (b) self-experimenting, and (c) Family and community. All of these sources of information were found to be interrelated, reinforcing each other but sometimes conflicting, as indicated in the details below.

Peers

Friends, siblings, and partners were noted as the main sources of information on contraceptives for adolescents. Information on contraceptives and how to get them was usually shared among the adolescents during their routine interactions. Peers were particularly influential to the adolescents, as they were empathetic and could identify with each other due to having similar experiences and challenges. Therefore, they held strong influences over each other's opinions and views towards the use of modern contraceptives. The quotations below illustrate the information shared and the influence AYP has on its peers.

> *"...our girlfriends tell us about the contraceptives they use to prevent pregnancy… so we follow or use that."* (Male FGD 18-24 Kasokoso)
> *"we usually talk to our friends and they tell us the methods they use and how they find them… if they are good, we use them."* (Female FGD 18-24 Kireka C)

However, some participants expressed the discomfort of discussing contraceptives use with their peers. This was usually informed by negative community perceptions, negative first experiences, ritualism, and lack of trust towards the use of contraceptives of AYP, which also depicted the interconnectedness of these categorises that framed adolescents' motivations for using contraceptives.

> *"I had a friend, but she never told me about her family planning, then I recently heard that she started using it before giving birth, she has searched for a child, but failed people are talking about her these days, so, I really don't like talking about such matters with people, you never know, people will talk behind your back," (female FGD3, 25+-year-olds).*

In the same regard, religion was noted as prohibiting AYP from using modern contraceptives. Therefore, some of them found it more difficult to discuss contraception with their peers. Additionally, negative first experiences determined whether the participants discussed with their peers or not. The participants noted that their partners only opened up about contraceptives if they had suffered side effects, making them refuse the use of contraceptives. Sometimes, the side effects required medical attention or treatment, which was also costly, thereby compounding the need to keep it secretive. On the other hand, for some, getting side effects was an embarrassment which led to a tendency to close out discussions on contraceptives. Consequently, some AYP noted using contraceptives in private and never talked about it because they feared spillage of the information to the community, which came with negative consequences. The quotations below depict the nuances that exist among peers as it pertains to sharing of information on contraceptives.

> *"using contraceptives is against the will of God and whites want Africans to sin… God sent us to the world multiply"* (Male FGD 18-24 Kireka).
> *"some girls will not tell when they are using family planning… they say when they get side effects and need money for treatment… I will not let my partner use family planning because I don't have money to spend on side effects"* (Male FGD 18-24 Kireka).

Self-Experimenting

Participants shared that they learned about contraceptives through self-experimenting. It was noted that after having bits of information from peers, sometimes the adolescents chose to self-experiment. The male AYP was noted as more adventurous and usually tried out with condoms. The male AYP noted they used condoms because of what they heard and wanted to see how it works. Additionally, it was noted that male AYP were more open to experiments compared to females because most decisions to use contraceptives were made by the men, and the females were reported to often play a passive role. Moreover, it was noted that the males were more open to experimenting because it was easier to obtain male condoms than to purchase pills or have an IUD inserted. The female contraceptives were noted to require more preparation and the involvement of third parties in their use.

> *"… you have to tell the man, about family planning and he chooses the best method to use… some men don't want it or care about it… as a woman you can use it in secret maybe."* (Female FGD 18-24 Kasokoso).

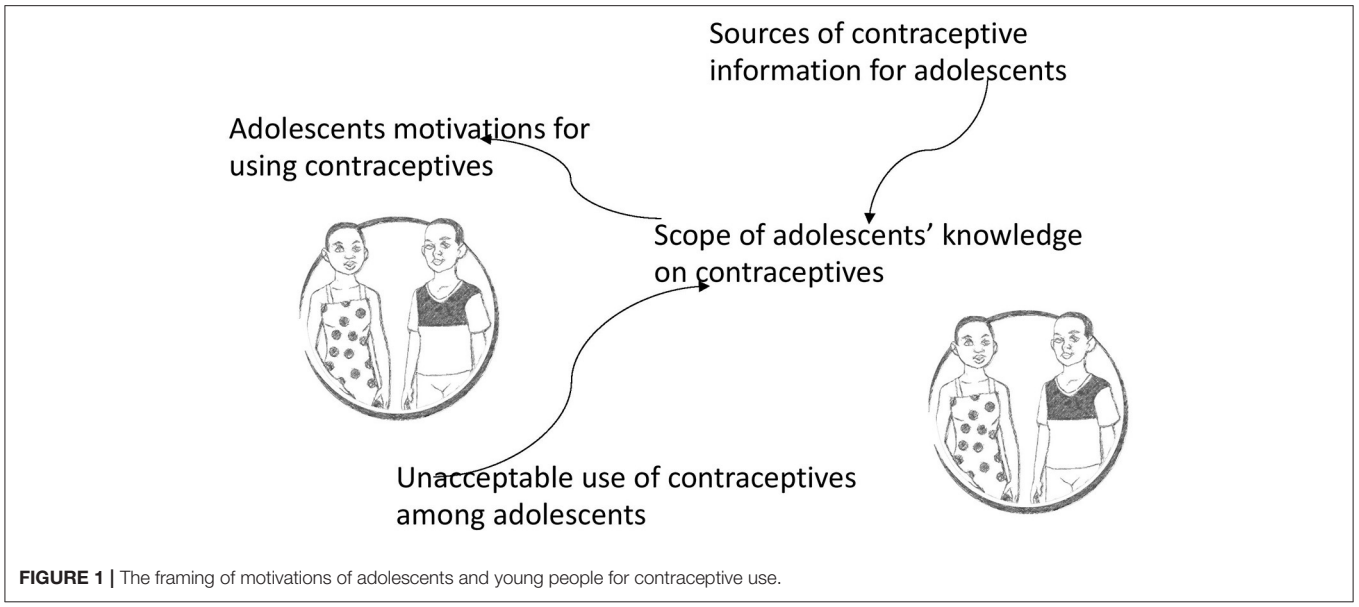

FIGURE 1 | The framing of motivations of adolescents and young people for contraceptive use.

"We try it out like condoms, when you hear that it can protect your girlfriend from getting pregnant, you say, let me try this thing and see how it works" (Male FGD 18-24-year-old)

AYP who reported learning about contraceptives through self-experimenting, also reported obtaining most of the information on which contraceptives to use through multi-media platforms such as billboards, television, radio, social media, the internet, and magazines. Multimedia was found to be particularly important in reinforcing massages and acting as cues for action. Some AYP noted trusting the information they received on television, and they also found print media particularly influential for those who were educated. The use of celebrities to advertise contraceptives was appealing to the adolescents and sometimes informed their choices regarding contraceptive use.

"*we get this information from adverts on TV, radio, billboards… the internet and we try them"* (Female FGD 24 and above Kireka C).
"When I see these singers using family planning, I get encouraged because we really admire them, they have made it in life, and we want to be like them (Female FGD 24 and above Kireka C).

Family and Community

Other sources for contraceptives information included parents, health providers, and schools. The information from parents was regarded highly as these were considered an authority in the adolescent's lives. In addition, parents were regarded as a trusted source of information because adolescents believed that they held their best interests at heart. The parents were noted as sharing information that was mainly protective and regarded as not leading to family embarrassments. For some parents, it was noted that they used their own experiences to warn against or encourage AYP to use modern contraceptives. Participants also reported that adolescents also received contraceptive information from other relatives, usually uncles and aunties.

"… parents tell us to keep the family dignity… they don't want us make the mistakes they made" (Male FGD 18-24 Kireku).
"… mothers tell the girls and fathers tell the boys… they tell us because they know the methods, they have used that are good or bad… they advise us." (Male FGD 18-24 Kireka)

Schools also shared information on the available contraceptives. The information was noted as being very general and not detailed enough to support choices for contraceptive use from schools. Nonetheless, schools were noted as an important source of contraceptive information, especially for school-going adolescents. Schools also acted as an avenue through which peers interacted and shared information on contraceptives. In addition, it was noted that parents who found it difficult to discuss contraceptive use among adolescents found schools to be a preferred alternative source of information.

"we learn about family planning from school, but they just tell us general things, they don't tell us what to use and how to use it" (Female FGD 18-24 Kireka C).

Health facilities, on the other hand, just like parents and family, were noted to be a trusted source of contraceptive information to adolescents. Health workers were regarded as knowledgeable experts. They provided this information at health facilities and outreach activities that were usually organised for other purposes such as health education and testing for HIV. However, some adolescents found health workers intimidating during their interactions. They noted that sometimes health workers held negative views towards contraceptives use among adolescents, making them similar to some community or family members. They questioned their use of contraceptives and made them feel bad about using contraceptives. In addition, it was perceived that

health workers promoted the use of contraceptives that could have life-threatening side effects on the users, such as cancers.

> *"The health providers can tell us what to use and we follow because they know, they tell us during HIV community outreaches, but we don't have specific ones on family planning… they should come and educate us more family planning" (Male FGD 24 and above Kireka D)*
> *"After I had delivered my third born at 24, the doctor wanted to insert the IUD and I refused because of what people were saying about it, it disappears into the body and causes cancer"* (Female FGD Kireka)
> *"They would have access, but they fear, a child of eighteen years when you are still in school in senior two or three they will imagine how they will go to the health facility and ask for family planning, of course the health worker will ask him/her what are you going to use that condom for and they will not have the answer so that is the reason why they leave it and they have sex without using family planning" (Male FGD3, 25+-year-olds)*

Unacceptable Use of Contraceptives Among Adolescents

The use of contraceptives among unmarried adolescents was deemed unacceptable in the community. This is because different community segments regarded sex before marriage as unacceptable and sinful and contraceptive use as shameful, especially for unmarried AYP. Parents protected their children from contraceptive information or sometimes shared only what was deemed protective. Religious groups equally shunned contraceptives among unmarried AYP, and for some religions, contraceptive use by unmarried adolescents was completely outlawed. This kind of attitude towards the use of adolescents of contraceptives provided a good breeding ground for misinformation among AYP, which later shaped their motivations for using (or not) contraceptives. This category was elaborated through two interlinked sub-categories: (a) family and community framing and (b) spoilt.

Family and Community Influences on Contraceptive Use

The acceptance or not of AYP's use of contraceptives was partly framed at the family level. Families, as indicated earlier, were careful about their image depicted by the growing adolescents. Therefore, the attitudes of a family towards contraceptives framed the access and willingness to initiate the use of modern contraceptives among AYP. The participants noted that AYP with parents or family members whose attitude towards contraceptive use was more liberal and encouraging found it easier to seek knowledge and use contraceptives. Participants recounted that such parents sought to preserve family dignity by preventing unwanted pregnancies and wanted to avoid similar experiences that they had encountered in their adolescent ages.

> *"my father told me about condoms… I used condoms."* (Male FGD 18-24 Kireka)

On the other hand, participants expressed the discomfort of discussing contraceptive use with parents. Openly discussing sexual activity was regarded as socially unacceptable, thereby creating room for secretive behaviour. Abstaining from sexual activity until marriage was generally preached by families but did not deter AYP from engaging in sexual activity, as recounted by one participant in the quote below.

> *"I used to carry pills for protection to school but did not tell my parents… if you tell them they will know you are having sex which is viewed as wrong by the parents."* (Female FGD 18-24 Kasokoso)

Furthermore, some family dynamics indirectly lured adolescents into using contraceptives, especially those coming from broken families. It was noted that female AYP were lured into earlier sexual activity to meet basic needs, which inevitably introduced them to contraceptives to avoid unwanted pregnancies.

> *"our mother left, and our father constantly told us if we get pregnant, we are on our own… he was a truck driver and he would leave home for months and leaves us with our step mum… when we requested her for anything, she would tell us to engage in sexual activity for favors from men, so I started using pills in my first year of secondary school, I needed to make ends meet with what I had, my body"* (Female FGD 18-24 Kasokoso)

However, the community was generally reported as holding negative attitudes towards the use of contraceptives by AYP.

Spoilt

Unmarried AYP who used contraceptives were generally labelled "spoilt" by their families and their communities. "Spoilt" AYP were described as individuals who were engaging in sexual activities, which, as described above, was considered evil and unacceptable.

> *"It is the same reason, if someone knows so and so's daughter has started using family planning and she is 17 years they will see her as someone spoilt" (Male FGD4, 25+-year-olds.)*
> *The community don't accept these adolescents to use family planning, they look at this adolescent as someone who is spoilt. Family planning is for people who have already produced children or those who are already tired of producing children (Male FGD2, 18-24-year olds).*

Community discouraged unmarried AYP from engaging in sexual activities and using contraceptives by using manipulative storeys focusing on the dangers of sex before marriage and the side effects of using contraceptives. For example, the storeys focused mainly on the inability to give birth later in life, failing to find a marriage partner, or the scare of catching cancer. Indeed, during the FGDs, some of the participants repeatedly questioned the use of contraceptives, noting that those who used contraceptives were adulterers and prostitutes. AYP noted that they were constantly reminded that if one used contraceptives, they would be labelled as "spoilt" or "inferior" in society than AYP, who abstained from sexual activities. While this community framing is targeted towards unmarried adolescents, it was noted that the negative attitude towards contraceptives lingers on into adulthood, thereby contributing to negative attitudes towards

contraceptive use even in adulthood and marriage. Therefore, the AYP involved in this study were either sceptical about using contraceptives or had written off their use owing to this negative framing that seemed to outweigh the positives they have heard.

"why would one use contraceptives if they have nothing to hide or if they are not a prostitute," (Male FGD 18-24 Kireku)
"Because they also have effects like cancer and stuff like that, women can take very long to have their periods, I don't know madam, but that's how it is, family planning is not good" (Male FGD4, 25+ years).

Scope of Knowledge on Contraceptives of Adolescents

The scope of AYP's knowledge on contraceptives was determined by the sources of contraceptive information and the unacceptable contraceptive use attitude, as indicated in **Figure 1**. These two categories or framings shaped what the adolescents knew about contraceptives, which determined their motivation for using contraceptives, as shall be detailed in the last category below. The scope of knowledge was described in three sub-categories: (a) popular contraceptives, (b) misinformation, and (c) not for us.

Popular Contraceptives

Given the available information, some contraceptives were indicated as more popular than others. For example, condoms were considered more easily accessible and cheap by the AYP. Condoms were also noted to have fewer contraceptive-related side effects. In addition, they were considered as offering double protection from unwanted pregnancies and sexually transmitted infections.

"we use condoms because that's what we know… you can find condoms everywhere… condoms protect us from diseases too" (Male FGD 18-24 Kireka)

In the FGDs, AYP acknowledged the knowledge gaps concerning contraceptives that females use to protect themselves against unwanted pregnancies aside from the well-known condoms. These contraceptives included pills, injectables, and IUDs. Most of the AYP mentioned that they did not know how these other methods worked and how best to obtain them.

"*I don't know how they use those other methods, I just know about condoms I know condoms, they say those other methods have issues, so I don't really want to know"* (Male FGD 18-24 Kireka D).
"I cannot use that injection again… I used it and got pregnant and then my friend said that the IUD made her fat and she removed it" (Female FGD 18-24 Kasokoso).

Misinformation

Owing to the unacceptable use of contraceptives among unmarried AYP, misinformation was abundant. This ranged from fears of getting pregnant while using contraceptives to contracting deadly cancers. Fear of being unable to bear children in the future also clouded the knowledge of contraceptives of the participants. Additionally, conspiracy theories about contraceptives being used by the white race to eradicate the black race were also prevalent. Some participants acknowledged their knowledge gaps but expressed fears about cancers and a lowered sex drive. The manner of application of some of the methods made it even more controversial. For example, some participants noted that they were never aware of how IUDs are inserted and removed from their bodies. Accordingly, they framed their own understanding of how IUDs negatively impact the users by disappearing into their bodies and turning cancerous.

"IUDs burn up all the ovaries if one has never produced" (Female FGD 18-24 years Kireka C)
us who are in school, you had rather take a pill and know you are not pregnant… those IUDs and injections you can get pregnant." (Female FGD 18-24 Kasokoso)
"Those IUDs get lost in the body...you don't see it after they have put it…it stays in your body and the body changes… such things cause cancer… rather use pills that I can see." (Female FGD 24 and above Kireka C)

Not for us

Adolescents and young people came to understand contraceptives as not meant for them. This was a consequence of the community framing on who should use contraceptives, as noted earlier. AYP were constantly reminded by the people in the community that they are not supposed to be using these modern contraceptives because they were still young. They commonly described family planning and modern contraceptives as ways through which adults avoided having more children. Contraceptives were, therefore, a reserve for the married and people in stable relationships. And as noted earlier, modern contraceptives were regarded as for the spoilt AYP and the adulterous. Hence other AYP regarded it as "not for us."

"family planning is for married people that are tired of producing children." (Male FGD 18 – 24 Kireku)
"like the pastors who want to hide that they have other partner, they do not want to have children with more than one woman, so they have to use family planning." (Male FGD 18-24 Kireka)

Motivation for Use or Not of Contraceptives

This category presents the motivations of AYP for using or not modern contraceptives. These motivations were informed by what they knew as informed by the sources of information and the unacceptable use of contraceptives among AYP in the society, as indicated in **Figure 1**. These motivations are detailed in these two sub-categories: (a) pleasure of sexual activity and double protection, and (b) accessibility of contraceptives side effects.

The Pleasure of Sexual Activity and Double Protection

Despite the challenges mentioned above, a few adolescents accepted that they were sexually active and were always open to using modern contraceptives that do not negatively affect their sex life and drive. Some adolescents mentioned that they had used condoms before. They did not like them because they enjoy "live sex" (referring to unprotected sex) more. In contrast,

others preferred them because of the extra lubrication that eased sexual activity. Although girls were sceptical about the use of contraceptives, it was reported that some girls who dared to initiate contraceptive use usually preferred using contraceptives that allowed them to have live sex, prevent pregnancies and enjoy sex. At the same time, some girls perceived the sperms obtained from live sex as something that could improve their body shape and body image. Additionally, the use of contraceptives was also viewed as a way through which one would enjoy sexual activity. This often led to the initiation of contraceptive use.

> *"Girls don't like to use condoms because live sperms make their bums bigger"* (male FGD 18-24 Kireka D).
> *"You cannot enjoy sex when using a condom, we want skin to skin"* (Male FGD 18-24 Kireka).
> *"Condoms are easy, there is no need for foreplay, because they already have that liquid (lubrication)"* (Male FGD 18-24 Kireku)
> *"I started taking pills at the age of 14, after discussing with a health worker, because I wanted to enjoy sex without becoming pregnant, but I did not like using condoms either"* (Female FGD 18-24 Kasokoso).

Condoms, on the other hand, were viewed as offering double protection, as noted earlier. Therefore, AYP were motivated to use them as protection against sexually transmitted diseases and pregnancy. Early parenthood was specifically undesirable to the male adolescents because they viewed it as extra childcare responsibility, a role that they viewed as burdensome given their lower social-economic status and urban life demands. The female participants were more concerned about being forced into double danger of unintended pregnancies and early marriage.

Accessibility of Contraceptives and Side Effects

Having quick access to contraceptives was an important factor in the choices the adolescents made. With the rather unstable living arrangements in informal settlements, the AYP in the FGDs noted that condoms were more desirable. They noted that they can find these anywhere and were often free. The use of contraceptives that may require stable building relationships with providers was not attractive to adolescents. For example, adolescents recounted the need to keep returning to providers if one gets side effects from pills, injectables, or IUDs. The inconvenience of sustaining relationships and the scare of side effects, as earlier on noted, partly motivated adolescents against certain contraceptives.

Quotes

> "*Condoms are everywhere, if I leave this place, I get them without suffering, so for me I will just use condoms, these other methods are complicated, you have to see a health worker, which I don't want* (Female FGD, 24 and above Kireka D)
> *"That thing [the IUD) my friend used it and she removed it (and) conceived, but she bled endlessly and lost her baby… if I get someone, I will not allow them to use contraceptives"* (Male FGD, 24 and above Kireka D)

DISCUSSION

This study explored the motivation for use or non-use of modern contraceptives by AYP living in informal settlements in Kira Municipality, Wakiso district, Uganda. We found that AYP's motivation to consider contraception use was influenced by their desire to engage in sexual activity, available information sources, restricted accessibility of health services, and the social and religious norms of their communities. Most of the AYPs in this study lacked the socio-economic agency to utilise contraception, and this was attributed to the packaging of adolescent-friendly information and services and societal norms that reinforced restrictions against AYP's access to contraceptives. These motivations are interconnected and continue to leave adolescents with only one option- not using contraception. Although these motivations are similar and consistent with previous research that has been conducted among AYP in urban and rural populations, the barriers to contraceptive use were more pronounced for AYPs in informal settlements who face more severe socio-economic inequalities. Some of the barriers to contraceptive use documented in previous studies include health workers refusing to give contraceptives to unmarried adolescents, socio-cultural norms, contraceptive stockout, and lack of AYP friendly services (36, 39, 40). We found that the motivation to use (or not) contraceptives was not merely an individual choice but a decision informed by peers, family, community, sexual partners, and information from social media. Although previous studies have highlighted how educational level is connected to contraceptives, no discussion related to education emerged in our discussions.

The desire to have unprotected sex for some AYP prompted the use of oral contraceptives, although most of the young people acknowledged the importance of condom use as it can offer double protection from both disease and unintended pregnancy. The choice of contraceptive use (or not) was also highly influenced by its costs and perceived side effects (41). In this study, sexually active AYP reported a high willingness to use contraception (such as condoms) which they perceived to have minimal side effects. What has considered minimal or major side-effects was mainly dependent on self-experimentations and sources of information available to AYP. Concerning cost, lack of socio-economic empowerment for AYP in informal settings left them mostly the choice of using free and readily available contraceptives (which were mainly condoms) (41, 42). In addition to cost and side effects, the choice to use certain types of contraception (such as pills or IUDs) also meant choosing to inconveniently deal with health care providers, who have been considered unfriendly un-confidential by AYP in previous studies. This was particularly important for female AYP who are more likely to experience side effects from the pill or IUDs than condoms, which are easily available with no side effects for their male counterparts. Consequently, female AYP were often seen as passive when deciding which contraceptive to use compared with their male counterparts. This gendered result could also be attributed to the different societal expectations that have been coined for women vs. men in which men are expected to initiate discussions around sex and are applauded for engaging

in sexual activities while the same activity is condemned among women (43).

Our study found that contraception use or engagement in any sexual activity was generally unacceptable for AYP and that decision to use contraceptives was usually one that required the secrecy or privacy of confidants. This finding was expected as most studies exploring adolescent sexuality and contraceptive use show that such topics are usually surrounded by socially defined "dos and don'ts" (44, 45), consequently influencing how information about contraception is shared with AYP. In most communities, information on sex and contraceptives is usually framed within the broader scope of discourses and societal norms that promote abstinence delayed sexual debut, dangers, and consequences of sex and contraceptives (46–48). Further, sexually active adolescents are generally inferior compared to their sexually inactive counterparts- which was noted to last through their adulthood (41, 49). Such labels could potentially repel the motivation for contraceptive use as most AYP wanted to preserve their societal images. In doing so, many AYP post-poned the discussion of contraception altogether until such a time as when they are considered qualified to use contraception without judgment- usually after marriage (41). This has led many adolescents to be victims of unwanted pregnancies and early marriages that could otherwise be avoided.

Sources and availability of information have serious consequences on the use of contraceptives for AYP. In our study, AYP in informal settlements continued to engage in sexual activity, despite the knowledge and information insufficiencies that reduced access and use of modern contraceptives. The most available source of information was their trusted peers and partners. Although young people perceived information sought from their parents, teachers, and health workers as more trustworthy and benevolent, this information was not readily available. Where available, the information obtained from parents, teachers, and health workers were often accompanied by warnings (of life-threatening diseases, future infertility, or the failure to find a marriage partner), heavy censoring, intimidation, and negative attitudes that left AYP demotivated to use contraception (7). Findings from a systematic review of contraceptive use in low and middle-income countries reported that information from parents, teachers, and health workers is trustworthy but insufficient to provide comprehensive information needed by AYP to make an informed decision on modern contraceptive use (43). Further, information from other scholars shows that, although trusted, SRHR information from parents and teachers is often not accessible to adolescents as discussions promoting contraceptive use are often neglected and considered a taboo (43, 50, 51), a significant contributor to the non-use of contraception among AYP. Contrary, peers, partners, and social media were preferred and, at the same time, influential sources of information as they tend to secure the privacy that sexuality-related discussions and decisions required for the AYP (52), compared to the risks associated with other members of the community knowing about their need for contraceptive use. Such a dynamic would potentially explain why adolescents used the most popular methods (condoms) and at the same time explain the rampant misconceptions modern contraceptives around such as fear of infertility, conspiracy theories, cancers, and loss of or lowered sex drive (41–43). It is therefore important to ensure that interventions that aim to motivate an increase in the utilisation of contraception and other SRHR services are holistic in nature and must aim to raise individual-level awareness, knowledge, clarify values and must be supported by contextual factors (53). When AYP are well-informed and supported, their individual level agency to make contraceptive use–related decisions increases (30, 48, 52).

Unique to adolescents in informal settlements is the increased need for economic and social emancipation, sometimes sought from sexual relationships (52), due to socio-economic inequalities such as low access to education- a most cited factor associated with delayed onset of childbearing among women (54, 55). Interestingly, the confidence in discussing contraceptives with their peers was compromised by the negative community perceptions of adolescent contraceptive usage. Within the community, social and religious norms that encouraged sex only after marriage with most community members viewing sex outside marriage as shameful, sinful, or completely outlawed (49), we assert that interconnected and multi-level nature of the barriers to contraception use among AYP (56) negatively impacted their motivation to use contraception, leaving them at risk of unintended pregnancy and STIs (18). This indicates the need for a multi-level response that targets all subgroups of AYP within the urban setting and should include socio-economic empowerment for poor urban AYP (56).

Methodological Considerations

In this study, we used data collected from FGDs as the only source of information. This could have limited some (shy) participants from sharing their personal experiences. To alleviate this discomfort, we ensured participants were segregated by sex and within appropriate age groups. In addition, we triangulated the findings obtained from AYP through additional FGD with individuals aged 25 and above. Throughout the FGD, participants were encouraged to freely communicate their views by our trained and vibrant research assistants. The finding discussed in this article used data from AYP living in informal settlements of Kira Municipality, Wakiso district, where delivery of contraceptives is influenced by the availability of contraceptives and inequity in services provision disfavors unmarried AYP. Thus, the transferability of the study findings should be limited to similar settings (36).

CONCLUSIONS

This article reveals that the motivation for use or non-use of modern contraceptives by AYP living in informal settlements in Kira Municipality, Wakiso district, Uganda, is not based on individual choices alone but also on various sources of information peers, family, community, sexual partners and social media. To be more effective, interventions that aim to increase uptake of Modern contraceptives in informal settings

should be more comprehensive and focused on alleviating individual health systems, social, religious factors that reinforce negative health-seeking behaviours towards contraceptive use. In addition, incorporating socio-economic empowerment strategies such as those that seek to equip AYP with sufficient resources to choose contraceptives of their choice may prove to be effective in improving the uptake of modern contraceptives among the urban poor.

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

The studies involving human participants were reviewed and approved by Makerere University School of Public Health Higher Degrees and Ethics Committee (HDREC-684). Additional approval was sought from the National council of science and technology (HS382ES). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

MT and HN conceptualised the study and led the data analysis. TS coordinated the data collection. CM and MM led the drafting of the manuscript. LA, AH, CB, DC, FN, and FM reviewed and provided substantial input to the manuscript. Additionally, MT provided overall scientific guidance to the manuscript drafting process. All authors reviewed the manuscript and provided substantial input, and approved the final manuscript.

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Assessing Wealth-Related Inequalities in Demand for Family Planning Satisfied in 43 African Countries

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Background: Around 80% of the African population lives in urban areas, and a rapid urbanization is observed in almost all countries. Urban poverty has been linked to several sexual and reproductive health risks, including high levels of unintended pregnancies. We aim to investigate wealth inequalities in demand for family planning satisfied with modern methods (mDFPS) among women living in urban areas from African countries.

Methods: We used data from 43 national health surveys carried out since 2010 to assess wealth inequalities in mDFPS. mDFPS and the share of modern contraceptive use were stratified by groups of household wealth. We also assessed the ecological relationship between the proportion of urban population living in informal settlements and both mDFPS and inequalities in coverage.

Results: mDFPS among urban women ranged from 27% (95% CI: 23–31%) in Chad to 87% (95% CI: 84–89%) in Eswatini. We found significant inequalities in mDFPS with lower coverage among the poorest women in most countries. In North Africa, inequalities in mDFPS were identified only in Sudan, where coverage ranged between 7% (95% CI: 3–15%) among the poorest and 52% (95% CI: 49–56%) among the wealthiest. The largest gap in the Eastern and Southern African was found in Angola; 6% (95% CI: 3–11%) among the poorest and 46% (95% CI: 41–51%) among the wealthiest. In West and Central Africa, large gaps were found for almost all countries, especially in Central African Republic, where mDFPS was 11% (95% CI: 7–18%) among the poorest and 47% (95% CI: 41–53%) among the wealthiest. Inequalities by type of method were also observed for urban poor, with an overall pattern of lower use of long-acting and permanent methods. Our ecological analyses showed that the higher the proportion of the population living in informal settlements, the lower the mDFPS and the higher the inequalities.

Conclusion: Our results rise the need for more focus on the urban-poorer women by public policies and programs. Future interventions developed by national governments and international organizations should consider the interconnection between urbanization, poverty, and reproductive health.

Keywords: urban health, urban poor, informal settlement, contraception, family planning, Africa

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INTRODUCTION

Population growth and dynamics pose many challenges to the achievement of the sustainable development agenda, particularly in low and middle-income contexts (1). Despite being one of the least urbanized places in the world, Africa has the fastest urban growth (2) and a positive annual urbanization rate is observed in almost all countries across the continent (3). Overall, urban areas usually have higher levels of coverage of health services than rural areas. However, urban poverty is increasing in many settings, especially in those experiencing a rapid urban transition, which may disproportionately affect people living in informal settlements and other vulnerable and marginalized groups (4–6). In several countries, despite the higher access to health care and availability of services generally found in urban areas, key maternal, and child health indicators for the urban poor present undesirably low coverage—similar to what is found for the rural poor populations (7–9).

Urban poverty has been linked to several sexual and reproductive health risks, including high levels of unintended pregnancies, and increased risk of sexually transmitted infections (10–12). Although the number of women in need of family planning using contraceptives is increasing worldwide, the demand for family planning satisfied with modern methods (mDFPS) is still low in several African countries, with little progress over time (4, 13–16). Comparing several interventions of the continuum of care, family planning coverage was one of the interventions with less progress overtime (15). Although specific programs like the Urban Reproductive Health Initiative have resulted in increased access to modern contraceptives for women living in urban areas of Kenya, Nigeria, and Senegal (13, 17), most policies and programs have failed to address the sexual and reproductive health needs of the most vulnerable urban populations (10). As a result, persistent high levels of unplanned pregnancies still being identified among urban women in sub-Saharan countries (4), and important inequalities in the coverage of mDFPS remain between and within countries across Africa (14, 16, 18). The West and Central Africa region presents the lowest average coverage of mDFPS, 33%, while average mDFPS reaches almost 60% in Eastern and Southern Africa (18). In most of African countries, coverage is lower among women who are poorer, less educated, and younger (16, 18).

Promoting family planning in urban contexts is critical to the development of healthy and productive urban populations, boosting economic growth, and ultimately the improvement of quality of life and achievement of the Sustainable Development Goals (10). Despite the abundant literature on national inequalities in mDFPS coverage, less is known about intra-urban inequalities. As most low- and middle-income countries are quickly becoming urban, efforts to achieve universal mDFPS require an understanding not only of urban-rural inequalities, but an understanding of intra-urban disparities in family planning coverage and the identification of population subgroups that are being left behind. In this study, we assessed between- and within-country wealth inequalities in mDFPS coverage among women 15–49 years of age living in urban areas of 43 African countries. We used data from national health surveys to perform the analyses, which had a particular emphasis on investigating whether urban poor women have lower mDFPS coverage in comparison to the other subgroups of the population.

MATERIALS AND METHODS

We used data from urban samples of Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys (DHS) carried out from 2010 to 2018 in African countries. All surveys that collected information on family planning for women aged 15–49 years were included. Forty-three surveys conducted across Africa were included in the analyses (**Table 1**). Analyses were based on 93,713 sexually active women irrespective of marital status, with a few exceptions. In Lesotho, Mauritania, and all surveys from the North African region—Algeria, Egypt, Sudan, and Tunisia—the samples were restricted to women who were married or in a union because the information on contraception was not collected for never-married women. Women were considered sexually active if they were married or living with a partner, or if they reported having had sexual intercourse in the month preceding the interview. Information on each survey sample is presented in **Table 1**.

Outcome

mDFPS coverage was defined as the proportion of women in need of contraception that were using (or whose partner was using) a modern contraceptive method. A woman was considered in need of contraception if she was fecund and did not want to become pregnant within the next 2 years, or if she was unsure about whether or when she wants to become pregnant. Pregnant women with a mistimed or unplanned pregnancy are also considered in need of contraception. Methods were classified as modern if they are medical procedures or technological products (19), including oral contraceptive pills, injections, male and female condoms, intrauterine devices (IUD), spermicides, implants, and sterilization (female or male). These methods were further classified as short-acting reversible contraceptives (oral contraceptive pills, male and female condoms, injectables, diaphragms, spermicidal agents, and emergency contraception), long-acting reversible contraceptives (IUD and implants), and permanent methods (male and female sterilization). Regarding having their demand for family planning satisfied by modern methods, women in need of contraception and using a modern method were classified as yes, while those in need of contraception but not using a method other than those classified as modern, were classified as no.

Stratification

Wealth Index

Household asset scores, generated through principal component analysis (PCA), were available in the DHS and MICS surveys. The PCA includes variables on household assets, building materials,

TABLE 1 | Countries included, sample characteristics, demand for family planning satisfied by modern methods (mDFPS), concentration index of inequality (CIX), and proportion of urban population living in informal settlements.

Country	Year	Source	Women sample	Unweighted sample size	mDFPS % (95% CI)	CIX	Informal settlements (%)
North Africa					69.6 (40.6; 98.5)		
Algeria	2012	MICS	Currently married	8,086	73.4 (71.7; 75.0)	0.2	NA
Egypt	2014	DHS	Currently married	6,478	81.4 (80.0; 82.7)	0.7	10.6
Sudan	2014	MICS	Currently married	1,448	42.8 (39.6; 46.2)	17.6	91.6
Tunisia	2018	MICS	Currently married	2,908	80.7 (79.0; 82.3)	0.4	8.2
Eastern and Southern Africa					67.3 (59.2; 75.4)		
Angola	2015	DHS	Sexually active	3,424	34.1 (30.4; 38.1)	26.3	55.5
Burundi	2016	DHS	Sexually active	1,098	47.6 (42.7; 52.6)	5.8	48.6
Comoros	2012	DHS	Sexually active	784	37.6 (32.9; 42.6)	0.1	69.6
Eswatini	2014	MICS	Sexually active	529	86.8 (84.0; 89.2)	1.4	32.7
Ethiopia	2016	DHS	Sexually active	1,567	77.2 (73.3; 80.6)	−3.1	65.9
Kenya	2014	DHS	Sexually active	2,642	75.7 (73.3; 78.0)	2.3	56.0
Lesotho	2018	MICS	Currently married	940	78.9 (75.4; 82.0)	1.3	53.6
Madagascar	2018	MICS	Sexually active	2,169	60.7 (58.1; 63.3)	−6.2	61.2
Malawi	2015	DHS	Sexually active	2,587	75.0 (73.0; 76.9)	−1.6	66.7
Mozambique	2015	DHS	Sexually active	1,456	61.1 (57.2; 64.8)	8.0	80.3
Namibia	2013	DHS	Sexually active	2,092	82.7 (80.4; 84.7)	1.6	39.4
Rwanda	2014	DHS	Sexually active	1,233	64.9 (61.7; 68.0)	−0.4	53.2
South Africa	2016	DHS	Sexually active	2,083	76.6 (74.0; 79.0)	0.3	26.3
Tanzania	2015	DHS	Sexually active	1,679	53.8 (50.6; 57.0)	0.2	50.7
Uganda	2016	DHS	Sexually active	1,805	57.4 (54.6; 60.1)	3.4	47.5
Zambia	2018	DHS	Sexually active	2,199	69.1 (66.6; 71.5)	−0.1	54.6
Zimbabwe	2015	DHS	Sexually active	2,192	85.7 (83.3; 87.9)	1.8	25.1
West and Central Africa					43.3 (38.9; 47.8)		
Benin	2017	DHS	Sexually active	2,755	27.4 (25.0; 29.8)	7.4	59.6
Burkina Faso	2010	DHS	Sexually active	2,099	56.3 (52.9; 59.5)	7.0	65.8
Central African Republic	2010	MICS	Sexually active	1,619	38.2 (33.7; 42.8)	18.1	95.9
Cameroon	2018	DHS	Sexually active	2,549	43.9 (41.6; 46.3)	6.4	33.7
Chad	2014	DHS	Sexually active	1,100	26.5 (22.7; 30.7)	8.0	88.2
Congo Brazzaville	2014	MICS	Sexually active	1,737	41.4 (38.9; 43.9)	5.2	46.9
Congo Democratic Republic	2017	MICS	Sexually active	2,834	36.6 (33.0; 40.2)	21.8	79.1
Cote dIvoire	2016	MICS	Sexually active	1,597	38.5 (35.1; 42.1)	10.5	59.2
Gabon	2012	DHS	Sexually active	2,540	41.4 (38.0; 44.9)	7.3	37.0
Gambia	2018	MICS	Sexually active	1,750	39.9 (36.6; 43.4)	8.6	27.1
Ghana	2017	MICS	Sexually active	2,329	33.8 (31.3; 36.4)	−0.7	30.4
Guinea	2018	DHS	Sexually active	1,128	37.7 (33.0; 42.7)	12.2	50.1
Guinea Bissau	2014	MICS	Sexually active	1,509	61.0 (57.3; 64.7)	1.7	74.4
Liberia	2013	DHS	Sexually active	1,667	41.3 (36.7; 46.0)	1.7	65.7
Mali	2018	DHS	Sexually active	1,103	48.7 (44.2; 53;2)	9.4	47.2
Mauritania	2015	MICS	Currently married	2,340	42.2 (38.7; 45.8)	6.5	79.9
Niger	2012	DHS	Sexually active	1,121	50.3 (46.0; 54.6)	6.8	81.7
Nigeria	2018	DHS	Sexually active	5,310	35.1 (33.2; 37.1)	7.2	53.9
Sao Tome and Principe	2014	MICS	Sexually active	884	47.3 (43.3; 51.3)	2.1	86.6
Senegal	2017	DHS	Sexually active	2,289	65.8 (62.7; 68.7)	3.0	29.5
Sierra Leone	2017	MICS	Sexually active	2,821	57.8 (54.9; 60.6)	3.0	59.8
Togo	2017	MICS	Sexually active	1,233	42.6 (38.5; 46.7)	4.9	53.0

and utilities like water and electricity, which are adjusted for the place of residence (20). DHS and MICS carried out separate PCA in urban and rural households as relevant assets may vary between them; both PCA are later combined into a single score using a scaling procedure to allow comparability between urban and rural households (21). The first component of the PCA, a continuous variable, was used to classify households into three groups of wealth, with the first group (T1) representing the poorest 1/3 of all families and the third one (T3) representing the wealthiest 1/3 of all families.

Statistical Analyses

The coverage of mDFPS and the share of the mDFPS by short-acting, long-acting, and permanent contraceptive methods were calculated for each survey and organized according to the UNICEF regions (North Africa, Eastern and Southern Africa, and West and Central Africa) (22), considering all urban women and according to wealth groups. We also calculated the concentration index of inequality (CIX) for mDFPS, a complex relative inequality measure according to wealth index (23, 24). It ranges from −100 and +100, where a CIX equals to zero represents equal coverage of mDFPS according to the levels of wealth groups. Positive CIX values indicate a pro-rich scenario (i.e., higher mDFPS coverage among the wealthier), while negative values indicate a pro-poor scenario (24).

The proportion of the urban population living in informal settlements for the years of all surveys analyzed was also described. According to the UN-Habitat, a household is defined as an informal settlement if it lacks one or more basic conditions, including access to improved water, access to sanitation, sufficient living area, housing durability, security of tenure, and housing affordability (25). Representing, therefore, an important proxy of extreme poverty. These information were obtained from the World Bank Open Data (26).

The relationship between the proportion of the population living in informal settlements and both the mDFPS coverage and CIX were analyzed using restricted cubic splines to account for their non-linear relationship. The splines were generated for the informal settlement variable using from three to seven knots, and then regressed on the mDFPS coverage and CIX estimates. The final number of knots to be used was estimated based on the quality of adjustment of the models, using the smallest values of the Akaike's (AIC) and Bayesian Information Criteria (BIC). The location of the knots was defined based on Harrell's recommendation (27).

All analyses were performed using Stata software version 16.1 (StataCorp LLC, College Station, TX) and adjusted for the sample design, including sample weights, clusters, and strata. All analyses relied on publicly available anonymized databases. The institutions and national agencies in each country obtained ethics approval for the surveys.

RESULTS

mDFPS Coverage and Share of Modern Contraceptive use Among Urban Women

Average urban mDFPS coverage among North African countries was 69.6% (95% CI: 40.6–98.5%), 67.4 (96% CI: 59.2–75.4%) for Eastern and Southern Africa countries, and 43.3% (95% CI: 38.9–47.8%) for countries from the West and Central Africa region (**Table 1**). At country level, the coverage of mDFPS among urban women ranged from 26.5% (95% CI: 22.7–30.7%) in Chad to 86.8% (95% CI: 84.0–89.3%) in Eswatini (**Table 1**). Countries in North Africa presented a high coverage of mDFPS (>70%), except for Sudan, where only 42.8% (95% CI: 39.6–46.2%) of urban women had their need for family planning satisfied by modern methods (**Table 1**).

According to the type of method, mDFPS in Algeria and Sudan was mainly achieved with short-acting reversible methods. Long-acting reversible methods were the most used in Egypt and Tunisia (**Figure 1**). In Eastern and Southern Africa, nine out of the 17 countries included in the analyses presented <75% of mDFPS coverage. Among the countries in the region, the lowest mDFPS coverage was found in Angola (34.1%; 95% CI: 30.4–38.1%). West and Central Africa presented the lowest mDFPS coverage across the African regions. mDFPS coverage reached 50% in only five out of the 22 countries: Senegal (65.8%; 95% CI: 62.7–68.7%), Guinea Bissau (61.0%; 95% CI: 57.3–64.7%), Sierra Leone (57.8%; 95% CI: 54.9–60.6%), Burkina Faso (56.3%; 95% CI: 52.9–59.5%), and Niger (50.3%; 95% CI: 46.0–54.6%). According to the share of method, short-acting reversible contraceptives were the most used in most countries. Long-acting methods were predominant only in Benin, Guinea Bissau, and Mali (mDPFS coverage of 53.0, 70.0, and 54.3%, respectively) (**Figure 1**).

Wealth Inequalities in mDFPS

The mDFPS coverage was also evaluated according to the proportion of people living in informal settlements. After testing different number of knots for the restricted cubic splines, the best model was obtained using three knots. An inverse relationship between the mDFPS coverage and the proportion of the population living in informal settlements was observed. The coverage reduced from 80% for the countries in which 10% of the population was living in informal settlements to approximately 45% for countries in which over 80% of the population was living in informal settlements (**Figure 2**). In contrast, a direct relationship between the relative inequalities (measured by the CIX) and the proportion of the population living in informal settlements was identified. The CIX increased from zero for countries with <20% to 10 for those with more than 90% of the population living in informal settlements, respectively (**Figure 3**).

The analysis stratified in terms of wealth groups showed that mDFPS is, in general, much lower among the poorest women compared to the wealthiest (**Figure 4**). In North Africa, marked wealth inequalities were found only in Sudan, where mDFPS among the poorest was 7.3% (95% CI: 3.4–15.0%) and 52.4% (95% CI: 48.8–55.9%) among the wealthiest. The largest gap in the Eastern and Southern African region was found in Angola, where mDFPS ranged between 5.5% (95% CI: 2.6–11.4%) among the poorest and 45.9% (95% CI: 41.1–5.8%) among the wealthiest. In Tanzania and Zambia, a bottom pattern of inequality was observed, in which a much lower mDFPS coverage was found among the poorest women compared to the other wealth groups. mDFPS coverage gaps between richer and poorer women were virtually null in Eswatini and very small in Comoros, Rwanda, and South Africa. In West and Central Africa, huge gaps were found for almost all countries, especially in Central African Republic (CAR) and Mauritania, where mDFPS was, respectively, 10.1% (95% CI: 6.5–17.4%) and 14.7% (95% CI: 7.2–27.7%) for the poorest, and 44.4% (95% CI: 39.0–49.8%) and 46.1% (95% CI: 41.9–50.4%), respectively, for the middle and wealthiest groups (**Figure 4**). Detailed information on the sample size and 95% confidence intervals is presented in the **Supplementary Material**.

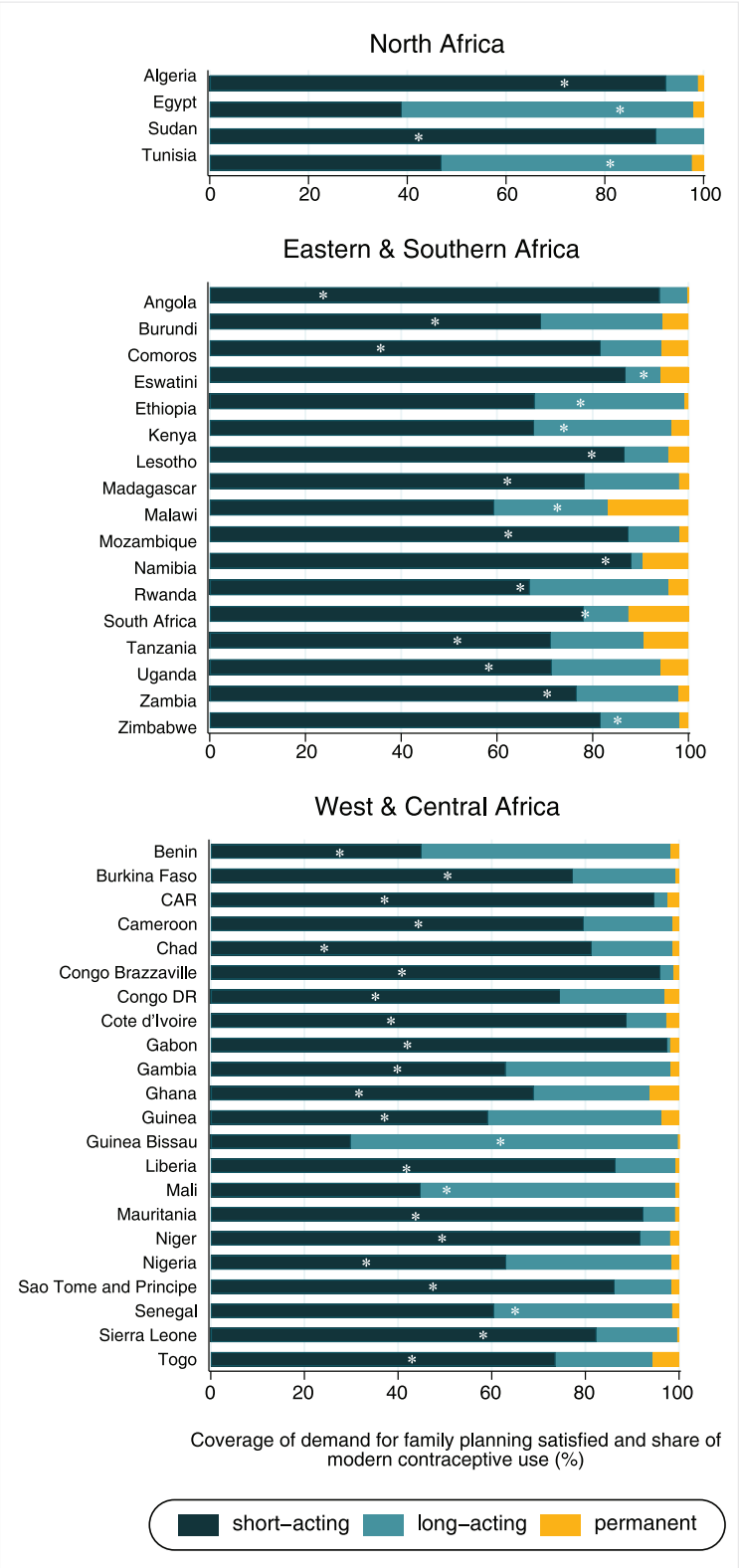

FIGURE 1 | Share of modern contraceptive use and coverage of demand for family planning satisfied by modern methods (white dot meaning of "*") according to world region.

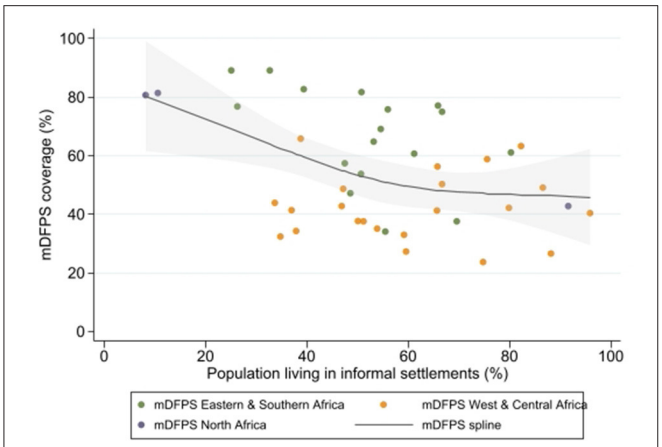

FIGURE 2 | Cubic spline model showing the relationship between the coverage of demand for family planning satisfied by modern methods and the proportion of the population living in informal settlements for each region.

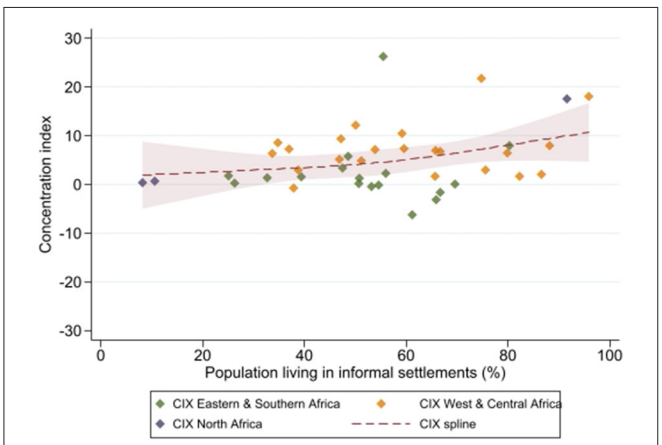

FIGURE 3 | Cubic spline model showing the relationship between the concentration index and the proportion of the population living in informal settlements for each region.

Analyzing the CIX estimates, we also found a high level of wealth inequality in mDFPS in Sudan (CIX = 17.6), Angola (CIX = 26.3), the Democratic Republic of the Congo (CIX = 21.8), and Central African Republic (CIX = 18.1) (**Table 1**).

Considering the share of modern contraceptive use according to wealth groups (**Figure 5** and **Table 2**), in North Africa the proportion of women using long-acting reversible methods positively increased with wealth in almost all countries included. The only exception was Tunisia, where the share of long-acting reversible methods was similar across all groups of wealth and higher than the share of the other methods. Countries from West and Central Africa presented varied patterns of contraceptive methods mix. Higher share of long-acting methods among the wealthiest was found in the Democratic Republic of the Congo, Ghana, Mali, Mauritania, and Togo. In Eastern and Southern Africa, results on the association between the type of methods and wealth status were mixed. The share of long-acting reversible methods was lower among the urban poor than the wealthiest in Angola, Burundi, Comoros, Eswatini, Kenya, Namibia, Rwanda, and Zambia. On the other hand, the share of permanent methods (sterilization) was markedly higher among the poorest as compared to the wealthiest in Kenya (6.6 vs. 3.4%), Tanzania (21.4 vs. 8.7%), Uganda (15.5 vs. 5.4%), and Central African Republic (9.0 vs. 2.0%).

DISCUSSION

We reported on surveys from 43 African countries, analyzing a sample of 93,713 women to assess between-country and within-country wealth inequalities in mDFPS coverage among urban populations. Our findings showed that mDFPS among women living in the urban area varied substantially by country, with West and Central Africa countries presenting the lowest mean coverage across the regions. Large within-country wealth inequalities in mDFPS were found for most countries included in our analyses, with a pattern of lower mDFPS coverage among the poorest women compared to the wealthiest. Differences in the type of contraceptive method used were also observed with an overall pattern of lower use of long-acting and permanent methods among the urban poor, but a few countries showed the opposite pattern. Our ecological analyses indicated that a higher proportion of informal settlements tend to be related to lower mDFPS coverage and higher relative wealth-related inequalities.

African countries are experiencing a rapid urban expansion largely due to natural population growth (4, 28). The rapid urbanization in African settings, concomitant with poor governance and slow economic growth, has led to informal settlements that are overcrowded and with poor infrastructure (10). There is evidence that several health conditions in these settings are better than among poor-rural women, however, it is frequently much worse than among urban non-informal settlements (29, 30).

In agreement with our findings, other studies have also found lower coverage of family planning services among informal settlements residents than urban non-informal settlements residents, where common barriers to modern contraceptive use are cost of method and lack of knowledge and access to modern contraceptives (30–33). There is also evidence of short birth intervals and higher prevalence of adolescent motherhood among informal settlement dwellers than among the non-informal settlements (30). In addition to financial barriers, adolescents tend to deal with additional barriers to access contraception, such as community disapproval of sexual activity during adolescence and social norms pressuring them to prove their fertility soon as they get married (34). Living in informal settlements have been contextualized as a mediator in the relationship between socioeconomic factors (such as wealth and education) and sexual and reproductive health outcomes (31). Previous studies also indicate a higher proportion of risky sexual behaviors in adolescents who grow up in informal settlements, such as multiple sexual partners, first sexual intercourse in early age, and unprotected sex.

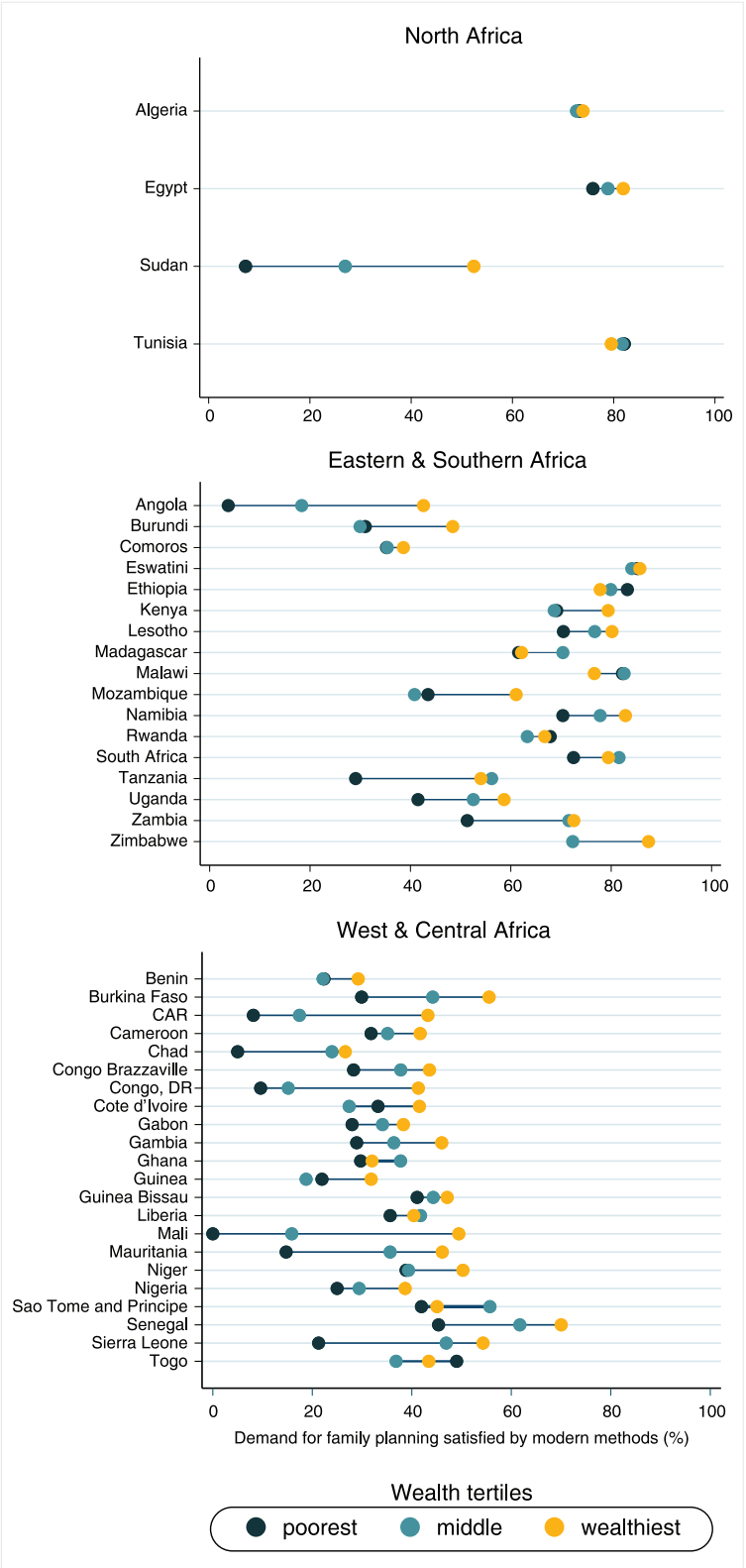

FIGURE 4 | Demand for family planning satisfied by modern methods according to world region and wealth groups.

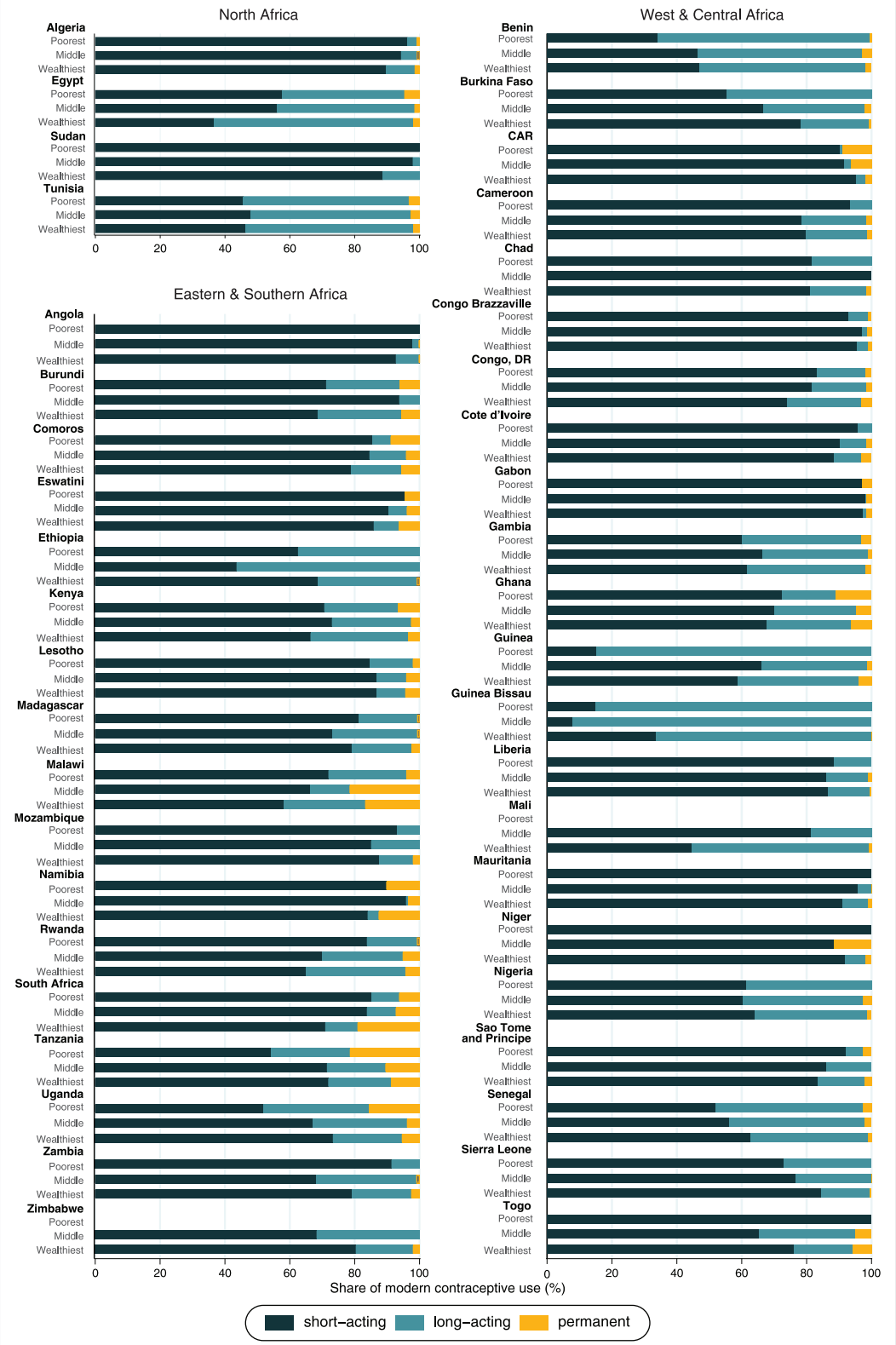

FIGURE 5 | Share of modern contraceptive use according to wealth groups*. *In Mali and Zimbabwe, the bars related to the poorest are not presented because we have no observation on modern contraceptive use among women from the poorest wealth tertile.

TABLE 2 | Demand for family planning satisfied by modern methods (mDFPS), share of each type of contraceptive method, according to wealth groups.

Country	Wealth groups	mDFPS		SARC	LARC	PERM
		% (95% CI)	*N*			
NORTH AFRICA						
Algeria (2012)	Poorest	73.3 (69.4; 76.8)	1,385	96.3	2.8	0.9
	Middle	72.7 (70.0; 75.2)	2,694	94.3	4.9	0.8
	Wealthiest	73.9 (71.9; 75.9)	3,704	89.7	8.8	1.5
Egypt (2014)	Poorest	75.9 (67.7; 82.5)	221	57.7	37.7	4.7
	Middle	78.9 (74.5; 82.7)	436	56.1	42.4	1.6
	Wealthiest	81.9 (80.4; 83.3)	4,526	36.6	61.5	2.0
Sudan (2014)	Poorest	7.3 (3.4; 15.0)	67	100.0	0.0	0.0
	Middle	27.0 (21.9; 32.7)	451	97.9	2.1	0.0
	Wealthiest	52.4 (48.8; 55.9)	999	88.7	11.3	0.0
Tunisia (2018)	Poorest	82.1 (76.8; 86.4)	309	45.7	51.0	3.3
	Middle	81.7 (79.2; 83.9)	1,273	48.0	49.4	2.6
	Wealthiest	79.5 (76.9; 81.9)	1,493	46.4	51.7	1.9
EASTERN AND SOUTHERN AFRICA						
Angola (2015)	Poorest	5.5 (2.6; 11.4)	188	100.0	0.0	0.0
	Middle	21.0 (17.5; 25.0)	1,575	97.9	1.9	0.1
	Wealthiest	45.9 (41.1; 50.8)	2,213	92.8	7.1	0.1
Burundi (2016)	Poorest	30.3 (20.9; 41.8)	18	71.3	22.7	6.1
	Middle	30.6 (12.9; 56.8)	25	93.8	6.2	0.0
	Wealthiest	48.9 (43.9; 53.9)	575	68.7	25.8	5.5
Comoros (2012)	Poorest	33.6 (20.0; 50.6)	100	85.5	5.6	8.9
	Middle	38.5 (29.5; 48.3)	197	84.6	11.2	4.1
	Wealthiest	38.4 (33.0; 44.1)	318	79.0	15.4	5.6
Eswatini (2014)	Poorest	81.0 (65.9; 90.4)	21	95.5	0.0	4.5
	Middle	87.8 (79.3; 93.1)	139	90.5	5.6	3.9
	Wealthiest	86.8 (83.1; 89.8)	607	85.9	7.7	6.3
Ethiopia (2016)	Poorest	83.2 (67.4; 92.2)	37	62.6	37.4	0.0
	Middle	79.9 (65.5; 89.3)	24	43.6	56.4	0.0
	Wealthiest	76.9 (73.0; 80.4)	1,062	68.7	30.4	0.8
Kenya (2014)	Poorest	68.9 (63.1; 74.1)	241	70.7	22.7	6.6
	Middle	69.7 (64.3; 74.6)	537	73.1	24.4	2.6
	Wealthiest	78.0 (75.0; 80.7)	2,156	66.4	30.1	3.4
Lesotho (2018)	Poorest	70.5 (56.8; 81.2)	43	84.7	13.2	2.0
	Middle	76.7 (68.1; 83.6)	361	86.8	9.1	4.1
	Wealthiest	80.2 (76.3; 83.5)	892	86.9	8.8	4.3
Madagascar (2018)	Poorest	61.8 (53.5; 69.4)	197	81.3	18.0	0.7
	Middle	70.4 (64.6; 75.6)	248	73.1	26.2	0.7
	Wealthiest	59.0 (55.9; 62.0)	1,494	79.2	18.5	2.4
Malawi (2015)	Poorest	83.7 (71.1; 91.5)	61	72.0	24.0	4.0
	Middle	80.5 (73.7; 85.9)	203	66.4	12.1	21.5
	Wealthiest	74.2 (71.8; 76.5)	2,011	58.3	25.0	16.7
Mozambique (2015)	Poorest	50.6 (36.3; 64.7)	42	93.1	6.9	0.0
	Middle	42.4 (33.7; 51.6)	128	85.1	14.9	0.0
	Wealthiest	64.3 (60.6; 67.9)	879	87.6	10.4	2.0
Namibia (2013)	Poorest	74.2 (65.4; 81.4)	161	89.8	0.0	10.2
	Middle	81.9 (78.5; 84.9)	714	95.9	0.6	3.5
	Wealthiest	84.1 (81.1; 86.7)	1,338	84.1	3.4	12.6
Rwanda (2014)	Poorest	64.3 (56.4; 71.4)	75	83.8	15.4	0.8
	Middle	64.4 (53.2; 74.2)	77	70.0	24.8	5.1
	Wealthiest	65.0 (61.5; 68.4)	801	65.1	30.6	4.3
South Africa (2016)	Poorest	73.7 (67,6; 79.0)	564	85.3	8.4	6.3

(Continued)

TABLE 2 | Continued

Country	Wealth groups	mDFPS		SARC	LARC	PERM
		% (95% CI)	*N*			
	Middle	76.7 (72.5; 80.4)	884	83.8	8.9	7.3
	Wealthiest	77.8 (74.2; 81.1)	1,208	71.0	9.9	19.1
Tanzania (2015)	Poorest	32.4 (22.4; 44.3)	105	54.2	24.3	21.4
	Middle	53.4 (43.2; 63.4)	181	71.5	18.0	10.5
	Wealthiest	55.1 (51.9; 58.3)	1,755	71.9	19.4	8.7
Uganda (2016)	Poorest	40.9 (31.3; 51.2)	154	51.9	32.6	15.5
	Middle	52.6 (45.8; 59.4)	260	67.2	28.9	3.8
	Wealthiest	59.6 (56.4; 62.7)	1,673	73.3	21.3	5.4
Zambia (2018)	Poorest	46.7 (32.4; 61.5)	41	91.4	8.6	0.0
	Middle	68.0 (63.2; 72.4)	634	68.3	30.8	1.0
	Wealthiest	69.9 (67.0; 72.8)	1,919	79.2	18.3	2.5
Zimbabwe (2015)	Poorest	NO	NO	NO	NO	NO
	Middle	73.2 (58.8; 84.0)	60	68.3	31.7	0.0
	Wealthiest	86.1 (83.8; 88.2)	1,801	80.4	17.6	2.0
WEST AND CENTRAL AFRICA						
Benin (2017)	Poorest	22.7 (17.8; 28.5)	428	34.1	65.3	0.6
	Middle	24.2 (19.9; 29.0)	523	46.5	50.6	2.9
	Wealthiest	29.5 (26.7; 32.5)	1,687	47.0	51.2	1.8
Burkina Faso (2010)	Poorest	33.1 (21.7; 47.0)	32	55.2	44.8	0.0
	Middle	45.3 (37.3; 53.5)	109	66.7	31.3	2.0
	Wealthiest	57.4 (53.9; 60.8)	1,685	78.3	21.0	0.7
Central African Republic (2010)	Poorest	10.8 (96.5; 17.4)	98	90.2	0.7	9.0
	Middle	18.2 (14.5; 22.6)	352	91.6	2.1	6.3
	Wealthiest	44.4 (39.0; 49.8)	1,564	95.2	2.8	2.0
Cameroon (2018)	Poorest	33.6 (21.9; 47.8)	76	93.4	6.6	0.0
	Middle	39.4 (35.6; 43.4)	842	78.6	19.8	1.7
	Wealthiest	46.6 (43.8; 49.4)	1,722	79.8	18.8	1.4
Chad (2014)	Poorest	7.5 (2.0; 24.4)	67	81.5	18.5	0.0
	Middle	21.9 (5.3; 58.4)	28	100.0	0.0	0.0
	Wealthiest	27.8 (24.0; 31.9)	1,048	81.1	17.4	1.5
Congo Brazzaville (2014)	Poorest	28.6 (20.3; 38.6)	282	92.8	6.2	1.0
	Middle	40.9 (36.7; 45.1)	1,475	97.2	1.5	1.3
	Wealthiest	44.5 (40.4; 48.6)	1,420	95.5	3.3	1.1
Congo Democratic Republic (2017)	Poorest	11.5 (5.7; 22.0)	246	83.1	15.1	1.8
	Middle	17.0 (12.6; 22.5)	724	81.7	16.7	1.7
	Wealthiest	43.2 (39.0; 47.5)	3,055	73.9	22.8	3.3
Cote d'Ivoire (2016)	Poorest	32.3 (19.7; 48.0)	44	95.8	4.2	0.0
	Middle	28.9 (24.5; 33.8)	669	90.2	8.1	1.7
	Wealthiest	43.2 (38.9; 47.6)	1,433	88.4	8.5	3.1
Gabon (2012)	Poorest	34.9 (29.8; 40.3)	740	97.0	0.0	3.0
	Middle	39.2 (33.8; 44.8)	1,285	98.1	0.2	1.7
	Wealthiest	47.0 (40.2; 54.0)	1,366	97.5	0.9	1.6
Gambia	Poorest	29.1 (22.2; 37.1)	387	60.1	36.8	3.1
	Middle	36.5 (31.6; 41.7)	905	66.5	32.4	1.1
	Wealthiest	45.6 (41.5; 49.7)	1,293	61.7	36.5	1.8
Ghana (2017)	Poorest	30.3 (22.9; 39.0)	280	72.4	16.6	10.9
	Middle	36.8 (31.9; 41.9)	857	69.9	25.4	4.7
	Wealthiest	32.7 (29.3; 36.3)	1,430	67.9	25.8	6.4
Guinea (2018)	Poorest	19.0 (6.2; 45.5)	13	15.3	84.7	0.0
	Middle	26.3 (17.7; 37.3)	158	66.2	32.5	1.3
	Wealthiest	39.8 (34.7; 45.2)	968	58.8	37.2	4.0

(Continued)

TABLE 2 | Continued

Country	Wealth groups	mDFPS		SARC	LARC	PERM
		% (95% CI)	*N*			
Guinea Bissau (2018)	Poorest	59.4 (44.2; 72.9)	57	14.9	85.1	0.0
	Middle	57.9 (50.8; 64.6)	223	7.9	92.1	0.0
	Wealthiest	61.6 (57.1; 65.8)	1,478	33.7	66.3	0.1
Liberia (2013)	Poorest	36.0 (21.7; 46.0)	168	88.5	11.5	0.0
	Middle	43.5 (37.4; 49.8)	817	86.1	12.8	1.1
	Wealthiest	40.7 (34.6; 47.0)	1,530	86.6	13.0	0.4
Mali (2018)	Poorest	0.0	1	100.0	0.0	0.0
	Middle	16.4 (6.2; 36.5)	15	81.3	18.7	0.0
	Wealthiest	49.2 (44.7; 53.7)	955	44.7	54.5	0.8
Mauritania (2015)	Poorest	14.7 (7.2; 27.7)	57	100.0	0.0	0.0
	Middle	35.7 (30.5; 41.1)	709	95.8	4.1	0.1
	Wealthiest	46.1 (41.9; 50.4)	1,591	91.2	7.7	1.1
Niger (2012)	Poorest	38.9 (17.7; 65.2)	5	100.0	0.0	0.0
	Middle	39.3 (20.6; 61.9)	16	88.5	0.0	11.5
	Wealthiest	50.6 (46.1; 55.1)	664	91.9	6.4	1.7
Nigeria (2018)	Poorest	25.6 (19.4; 33.0)	308	61.4	38.6	0.0
	Middle	29.2 (26.3; 32.4)	1,601	60.3	37.0	2.7
	Wealthiest	38.0 (35.8; 40.3)	4,314	64.1	34.7	1.2
Sao Tome and Principe (2014)	Poorest	42.4 (34.7; 50.6)	253	92.0	5.5	2.5
	Middle	53.7 (47.5; 59.7)	288	86.1	13.9	0.0
	Wealthiest	45.9 (39.9; 52.0)	432	83.5	14.4	2.1
Senegal (2017)	Poorest	45.8 (36.7; 55.1)	108	51.9	45.5	2.6
	Middle	61.6 (56.8; 66.1)	806	56.3	41.7	2.1
	Wealthiest	69.1 (65.2; 72.7)	1,649	62.8	36.0	1.1
Sierra Leone (2017)	Poorest	34.1 (20.9; 50.4)	48	73.0	27.0	0.0
	Middle	52.8 (48.7; 56.9)	964	76.7	23.2	0.1
	Wealthiest	60.2 (56.9; 63.3)	2,485	84.5	15.0	0.5
Togo (2017)	Poorest	49.0 (5.6; 94.0)	4	100.0	0.0	0.0
	Middle	37.0 (30.7; 43.7)	388	65.2	29.9	4.9
	Wealthiest	44.6 (40.1; 49.2)	1,041	76.2	18.0	5.8

SARC, short-acting reversible contraceptives; LARC, long-acting revesible contraceptives; PERM, permanent contraceptives.

Urban informal settlements are often neglected settings, with important limitations in relation to health services provision (33). Our findings support this evidence, since the higher the proportion of informal settlements, the lower the mDFPS coverage. Supply-side interventions may be extremely relevant in increasing family planning coverage in urban African settings, especially among non-users, when based on a rights-based approach and when considering the contexts where these women are located and their particular needs (13).

Our findings revealed important inequalities in mDFPS between and within the countries studied. Sudan, Angola, Central African Republic, the Democratic Republic of the Congo, and Mauritania, for instance, presented the lowest national mDFPS coverage among urban women and presented large wealth inequalities in mDFPS with the urban poor faring worst. In addition to the out-of-pocket payment that may be required to get contraceptives (35), there is evidence of a lower approval of family planning by the husband among poorer couples (36). Both factors can be contributing reasons for lower mDFPS coverage among the poorest. Prior studies also documented significant gaps in mDFPS coverage in these countries according to area of residence, level of education, religion, and age (18, 35). Besides the current unfavorable scenario in terms of inequalities, slow improvements in national family planning coverage have also been reported for these countries in the last years (14, 37).

Chad and Central African Republic had the lowest mDFPS coverage. Both are among the poorest countries in the world and have large gender inequalities, leading the rank of child marriage rates and with high levels of illiterate girls (38). In addition to their cultural norms, the high poverty rates in these countries push girls to early marriage to reduce family expenses and increase their assets, through the dowry (38). Besides that, the economy in these countries is highly reliant on subsistence farming, which favors bigger families and may partially explains the persistent lower demand for family planning in comparison

to other African countries (39, 40). Even with the lower demand for family planning, both countries still have a high proportion of demand for family planning unsatisfied. Chad presented the smallest mDFPS coverage among all the countries included in our analyses as well as enormous wealth inequalities, leaving behind the poorest urban women. Central African Republic similarly presented a small national coverage of mDFPS, with huge gaps in mDFPS between the poorest and wealthiest women in urban areas. Our findings support projections indicating that universal coverage of family planning services would only be reached in 2076 in Central African Republic, and in 2100 in Chad (41).

Sustainable mDFPS coverage depends on the availability of a range of contraceptive methods, guaranteeing different options depending on women's needs and wants (42). Long-acting reversible methods have lower failure rates. They are cost-effective and do not require frequent attention by their users (43). However, long-acting reversible methods require special conditions such as a qualified health worker, appropriate place to be inserted, and medical follow-up after procedure due to risks of uterine perforation, infection, or expulsion. The additional requirements for safe provision of long-acting reversible methods may explain the more frequent use of short-acting reversible methods in many African countries (28, 44). Not surprisingly, the share of short-acting reversible methods was higher among the poorest urban women in several countries. The unavailability of long-acting reversible methods in informal settings can result in limited choice and contribute to lower mDFPS among the urban poor (32).

Our study is not free of limitations. The analyses about informal settlements are based on a common household-centered definition of informal settlement, where most of the classification elements are basic household living conditions instead of characteristics of a neighborhood or a larger area. Therefore, it represents an additional metric of wealth inequalities, but it lacks the important aspect of the environment. A more detailed definition of informal settlements, including the neighborhood in which the household is located, should be adopted to take into consideration the influence of contextual factors on sexual and reproductive health indicators. The analyses presented here were limited to wealth-related inequalities; however, other socioeconomic factors such as education and age could also present large mDFPS coverage gaps. Inequalities regarding these factors should be analyzed individually and concurrently with other factors using double stratification analyses. Despite of these limitations, our findings shed new light on the need to consider the intersectionality of the several axes of inequality and on the presented intra-urban wealth inequalities in mDFPS.

CONCLUSION

We showed that mDFPS coverage among urban populations is highly variable across Africa and most countries presented significant wealth inequalities with the lowest coverage among poorer urban dwellers compared to their wealthier counterparts. Our findings highlight the need for greater investments to improve access to and use of family planning services in urban poor contexts. Our findings also underscore the value of future research using individual data on countries where inequalities were found.

The interconnection between rapid urbanization, poverty, and sexual and reproductive health is often ignored in the global development agenda as living in urban areas is often assumed to mean better access to health services and better health outcomes. However, this view fails to consider the significant vulnerability of the poorest urban women, who live in precarious conditions. The rapid urbanization occurring in many African countries with weak economies has led to the precipitous growth of informal settlements. In these urban poor contexts, it is important to consider programs such as asset building and economic empowerment strategies that also address the socio-economic drivers of poor sexual and reproductive health outcomes (45).

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/s.

AUTHOR CONTRIBUTIONS

FH, CC, and CB proposed the idea, outlined the methods to be used in the study, and wrote the initial draft of the manuscript. FH and CB analyzed the data. AB supervised all statistical analysis. All authors contributed to the article, revised the final version and approved the submitted version.

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SUPPLEMENTARY MATERIAL

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Experiences, Preferences, and Needs of Adolescents and Urban Youth in Contraceptive Use in Conakry, 2019, Guinea

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Introduction: The use of contraceptive methods is very low in Guinea, particularly among adolescents and young people. The purpose of this study is to analyze the experiences and expectations of adolescents and young people regarding the use of contraceptive methods in 2019 in Conakry, Guinea.

Methods: We conducted a 6-month qualitative and descriptive study. Data were collected through individual in-depth interviews and focus group discussions with adolescents and young people, health providers and health policy makers. Two approaches of deductive and inductive analysis were used to synthesize the main insights from the data.

Findings: Twenty-six participants were included in this study. Adolescents and young people have personal, family and community experiences that positively or negatively influence their contraceptive needs and preferences. Positive experiences include the relative cost of injectable forms, perceived absence of side effects of implants, proven efficacy and duration of action of the modern method used (implants and injectable form). Negative experiences included cost of implants remain high (15 Euros), perceived side effects including weight gain, pill compliance, method indiscretion, and low sensation of sexual pleasure for the condom. The preferences of the young participants were dominated by Implants and injectable forms that better meet their contraceptive needs. In terms of needs, the expectations expressed revolved around needs related to the health system, including sex education, reduction in the cost of some contraceptives (implants), availability of contraceptive methods, and equity in the provision of family planning services to adolescents and young people.

Conclusion: Exploring the contraceptive experiences, needs and preferences of adolescents and young people reveals decision-making dilemmas. Adolescents and young people expressed their experiences in terms of the cost of preferred

contraceptives (implants), side effects, proven efficacy, and duration of action. However, their decisions are still influenced by availability, equity in service delivery, and the involvement of parents and religious leaders in sex education. Decision-makers should then place particular emphasis on improving health service delivery, adolescent sexual and reproductive health, availability of preferred contraceptive methods at affordable cost, and a program on sexuality education with the involvement of parents and religious leaders and the promotion of condom use.

Keywords: experiences, preferences, needs, adolescents, youth, urban, contraceptives, Guinea

INTRODUCTION

In resource-constrained countries, about 10 million unintended pregnancies occur each year among adolescents aged 15–19 in low contraceptive prevalence settings (1). Improved access to family planning (FP) information and services can reduce the number of teenage pregnancies and early deliveries, as well as the number of deaths from resulting complications (2, 3). Matching FP services to the needs and preferences of adolescents and young people can improve their reproductive health, particularly by increasing the use of contraceptive methods (2, 4, 5).

In sub-Saharan Africa, adolescents and young people have a variety of experiences that influence their preferences and use of contraceptive methods. These experiences and preferences relate to the type and geographic accessibility of health facilities, frequency of service delivery, provider attitudes, confidentiality of services, waiting time at the health facility, availability, diversity, and cost of contraceptive products, cultural and religious norms of communities, and gender (6–10). Thus, special attention needs to be paid to these aspects in order to effectively meet the contraceptive needs of adolescents and young people.

Half of the Guinean population is between 15 and 24 years old, with 15–19 year group as adolescents and 20–24 year group as young people (11). Contraceptive prevalence among women of reproductive age (15–49 years) remains low in Guinea, although it has increased in recent years, from 9% in 2012 to 11.3% in 2018 (12, 13). Contraceptive prevalence among adolescents (10.6%) and young women (11.7%) also remains low (13).

The Guinean Ministry of Health recognizes that there are specific challenges to meeting the contraceptive needs of Guinean adolescents and young people; however, funding has largely focused on increasing the supply of family planning services, ignoring the operations research and action research needed to understand needs, stimulate demand, and improve the supply of services (13, 14).

The objective of this study is to analyze the experiences, preferences, and expectations of adolescents and young people regarding the use of contraceptive methods in Conakry, Guinea.

METHOD

Study Design

This was a descriptive qualitative study conducted in the city of Conakry (from June 1 to October 30, 2019).

Study Framework

Our study took place in the city of Conakry, and more precisely in each of its five communes (Kaloum, Dixinn, Ratoma, Matam and Matoto) (**Figure 1**). Conakry, the capital of Guinea, is the largest city in the country with an estimated population in 2019 of 2,317,376 inhabitants and a density of 5,150 inhabitants/km^2. Adolescents and young people (15–24 years old) represent 55.5% of the population of Conakry (11). In 2018, contraceptive prevalence among adolescents and young people in the city of Conakry was 17.1% (13).

Study Participants and Recruitment

The study population consisted of: adolescents and young people. These participants were selected purposively, accounting for variation in their socio-demographic characteristics (age group, sex, level of education, marital status, and commune of residence). In each commune of the city of Conakry, three neighborhoods were randomly selected for data collection; in each neighborhood, one sector was randomly selected. In each selected sector participants aged 15–19 or 20–24 were selected for interviews. To include a participant, she/he should be using a contraceptive method or have a history of contraceptive use. Any eligible person who did not consent to be included in the study was not included as participant.

Participants were reached with the help of local authorities who contacted household heads to seek participation of the adolescents and young people living with them. At a first stage, participants selected by the help of local authorities were interviewed through in-depth individual interviews (IDIs). For sample size, inclusion of participants continued until data saturation, i.e., no new information emerged from new participants.

At a second stage, IDI participants participated in focus group discussions (FGDs) with additional peers whom they contacted through a snow ball sampling. Two FGDs were organized per commune of residence, that is 10 FGDs in total. FGDs were categorized into married, single, literate and illiterate participants. In total, 72 people participated in the FGDs. FGDs were facilitated by the first author (CB) with the second author (ND) as note-taker. The rationale of conducting both (IDIs) and FGDs was to triangulate participants' individual and collective views on contraceptive use, which is somehow considered as taboo in most households in the research setting. Interviews were scheduled at participants' convenience.

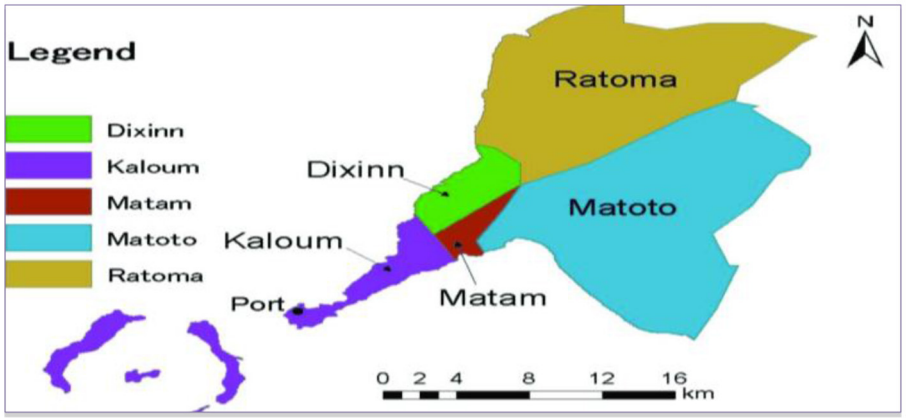

FIGURE 1 | Conakry with its 5 communes according to the national direction of the territory (13).

Data Collection and Sources

We used individual in-depth interview (IDI) and focus group discussion (FGD) techniques that encouraged interaction among participants. Data were collected by a team of experienced and trained qualitative interviewers (young public health doctors, sociologists) and took place in locations chosen by the participants. These interviews were conducted in French or in the local language (Soussou, Malinké, and Peullh) depending on the preference of the participants. All discussions and in-depth individual interviews were recorded on Dictaphone with a built-in microphone and transcribed into French.

Profile of Respondents

Twenty-six participants were interviewed through individual in-depth interviews (**Table 1**). These participants were predominantly female (65.4%) and had attended formal school (61.5%). More than half of the adolescents and young people were married (53.8%). In addition to the individual interviews, 10 focus group discussions were conducted in the five communes with the participation of 80 adolescents and young people aged 15–24.

TABLE 1 | Characteristics of participants in the individual in-depth interviews (IDI).

Socio-demographic characteristics	Headcount ($n = 26$)	Percentage (%)
Types of participants		
15–19	9	34.6
20–24	17	65.4
Sex		
Males	8	30.8
Women	18	69.2
Residence of participants		
Kaloum	6	23.1
Dixinn	6	23.1
Matam	4	15.4
Ratoma	5	19.2
Matoto	5	19.2
Schooling—teens and young peoples		
Attended formal school	16	61.5
Did not attend formal school	10	38.5
Marital status—adolescents and young people		
Married	14	53.8
Singles	12	46.2

Data Analysis

The data collected were entirely transcribed into French by members of the research team, then entered and coded using Microsoft Word and Excel Windows 16. These were examined using content analysis approach to identify the main themes and sub-themes. Data were coded by two trained encoders (CB and BSC). Each of the encoders received half of the transcriptions. After familiarization with the content of each transcription, two codebooks were developed in Excel sheets separately by both encoders, using five transcriptions. These codebooks were compared for discrepancies, similarities and complementarity during two discussion meetings including the other co-authors. One consensual codebook was then adopted and guided parallel data coding by both encoders. Information pieces relevant to the research questions were highlighted in the word document and attributed a code using the "new comment" option. Highlighted information pieces were then copied and pasted in an Excel sheet along with the name and short definition of the respective codes, as well as the ID number and characteristics of the respondents. Next step, the codes were organized into themes and sub-themes accounting for similarities and differences, using the Excel sheets. Each encoder interpreted the themes/sub-themes and identified illustrative quotes. Interpretation of themes/sub-themes as well as corresponding illustrative quotes were discussed in a third meeting with all co-authors.

Ethical Considerations

The research protocol was approved by the National Committee of Ethics for Health Research in Guinea (CNERS). Study

participants were informed and gave their written consent prior to participating in the study. Assent was obtained from a parent or household decision maker of each participant below the age of 18. Interviews were conducted in private locations to ensure confidentiality. Some of the participants were minors aged 15–17 years and gave their consent. The informed consent of their parents/guardians was also obtained for participation in the study.

RESULTS

Participants' stories about their experiences, preferences and needs regarding the use of contraceptive methods in urban areas were clustered into three main themes with sub-categories or themes within each theme. These three themes focused on participants' experiences (personal, family and community), preferences for contraceptive methods, needs vis-à-vis the health system (sexual education, affordability, availability of contraceptive methods, equity in service provision) and needs vis-à-vis the community (involvement of parents and religious leaders).

Adolescents' and Young People's Experiences of Contraceptive Use

Individual Experiences of Urban Teens and Young People

Positive Experiences

Adolescents' and young peoples' individual experiences with contraceptive use are summarized by the perceived characteristics of the method used, including cost, absence of side effects, proven efficacy, and duration of action.

Some Methods Are Affordable. Affordability of different methods depends on the financial capacity of individual respondents. While the cost of the different methods ranges from free (distribution) or 1,000 GNF (1 eurocent) for condoms to 150,000 GNF (15 euros) for implants, different respondents, depending on their financial capacity, believe that these costs are affordable. Indeed, a few testify that they have no difficulty in finding the money to buy these methods.

> *"Despite the high price of anti-ball [implant], I never had a problem with money to get it, because you don't always buy it".* (IDI, in school, adolescent, female, current user, commune of Kaloum)

Condom Is Effective for Pregnancy and STIs Prevention. Users of methods such as implants and injections have testified to the effectiveness of these contraceptive methods in preventing pregnancy in their homes. In addition to teenagers and young boys who reported avoiding pregnancy and sexually transmitted infections (STIs/AIDS) in their couples by using condoms, the following are some of the most common reasons why they use condoms.

> *"We use condoms for a lot of things. To keep girls from getting pregnant and also that they don't get sexual diseases"* (Participant 3, in school, adolescent, male, unmarried, current user, FGD, Commune of Dixinn)

Some Methods Have Long-Lasting Action. In addition, the long duration of action of the method was an advantage reported by respondents who used implants or injections. For them, these methods prevented them from becoming pregnant despite having sex without a condom for the duration of the method's action, 3 months and 3 years, respectively.

> "*I use the device that you put in your hand [implant], so no one will understand that I'm planned, and lasts a lot of years, because I don't go to the hospital every time*" (Participant 2, in school, young, female; married, current user, FGD, Commune of Matoto).

Negative Experiences

Adolescents' and young people's personal negative experiences with contraceptive methods are related to affordability, dose-related compliance, perceived side effects, method indiscretion, and low sensation of sexual pleasure.

Some Methods Are Not Affordable. Respondents testified about the financial constraints to accessing contraceptive methods such as implants. Indeed, they perceive this method as their preferred method because of its effectiveness and duration of action; however, they say they are unable to bear the cost, which amounts to 150,000 GNF (15 euros) for a period of 3 years.

> *"I once decided to plan ahead, I went to the hospital for the Jadelle [implant], I was told it's 150,000 GNF and I didn't have any money at the moment. So I came back without planning"* (IDI, young, female, in-school, unmarried, former user,Commune of Dixinn)

The Daily Use of Pills Is Boring. Some of the respondents stressed that they are challenged by the demands of daily use of methods such as the pill. Indeed, they sometimes say they forget to take pills, which sometimes results in the ineffectiveness of the method, i.e., the occurrence of pregnancy.

> "*… I used to use the pills [birth control pills] even that... I got pregnant, but I forgot to take my medication a lot*" (Participant 6, young, female, unmarried, former user, FGD, Commune of Matam)

Some Methods Have Side Effects. Respondents who had used implants, injections and condoms reported experiencing side effects after use. Weight gain and menstrual problems were cited as side effects following the use of injections and implants. In addition, two young women reported infections from their partners' use of condoms, which they believed were caused by the lubricant.

> "*I have a problem, people say to use [condoms] but when my boyfriend puts them on, the oil on them gives me infections afterwards.*" (IDI, young, female, unmarried, out school, former user, Commune of Matam)

Implant Is Not a Discrete Method. Furthermore, implants have been cited as a method that is not discreetly used. They find that the visibility of the implant under the skin reveals their status as a contraceptive user against their will.

> *"I like anti-ball [implant] but when you put it on, everyone will see the marks when you wear the straps"* (IDI, adolescent, female, in school, unmarried, former user, Commune of Matoto)

Condom Does Not Provide Sufficient Sexual Pleasure. Two adolescent girls and one young woman confessed that they did not feel sufficient sexual pleasure when their partners used condoms during sex.

> "*Frankly, I don't feel the taste when using condoms. It spoils my appetite*" (Participant 3, adolescent, female, unmarried, in school, former user, FGD, Commune of Dixinn)

Family Experiences of Adolescents and Young People

The family experiences reported by participants (parents) in this study relate to the level of parental involvement in their children's sex education. Some mothers reported being involved in their daughters' sex education from puberty onward, in that they recommend contraceptive methods to their daughters. In some places, this recommendation by mothers is motivated by negative experiences that girls or their mothers have in the family. Indeed, some mothers report that they have been threatened with dismissal from their homes because their daughters had a pregnancy outside of marriage. Others testified that their daughters were fired from their homes for the same reason.

> *"When I got pregnant, I was the laughing stock of the family, I was fired by my father... Immediately after giving birth, my mom put 'Anti-ball' [implant] since it is a long-lasting method"* (IDI, adolescent, female, out school, current user, Commune of Matoto).

Another experience is the lack of communication between parents and their children about contraceptive methods. This influences adolescents' and young people's perception of method use by the lack of support from their parents, especially financial support, to purchase a contraceptive method. Indeed, they fear that by asking for such support, they will be in conflict with their parents, who, in their opinion, would consider that they started having sex too early.

Fear of parents also leads some adolescents and young people who are already sexually active to use contraceptive methods that are discreet, both to avoid getting pregnant and to allow their parents to know that they are using contraception.

Community Experiences of Adolescents and Young People

Community experiences relate to values and beliefs as well as family honor. A mother from the Peulh ethnic group argued that Peulh culture does not encourage the use of contraceptive methods by the girl. According to her, this is the reason why many teenage girls and young women, including her own, do not use the contraceptive method. In addition, one young woman let us understand that she does not use contraceptive methods under recommendation of the Muslim religion.

Moreover, the preservation of family honor, that is, keeping the girl's virginity until marriage through education transmitted by families, motivates some parents but also some adolescents and young people to opt for abstinence rather than use a contraceptive method that, according to them, encourages sexual activity. Another fear related to family integrity is the concern of parents to be safe from slander in the community in case their daughters become pregnant before marriage. This concern leads them to encourage their children to use contraception.

Adolescents' and Young People's Preferences for Contraceptive Methods

Modern Methods

Both adolescents and young people expressed similar preferences for modern methods of contraception. For adolescents and young girls, the implant, injectable method and the morning-after pill were the preferred methods.

Respondents said they preferred the implant because of the absent or minimal side effects from its use and its long duration of action, saving users from having to see a service provider too often. Another advantage explaining the preference for the implant is that it restores the user's ability to become pregnant as soon as the method is discontinued. The injectable method is considered to be the best method for ensuring discretion, since it does not leave a mark on the body and does not require daily administration like the pills that must be kept on one's person. The preference for the morning-after pill lies in the fact that it is only taken occasionally, i.e., after the sexual act, and lasts only 72 h. Unlike other methods that have to be administered periodically and have a relatively long duration of action, the morning-after pill is not a pill.

> *"For example, I already have a child, I'm not educated so I don't want to get pregnant anymore, I preferred the Jadelle [implant] because I won't go to the hospital every time"* (IDI, young, female, married, in school, current user, Commune of Matam)

However, young women and men prefer to use the male condom because of its dual purpose. According to them, this method not only causes no side effects but also helps prevent sexually transmitted diseases. A young people from Matam told us:

> *"I prefer the condom because it doesn't create any problem on the body and helps me to avoid sexually transmitted diseases".* (IDI, young, male, out school, unmarried, current user, Commune of Matam)

Traditional Methods

According to respondents, their preferences for traditional methods ranged from necklace, abstinence, upside-down canary, and papaya seeds. In fact, the necklace is a string of beads with different colors representing the different days of the menstrual cycle, making it possible to identify the days at risk and not at risk of pregnancy. In addition to these reasons, users of the

necklace method also say they use it for its quality to guide non-literate users;

In addition, spiritual belief is a particular source of motivation for users of the reverse canary method. This method consists of turning the canary upside down on the ground after quoting a number of Koranic verses. Users say they never get pregnant while the canary is upside down.

As for papaya seeds, this method consists of drying the seeds and then using them in tablet form. They are used for its virtual free and no side effects, as explained by a young woman:

> *"It is a method of my grandmother, the papaya seeds that I used for a long time and I found it effective, without [side] effects"* (IDI, Young, female, unmarried, out school, current user, Commune of Matam).

The preference for these different methods is mainly related to their affordability. In addition, according to our respondents, these methods do not cause side effects.

Expectations Regarding Contraceptive Use

Adolescents and young people expect actions from the health system and the community.

Expectations From the Health System

Expectations from the health system regard sexual education, affordability and availability of contraceptive methods, fairness in service delivery.

Sexual Education

Adolescents and young people recommend a sexuality education program, especially in schools, since this is their own space (few adults are there) and is conducive to improving their knowledge of contraceptive methods.

> "*We want that [family planning promoters] raise awareness at the family level [most people] do not go to school, so [family planning promoters] have to come to the families, to the parents of the students, to explain to them that it is not taboo to take the time to talk with their daughter*". (FGD, young, in school, female, unmarried, current user, Commune of Matam).

Affordability

Adolescents and young people expect the health system or the government to facilitate financial accessibility, i.e., to offer certain methods free of charge or to set costs within their reach. For them this financial accessibility given their economic dependence on their parents.

> "*We cannot ask money to our parents for this [contraceptive method]; they make it [contraceptive method] free of charge, then it will encourage us…*". (FGD, adolescent, in school, female, unmarried, former user, Commune of Ratoma).

Availability of Contraceptive Methods

Adolescents and young people recommend that the health system take care to prevent stock-outs of contraceptive method in health facilities.

> "*Sometimes you need a method, you go, they tell you it is out of stock. They should to all their best to have all methods with them anytime*". (FGD, young, in school, female, unmarried, current user, Commune of Dixinn).

Fairness in the Service Delivery

Some adolescents and young people pointed out that in some health facilities, adults are given priority in the delivery of family planning compared to adolescents and young people. They therefore expect health facilities to prioritize adults in the same way as adolescents and young people in the delivery of services.

> "*They should not consider adults more than us when we go there, if they want to encourage us to use contraceptive*". (FGD, adolescent, in school, female, unmarried, former user, Commune of Kaloum).

Expectation From the Community

Some adolescents and young people emphasized the need for their parents and religious leaders to be involved in promoting contraception for adolescents and young people.

Parents' Involvement

According to adolescents and young people, the involvement of their parents in the promotion of contraception would be a facilitating factor for their financial accessibility to contraceptive methods, but also for the fact that they are reassured not to disagree with their parents when they use these methods.

> "*We recommend that [family planning promoters] raise awareness of parents so that they involved themselves in their children' family planning*". (Participant 7, former user, FGD, Young unmarried women, Commune of Matoto).

Religious Leaders' Involvement

Adolescents and young people emphasized that the recommendations of Islam prevent them from using contraceptive methods, a practice they believe compromises their compliance with religious rules. They therefore believe that the involvement of religious leaders in promoting contraception would reassure them in their religious conduct.

DISCUSSION

This study reveals that adolescents and young people have personal, family and community experiences that positively or negatively influence their needs and preferences for using modern contraceptive methods. This is despite the fact that we found that all participants we met were aware that the use of modern contraceptives including condoms can prevent unwanted pregnancies and sexually transmitted diseases.

Thus, these different experiences expressed by adolescents and young people highlight the dilemmas and difficulties inherent in influencing their decision making regarding the use of modern methods of contraception. Positive experiences of adolescents

and young people included the relatively affordable cost of condoms and implants, perceived absence of side effects, proven efficacy and duration of action of the modern method used (implants and injectable form). In fact, these positive experiences for this group of adolescents and young people) are one of the main sources of motivation guiding their contraceptive preferences. The preference for implants by adolescents is explained by the fact that it is a long-lasting method with fewer side effects and reduces the use of health facilities for contraceptive research.

As for the negative experiences experienced by adolescents, in contrast to the financial accessibility of implants supported by a minority of adolescent girls, a majority find that the cost of implants remains high (15 Euros) despite their proven effectiveness and their longer duration of action. Negative experiences such as the financial accessibility of implants, compliance with the dosage (the pill), perceived side effects, indiscretion of the method, and the low sensation of sexual pleasure for the condom, weight gain after taking the pills were also raised by the study participants. Among the negative experiences, a minority of participants reported cases of infection as a result of the lubricants in the male condoms used by their partners. However, all participants were aware that contraceptives, including condoms, prevented unwanted pregnancies and sexually transmitted diseases.

Experiences, preferences and expectations of adolescents and young people regarding contraceptive use in Guinea have health system and socio-cultural implications that are key to increasing contraceptive prevalence in these groups.

From the experiences of adolescents and young people in Conakry, health system factors such as cost and availability of certain methods hinder contraceptive use by these groups. Indeed, in the Guinean context, these groups are economically dependent on their parents from whom they generally lack support for contraceptive use as illustrated in this study. Alleviating financial barriers for access of these groups to contraceptive methods would be useful to reduce FP unmet need within these groups. In Guinea, reproductive and Maternal health are national priorities (15), however, user fee exemption policies are only adopted for maternal care i.e., ANCs, childbirth and post-partum care (15). Priorities geared toward user fee exemption for all contraceptive methods for adolescents and young people in Guinea could help increase contraceptive coverage among this group. User fee exemption policies for maternal health has been reported to increase utilization of emergency obstetric care in rural Guinea (16). However, in Conakry region (urban area), payment of user fees for childbirth has been reported in government hospitals in a context of user fee exemption policies, with 95% of women paying for childbirth services (17). Achieving user fee exemption policy for FP with an integrated audit system of FP service provision is therefore needed in the Guinean context. Elsewhere, some studies have shown that contraceptive clients prefer to receive detailed information on contraceptive methods to help them make their decision. (18–21) and others stressed the importance of personalized contraceptive information tailored to their individual needs and preferences (20–22).

Socio-cultural factors are also very influential on adolescents and young people's contraceptive behaviors in Guinea, as shown in this study. Contraception is considered a taboo because it is related to sexuality; it is also considered socially and religiously deviant in Muslim religion which is the most dominant one in Guinea. Fear of being considered socially and religiously deviant therefore leads adolescent and young people either refrain from using use any method, or limit their choices to methods that they perceive as discrete. The influence of community and religious norms has also been reported in other studies (18, 19, 22).

In a context where contraceptive use is highly about preference given other factors such as cost and side effect, but also about availability, limitation of contraceptive choices to the perceived discrete ones constitutes an obstacle to contraceptive use. As recommended in this study by adolescents and young people, parents involvement in the promotion of contraception would be a facilitating factor for their financial accessibility to contraceptive methods but also for their social fulfillment. However, parents shifting their efforts toward contraceptive promotion in a society seen as influenced by religious prohibition regarding family planning requires involvement of religious leaders. In addition to the media and health personnel, religious and community leaders are among the main sources of information for adolescents and young people (22) that may influence their sexual life.

CONCLUSION

Adolescents and young people expressed diverse positive or negative experiences in terms of the cost of some contraceptives preferred by adolescents and young people (implants, side effects, proven efficacy and duration of action of the modern method used) and preferences (implants and injectable form) to better meet their contraceptive needs. However, their contraceptive decisions are still influenced by the availability of contraceptives, equity in service delivery, and the involvement of parents and religious leaders in the sexual and reproductive health education of adolescents and young people.

Experiences, preferences and expectations of adolescents and young people regarding contraceptive use in Guinea have health system and socio-cultural implications that are key to increasing contraceptive prevalence in these groups.

Achieving user fee exemption policy for FP with an integrated audit system of FP service provision is therefore needed in the Guinean context. What's more, involvement of parents and religious leaders in the promotion of contraception would be a facilitating factor for their financial accessibility to contraceptive methods but also for their social fulfillment.

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/s.

ETHICS STATEMENT

The research protocol was approved by the National Committee of Ethics for Health Research in Guinea (CNERS). Study participants were informed and gave their written consent prior to participating in the study. Interviews were conducted in private locations to ensure confidentiality. Some of the participants were minors aged 15–17 years and gave their consent. The informed consent of their parents/guardians was also obtained for participation in the study.

AUTHOR CONTRIBUTIONS

BC analyzed the data and drafted the paper which was approved and commented by all authors. All authors contributed to the article and approved the submitted version.

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Quality of Care in Family Planning Services: Differences Between Formal and Informal Settlements of Kira Municipality, Uganda

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Background: Quality of care (QoC) of family planning (FP) affects contraceptive use, and it varies across types of urban settlement. This study assesses the difference in service delivery point (SDP) structural and process factors between formal and informal urban settlements, and the opinion of the client on the QoC in informal settlements. This is useful in creating an evidence base to advocate for better quality services for the most vulnerable in society.

Methods: This was a cross-sectional survey that included SDPs of Kira municipality in Wakiso district, Uganda. Data were collected from all the service points in Kira municipality with the caretakers consented. In addition, using multi-stage sampling, 626 women of reproductive age (15–49 years) who lived in the informal settlements of Kira municipality were interviewed. Data were collected using structured questionnaires, descriptive analysis was carried out in Stata version 14.0, and Chi-square and *t*-tests were used to compare the informal with the formal settlements.

Results: Formal settlements generally had more higher-level SDPs compared to informal settlements (value of $p < 0.001$). SDPs in the formal settlements provided more FP methods and had more community health workers (CHW) to support their work. Also, SDPs in the formal settlements were more likely to have long-term FP methods available and more likely to have trained personnel to insert and remove implants and IUDs compared to those in informal settlements. Additionally, more SDPs in the formal settlements provided counseling for permanent, long-term, and short-term FP methods. Of the 626 interviewed women, most of the women (68.6%) reported that they would not return to the previous FP provider or refer a friend to the same provider (72.7%).

Conclusions: There is a lower quality FP services in the informal settlements with a commensurable effect on the client satisfaction with the services. Therefore, improving the quality of FP services in informal settlements should be a top priority. Improved quality of services could act as a motivation to increase the uptake of modern contraceptives in such settings.

Keywords: family planning services, quality of health care, urban health, informal settlements, Uganda

INTRODUCTION

In comparison to other regions, decline in fertility levels has been slower in sub-Saharan Africa (SSA) (1). The fertility rate in SSA was estimated to 5.1 births per woman in the period, 2010–2015 and projected to be 4.75 in the period, 2015–2020 (2), whereas the fertility rates are close to the desired 2.1 children per woman in Asia, Latin America, and the Caribbean for the same periods (3–5). The high fertility rate is associated with increased maternal mortality, neonatal mortality, and under-five mortality (6, 7). One of the major strategies for fertility reduction is the use of family planning (FP) methods, particularly modern contraception (8); however, over 225 million women are estimated to have an unmet need for FP, more so in sub-Saharan Africa (9, 10).

In Uganda, however the percentage of women aged 15–49 who use a modern contraceptive method has increased over the years, but still remains relatively low at 35% as of 2016 (11). The total fertility rate of the country remains one of the highest worldwide at 5.4 children per woman, with 28% of currently married women and 32% of sexually active unmarried women having an unmet need for FP. Moreover, 45% of contraceptive discontinuations were estimated by the 2016 Demographic and Health Survey (DHS) (11). Unmet need for contraception and contraceptive discontinuation can be due to several obstacles including, but not limited to, lack of knowledge of contraceptive methods, concerns of side effects, stock-outs, as well as low quality of FP services (9, 11).

High quality of care (QoC) in FP services is associated with increased and continued contraceptive use in several settings (12–16). A multi-country analysis based on DHS data in 15 countries showed that about 7–27% of women discontinue contraception because of a reason related to the QoC (12). In a longitudinal analysis in Bangladesh, Koenig et al. (16) found that women had a 60% higher likelihood of adopting a modern method and a one-third lower likelihood of discontinuing the method if they received a higher quality of FP services from fieldworkers. Similarly in the Philippines, the quality of FP services women received determined maintenance and continuation of the method (17). Research in Uganda has also found that the quality of FP services affects significantly their utilization by clients (18). More specifically, providing counseling to the clients during FP services was found to improve both long-term outcomes, such as increased birth spacing and continued use of modern contraception methods, as well as short-term outcomes such as increased knowledge and satisfaction with the FP services (19–21).

Despite the importance of quality in providing FP services, measuring the QoC can be challenging due to various definitions and components. Donabedian (22) discusses the measurement of QoC in three components, namely, structure (including the infrastructure of the health facility, equipment, and its commodities), process (the health provider's method of delivering care including interpersonal interaction with the client and technical competency), and outcome (the outcome of the service provided such as satisfaction of the clients). Based on the framework of Donabedian, recent literature in SSA and planning monitoring and accountability (PMA 2020) has synthesized three pillars of FP QoC as measured through the client satisfaction, and these are (1) socio-demographic characteristics of clients, providers, and facilities, (2) structural factors such as staffing, and (3) process factors such as provider–client interaction (13, 22–29) as shown in **Table 1**.

The information required to understand the above aspects of QoC in FP can be obtained by either interviewing the clients using the services or through observing the interactions between the provider and the client. However, a combination of observations and client interviews is suggested to provide a better assessment (30).

Quality of care is usually perceived to be better in urban compared to rural settings. However, with increasing urbanization, it is important to examine the QoC in such settings, given that 68% of the population of the world will be living in urban areas by 2050 (31). Indeed, there is an empirical generalization that the fertility levels tend to be positively related to urbanization since most fertility indicators are better in urban areas than in rural areas. However, this gap is narrowing in many countries due, partly, to significantly worse outcomes among the urban poor living in the informal settlements (32). As opposed to the formal settlements, the informal settlements commonly known as slums are characterized by inadequate housing, insufficient living spaces, insecure land tenure, and lack of access to basic services including social services such as clean water and sanitation (33). Urban women in the highest wealth quintile, the use of contraception is two and half times more compared to urban women in the poorest wealth quintile; and a similar pattern emerges with respect to the unmet need for FP (32). This study sets out to assess the QoC of FP services at a service delivery point (SDP) with a focus on provider-related structural and process factors exploring variations between the informal and the formal settlements of Kira municipality. The study also assesses the FP service satisfaction among the women living in the informal settlements.

TABLE 1 | A modified framework of quality of family planning services according to PMA 2020.

	Examples	Relevant PMA 2020 variables
Socio-demographic factors	Age, gender, and education status of the client Provider's experience and FP training Type, level, ownership, and location of the health facility	- Age of the client - Provider's experience and knowledge in FP - Facility ownership - Facility level
Structural factors	Facility human resources, supervision, distance, business hours, cleanliness, infrastructure, availability of contraceptive methods and equipments, and fees	- Number of staff - SDP supports CHWs - Number of days of offering FP - Examining room cleanliness - Electricity, water, and handwashing availability in the facility - Fees charged for FP - Methods of FP provided - Methods of FP out of stock - Examining room supplies
Process factors	Client provider interaction (communication, choice of method, information provided), confidentiality, client waiting time, pre-requite for contraceptive services	- Visual and auditory privacy - Collection and review of client opinions - Provision of services to adolescents - Provision of post-abortion services

FP, family planning; SDP, service delivery point; CHWs, community health workers.

MATERIALS AND METHODS

Study Design and Settings

This was a cross-sectional survey for all health facilities in Kira municipality. Kira is located in Wakiso District of the Central Region of Uganda and is the second most populated municipality in the country. Kira municipality is made up of three divisions, namely, Kira, Bweyogerere, and Namugongo, which occupy a total land area of about 98.83 km^2. The rapid population growth in this area has in-turn compromised physical planning and effective service delivery including healthcare. This has eventually resulted in the growth of the informal settlements, whose inhabitants have a low socio-economic status and reside in poor household structures. The municipality headquarters are located about 10 km from the city center with a growing population of 400,000 people, of whom 47.8% are men and 52.2% are women (34, 35).

Description of Family Planning Services in Kira Municipality

Family planning services in Kira municipality are provided by various health facilities, including drug shops, health centers, and pharmacies. Some facilities are supported by the Ministry of Health (MOH) or non-government organizations (NGOs), and others are privately owned. FP is provided on a specific day and specific time in some facilities while other facilities do not have a specified day or specified time. FP services provided in the facilities range from short-term methods to permanent methods (36).

Study Population and Sampling Procedures

To measure the structural and process factors of quality of care, we surveyed all family planning service points at different levels of service in the Kira municipality, and these included general hospitals, health centers at level IV (managed by a doctor, and surgeries are carried out), level III (managed by a clinical officer and offers inpatient care), and level II (managed by a nurse and offers only outpatient care) (37), pharmacies, clinics, and drug shops and their caretakers. Health facilities whose caretakers consented (187 out of 192 facilities) were mapped and targeted for the survey.

In addition, women of reproductive age (14–48) were interviewed to assess the perception of the client about the FP services in the informal settlements. A total of 626 women who lived in the informal settlements of the study area for at least 6 months were randomly sampled and recruited in the study. Multi-stage sampling was conducted. First, four out of the eight villages of the informal settlements of Kira municipality were randomly selected. Thereafter, 13 of the 65 Enumeration Areas (EAs) within these villages were randomly selected. Finally, the participants were randomly selected from a list of all households that had eligible women. The sample size for women respondents in this study was calculated primarily to measure the prevalence of contraceptive use and unmet need for family planning in this setting (38) using the Kish Leslie formula for cross-sectional studies, $N = \frac{Z^2PQ}{\sigma^2}$. We assumed a prevalence of modern contraceptive use in an urban setting in Uganda of 52.1% (11), a 95% level of confidence, a margin of error (d) of 0.05, and a Z score of 1.96 after adjusting for no response and design effect. The total size of the sample was 626 participants and the potential participants were selected using the multi-stage sampling through their enumeration areas and households.

Data Collection

Data for this analysis are a part of an earlier survey conducted to determine the unmet need for FP in informal settings (38). The data were collected by trained research assistants, who were familiar with Kira municipality. In addition, local guides who worked at the municipality supported the research

TABLE 2 | Characteristics of health facilities in Kira municipality.

	All facilities *N* = 187	Informal settlements *N* = 80	Formal settlements *N* = 107	*p*-value
	%	%	%	
Health facility level				
1–2 roomed clinic	32.6	53.8	16.2	0.001
3+ roomed Clinic	25.7	21.3	29	0.043
Drug shop	18.2	20	16.2	0.731
Pharmacy	13.4	0	23.4	N/A
Health center II	1.1	1.3	1	N/A
Health center III	7	2.5	10.3	0.013
Health center IV	1.6	1.3	1.9	N/A
Hospital	0.5	0	1	N/A
Health facility ownership				
Faith-based organization	1.6	1.3	1.9	
Government	2.1	2.5	1.9	N/A
NGO	1.1	1.3	1	N/A
Private	95.2	95	93	0.051
Facility offered FP services	94.1	92.5	95.3	0.035

N/A, very few observations to get a p-value.

assistants to easily identify the facilities for the mapping exercise and potential women for study participation. KoboCollect (support@kobotoolbox.org), a mobile data collection application was used to collect the data. Before the data collection, the questionnaires (assessing the structural and process factors affecting the quality of FP at the SDP as well as the opinion of the women on the FP delivery) were initially pre-tested around the Makerere University area; the area has both the formal and the informal settlements, which made it ideal, given its similarities with the actual study area. Following the pre-test, to ensure quality quantitative data collection, the data entry screen was designed with skips and more restrictions added to ensure completeness of entry. On a daily basis, the completed questionnaires were uploaded to a remote server to which the PI and the study coordinator had access. The data were kept strictly confidential and later analyzed after de-identification.

Measures

For this analysis, the main outcome was the quality of FP services in Kira municipality, by comparing the informal and the formal settlement. A secondary outcome was the opinion of the user (women) about the quality of FP services from their respective SDPs. Quality of FP services was determined as the availability of provider-related structural and process measures at a given facility with respect to client satisfaction.

Statistical Analysis

Data analysis was performed with Stata version 14.0 (Stata Corp) software. Descriptive statistics for the baseline characteristics were conducted and the analysis was presented with summaries in percentages for the categorical variables, and mean (±SD) for continuous data. A comparison of key outcomes for the informal and the formal settlements was conducted using the Chi-square for categorical variables, and the *t*-test for the continuous variables, with a *p*-value at <5% for statistical significance cut-off. The opinion of the women on FP services was also described in proportions.

RESULTS

Characteristics of Health Facilities in Kira Municipality

In Kira municipality, the majority of the health facilities in the informal settlements had clinics with one or two rooms (53.8%) and only 21.3% of the clinic had at least three rooms, drug shops (20%), health center III (2.5%), and health center II (1.3%) whereas, in the formal settlements, most of the health facilities had clinics 3+ rooms (29.0%), followed by pharmacies (23.4%), clinics with one to two rooms (16.2%), drug shops (16.2%) and health center III (10.3%).

In general, there were no statistical differences in facility ownership between the informal and formal settlements. However, the difference between the number of private health facilities in the formal settlements and the informal settlements should not be neglected, showing a barely significant *p*-value ($p = 0.051$); we found more private health facilities in the formal settlements. In addition, most of the facilities were privately owned (95.2%) and the majority (94.1%) of the facilities provided the FP services. Moreover, there was a statistically significant higher number of facilities that offered FP services in the formal settlements compared to the informal settlements, as shown in **Table 2**.

TABLE 3 | Family planning services provided at the facilities.

Characteristics	All facilities *N* =1 87	Informal settlements *N* = 80	Formal settlements *N* =1 07	*p*-value
Structural factors				
Number FP methods provided by a health facility; mean (±SD)	3.7(±1.70)	3.3(±1.46)	4.1(±1.78)	0.001
Offering FP services for ≥ 6 days a week; (%)	81.3	78.4	83.3	0.406
Providing ≥ 3 methods of FP; (%)	51.1	46.0	54.9	0.241
Using CHWs in providing FP; (%)	5.7	6.8	4.9	0.6
Number of CHWs used per facility for FP; mean (±SD)	2.1(±1.46)	1.2(±0.45)	3(±1.58)	0.02
Availability of long term FP; (%)	18.7	8.8	26.2	0.003
Offering permanent FP methods; (%)	1.1	1.4	1.0	0.819
Having the requirements to insert and remove IUD; (%)	14.0	3.8	21.5	0.001
Having the requirements to insert and remove implant; (%)	21.4	10.8	30.0	0.004
Availability of short term common FP; (%)	48.9	45.0	51.4	0.642
Having trained personnel to insert and remove implant; (%)	25.1	13.8	33.6	0.008
Having trained personnel to insert and remove IUD; (%)	16.6	5.0	25.2	<0.001
Having an EMR where FP is conducted; (%)	48.1	43.8	51.4	0.494
EMR having water and accompaniments; (%)	5.9	6.3	5.6	0.524
EMR having waste disposal equipment; (%)	26.7	26.3	27.1	0.468
EMR having requirements for patient examination; (%)	33.7	35.0	32.7	0.156
Process factors				
Providing adolescent FP services; (%)	75.6	74.3	76.5	0.744
Providing FP outreaches; (%)	9.1	6.8	10.8	0.359
Number of FP outreaches by facilities; mean (±SD)	1.2(±0.89)	1(±0)	1.3(±1.12)	0.263
Counseling for permanent FP methods; (%)	18.8	10.8	24.5	0.022
Counseling for long term non-permanent FP methods; (%)	36.9	21.6	48.0	<0.001
Counseling for short term common FP; (%)	48.9	39.2	55.9	0.029
EMR having privacy; (%)	27.3	31.3	24.3	0.05

FP, family planning; CHW, community health worker; IUD, intrauterine device; EMR, examination room; SD, standard deviation.

Provision of Family Services at the Health Facilities in Kira Municipality

Structural Factors

Overall, the mean number of FP methods provided by facilities was (3.7 ± 1.70), and facilities in the formal settlements provided significantly more FP methods (4.1 ± 1.78) compared to those in the informal settlements (3.3 ± 1.46). Health facilities in the formal settlements were supported by more number of CHWs in providing FP services (3 ± 1.58) compared to the informal settlements (1 ± 0.45), and long-term FP methods were significantly more available in the formal settlement facilities (26.2%) compared to the informal settlement facilities (8.8%). More facilities in the formal settlements had the requirements to insert and remove the implant (30.0%) and IUD (21.5%) compared to the informal settlements (10.8%) and (3.8%), respectively, and showing significant differences in both cases. Similarly, more facilities in the formal settlements had more trained personnel to insert and remove the implant (33.6%) and IUD (25.2%) compared to the informal settlements (14.8%) and (5.0%), respectively (**Table 3**).

Process Factors

Significantly more facilities in the formal settlements provided counseling for permanent FP methods (24.5%) compared to those in the informal settlements (10.8%), and more facilities in the formal settlements offered counseling for long-term FP (48.0%) compared to those in the informal settlements (21.6%). Likewise, more facilities in the formal settlements (55.9%) provided counseling for short-term FP compared to) the informal settlements (39.2%) (**Table 3**).

Client Opinions

A total of 626 women were interviewed in the survey. The mean (SD) age of the participants was 28.1 (±7.6) years. The adolescents and young people aged 15–24 years represented 36.1% of all women in the survey. Most (55.9%) respondents had attended secondary or a higher level of education, and nearly 75% were currently married or living with a man.

The majority of the participants reported that they would not return to the previous FP provider (68.6%) or refer a relative or a friend to the very provider (72.7%). The majority of the participants (83.4%) reported having told about FP when they visited the health facility for other services. Most of the participants (77.3%) reported having been visited by a CHW for FP services, as shown in **Table 4**.

DISCUSSION

Overall, most of the surveyed facilities were privately owned, and the majority of them provided FP services. The formal

TABLE 4 | The opinion of participants on family planning services in Kira municipality.

Client opinions	*N* = 626 (%)
Returning to the provider	
Yes	7.6
No	68.6
Don't know	10.7
No response	13.1
Refer a friend or relative to the provider	
Yes	7.2
No	72.7
Don't know	13.5
No response	6.7
Told about FP when I visited the facility for other issues	
Yes	83.4
No	16.6
Paid fees for FP at the facility	
Yes	50
No	50
Visited by a CHW for FP	
Yes	77.3
No	22.7

FP, family planning; CHW, community health worker.

settlements had more health facilities and a higher level of facilities compared to the informal settlements. Facilities in the formal settlements provided more FP methods, used more CHWs were more likely to have long-term FP methods available, and trained personnel to insert and remove implants and IUDs compared to those in the informal settlements. Despite more facilities in the formal settlements providing counseling for permanent, long-term, and short-term FP methods, the difference was smallest for short-term methods. Finally, although most of the participants reporting to have been told about FP when they visited a health facility for other services and the majority were visited by a CHW for FP services, the majority of the participants reported that they would not return to their previous FP provider and would not refer a relative or friend to that provider.

Generally, the quality and availability of FP services were less in the informal settlements compared to the formal settlements. A similar observation was reported in Bangladesh (39, 40). Relatedly in Uganda, sexual and reproductive health were reported to be poorer among the urban poor (41). In this study, levels of health facilities were lower in the slum areas; health facilities in the informal settlement provided less number of methods and had less number of methods available. These results reflect that the urban poor women often live in informal settlements that are largely excluded from the formal services (42). Previous studies have shown that many health facilities in informal settlements are private and usually lack basic resources such as diagnostic equipment, supplies, and medicines. In Bangladesh, for example, most of the dwellers of the informal settlement were reported to get their health services from the informal health facilities such as drug shops (43). Therefore, the dwellers of the informal settlement are reported to rely on such facilities because the public health facilities closest to them are also in poorer conditions. However, in addition to being in a poor condition, private clinics charge high fees for FP services and hence making contraception in informal settlements less affordable and utilized (32, 44). For instance, in Kenya, women living in informal settlements were less likely to use short-term or long-term methods compared to their counterparts living in formal settlements (45).

Despite the weak positive association between the number of staff in a health facility and client satisfaction (25), the number of trained personnel available is critical in defining the quality of FP services (23). In our study, informal settlement facilities had less number of trained personnel to insert and remove the implants and IUDs compared to those in the formal settlements. This is similar to Oketch et al. (46) findings in Kenya in which they reported that informal settlements are likely to be served by informal providers that are likely to be poorly regulated and hence provide poor quality of services. In our study, the lesser number of trained personnel to insert and remove the implants or IUDs in slum areas may be generally explained by the significantly declining provision of health services in the public sector, which is known to use trained health providers (47). The declining provision of health services in the public sector leads to an increase in private providers who can be difficult to regulate especially in emphasizing professionalism in providing the services. In Uganda particularly, 80% of contraceptive users obtained their methods from a public facility in 1988 and by 2006 this proportion had decreased to as low as 34% (32, 47).

Generally, the average proportion of counseling for all FP methods was low at 34.9%. However, this was higher than what was reported in India from a longitudinal household survey for which 22% of interviewed women aged 15–49 reported to have received FP counseling (48). This difference could probably be due to different study designs and populations. The Indian study used a longitudinal survey and included only those women who were currently on modern contraception as opposed to our study which used a cross-section design and inclusion of all women of reproductive age (15–49 years). Even though the provision of FP counseling for all methods (short-term, long-term, and permanent) was less in the informal settlements compared to the formal settlements, the gap was smallest for short-term methods. This implies a significant deficit in the use of long-term and permanent methods in the informal settlements, yet dwellers of such settlements need more reliable and easy compliance methods due to the higher fertility rate associated with the poor communities (32). Similar to our findings, a study conducted in Kenya showed that the women in slum areas choose more short-term contraceptives compared to the long-term methods (45). This can be due to the long-term methods being more expensive than the short-term; hence, it is less affordable by women in the poorest wealth quintile in the informal settlements (49). Low levels of counseling, especially on long-term and permanent FP methods, may lead to persistence in localized

social networks of the urban poor, which may serve to sustain and foster misconception about the contraceptive methods and limit information about the availability of FP services hence undermining the use of contraception with an eventual increase of unmet need for contraception.

In this study, more participants reported having been told about FP when they visited the health facility for other services (83.4%) and were visited by a CHW for FP services (77.3%). This implies that in Uganda, women are likely to get significant information about FP, which is reflected in the 2016 DHS finding, reporting that 99% of women aged 15–49 had general knowledge about FP (11).

Although significant FP service client satisfaction was reported in previous intervention research studies in Uganda (50–52), our findings show that this may not be a similar picture in a program setting. This is because most of the participants in our study reported that they would not return to their previous FP provider and would not refer a relative or friend to that FP provider. Mindfully, the perceived quality of services is considered to be a predictor of client satisfaction (53, 54). Moreover, in our study, all the quality defining parameters of quality of care at SDPs were generally below 50% and worse in slum areas; this may imply a commensurable effect on the client satisfaction with the services in the slum areas. The discrepancy in previous interventional research studies (50–52) and our findings (program setting) could be because, in research settings, participants receive better care than clients in a program setting. However, our findings are also discrepant from Akol A et al. findings (55), in rural districts of Uganda (program setting) reported that most of the Depot-medroxyprogesterone acetate (DMPA) clients (74%) were very satisfied receiving their method from the drug shop, and 98% intended to get their next injection from the same type of facility. This higher satisfaction in Akol A et al. (55) study could be due to the fact that the drug shop attendants in this study had been just trained to offer DMPA 1 year before the evaluation survey. Implying that if FP providers are trained, clients can get satisfied with the services.

Strengths and Limitations

We were not able to adjust for other factors in the analysis due to the low sample size and the many indicators of quality we were using. Controlling for other factors such as the level and the ownership of facilities could potentially change the results. The complexity of defining quality of care, as well as selecting and constructing the indicators, is another limitation of the study. Lastly, satisfaction is always subjective and may not easily be generalized. The strength of the study is the inclusion of all health facilities in the municipality; therefore, we think that our findings may be generalizable to similar town settings.

Conclusion and Recommendations

Indicators of FP quality of care were less available or provided in the informal settlement-based facilities compared to the formal settlement-based facilities. Clients in the informal settlements were generally not satisfied with the FP services despite significant FP information. Additionally, FP services in the informal settlements have lower quality services and hence need to be improved to fulfill the contraceptive demands of people in such settlements.

Since most of the urban residents in the least developed countries live in the informal settlements, there is a need to reduce existing inequalities in the provision of FP services. Therefore, policies should not be made based on urban averages alone, but instead, priority should be given to the specific needs of the poor and vulnerable people in the informal settlements. This can be achieved by training health care providers in the informal settlements to provide appropriate and adequate counseling to increase client satisfaction. Furthermore, the government should establish a partnership with development partners such as NGOs and private facilities in providing subsidized professional and quality FP services, especially long-term FP to the urban poor living in the informal settlements.

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 study involved human participants and it was reviewed and approved by the Ethics Committee of Makerere University School of Public Health higher degrees (HDREC-684). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

ZL led the the data analysis and drafting of the manuscript. MT led the project, participated in data collection and supported data analysis. OFR supported data management. LA and FEM supported the conceptualization of the project and data collection. MB supported the data analysis and provided overall technical guidance to the conceptualization and drafting of the manuscript. All authors contributed to the article and approved the submitted version.

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Total Demand, Use and Unmet Need for Modern Contraceptives Among Women Living in Informal Settlements in Kira Municipality, Wakiso District, Uganda. Implications for Urban Health

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Background: Update and utilization of modern contraceptives has public health benefits including reduction of unintended pregnancies, unsafe abortions, and related maternal mortality. However, paucity of evidence on key indicators of family planning in the informal settlements abounds. Data are usually collapsed within the larger urban communities that tend to mask peculiarities of informal settlements. This study determined the proportion of women using modern contraceptives, the unmet need for modern contraceptives and the total demand in informal settlements of an urban municipality.

Methods: A cross-sectional study conducted among 626 women in the reproductive age (15–49 years) in the informal settlements of Kira municipality (part of metropolitan Kampala). Multi-stage sampling was applied in the selection of the respondents. Descriptive and log-binomial regression analysis were conducted to determine percentage of women using modern contraceptives, unmet need, and total demand with their associated factors. All analyses were conducted using STATA version 15.0.

Results: The total demand for modern contraceptives was 84.9%, modern contraceptive prevalence was 47.4% nearly meeting the national target of 50%, however the unmet need was 37.3%, which much higher than the national target of 10%. Lower total demand for contraceptives was associated with higher women's education status and preference to have another child, while higher total demand was associated with having at least one living child. Higher modern contraceptives use was associated with older age, having at least one living child and high decision-making power, while lower

modern contraceptives use was associated with higher education and undetermined fertility preference. Lower unmet need for modern contraceptives was associated with older age (PR 0.68, 95% CI: 0.48–0.97) and high decision-making power (PR 0.64, 95% CI: 0.50–0.81), while higher unmet need was found among those who having at least one living child (PR 1.40, 95% CI: 1.01–1.93) and undetermined fertility preference (PR 1.70, 95% CI: 1.24–2.34).

Conclusions: Total demand and contraceptive use were found to be higher in the informal settlements of Kira municipality, however, the unmet need was much higher among this population as compared to the national urban estimates. This indicates a much higher demand for contraceptives and the need to consider the diverse socio-demographic characteristics of urban spaces. Development of Interventions need to critically consider the diverse urban space, associated explanatory variables and a collaborative systems lens to achieve sustained improvements.

Keywords: total demand, modern contraceptive use, unmet need, urban informal settlements, urban health, systems thinking

BACKGROUND

Globally, women's access to family planning services remains a significant public health and social challenge. In 2019, only 842 million out of 1.11 billion women of reproductive age who needed a family planning service used a modern contraceptive method, while 270 million still had an unmet need (1). In addition, only 75.7% of the total demand for family planning was satisfied (1). The unmet need for family planning services is worse in the developing world where over 232 million women cannot access a modern contraceptive method when needed (2).

Given the public health and social benefits of family planning, several governments made commitments aimed at bridging access challenges. In 2012, for instance, Uganda committed to reduce the unmet need for family planning to 10%, and to increase the modern contraceptive prevalence rate to 50% by 2020 (3). The modern contraceptive rate has since 2001 increased from 22.8 to 39.0% in 2016, the total demand has increased from 54.0 (2001) to 67.0% (2019) while the unmet need reduced from 35.0 (2001) to 28.0% (2016) (4). An increase in the modern contraceptive prevalence rate and total demand consequently leads to improved maternal health outcomes.

Although there have been improvements in family planning indicators, a lack of disaggregated data on key family planning services within the urban settings could be masking the situation faced by the urban poor whose socio-economic status predisposes them to unique challenges (5). As a result, the urban population especially those living in informal settlements, defined as settings characterized by overcrowding, insecure land tenure, and limited access to social services, including healthcare services, remain under-served. Failure to improve family planning access rates for the urban poor compromises their ability to benefit from the demographic dividend (6). Indeed, a recent study that mapped family planning services in an urban setting in Uganda demonstrated a limited availability of family planning services in informal settlements as compared to formal settlements. For example, it was found that long-acting contraceptives were significantly less available in informal settlements, in addition, informal settlements were largely serviced by small private actors operating in one to two roomed facilities (7). This indicated limited access to choice and quality for persons living in informal settlements, factors that could potentially undermine the use of modern contraceptives.

Unplanned births constrain the already meager household finances and leads to poor child health outcomes such as malnutrition and unsafe abortions. Unsafe abortions are common due to Uganda's severely restricted abortion law, often resulting into maternal complications, disability, catastrophic expenditures and at times maternal deaths (8–11). Despite the consequences of unabated population growth and the imminent population sprawl that characterize urban areas especially informal settlements, there is limited evidence on the demand, unmet need and modern contraceptive prevalence among women living in informal settings. Existing literature often provides statistics along the dual urban and rural divide without examining the intra-urban differences. Usually, urban spaces are presented as having much more favorable indicators, thereby limiting the need to improve service investments in such settings (11, 12). For example, the latest UDHS indicated the unmet need among urban dwellers to be at 22.8% while that of their rural counterparts was 30.1% (4). Our study, therefore, determined the total demand, modern contraceptive prevalence and the unmet need for modern contraceptives, and associated factors among women living in informal settlements in Kira municipality, Uganda. Kira was selected given its representativeness of the rapid urban population growth that characterizes many medium sized urban centers in the country and the east Africa region. In addition, similar studies in the region have mainly focused on big

cities with huge slums whose context could be different for a medium sized urban municipality such as Kira municipality (10, 13).

METHODS

Study Design and Setting

This cross-sectional study was conducted in Kira municipality, Wakiso district Uganda. The study area serves as both the commercial and dormitory center for people working in Kampala, Uganda's Capital City. The municipality is located approximately 5.3 km by road, East of Kampala, and stands at latitude 0.397239 and longitude 32.640557 North of Equator. The estimated population of Kira municipality is over 400,000 inhabitants. It is made up of three divisions namely, Kira, Bweyogerere and Namugongo, with a total land area of about 98.83 km2 (4). The municipality is characterized by a high population sprawl, which has in-turn compromised physical planning and effective delivery of social services, including healthcare. The rapid population growth in Kira municipality has resulted in the growth of informal settlements. The informal settlements have developed mainly in the divisions of Bweyogerere and Namugongo, making these two divisions the specific study areas.

Study Population and Eligibility

Our study population comprised of women in reproductive age (15–49 years old). To be a respondent, one must have been aged between 15 and 49 years at the time of the survey. All such women who were not residents and those who had not stayed in Kira Municipality for at least 6 months prior to the study were not eligible. Data were collected between 30 June and 10th July 2019.

Sample Size Calculation

The sample size for this study was calculated using the Kish Leslie formula for cross-sectional studies (14). We assumed a prevalence of modern contraceptive use in an urban setting in Uganda of 52.1% (4), a 95% level of confidence, a margin of error (d) of 0.05 and a Z score of 1.96. This yielded a minimum sample size of 377. To adjust for non-response, we used the following formular.

$$n = \frac{N}{1 - x}$$

Considering a non-response rate, x, of 10% and N, the estimated sample size, and substituting into the formula, a total sample size of 418 was established. In addition, a design effect of 1.5 was considered to adjust for the clustered nature of the sample across the two divisions that had slums in Kira Municipality. This brought the total sample size to 627 participants.

Sampling

Multi-stage sampling was used in the selection of the respondents. The two study divisions were purposively selected since these comprised of the informal settings in the municipality. After the selection of the divisions, it was determined that a total of 8 villages were within the informal settlements of Kira municipality, four of these were randomly selected to be included in the study. A list of enumeration areas (EAs) used by Uganda bureau of statistics was then used to determine EAs that fall within these informal settlements, these totaled to 65. A random sample of 13 EAs was then selected. A listing of all households with eligible women followed in all the 13 EAs. Every EA has an average of 165 households, an equal sample size (49) was randomly selected from each of the EAs selected. The random sample was obtained using a mobile application named "RING Plus." During interviewing, if an eligible woman was not available, three recalls were made before a replacement would be made, all eligible women were reached within the three recalls.

Variable Measurement

Outcome Variables

- ***Unmet need***: The unmet need was defined based on the methods developed by Bradley et al. (15). Unmet needs were coded as 1 if a married/in union or sexually active unmarried woman is fecund, not using a modern contraceptive method AND
  - Are not pregnant or postpartum amenorrhoeic OR
  - Their current pregnancy/last birth is/was unwanted or wanted later OR
  - Does not want to have more children or wants to delay the next child by 2+ years or undecided
  - Sexually active women are those who had sex during the last month.
- ***Modern contraceptive use***: women who are currently using any modern (male or female sterilization, IUD, implant, injectables, pills, emergency pills, male and female condoms, diaphragm, and foam jelly) contraceptive method were coded as 1.
- ***Total demand***: was coded as 1 if the woman is currently using any modern contraceptive method or have unmet needs.

Covariates

The following covariates were selected to be used in this study based on their use in existing literature, the Uganda demographic health survey and in the performance monitoring for action (PMA 2020) project (4, 9, 10, 16–19).

- ***Age***: was categorized as 15–24 years-old, 25–34 years-old and 35–49 years old.
- ***Number of living children*** was coded as 1 if the women have at least one living child.
- ***Women' education*** were categorized as (1) no education if the woman had never attended school or never completed primary school, (2) primary if the women completed primary school and (3) secondary and higher if the women have attended ordinary secondary school (4 years post primary), Advanced secondary school (6 years post primary) or tertiary/University.
- ***Marital status*** was categorized as (1) unmarried or not in union including widows and divorced women and (2) married or in union.

- ***Experienced death of a child*** was coded as 1 if the women have ever experienced a death of a child regardless of the child's sex.
- ***Fertility preference*** was categorized as (1) no more children desired and (2) want another child or (3) undecided.
- ***FP counseling*** was coded as 1 if during the last 12 months the women visited a FP facility or been visited by a community health worker who talked about FP.
- ***Woman's decision-making power*** was coded as empowered if the women (1) can say no to having sex, (2) can avoid having sex if not wanted, (3) if she wanted to use contraceptives she can tell her partner, and (4) can use contraceptives whenever she wants. The women were coded as "less empowered" if they cannot do at least one of these four mentioned criteria.
- ***Media exposure***: was coded as 1 if the women have received information about FP through radio, TV, or newspaper/magazine.

Data Collection Tool and Data Management Plan

Data were collected using a women's questionnaire developed under the performance monitoring for action (PMA 2020) project. The tool is used to collect data on family planning indicators in elven countries (19). The tool is consistent with DHS tools, which have already been validated. The key areas included socio-demographics, reproduction, pregnancy and fertility preferences, contraception, sexual activity, and empowerment. To allow for real time data capture and entry, and to minimize errors and missing data during field data collection, the questionnaire was preloaded on the Kobo Collect mobile application. The e-questionnaire was designed with relevant skips to allow for consistency during data collection. The research assistants uploaded data collected to the server daily. Upon submission of the data to the server, the investigators and data managers conducted quality control checks on key variables such as age to ascertain their correctness.

Statistical Analysis

The outcome variables: total demand, modern contraceptives use and unmet need, were calculated and prevalence presented by the respondents' characteristics. The associations between the three outcomes and the respondents' characteristics were examined using log- binomial regression (20). Unadjusted prevalence ratios with their 95% confidence intervals were calculated and presented for each of the outcomes. The adjusted prevalence ratios were calculated after controlling for all explanatory variables. Regression models were tested for multicollinearity with the variance inflation factor. A log-binomial regression was used since our outcomes were estimated to be more than 10% given existing studies. In such cases, Odd ratios derived from logistic regression would overstate values compared to prevalence ratios derived from log-binomial regression (21). Sexually inactive unmarried women and infecund women[1] were not included in the data analysis, this brought the overall total analyzed sample size to 477 women of reproductive age.

[1]The following conditions were identified as infecund: (1) not having a child in the last five years despite being married and never used contraceptives, (2) not having a period in the last 6 months and not postpartum amenorrhic and (3) those who answered "cannot get pregnant" when asked about their fertility preference.

Quality Assurance and Quality Control

Research assistants were trained on the research protocol and ethical issues surrounding the study to ensure quality data collection. TM and TS, together with the RAs conducted a pretest of the data collection tools. The pretest was conducted in Katanga, a slum in Kampala, Uganda's capital. Katanga was selected as the ideal setting for the pre-test since it had similar characteristics to those of the selected enumeration areas in Kira municipality. Just like the selected enumeration areas, Katanga slum is heavily populated, limited or no physical planning and limited social service provision.

RESULTS

Socio-Demographic Characteristics of the Respondents

A total of 626 women of reproductive age were interviewed, representing a response rate of 99.8%. However, to undertake the analysis, sexually inactive unmarried women and infecund women where dropped, making the sample size 477. The average age of the participants was 28.3 (standard deviation = 7.5). About 47.6% (227/477) of the participants were aged between 25 and 34 years, 82.4% had at least one living child and 38.5% (183/477) had attained primary education as their highest level. Around one tenth of the respondents, 11.1% (53/477) had ever experienced death of their child. Majority, 52.2% (249/477) were empowered and 71.9% (343/477) had mainstream (e.g., radio, TV, or newspaper) media exposure to family planning information (**Table 1**).

Total Demand, Modern Contraceptive Use, and Unmet Need

Overall, 84.9% (405/477) of the participants had demand for a modern contraceptive method. The prevalence of modern contraceptive use was 47.4% (226/477), and the unmet need was 37.3% (178/477). Based on the socio-demographic strata, the total demand for contraceptives was highest among women who had no formal education-100% (27/27) but they had 37% (10/27) unmet need. In terms of modern contraceptive use, this was highest among women who had no formal education, had no desire for more children (59.4%), and were empowered (59.0%).

The unmet need for family planning was highest among those who were undecided about getting another child-64.6% (42/65), those who were less empowered women-46.9% (107/228) and those who had experienced death of a child-43.4% (23/53) (**Table 2**).

Total demand for contraceptives was associated with women's education; women with secondary or higher education had lower demand compared to those with no education (PR 0.87, 95% CI: 0.80–0.94). Those having at least one living child had higher demand compared to those having no living child (PR 1.49, 95% CI: 1.24–1.79) and those preferring to have another child had lower demand compared to those who preferred having no more child (PR 0.90, 95% CI: 0.84–0.97).

TABLE 1 | Background characteristics of the study participants.

Variable	Frequency (*N* = 477)	Percentage (%)	95% confidence interval
Age (Years)			
15–24	166	34.8	30.6–39.2
25–34	227	47.6	43.1–52.1
35–49	84	17.6	14.4–21.3
Woman's education			
No education	27	5.7	3.9–8.2
Primary	183	38.5	34.2–43.0
Secondary & higher	265	55.8	51.3–60.2
Marital status			
Unmarried/not in union	47	10.0	7.6–13.0
Married/in union	425	90.0	87.0–92.4
Number of living children			
No living children	84	17.6	14.4–21.3
At least 1	393	82.4	78.7–85.6
Fertility preference			
No more children desired	96	20.4	17.0–24.3
Another child	309	65.7	61.3–69.9
Undecided	65	13.8	11.0–17.3
Experienced death of a child			
Yes	53	11.1	8.6–14.3
No	424	88.9	85.7–91.4
Family planning counseling			
Yes	271	56.8	52.3–61.2
No	206	43.2	38.8–47.7
Woman's decision-making power			
Less empowered	228	47.8	43.3–52.3
Empowered	249	52.2	47.7–56.7
Media exposure			
Yes	343	71.9	67.7–32.3
No	134	28.1	24.2–32.3

Regarding modern contraceptive use, women aged 25–34 years had higher use compared to younger women (PR 1.35, 95% CI: 1.07–1.69), women with secondary or higher education status had lower use compared to women with no education (PR 0.73, 95% CI: 0.53–0.99), women who had at least one living child had higher use compared to those who had none (PR 1.74, 95% CI: 1.15–2.63), women who were uncertain about their fertility preference had lower use compare to those who preferred not having more children (PR 0.48, 95% CI: 0.30–0.77) and empowered women had higher use compared to the less empowered (PR 1.45, 95% CI: 1.18–1.78).

The unmet need for modern contraceptives was associated with age; older women had lower unmet need compared to younger women (PR 0.68, 95% CI: 0.48–0.97), women with at least one living child had higher unmet need compared to those who had none (PR 1.40, 95% CI: 1.01–1.93), women who were uncertain about their fertility preference had higher unmet need compared to those who preferred not having more children (PR 1.70, 95% CI: 1.24–2.34) and empowered women had lower unmet need compared to the less empowered (PR 0.64, 95% CI: 0.50–0.81 (**Table 3**).

TABLE 2 | Prevalence of total demand, modern contraceptive use and unmet needs.

Variable	Total demand *n* (%)	Modern contraceptive use *n* (%)	Unmet need *n* (%)
Overall*	405 (84.9)	226 (47.4)	178 (37.3)
Age category (Years)			
15–24	128 (77.1)	61 (36.8)	67 (40.4)
25–34	203 (89.4)	125 (55.1)	77 (33.9)
35–49	74 (88.1)	40 (47.6)	34 (40.5)
Woman's education			
No education	27 (100.0)	17 (63.0)	10 (37.0)
Primary	154 (84.2)	87 (47.5)	67 (36.6)
Secondary & higher	223 (84.2)	122 (46.0)	100 (37.7)
Marital status			
Unmarried/not in union	38 (80.9)	19 (40.4)	19 (40.4)
Married/in union	365 (85.9)	207 (48.7)	157 (36.9)
Number of living children			
No living children	48 (57.1)	19 (22.6)	28 (33.3)
At least 1	357 (90.8)	207 (52.7)	150 (38.2)
Fertility preference			
No more children desired	93 (96.9)	57 (59.4)	36 (37.5)
Another child	254 (82.2)	153 (49.5)	100 (32.4)
Undecided	57 (87.7)	15 (23.1)	42 (64.6)
Experienced death of a child			
Yes	47 (88.7)	24 (45.3)	23 (43.4)
No	358 (84.4)	202 (47.6)	155 (36.6)
Family planning counseling			
Yes	236 (87.1)	133 (49.1)	103 (38.0)
No	169 (82.0)	93 (45.2)	75 (36.4)
Woman's decision-making power			
Less empowered	186 (81.6)	79 (34.7)	107 (46.9)
Empowered	219 (87.9)	147 (59.0)	71 (28.5)
Media exposure			
Yes	106 (79.1)	56 (41.8)	50 (37.3)
No	299 (87.2)	170 (49.6)	128 (37.3)

** the percentages in this row is the percentage from the total sample.*

DISCUSSION

Our study aimed at establishing the total demand, prevalence of modern contraceptive use, and the unmet need for modern contraceptives among women living in informal settlements in a highly populated urban setting in Uganda. The total demand for contraceptives was 84.9%, less than half (47.4%) of the women in the study area were current users of a modern contraceptive method, and at least 37.3% had an unmet need for family planning. Modern contraceptives are highly efficacious in reducing unplanned, unwanted, and mistimed pregnancies. Closing the demand-use gap is therefore essential.

The unmet need for modern contraceptives in informal settlements for married (36.9%) and unmarried sexually active women (40.4%) was found to be considerably higher than the urban estimates (22.8%) and (22.2%), respectively, as reported

TABLE 3 | Factors associated with total demand, modern contraceptive use and unmet need for modern contraceptives among women of reproductive age in Kira Municipality, Uganda.

Variable	Total demand		Modern contraceptive use		Unmet need	
	Crude PR[a]	Adjusted PR[b]	Crude PR	Adjusted PR	Crude PR	Adjusted PR
Age category (Years)						
15–24	1	1	1	1	1	1
25–34	1.16* (1.06, 1.27)	1.02 (0.93, 1.11)	1.50* (1.19, 1.89)	1.35* (1.07, 1.69)	0.84 (0.65, 1.09)	0.68* (0.52, 0.88)
35–49	1.14* (1.02, 1.28)	1.00 (0.89, 1.13)	1.30 (0.96, 1.75)	1.33 (0.98, 1.81)	1.00 (0.73, 1.38)	0.68* (0.48, 0.97)
Woman's education						
No education	1	1	1	1	1	1
Primary	0.84* (0.79, 0.90)	0.85* (0.78, 0.92)	0.76 (0.54, 1.05)	0.74 (0.54, 1.02)	0.99 (0.58, 1.68)	1.07 (0.67, 1.69)
Secondary & higher	0.84* (0.80, 0.89)	0.87* (0.80, 0.94)	0.73 (0.53, 1.00)	0.73* (0.53, 0.99)	1.02 (0.61, 1.71)	1.11 (0.71, 1.75)
Marital status						
Unmarried/not in union	1	1	1	1	1	1
Married/in union	1.06 (0.92, 1.23)	0.89 (0.78, 1.02)	1.20 (0.84, 1.73)	0.86 (0.60, 1.24)	0.91 (0.63, 1.32)	0.92 (0.63, 1.34)
Number of living children						
No living children	1	1	1	1	1	1
At least 1	1.59* (1.32, 1.92)	1.49* (1.24, 1.79)	2.33* (1.55, 3.50)	1.74* (1.15, 2.63)	1.15 (0.83, 1.59)	1.40* (1.01, 1.93)
Fertility preference						
No more children desired	1	1	1	1	1	1
Another child	0.85* (0.80, 0.90)	0.90* (0.84, 0.97)	0.83 (0.68, 1.02)	0.96 (0.78, 1.18)	0.86 (0.64, 1.17)	0.83 (0.61, 1.13)
Undecided	0.91* (0.82, 1.00)	0.98 (0.87, 1.09)	0.39* (0.24, 0.62)	0.48* (0.30, 0.77)	1.72* (1.26, 2.36)	1.70* (1.24, 2.34)
Experienced death of a child						
No	1	1	1	1	1	1
Yes	1.05 (0.95, 1.17)	0.98 (0.88, 1.08)	0.95 (0.70, 1.30)	0.90 (0.66, 1.23)	1.19 (0.85, 1.65)	1.09 (0.78, 1.52)
FP counseling						
No	1	1	1	1	1	1
Yes	1.06 (0.98, 1.15)	1.02 (0.95, 1.11)	1.09 (0.90, 1.32)	1.09 (0.90, 1.33)	1.04 (0.82, 1.32)	0.94 (0.73, 1.22)
Woman's decision-making power						
Less empowered	1	1	1	1	1	1
Empowered	1.08 (1.00, 1.16)	1.03 (0.95, 1.11)	1.70* (1.39, 2.09)	1.45* (1.18, 1.78)	0.61* (0.48, 0.77)	0.64* (0.50, 0.81)
Media exposure						
No	1	1	1	1	1	1
Yes	1.10* (1.00, 1.21)	1.07 (0.98, 1.17)	1.19 (0.95, 1.49)	1.11 (0.89, 1.38)	1.00 (0.77, 1.30)	1.01 (0.78, 1.32)

**P-value < 0.05. [a]Crude PR, Unadjusted prevalence ratios (the result of the uni-variable regressions). [b]Adjusted PR, The adjusted prevalence ratios were calculated after controlling for all explanatory variables.*

in the most recent demographic health survey (4). A fact that is often masked by the national demographic surveys that report findings of urban spaces as though the urban space is demographically homogenous and usually with better outcomes as compared to rural areas (11, 12, 22). In Uganda, rapid growth of the urban population has not grown at the same pace as the needed physical infrastructure to meet social needs such as education, housing, and health care for all. This, consequently, has led to the creation of informal settlements that are often underserved by social services (12). In addition, the unmet need for family planning remains much higher than the national target of 10% (23). The unmet need for family planning in informal settings could be attributed to inadequate availability of service delivery points, limited information on family planning services, and the low socio-economic status that deprives the population of the ability to pay for family planning services when needed (7, 16). Interestingly, the total demand and modern contraceptive use in this population was much higher than what is reported for the general urban population (4). Similarly, this could be attributed to the lower socio-economic status of this population, social context within which women live has been shown to influence contraceptive use (7, 16, 24).

Total demand in this study was inversely associated to education level of women, a finding that we found surprising. Further studies within similar population should be conducted to validate this. Nonetheless, despite the high total demand and use among women with no education, the unmet need is still comparable to those with higher education. The role of education in empowering women to take more charge of their sexual and reproductive health issues is indisputable (4, 17, 25). Indeed, our study still found a high total demand (84.2%) and contraceptive use (46.0%) among the highly educated women in the informal settlements of Kira municipality. Moreover, a study conducted in Uganda found a link between education

and increased contraceptive use by increasing their economic opportunities and likelihood of engaging in protected sex (18).

Total demand and modern contraceptive use among women living in informal settings was higher if the woman had at least one living child, still unmet need is higher in this group. The use of modern contraceptives in many African settings is often dictated by the number of children a woman bears. Women who fail to bear children are often disregarded in society (26, 27). Therefore, women without any children tend to have a lower modern contraceptive demand as a way of increasing their chances of bearing children for their partners. This implies that after bearing children, women are in a better position to decide whether to have more children or not, and thus an increase in the total demand and modern contraceptive use. Findings indicating the role of having at least one living child in shaping modern contraceptive prevalence have also been reported other parts of Sub-Saharan Africa (27, 28).

Similarly, fertility preference was associated with total demand for modern contraceptives, use, and unmet need. Women who were undecided about having another child had a much higher unmet need (64.6%). Such women are at a higher risk of unintended or mistimed pregnancies compared to their counterparts who wanted no more children. Being undecided places women in an uncertain circumstance which increases their chances of unintended pregnancies. In Uganda, it is often the decision of the men to decide how many children to have and when to (29). This could be compounded by limited access to family planning services such as health education and counseling in informal settings (7, 26). The need for a broader approach to sexual and reproductive health issues, to include fertility preferences and the role of women is essential. Additionally, this highlights the wider cultural context within which contraceptive use choices are made and underscores the need for a multi-sectoral/systems approach to improving the use of modern contraceptives (28, 30). For example, as expounded in the next paragraph, more empowered women are more likely to be in charge of their fertility choices.

Modern contraceptive use was higher among the empowered women in comparison to the less empowered and therefore had lower unmet need. Empowerment improves the agency of women thus making it easier for them to make decisions on issues pertaining their sexual and reproductive health. Unlike less empowered women, empowered women are often in a better position not to have sex when they want, and to use contraceptives whenever they want. The impact of women's empowerment on modern contraceptive use is widely documented in other settings (31, 32), and this indeed underscored the need to empower women in order for them to realize their sexual and reproductive health needs. These findings indicate the critical role that gender equality interventions could play in advancing the use of modern contraceptives (32–34). This, therefore, calls for a more multifaceted approach to promoting contraceptive use, thereby making a systems thinking lens critical in intervention designs.

Further, the prevalence of modern contraceptive use was lowest among young people (15–24 years). Modern contraceptive use was lowest among the 15–24-year-olds probably due to the healthcare system barriers that characterize informal settings. The age group represents a cluster of young adults whose sexual and reproductive health care needs are often unique, thereby in need of youth focused services. Service delivery points/healthcare facilities in such settings often lack access to youth-friendly sexual and reproductive health services (7). Yet, such services are known to improve the health seeking behaviors of young people (35). Absence of youth-friendly services limits the uptake of modern contraceptives since young people may shy away from using service delivery points that are dominated by the older age groups due to fear of being judged, and at times lack of the financial power to pay for family planning services. The lack of youth-friendly services also limits the sensitization of young people on the use of modern contraceptives, as well as contraceptive counseling, both of which are known to increase uptake of modern contraceptives and consequently reduce the unmet need for modern contraceptives (7, 36). The current study highlights the need for innovative solutions aimed at increasing access to modern contraceptives to young people living in informal settlements.

Methodological Considerations

The current study offers a unique dataset to understand modern contraceptive use and unmet need in informal settlements. It follows a rigorous sampling and data collection method with a very high response rate to obtain a representative sample of women of reproductive age in a mid-sized informal settlement. However, several points should be considered when interpreting our findings. First, to undertake the study analysis, we excluded infecund and sexually inactive unmarried women in keeping with the revised definition of unmet need. This, however, appears to have led to higher estimates compared to the Uganda demographic health survey (UDHS) which does not exclude the infecund and sexually inactive from the analysis undertaken. Our findings, therefore, should be interpreted considering the differences in sample characteristics.

Second, given the cross-sectional design of the study, all results should be understood as associations rather than causal relations. Third, we combined single women and those divorced or widowed during data analysis. We believe this did not have had any effect on the results of the study. However, we recommend that these be separated for future studies to understand the differences within these groups as pertains the outcomes of interest. Finally, we think that our study area is a good example of mid-size urban areas in East Africa and therefore our results can be generalized to other areas with similar settings.

CONCLUSIONS AND RECOMMENDATIONS

The total demand and modern contraceptive use in this study were found to be high. The prevalence of modern contraceptive use was lowest among women aged 15–24.

The unmet need in this study (37.3%) was found to be much higher than what is reported in the latest UDHS (22.8%) for the urban population. This is an indication of the socio-demographic and socio-economic diversity of the urban population. Unmet need for modern contraceptive use was associated with women

having at least one living child, their fertility preferences and empowerment levels.

To decrease unmet need for contraceptive use among residents of urban informal settlements, we make three interrelated recommendations. One, interventions targeted for the urban population need to take into consideration the diverse socio-demographic and social economic characteristics of the urban population. Those living in informal settlements are faced with unique challenges to contraceptive access and use, understanding those and tailoring interventions to overcome them is critical. A further look into the drivers of high demand and use of modern contraceptives among women living in informal settlements is recommended. We hypothesize that the high urban living costs, could be a motivation to limit childbearing amongst this population.

Two, the role of education, fertility preferences, having a living child and women's empowerment in determining contraceptive use among women living in formal settlements must be considered in intervention designs. Three, a whole systems approach to promoting contraceptive use in urban informal settlements will have higher chances of yielding positive results. Women's empowerment through promotion of quality girl child education, the use of micro-economic tools such as provision of soft loans to improve women's and youth (15–24-year-olds) income levels, promotion of school health programs and the engagement of men and other social actors to systematically reflect and change suppressive social and gender norms must be tackled from a multi-sectoral and systems perspective. Such a perspective will enable the harnessing of strengths from different stakeholders while at the same time enabling a holistic approach to needed changes, thereby creating opportunities for dealing with unintended consequences that may be created by making one off and stand-alone interventions. For example, to tackle entrenched gendered norms or limited use of contraceptives among the youth, will require concerted efforts of religious and other opinion leaders, politicians and cultural heads, local interest groups, youth leaders, civil society, men, education stakeholders, health workers, urban planners, and development partners. Such a complex approach needs to be sustained over a long period of time for it to yield intended benefits.

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 approval was obtained from Makerere university School of Public Health Higher Degrees and Research Ethics Committee (HDREC-684). The study was registered with the Uganda National Council of Science and Technology (HS382ES). Permission to interview the participants was sought from Wakiso District local government and the Kira Municipality officials. Prior to any interviews, informed written consent was sought from all adults above 18 years, the legal age in Uganda. For minors (15–17 years), informed consent was first obtained from their parents/guardians, as well as assent from the respondents. Minors who were pregnant or those who had given birth at the time of the interviews were considered emancipated and thus consented on their own.

AUTHOR CONTRIBUTIONS

MT conceptualized the study, participated in data collection and management, and led the manuscript drafting. MB led data analysis with support from CB, MT, and SK. TS participated in data collection and supported the drafting of the manuscript. LA contributed to the conceptualization of the study. FM provided overall technical guidance to the conceptualization process and participated in reviewing initial drafts of manuscript. All authors reviewed the manuscript, provided substantial input, and approved the final manuscript.

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Contraceptive Use, Access to Methods, and Program Efforts in Urban Areas

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This article uses two large sets of internationally comparable national surveys to analyze urban patterns of contraceptive use, access to methods, and fertility. Urban areas show higher use of contraception and lower fertility rates than rural areas, with substantial differences in the method mix. Urban women tend more toward the long-term methods of the intrauterine device (IUD), implant, and sterilization and less toward short-term, resupply methods. The overall use increases with education and with higher wealth quintiles. By regions, contraceptive use is unbalanced between urban and rural sectors especially in sub-Saharan Africa, where the overall levels of use are lowest. Overall, the urban fertility rate is only 70% of the rural rate. Across countries, the fertility rate correlates negatively with contraceptive use. National family planning programs tend to raise contraceptive use and to improve access to the methods. About half of the unmarried, sexually active women use contraception, with great diversity in which method is preferred. This holds for all married women as well: regions and countries show quite different patterns of use. Therefore, planners and donors should focus on the circumstances in individual countries.

Keywords: contraception, access, program effort, regions, equity

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INTRODUCTION

The conditions under which most people live have been transformed over the last seven decades by what may be termed the "urban revolution." Since the end of World War II, the proportion of people dwelling in cities has grown from less than a third (30%) in 1950 to over half (56%) in 2020, and it is projected to exceed two-thirds (68%) by 2050. In terms of numbers, the urban population grew from 750 million in 1950 to 4.4 billion in 2020, and it is projected to total 6.7 billion by 2050, nearly nine times higher than in 1950. Meanwhile, the total rural population, which grew from 1.8 billion in 1950 to 3.4 billion in 2020, is expected to decline by about 10%, from 3.4 billion in 2020 to 3.1 billion by 2050 (1)[1].

The urban sector is projected to grow in many different ways across countries and regions. In Latin America, over the 30 years from 2020 to 2050, the urban population is projected to increase from 539 million to 685 million, an increment of 146 million for a 27% increase. Sub-Saharan Africa, starting from a smaller 2020 total of 459 million, will grow to 1.26 billion, an addition of 800 million, up by 174% (1).

Uneven growth is illustrated by the different paths expected in China and India; in 2020 they accounted for 40% of residents in developing regions. The United Nations (UN) projections to

[1]The UN Population Division provides estimates and projections of both urban and rural population numbers for every country and region, 1950–2050. Online at population.un.org/wup.

2050 show urban populations in China increasing between 2020 and 2050 by 217 million, up by a fourth (25%; 875 million to 1.092 billion). India will exceed this by a large margin, increasing by 394 million, up by four-fifths (81%) in the same period (483 million to 876 million). Together, China and India alone will account for 28% of all growth by 2050 in the developing regions. The next 10 countries[2] (by the size of their 2020 urban populations) will account for another 18%. To sum up, 46% of all growth will occur in only 12 countries.

The massive shift into the cities raises the demands for public services, housing, education, and jobs in a frequently losing battle with the ever-increasing numbers. In the case of reproductive health and contraceptive protection of women, medical infrastructures must grow, as well as the capacities of the private sector to address the needs for both short-term and long-term methods.

The literature is unfortunately scanty on urban–rural differences in contraceptive use for large sets of low- and middle-income countries. Many studies on local and individual countries exist, but they are highly variable in character and no attempt is made to review them here. Instead, the available cross-country compilations that compare urban and rural sectors for variables of interest are discussed.

Two early UN publications compiled numerous national surveys and discussed the urban–rural differentials in contraceptive use. The first (2) used 20 surveys from the World Fertility Surveys[3] (WFS), a series running from 1974 to 1987 that ultimately included 42 countries and led to the Demographic and Health Survey (DHS) program. The 1981 study found considerably higher use rates among urban than among rural women for nearly all countries, though somewhat smaller differences after controls for education. The perceived availability of services appeared to matter since they paralleled the differentials in use in countries with evidence on both.

The second UN publication (3) used WFS surveys in 30 countries and found similar urban–rural differentials in contraceptive use, but it expanded the work to examine use according to the method. In most of the countries, the use of the long-term methods of sterilization and the intrauterine device (IUD) differed little between sectors, but in cities, short-term supply methods were favored, as opposed to the traditional methods in rural areas.

In 2011, the UN published a Wall Chart covering all countries, with 17 indicators across a range of topics for the urban sector (4). These indicators included urban population sizes and growth rates, the shares of the urban population dwelling in the largest cities, the percentages living in slums, and the percentages using improved sanitation facilities and improved drinking water sources. They also included carbon dioxide emissions and certain development measures such as GDP per capita, the percentage working in industry and services, and the energy consumption per capita.

Also, in 2011, the UN published an update of its series that provided estimates and projections of the numbers of urban residents in all countries, by individual year, from 1950 through 2050. For the first time, this update incorporated geographic coordinates for large cities (633 cities with over 750,000 inhabitants). This permitted linkages to data on various environmental characteristics such as nearness to coasts, earthquake faults, and climate zones.

The most recent report in the series, for 2018, is available at https://population.un.org/wup/. In addition, the UN maintains an online database that permits access to each country, with options for data tables, figures, and maps.

In 2015, the Population Reference Bureau (5) published a Wall Chart with separate urban and rural values on 16 indicators for low- and middle-income countries. These indicators are categorized under the five headings of demography, socioeconomic variables, maternal and child health, family planning, and drinking water and sanitation. Important findings included the earlier start of childbearing and less antenatal care in rural areas, as well as less skilled attendance at delivery together with higher infant mortality rates. In addition, more children below age 5 were underweight. Rural areas suffered from less access to improved drinking water and less access to improved sanitation facilities.

As part of its long-running annual series of Wall Charts, the PRB has most recently included the percentage of the population living in cities and the percentage living in cities of 1 million or more for each country (6).

In summary, the available cross-national literature provides numbers and projections for the rural and urban populations, in all countries, to 2050. Much is known about the use of contraception in whole populations, but the picture just for the urban sector is often not available, and no common source has been found that breaks down the urban contraceptive use by the personal characteristics of users.

The present study uses the DHS series to compare the rural and urban sectors for contraceptive use by method, by six geographic regions, covering most of the developing world. Urban–rural ratios for contraceptive use are given for each country. The patterns of use according to four personal characteristics are provided, along with the method preferences of unmarried sexually active women. The association of urban fertility levels with contraceptive use is discussed. Finally, the efforts of national family planning programs to extend contraceptive use are presented, with estimates of the proportions of populations with access to each major contraceptive method.

METHODS AND DATA SOURCES

The analyses in this article draw upon a set of 87 countries included in the DHS series, a long-running program that collaborates with agencies in many countries, primarily in the developing world, to assess a range of measures for reproductive health, contraceptive use, fertility, and related items. The DHS series uses nationally representative surveys with large sample sizes (usually between 5,000 and 30,000 households). These focus

[2]In order of urban population size in 2020: Brazil, Indonesia, Mexico, Pakistan, Bangladesh, Turkey, Iran, Philippines, Egypt, Republic of Korea.

[3]For details, see http://ghdx.healthdata.org/series/world-fertility-survey-wfs.

on women aged 15–49, and in some countries, men aged 15–54 or 59 are interviewed in a subsample. Most of the countries interview women of all marital statuses; all countries cover at least the married in-union women, and they are the focus here to include more countries for analysis. Some countries also interview sexually active unmarried women below age 30 or 25, and this data set is used in one section below. (For further information on the DHS series, see https://dhsprogram.com/). Alternative sources such as the MICS, PAPCHILD, and RHS series[4] do not contain urban–rural breakdowns for personal characteristics and other items needed for the analyses in this article, focusing especially on the urban sector.

To examine the use of contraception, the main eight contraceptive methods are studied: the "modern methods" of male and female sterilization, IUD, implant, pill, injectable, condom, and the traditional methods (rhythm and withdrawal). Other methods with little use in most of the countries are omitted. Personal characteristics of contraceptive users are included by age, family size, education, and wealth quintiles. Of the survey dates, one-sixth are between 1985 and 1999, another-sixth are from 2000 to 2009, and two-thirds are from 2010 to 2018. Surveys come from 7 regions: 15 from Asia, 5 from the Central Asia Republics, 3 from Europe, 15 from Latin America, 8 from the Middle East/North Africa, 19 from the East and Southern countries of sub-Saharan Africa, and 22 from the West and Central countries of sub-Saharan Africa. Only 55 countries have data on the unmarried, sexually active group of women, and only 65 have information on contraceptive use by the personal characteristics of age, the number of living children, education, and wealth quintiles. Surveys done prior to 2000 are omitted in the figures and tables but are included in the **Appendices**. Trends as such are not analyzed; the focus is on the most recent picture as approximated by the latest available surveys in the DHS series, which uniquely affords the urban–rural comparison not available in other large-scale data sets.

The urban–rural breakdown follows the definition in each country; this varies, as many go according to the population size of each locality, while others reflect the levels in the administrative structure. The compilations by the UN and other agencies, as well as the DHS series, necessarily use the definition available in the data set of each country.

An additional source of data, besides the DHS series, is employed to study the relation of contraceptive use to the strength of national family planning programs. This data set comes from a 2014 study of 90 countries that rated the strength of program efforts under the components of policies, services, evaluation, and access to methods.

RESULTS

Contraceptive Prevalence by Method and Residence

Contraception is used more in urban than in rural areas, quite consistently and by a substantial margin. For "any method" at left in **Figure 1**, the gap is 7.7 percentage points (45.7 vs. 38.0%) for any method and 6.6 percentage points for modern methods (38.0 vs. 31.4%).

In four of five countries, contraception is used more in urban than in rural areas. The actual levels of urban use for any method vary greatly. The lows occur especially in the West and Central parts of sub-Saharan Africa at a mere 11.2% in Chad, 13.0% in the Gambia, and 16.0% in Guinea. The highest levels are in Asia with Vietnam at 79.1% and in Latin America with Brazil (78.7%), Colombia (81.5%), and Peru (75.8%) (**Appendix 1**).

Figure 1 and the following figures use only the surveys conducted in 2000 or later.

The urban advantage is true for each of the eight contraceptive methods except the injectable; even the traditional methods (rhythm and withdrawal) are used more in the cities. The urban advantage is greatest for the condom, by 2.7%, and the IUD, by 1.9%. **Appendix 1** includes contraceptive use by the method and residence for all countries.

(The averages in **Figure 1** are unweighted, giving each country the same importance, so a small country counts as much as a large one. With population weights, the pattern is the same, but the levels would differ. The largest countries then dominate. For example, the top four countries in Asia, namely, India, Pakistan, Bangladesh, and Indonesia contain two-thirds of all Asia outside of China).

Ratios of Contraceptive Use by Residence

The urban excess in contraceptive use varies considerably by region. The urban/rural ratios (**Figure 2**) are the highest in sub-Saharan Africa and especially in its West and Central region, where all use is at lower levels and the infrastructures are less advanced. For all methods, the ratio there averages 2.3 and for modern methods, the ratio averages 3.2.

Overall (total bars), the urban advantage is greater for modern methods than for all methods. A contributing factor may be the easier logistics for resupply methods and access to clinical methods in the cities than in the outlying areas. **Appendix 2** provides the urban-rural ratios by method, for all regions and countries.

Ratios by Country

Behind the regional averages lie the considerable country differences. **Figure 3** based on **Appendix 2** sequences countries by the ratio size (median 1.2).

Greater use in the cities is common, by 50% or more in many countries (ratio of 1.5 or higher). The ratios reach 2 or 3 or more in 13 countries; three outliers exceed 4. All are in sub-Saharan Africa, including the two large countries of the D.R. Congo and Nigeria. The original levels of use there tend to be lower for both urban and rural sectors, and the rural sectors suffer from poorer health infrastructures vital for contraceptive services. Ratios closer to equality occur where contraceptive prevalence is relatively high, as in Indonesia, Peru, Colombia, and Vietnam.

Use by Personal Characteristics

It is of interest to know how contraceptive use varies by the personal characteristics of age, family size, education, and wealth (**Figure 4**). As above, these show averages across the 87

[4]For a compilation of all national surveys from these and other sources, refer to https://www.un.org/development/desa/pd/data/world-contraceptive-use.

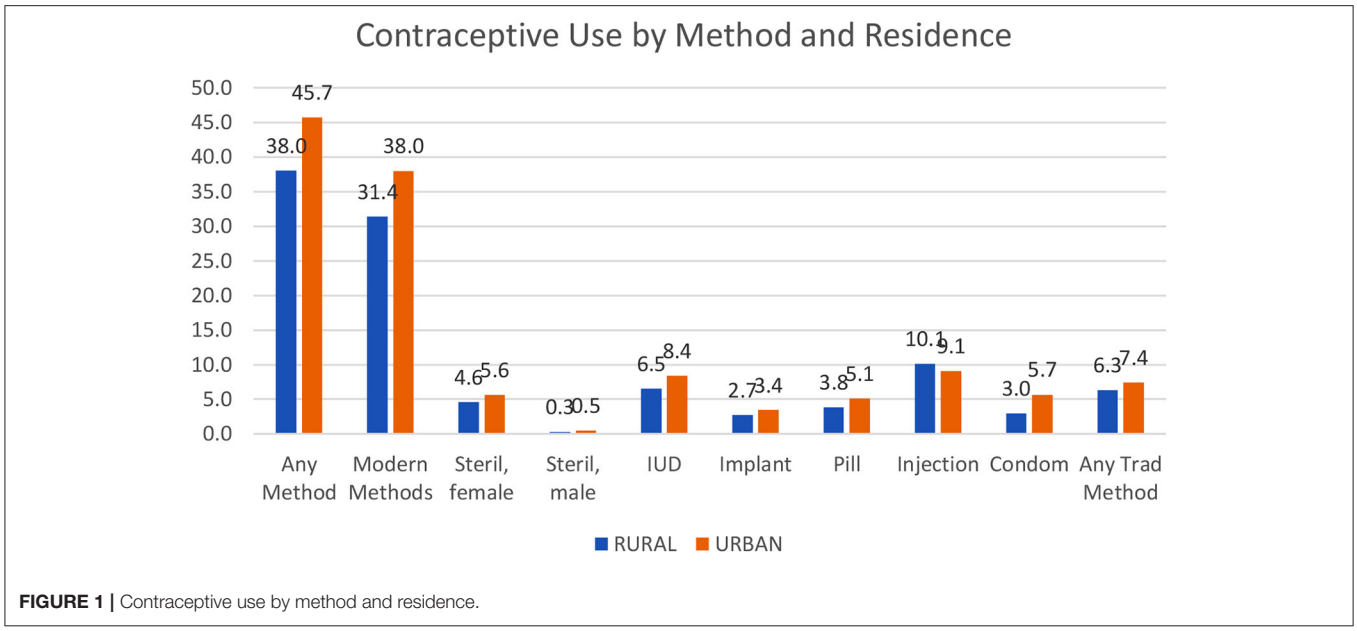

FIGURE 1 | Contraceptive use by method and residence.

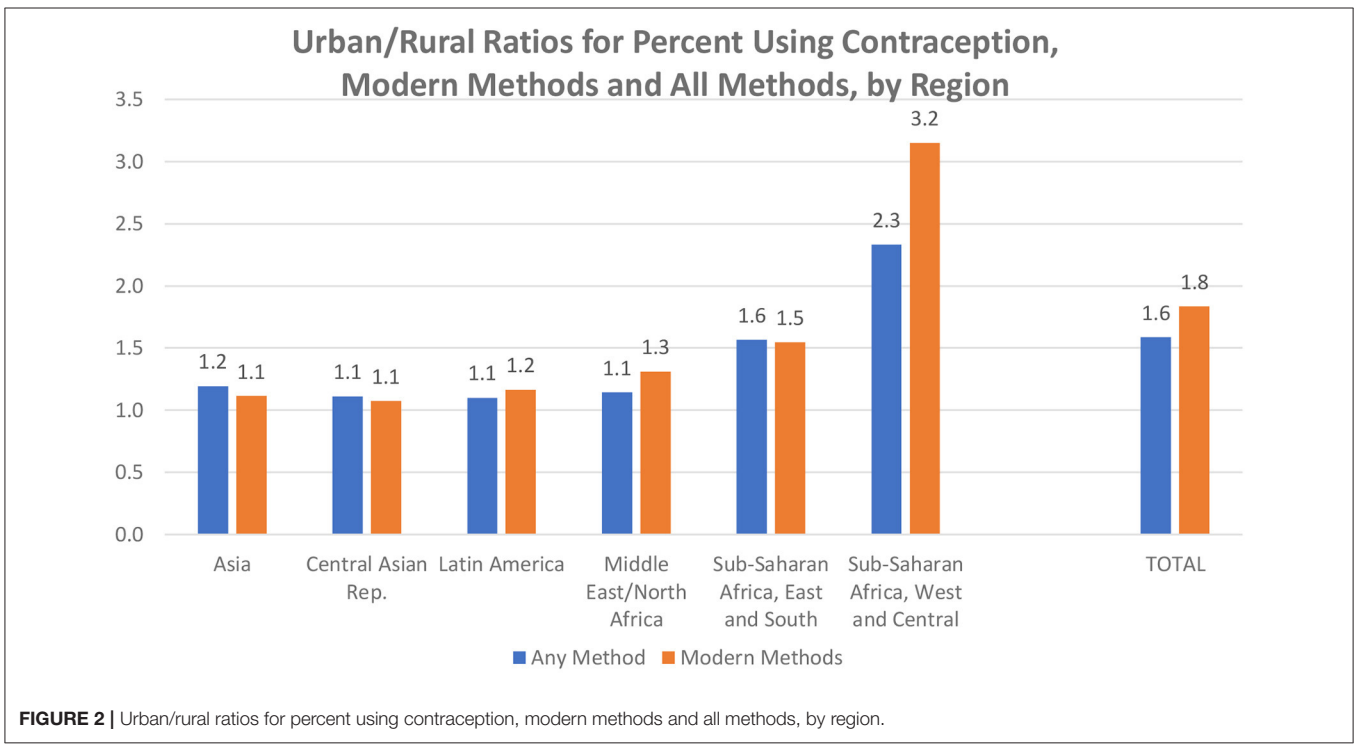

FIGURE 2 | Urban/rural ratios for percent using contraception, modern methods and all methods, by region.

countries, just for the urban sector and just for married and in-union women.

The age pattern is as expected, showing the common bell-shaped pattern, with the greatest use centering on women in their 30's, where many wish to cease childbearing and others are spacing to postpone the next birth.

By the number of children, the pattern of use is similar to that for age, except for more uniformity across the groups. The level of 45–50% obtains for all four middle groups. Moreover, the use is sustained in the highest group at over 40%, compared to that at about 30% for the highest age. Note the interaction between contraceptive use and the number of children: for some women, a larger family motivates them to use a method, but for others, the failure to use something causes the larger family.

Women of higher education use contraception by a clear margin. Differences are small between those of "some primary" and those of "some secondary" levels, and the least use occurs

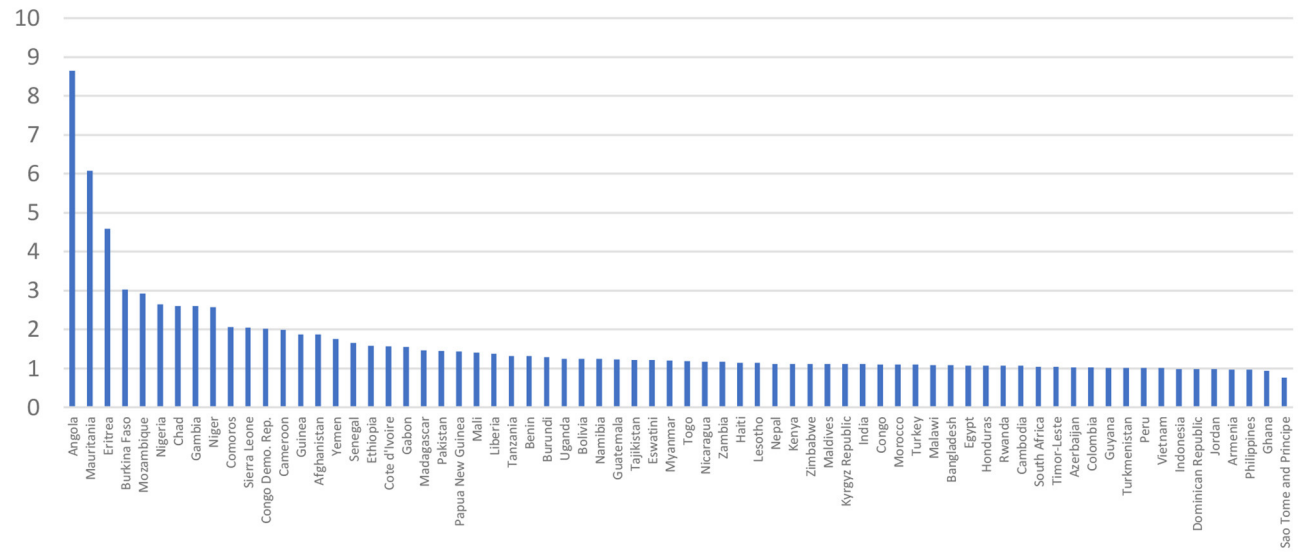

FIGURE 3 | Urban/rural ratios for percent using contraception (any method).

among those with no education. Overall, 35% or about a third are using some method.

Contraceptive use according to wealth quintiles[5] is greatest among the richest group of women, but it is nearly as great in the next level down. It then drops in the next two groups and is least in the bottom group. There is a nine-point difference overall between 27 and 36%. Thus, while the overall use is greater in the cities, there is the expected differential in the use by relative wealth.

The quintile comparison is extended to show differences by the method mix (**Figure 5**) since public action programs must be shaped partly by the characteristics of the poorest women, who live disproportionately in slum dwellings and need to be contacted in special ways by staff and the media (In the figure, tracing each quintile across the bars, all methods add to 100%).

Two notable results are the preferences by the poorest quintiles for the injectable and their aversion to the condom. They have a slight aversion to the IUD and the pill. The bars for the richest women are highest for the condom, next with small differences among the traditional methods, pill, and injectable. Levels for the richest quintile are lower for the implant, IUD, and female sterilization and are negligible for male sterilization. This is a general pattern: four methods at the left are least favored, while four methods to the right are most favored.

[5]Wealth for the respondent is according to that of her household, which is judged by the ownership of selected assets such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilitation facilities. Details at https://dhsprogram.com/topics/wealth-index/Wealth-Index-Construction.cfm.

Contraception and Fertility

The method mix as discussed above affects the fertility rate since certain methods have higher failure and discontinuation rates. However, the total prevalence of use matters, and overall, fertility rates are lower where more women use contraception, documented below for the urban sector.

Rural fertility is higher, by large margins, according to the total fertility rate (TFR), the average number of lifetime births expected from the current age patterns. The general pattern (**Figure 6**) is true within every geographic region. Overall, the average TFR is 3.1 for urban women vs. 4.4 for rural women, higher by nearly a half (ratio of 1.42).

Rural fertility is far higher than urban fertility in some of the same countries that show a similar imbalance in contraceptive use. The TFR ratio is above 4 in 11 sub-Saharan African countries including Nigeria, Niger, DR Congo, and Mauritania. It is above 3 in Tanzania, Rwanda, and Uganda, among others. The lowest ratios are in countries with low TFR levels; they fall at 2 or below in Bangladesh, Nepal, and Colombia, as well as in the former USSR republics of Armenia, Moldova, and Ukraine.

The regions vary considerably: in **Figure 7** the difference is least in Asia, where urban fertility is 80% of rural fertility, and greatest in the East and Southern parts of sub-Saharan Africa and in Latin America. The other three regions are intermediate, at 0.71 to 0.76.

It is of interest that Asia has both low fertility rates (**Figure 6**) and the least difference between the urban and rural rates. However, the other regions do not follow that pattern, as the ratios are irregular in their correspondence to the levels of the rates. Indeed, the balance between the fertility behavior in the

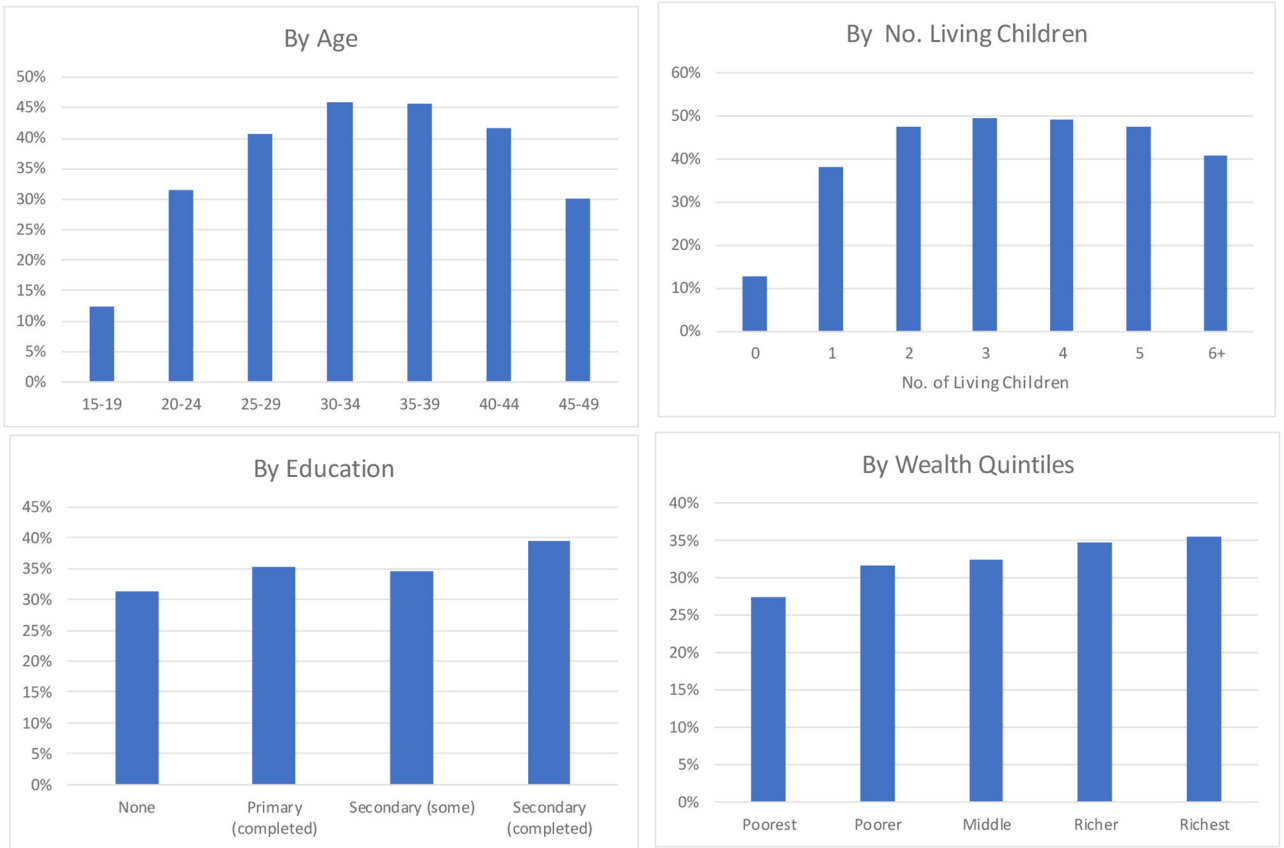

FIGURE 4 | Differentials in the percentage using any method of contraception by four personal characteristics, urban sector.

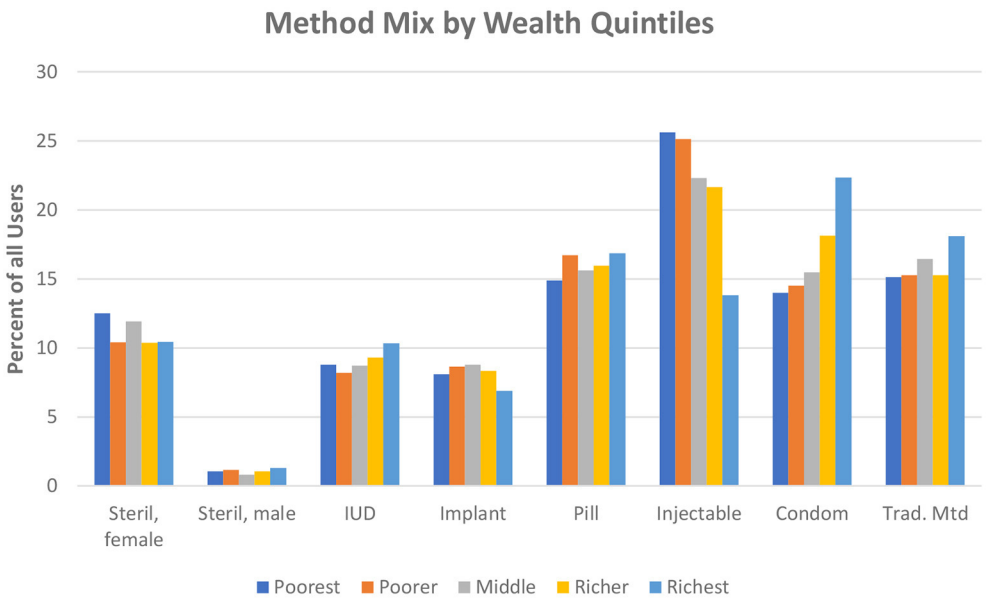

FIGURE 5 | Method mix by wealth quintiles.

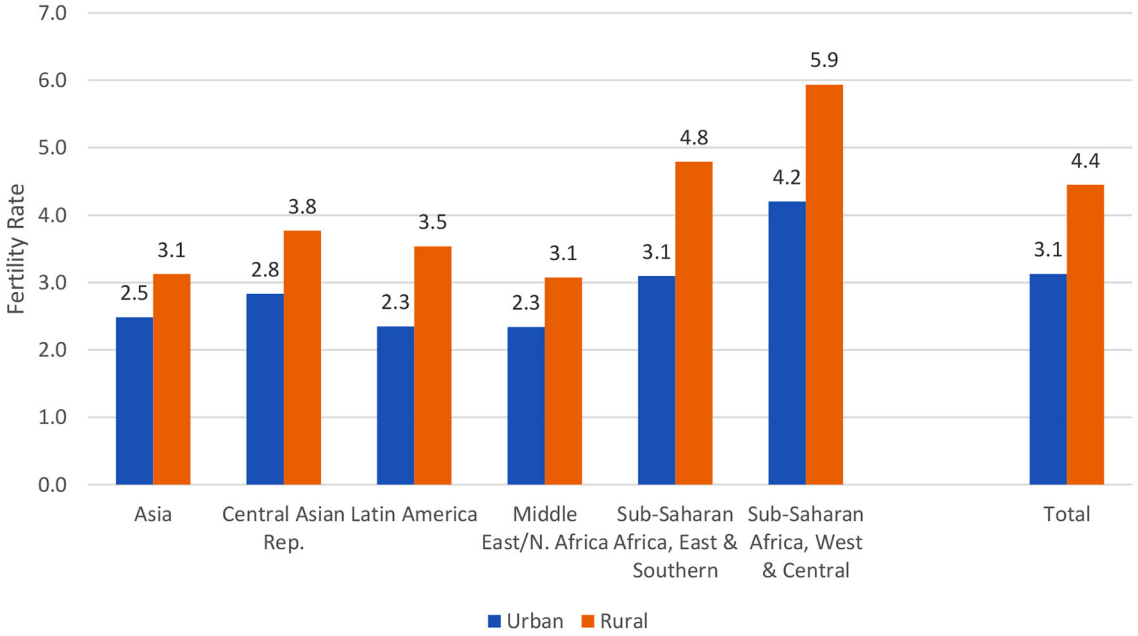

FIGURE 6 | Total fertility rates by region and sector.

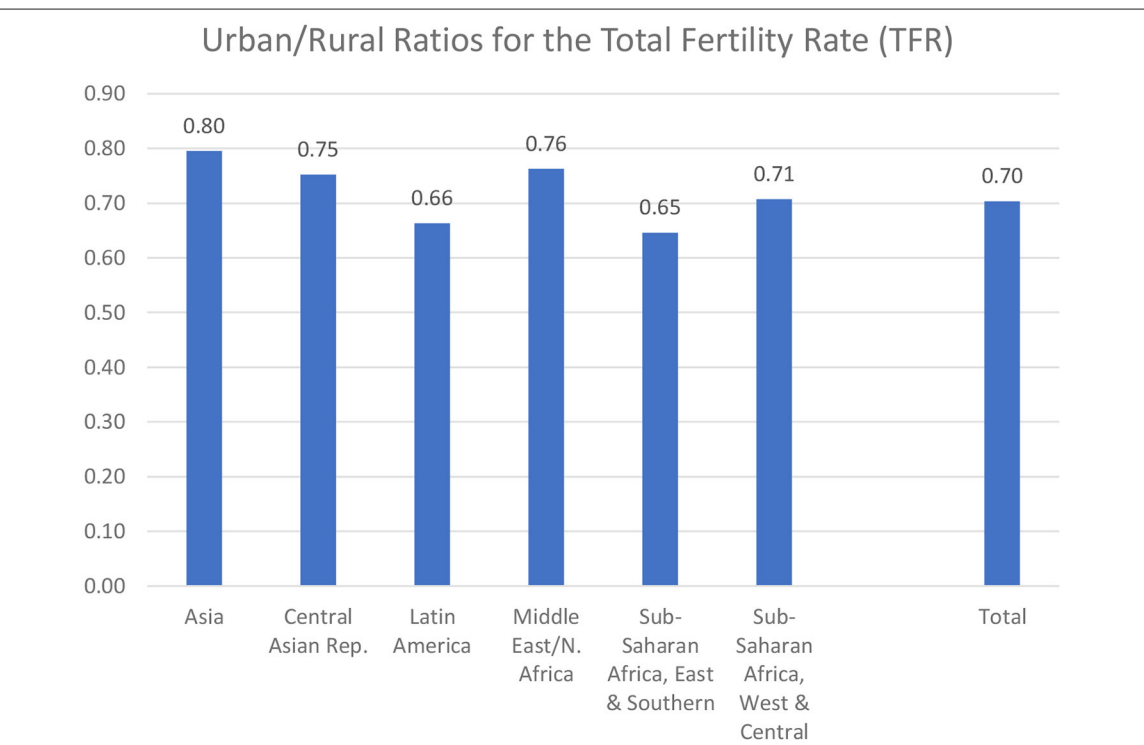

FIGURE 7 | Urban/rural ratios for the Total Fertility Rate (TFR).

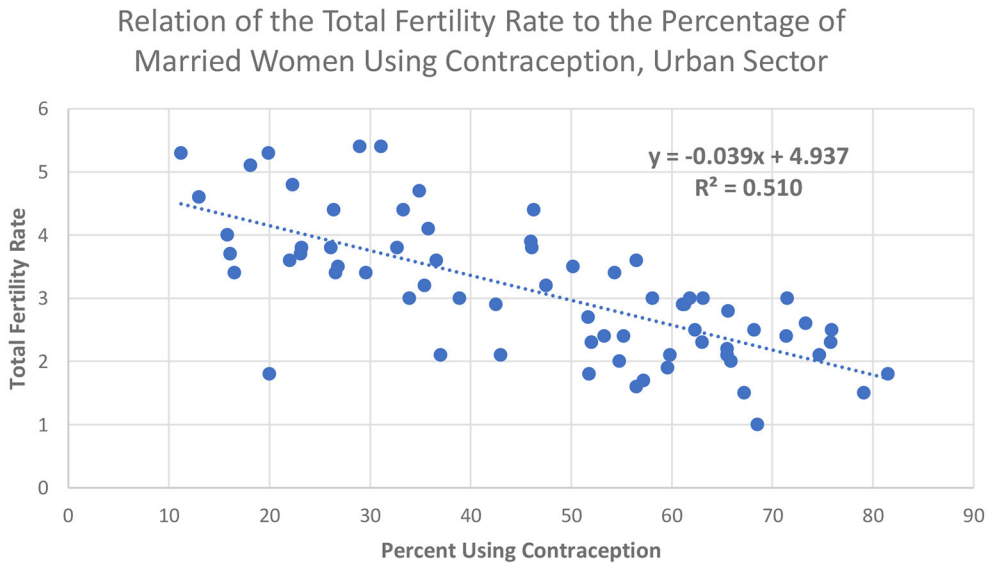

FIGURE 8 | Relation of the Total Fertility Rate to the percentage of married women using contraception, urban sector.

urban and rural environments is subject to somewhat different sets of determinants across the regions.

Contraceptive use is one of those determinants. Where contraceptive use is greater, the TFR is lower (**Figure 8**). Most of the countries lie within one child of the trendline. The same pattern exists by an alternative measure, the general fertility rate, i.e., the number of births per year per 1,000 women (not shown). As in entire countries, behavior in the cities shows the dependence of fertility outcomes on contraceptive use. This, in turn, leads to the question of access to contraceptive methods.

Unmarried Sexually Active Women

A group of particular interest is sexually active unmarried women. Most are young, living in the cities, exposed to unplanned pregnancies, and unsafe abortions. Many are poor and preyed upon by older men. The contraceptive methods available to them, and the ones they adopt, are limited and vary markedly across countries. However, in some countries, higher proportions of these women use contraception than do their married counterparts of the same age, partly because many young married women are seeking their first births. Measurement issues are discussed by Fabic and Jadhay (7).

Information concerning this group is available from the DHS series for 55 countries with surveys from 2000 onward. Information for the urban sector alone is not available, but on average, 62% of these women live in the cities and so it seems worthwhile to include the available information in this study since the broad patterns should apply to the urban sector. The following therefore pertains to whole countries and is only for the especially concerned age groups 15–19, 20–24, and 25–29. **Appendix 3** gives the total percentage using each method across the age groups, for the 64 countries with information.

TABLE 1 | Contraceptive use by unmarried sexually active women, by all methods and modern methods, and region.

	Any method	Modern methods
Asia	30.8	29.8
Central Asia Rep.	57.8	60.3
Latin America	65.3	59.4
Sub-Saharan Africa, E & S	53.5	45.2
Sub-Saharan Africa, W & C	41.1	40.4
Total	49.9	47.8

About half of the sexually active, unmarried women use some contraceptive method; nearly all of this is for modern methods (47.8% compared to 49.9%). **Table 1** gives the mean values for the percentage using any method and any modern method, showing the substantial regional differences (there are only two countries with information in the Central Asia Republics, but all five are known to heavily favor the IUD).

As **Figure 9** shows, there are decided differences as to the preferred method, and these vary interestingly by age. The condom is easily the favorite, followed by the injectable. The pill, implant, and traditional methods are equally popular. However, the long-term methods of the IUD and sterilization are little used, although both increase in the 25–29 age group. Only the condom shows a clear decline by age.

In summary, an average of about half of unmarried, sexually active women use some method of contraception but with wide variations in the percentage using and the particular method chosen. Every method except male sterilization finds some users, and each method has its adherents. Overall, most of the use is of the resupply methods, a reasonable outcome given the young age range and the unmarried status.

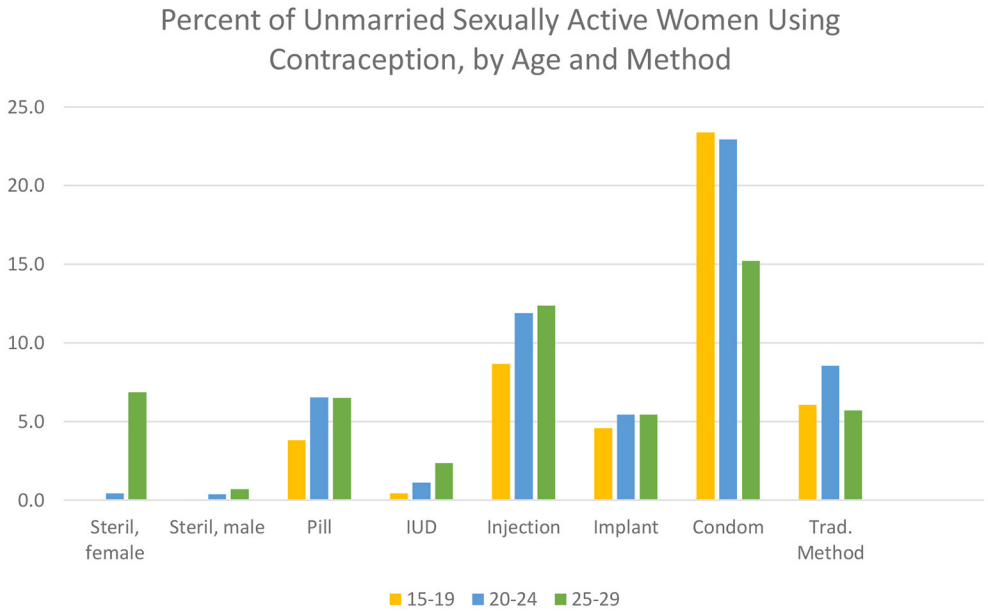

FIGURE 9 | Percent of unmarried sexually active women using contraception, by age and method.

Regional differences are quite marked. **Appendix 3** shows the percentage of unmarried, sexually active women using each contraceptive method, by country and region. The pill is outstanding only in some Latin American countries. Notably, the injectable has won a prominent place there, but not as impressively as in most of the countries in the east and southern regions of sub-Saharan Africa. The implant is important only in selected countries there and in the west and central regions. The condom, as noted, is the most used method, true in every region except Asia. Finally, the IUD is little used except in Kazakhstan. Female sterilization is prominent only in Latin America; it is negligible elsewhere, with the remarkable exception of India, where 48% use it.

These patterns of contraceptive use among sexually active, unmarried women reflect the broader preferences of other women, but only partially. In particular, the condom is far less popular among other women.

Family Planning Programs to Extend Contraceptive Use

Large-scale programs offering contraceptive information and services exist in most of the developing countries, often as part of maternal and child health services. These programs vary in their strength of effort, as measured by 30 ratings over the past several decades (8, 9). The ratings are summarized under four components, for policies, services, evaluation, and access to methods, and are available for 90 countries. The study is not specific to the urban population, and the data pertain to entire populations. However, it serves as a useful proxy since most of the programs serve both the urban and rural sectors, and the ratings provide at least a broad picture of differentials across regions and over time. **Appendix 4** provides the latest (2014) ratings for the four components in the 90 countries studied.

The total rating for the strength of program efforts (average of the 30 indicators) has greatly improved over the four decades since the first measurement in 1972 and repeated rounds about every 5 years (probably the longest series of any indicator for family planning ever done). The increase was from a country average of 20 (of a maximum of 100) in 1972 to 58 in 2014, a near tripling. However, 58 leaves a considerable margin for improvement, and there was some leveling off after 2004.

The national programs attempt primarily to encourage the use of the "modern" methods (IUD, pill, sterilization, injectable, implant, and condom), with varying emphases among countries. These are generally advocated in preference to the "traditional" methods of rhythm and withdrawal, which require no supplies or clinical involvement but have higher failure rates. Across countries, the use of modern methods correlates at 0.50 with the total rating of effort and much higher with the rating for access to methods, at 0.75 ("*r*" values).

Differentials by the four program components and by region are quite marked (**Table 2**). By the total score, programs in Asia and the Central Asian Republics have scored the highest, well above the other regions. The lowest scores are for sub-Saharan Africa in the west and central subregions and in the "MENA" countries for the Middle East and North Africa. Sub-Saharan countries in the eastern and southern subregions rank near to those in Latin America. Overall (total row), policy positions score the highest, and actual services score the lowest. Evaluation activities rank second, with access close.

The contributions of the programs are reflected in the source of supply or service as reported by survey respondents. As a country average, 62% of respondents report that their most recent

contraceptive supply or information came from a public source, including government hospitals and health centers. Without the involvement of the national family planning programs, contraceptive use would be less available for large segments of the population. This leads to the ratings for access to the various methods.

Access to Methods

A critical test of the national policies favoring family planning is the proportion of the population with access to specific contraceptive methods. The access component of the ratings above is the average rating across the methods, each of which can theoretically range from 0 to 100% but in fact the ranges are from about 30% to about 75%, with large variations by region. As noted above, the correlation is as high as 0.75 between the use of modern methods and the access ratings.

A breakdown (**Table 3**) shows a great diversity of access by both the method and the region, from very low ratings for male sterilization in all regions and low ratings for safe abortion except in the Central Asian Republics. The ratings are evenly high values for the condom and pill. The implant scores especially high in sub-Saharan Africa but not elsewhere, so its total rating is low. Indeed, most of the methods vary substantially by region: the IUD is highly favored in the Central Asian Republics and considerably so in the Middle East/North African countries, where the injectable, however, shows the lowest access. Overall, the West/Central countries in sub-Saharan rate the lowest by a substantial margin.

The upshot from these uneven patterns is that countries have a far way to go to ensure ready access to a variety of methods, augmenting resupply (short-term) methods with long-term (clinical) methods such as the IUD, implant, and sterilization.

Access Ratings by Country

The diversity by region is also common at the country level. **Figure 10** shows the proportion of the population in each country based on the same access score as in **Table 2**. Higher access ratings are found in such Asian countries as China, Bangladesh, and Vietnam, as well as in the Central Asian Republics of Tajikistan, Turkmenistan, and Uzbekistan. However, they are quite low (below 40%) in Afghanistan, Nigeria, the D.R. Congo, and South Sudan, among others.

The overall distribution of the access scores across the countries runs from the mid-70's to the mid-40's around a median of 51.0% (mean 51.2%), where 100% indicates that the entire population has ready access to the methods. (The interquartile range is from 42.8 to 57.5%, just seven points above and below the median.). The total range runs from a low of only 19.3% to 76.2%. Indeed, there is much room for improvement, where even the best-scoring countries fall short, about 25% below full access.

DISCUSSION

Contraceptive use is higher in the cities, and the method mix is somewhat different from that in rural areas. Fertility rates are also lower, and they correlate with the extent of contraceptive use. Additional factors are smaller desired family sizes, later marriage, and reliance upon abortion. Separate data on abortions in the cities are lacking, but country estimates show them to be important and highly variable (10). Among sexually active unmarried women, about half use some method, and the variety of method preferences is remarkable.

All of these findings are highly variable by region and by countries within each region, as shown, for example, by the leaning toward the IUD in the Middle East/North Africa and the Central Asia Republics, toward sterilization in the Indian subcontinent and the implant and injectable in sub-Saharan Africa.

The urban environment offers logistic advantages for contraceptive supply and more clinical facilities for methods, as well as a more active private sector, more mass media activity, and easier educational approaches. National family planning programs have gained strength over the decades, but ratings show them to be, on average, about half of full strength. This is also true of the access component of the effort, regarding the

TABLE 2 | Strength of national family planning programs.

	Total score	Policies	Services	Evaluation	Access
Asia	55.7	59.0	53.4	55.8	56.3
Central Asia Rep.	57.5	56.2	53.5	58.9	65.6
Middle East/N. Africa	45.4	46.3	41.5	50.0	49.7
Latin America	49.5	53.3	45.1	51.0	52.8
Sub-Saharan Africa, E & S	50.9	55.7	48.0	52.9	50.0
Sub-Saharan Africa, W & C	45.4	48.8	43.1	49.7	43.8
Total	49.9	53.0	46.8	52.3	51.4

TABLE 3 | Percent with access to each method.

	Steril, female	Steril, male	IUD	Implant	Pill	Injection	Condom	Safe abortion
Asia	48.9	38.3	57.4	41.1	75.4	61.4	78.1	34.4
Central Asia Rep.	51.2	26.1	84.1	31.5	79.9	63.7	83.9	70.4
Middle East/N. Africa	35.5	15.3	66.6	25.0	74.3	50.8	74.8	30.8
Latin America	49.8	27.3	56.8	28.3	75.5	69.7	78.6	11.9
Sub-Saharan Africa, E & S	35.9	22.8	44.0	49.0	76.4	72.1	82.5	16.5
Sub-Saharan Africa, W & C	20.6	11.0	46.6	48.7	70.0	62.8	80.9	14.8
Total	38.7	23.2	55.6	38.5	74.7	63.6	79.4	24.4

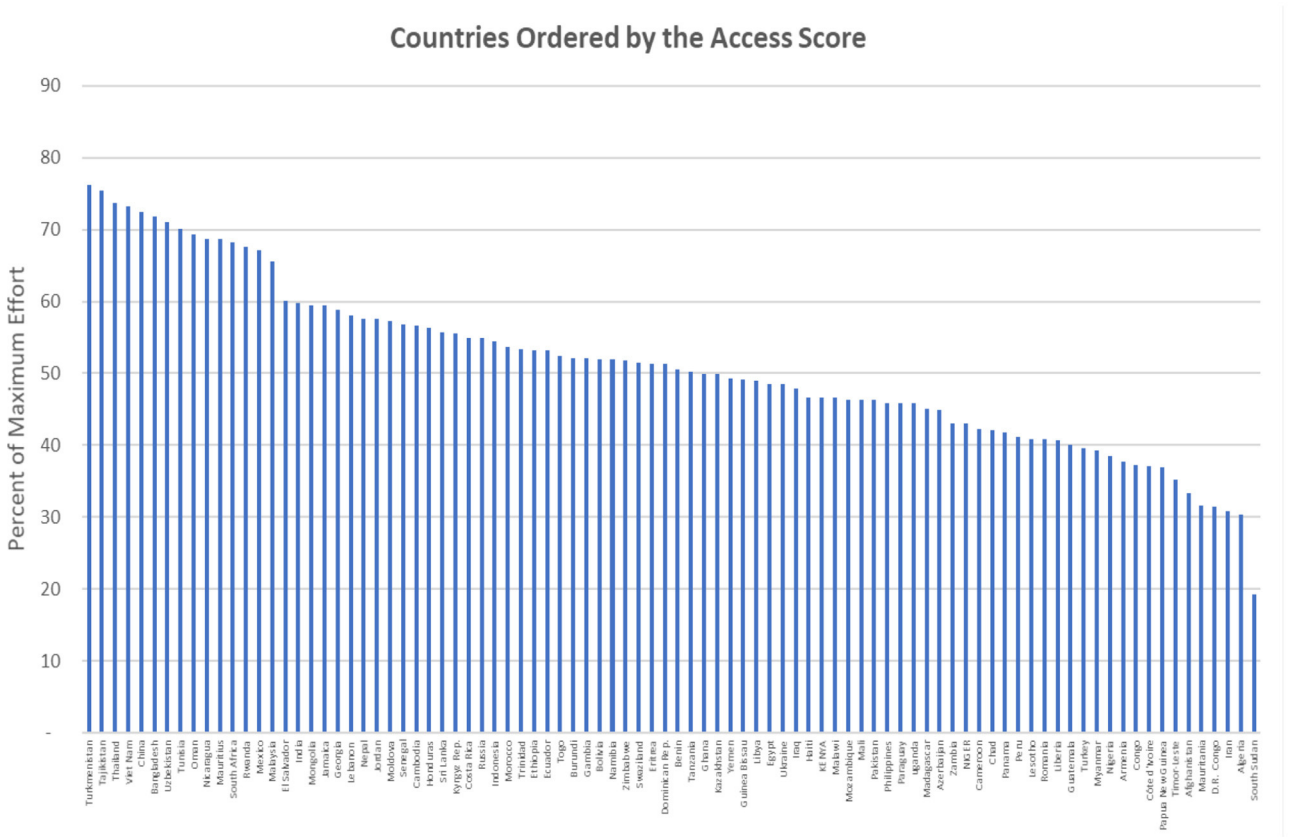

FIGURE 10 | Countries ordered by the access score.

availability of the methods to the general population. All this leaves substantial gaps between current performance and full access to contraceptive protection.

For planning purposes by local and international agencies, the watchword, therefore, is an examination of the particular profile of use and method availability in each country. The main patterns of method preferences will not change appreciably, although the advent of the injectable and implant in sub-Saharan Africa shows the potential of introducing new technologies and making them affordable and available.

The question of equity for contraception across lines of social status is not directly discussed in this report; however, the differentials by wealth quintiles show less use by the poor and a selective method mix, and the poor are likely to suffer from disadvantages in access to a full choice of contraceptive options. A broader look at equity for both contraception and 18 reproductive health indicators found a welcome move toward diminishing gaps between the poor and the rich (11). The narrowing of the gaps was primarily due to faster improvements among the poor than among the rich.

The effects of the ongoing Covid virus pandemic deserve attention. To some extent, it disturbs the relationships and findings discussed above by the morbidity and mortality that it currently causes, just as historically the HIV epidemic did to reproductive behavior. In both cases, the effects were compounded because the medical staff who were required to fight the disease were themselves weakened. And in both cases, the poorest and most disadvantaged members of the public were the most affected, worsening the equity imbalances already present.

DATA AVAILABILITY STATEMENT

Publicly available datasets were analyzed in this study. This data can be found at: https://www.statcompiler.com/en/.

AUTHOR CONTRIBUTIONS

JR designed the analysis and wrote the article.

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SUPPLEMENTARY MATERIAL

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Scaling Access to Contraception for Youth in Urban Slums: The Challenge Initiative's Systems-Based Multi-Pronged Strategy for Youth-Friendly Cities

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Introduction: More than half of all adolescents globally live in Asia, with India having the largest adolescent population in the world at 253 million. In sub-Saharan Africa, adolescents make up the greatest proportion of the population, with 23% of the population aged 10–19. And these numbers are predicted to grow rapidly—particularly in urban areas as rural youth migrate to cities for economic opportunities. While adolescents and youth are subject to high sexual and reproductive health risks, few efforts have been documented for addressing these in urban settings, especially in poor settlements.

Methods: The Challenge Initiative (TCI) is a demand-driven, family planning platform for sustainable scale and impact that lets city governments—in particular urban slums—lead implementation. It is currently active in 11 countries in Africa and Asia. In June 2018, TCI heightened its focus on adolescent and youth sexual and reproductive health (AYSRH) for youth living in urban slums. It now supports 39 city governments. TCI dedicates technical and program support to married (including first-time parents) and unmarried youth ages 15–24 years. Using an innovative coaching model and an online learning platform (TCI University), TCI supports city governments as they implement AYSRH interventions to accelerate the impact of TCI's model for rapid scale.

Results: TCI has been assessing the performance of cities implementing its AYSRH approaches using its RAISE tool and has found considerable improvement over two rounds of assessments through TCI coaching and support for adaptation of its high-impact interventions between the first and second round.

Conclusions: TCI's AYSRH approach scaled rapidly to 39 cities and multiple urban slums since 2018, using its evidence-based interventions and coaching model. In the context of universal health coverage, TCI has supported segmented demand generation and improved access to quality and affordable contraceptive as well as youth-friendly

health services. It provides a menu of interventions for cities to implement for youth—including such approaches as public-private partnerships with pharmacies and quality assurance using quick checklists—along with an innovative coaching model. This approach has facilitated greater access to contraceptive methods of choice for youth.

Keywords: adolescents, sexual and reproductive health, urban slums, contraception, scale, family planning, youth

INTRODUCTION

Across the world, a disproportionate number of youth are migrating to urban centers to seek better economic opportunities than found in the agricultural sector in rural areas (1, 2). While 56% of the world's population lived in urban areas in 2019 (3), it is estimated that 60% of urban populations will be under the age of 18 by 2030 (4). Currently, more than half of all adolescents live in Asia—with India having the largest adolescent population in the world at 253 million (5). In sub-Saharan Africa, adolescents make up the greatest proportion of the population, with 23% of the population aged 10–19 (6).

While it is recognized that this age group faces high sexual and reproductive health risks (7), few efforts have been documented for addressing these in urban settings, where the situation is further complicated by poverty, population density, and a lack of access to quality services, including reproductive health services (8). Most developing country governments have focused on improving services in rural areas, not taking into consideration the rapid urbanization taking place and burgeoning urban slums with inadequate or non-existent public health services.

Adolescents and youth in urban slums are vulnerable to early unintended pregnancy that result in poor social, health, and economic outcomes not only for young mothers but young fathers too (9). These young mothers and their children are also at higher risk for adverse birth outcomes (10, 11) when compared with older mothers. There are also intergenerational effects for children of young mothers, who tend to have lower educational achievement scores and poorer socioemotional outcomes (12, 13).

Depending on their country, city, socioeconomic status, or gender, adolescents have insufficient, inaccurate, incorrect, or poor knowledge and information about safe sex and contraceptive use. This situation is worsened by the lack of availability of, and access to, adolescent and youth-friendly health services (AYFHS) and health products for adolescents. Thus, many adolescents and youth do not have the means to protect themselves with condoms or other contraceptives or to use health services for prevention, promotion, and maintenance of their good health should they contract a disease (e.g., a sexually-transmitted infection) (14). So while many young women in sub-Saharan Africa are sexually active and would like to avoid pregnancy, contraceptive use remains low with national DHS prevalence data (2010–2014) showing Benin at 10.5%, Kenya 37.7%, Nigeria 12.6%, Senegal 8.1%, Tanzania 23.7%, and Uganda 18.1% (15).

Globally, unmet need for contraception remains relatively constant at 23%, reflecting rising demand. In the developing world, an estimated 38 million girls were sexually active (had intercourse in the past 3 months) and wanted to avoid pregnancy in 2016, but only 15 million reported use of a modern contraceptive, leaving 23 million—or 60%—at risk of unintended pregnancy (16).

Recognizing that adolescent birth rates in sub-Saharan Africa are the highest in the world at 104 births per 1,000 adolescent girls, The Challenge Initiative (TCI) focuses its efforts there on preventing teen and repeat pregnancies (17–19). In India, most young women experience their sexual debut within marriage and are often pressured to bear children. For them, TCI supports interventions after the first child as the most effective strategy. In summary, while sexual activity and unmet need for contraception are common among adolescents, clear differences exist in age, sex, rural/urban region, country, and marital status. Therefore, evidence-based intervention strategies are based on common principles (20), but adapted by each city for their local context.

These emerging evidence-based interventions (21, 22) include addressing provider bias and improving the quality of services to make them youth friendly, implementing strategic behavior change communication campaigns segmented for youth age-cohorts, and involving youth in designing, advocating for and supporting the implementation and monitoring of programs. However, these interventions are not yet widely adopted, suffer from limited funding, and are difficult to scale up.

MATERIALS AND METHODS

Study Setting

TCI is a Bill & Melinda Gates Foundation-funded family planning platform currently being implemented by city governments in 11 countries in Africa and Asia (India, Senegal, Benin, Burkina Faso, Cote d'Ivoire, Niger, Nigeria, Kenya, Uganda, Tanzania, and Philippines). The Gates Institute for Population and Reproductive Health (GI), housed at the Johns Hopkins Bloomberg School of Public Health, manages TCI's implementation through five regional hub partners: East Africa: Jhpiego; Francophone West Africa: IntraHealth International; India: Population Services International (PSI); Nigeria: Johns Hopkins Center for Communication Programs (CCP); and the Philippines: the Zuellig Family Foundation (ZFF). Currently, TCI supports 104 cities in implementing high-impact interventions for family planning and AYSRH. Of these, 39 have a distinct focus on AYSRH programming and cover a total population of nearly 45 million (**Figure 1** and **Table 1**).

TCI's goal is greater self-reliance of city governments to scale up family planning and AYSRH high-impact interventions, leading to sustained improvements in urban health systems and increased use of modern contraception, especially among

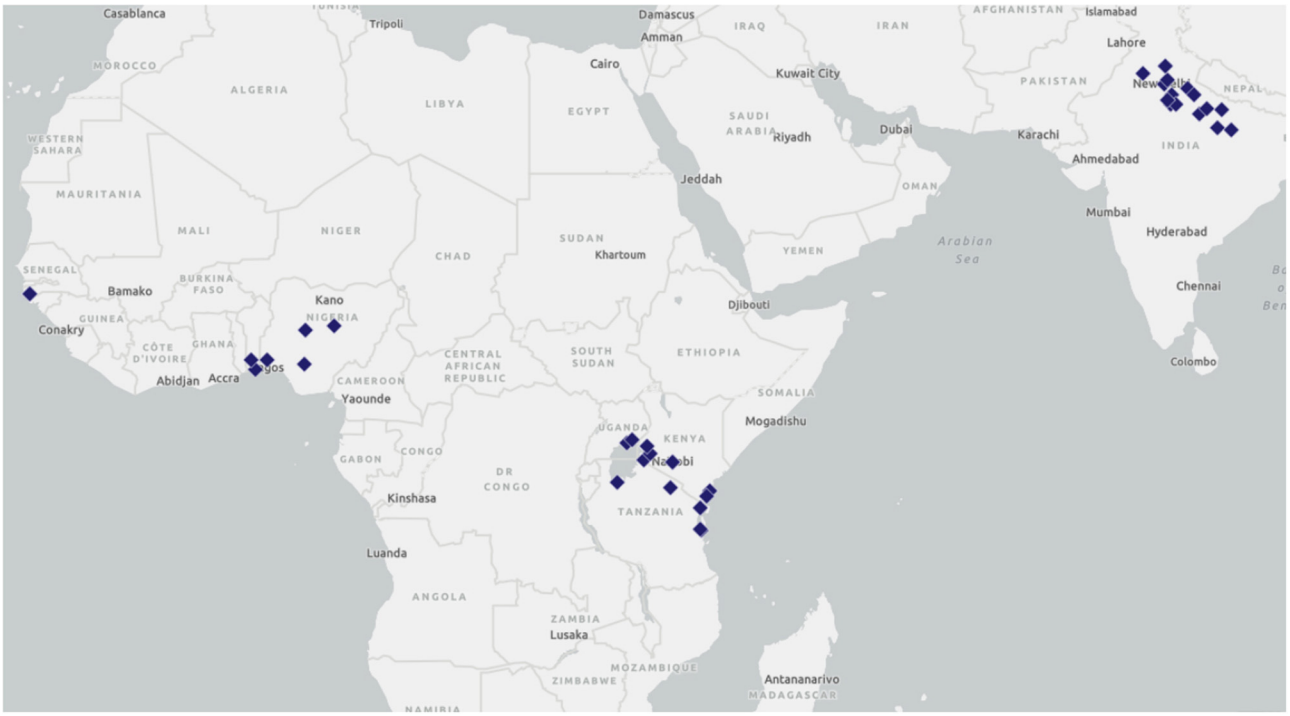

FIGURE 1 | TCI is working with local governments in 39 cities/states across seven countries to implement AYSRH programming.

TABLE 1 | TCI geographic and population coverage.

Country	Cities/States	Total population	Youth 15–24
Benin	Cotonou, UCOZ	1,804,696	204,369
India	Agra, Aligarh, Allahabad, Bareilly, Faizabad, Firozabad, Ghaziabad, Gorakhpur, Kanpur, Lucknow, Mathura, Meerut, Saharanpur, Shahjahanpur, and Varanasi	19,232,784	1,639,542 (Focus on First-Time Parents)
Kenya	Malindi, Migori, Mombasa, Kamukunji, Kasarani, Ruraka, Nyamira, and Vihiga	6,431,492	806,228
Nigeria	Edo, Niger, Ogun, and Plateau	10,007,753	948,317
Senegal	Ziguinchor	662,473	64,677
Tanzania	Arusha DC, Arusha City, Ilala, Kinondoni, Tanga City, and Geita	4,455,337	496,730
Uganda	Buikwe, Iganga, and Mukono	1,947,667	204,969
TOTAL	39 cities/states	44,542,202	4,364,832

Estimates made using census and UN Population Division data.

the urban poor. Its main focus has been on strengthening city governments' capacity to implement high-impact interventions for family planning in a sustainable way. TCI lets city governments lead their own family planning and AYSRH programming for scale, impact, and sustainability. Cities self-select to participate in TCI, committing their own financial and human resources, and political will. As a participant, cities can access TCI's Challenge Fund, which incentivizes participation with seed funding from donors, including foundations, the private sector, and private philanthropists. Cities identify their own family planning and AYSRH program needs and TCI provides technical support with its high-impact interventions housed in an online learning platform called TCI University (TCI-U). Cities also receive guidance from experienced family planning/AYSRH experts—or coaches—to adapt, apply, scale, and sustain these interventions.

A Heightened Focus on AYSRH

In June 2018, TCI was given additional funding by the Gates Foundation to heighten its focus on improving contraceptive access for adolescents and youth 15–24 years of age[1]—within the larger cohort of women of reproductive age (WRA) 15–49 years of age already supported by its family planning program. This was in response to demands from stakeholders at the local level concerned about increasing unintended pregnancies among

[1]TCI uses the United Nations' definition for youth: 15 to 24 years, endorsed by the UN General Assembly in its resolution 36/28 of 1981.

adolescents. The additional funding allowed TCI to dedicate technical and program support to married (including first-time parents) and unmarried youth in TCI-supported cities.

The following primary outcomes are part of TCI's results framework:

- Increased number of local governments effectively implementing family planning and AYSRH interventions.
- Increased uptake of modern contraceptive methods among women ages 15–49, with an increased emphasis on the urban poor and youth 15–24 years.
- Improved local government leadership and ownership in implementing effective and sustainable family planning and AYSRH programs.

While government leaders may be committed to improving contraceptive access for young people, many lack clear guidance on how to do so effectively (23). TCI's AYSRH technical and program experts share such guidance with local governments, build upon interventions that have proven effective, and support any new promising evidence in AYSRH programs to demonstrate results quickly. Twelve proven AYSRH interventions are curated in a global AYSRH-specific toolkit that launched on TCI-U in 2018. From these original 12 interventions, TCI's five hubs have developed 31 related AYSRH interventions that were adapted from the global toolkit for their local context. For example, the global toolkit's Adolescent and Youth-Friendly Services' intervention has locally adapted versions in the East Africa, Francophone West Africa, Nigeria, and Philippines' toolkits.

How TCI Engages Urban Slums

Cities submit formal expressions of interest (EOI) detailing their political commitment to family planning or AYSRH, resource contribution, health systems readiness, as well as the size of potential population impact. TCI has received 82 EOIs to date for AYSRH programming. Once TCI approves an EOI, the city and TCI co-develop a program design that includes a landscaping exercise and gap analysis to identify challenges that can be addressed by selecting appropriate interventions in TCI-U. TCI-U's dynamic learning platform ensures the high-impact interventions are constantly updated with learnings from real-world experience.

When TCI added AYSRH in East Africa, Francophone West Africa, India and Nigeria in 2018, it applied the same demand-driven model as outlined above and cities (or states in the case of Nigeria) were selected to receive AYSRH-focused coaching along with the TCI Challenge Fund.

In Nigeria, for example, after seven states submitted EOIs, Niger, Ogun, Plateau, and Edo states were selected. They were then supported to complete program designs while committing resources to implement AYSRH interventions. During the program design phase, 29 urban and peri-urban Local Government Areas (LGAs) were selected based on population size. A total of 130 high-volume health facilities were selected for scale up in the 29 LGAs.

In India, a more elaborate mapping process occurs for urban slums. It is difficult to assess urban boundaries so demarcating the slum area is a significant first step for any successful urban intervention. TCI developed a mapping and listing tool that identifies residents in need of services by determining the number of people living in slums and what is needed to meet their health needs. For example, this exercise can determine how many Auxiliary Nurse Midwives (ANMs), accredited social health activists (ASHAs), and urban primary health centers (UPHCs) are necessary to serve this population. In addition, the Uttar Pradesh government provides all ASHAs with registry diaries to maintain health records on the women, men, and children in their catchment areas. The diary records immunizations, antenatal and prenatal care, institutional delivery, family planning, and other health service areas. Systematically maintaining this data is crucial for ensuring those with various health needs are counseled by ASHAS and provided information and referrals to services. This is especially important because ASHAs can identify first-time parents and counsel them on available family planning services based on their need and choice.

TCI's Concentric Circle Strategy Helps AYSRH Programming Go to Scale

TCI's concentric circle AYSRH strategy (**Figure 2**) is the framework guiding its support to city governments to improve access to contraception for youth in urban slums. It emphasizes as a top priority the importance of making AYSRH data visible to decision-makers, community members, and youth themselves. It highlights the importance of youth engagement with government and community leaders to advocate for youth sexual and reproductive health (SRH) issues including funding. Segmented demand generation messages for youth and their influencers (i.e., partners, parents, teachers, and other gatekeepers) are also essential through both interpersonal communication, WhatsApp chatrooms, and media channels. And central to the strategy is addressing provider bias and service quality so youth are linked to quality AYSRH services delivered by sensitized facility staff oriented to set aside their biases against contraceptive provision—in particular for unmarried youth. The implementation process for this strategy is described below.

Making Data on Youth Sexual and Reproductive Health Visible

Most governments only report contraceptive uptake for women ages 15–49 without age disaggregation. Uganda and Senegal are currently the only TCI-supported countries whose health management information systems (HMIS) disaggregates data on contraceptive use by age and method in all facilities. While TCI has observed early, promising results from its AYSRH implementation in Uganda, more study is needed to determine the extent of TCI's impact there. TCI supports city governments in collating data on youth contraceptive use directly from health facility registers. It then coaches governments on using this data to monitor impact and, importantly, advocate to local, state and national government officials to prioritize data collection, funding, and programming for youth.

Data visibility: Analyzing and advocating to governments with age disaggregated data on youth sexual and reproductive health.

Advocacy: Ensuring separate government budget line-items committed to AYSRH and elevating youth issues – with youth engagement – at regular multi-sectoral government and community meetings.

Demand generation: Developing engaging SRH messages with youth and sharing through edutainment, digital channels, community health workers, and youth ambassadors.

Service delivery: Improving the quality of contraceptive care for young people by increasing youth-friendly service delivery sites with unbiased, supportive health providers.

FIGURE 2 | TCI's concentric circle strategy for AYSRH programming.

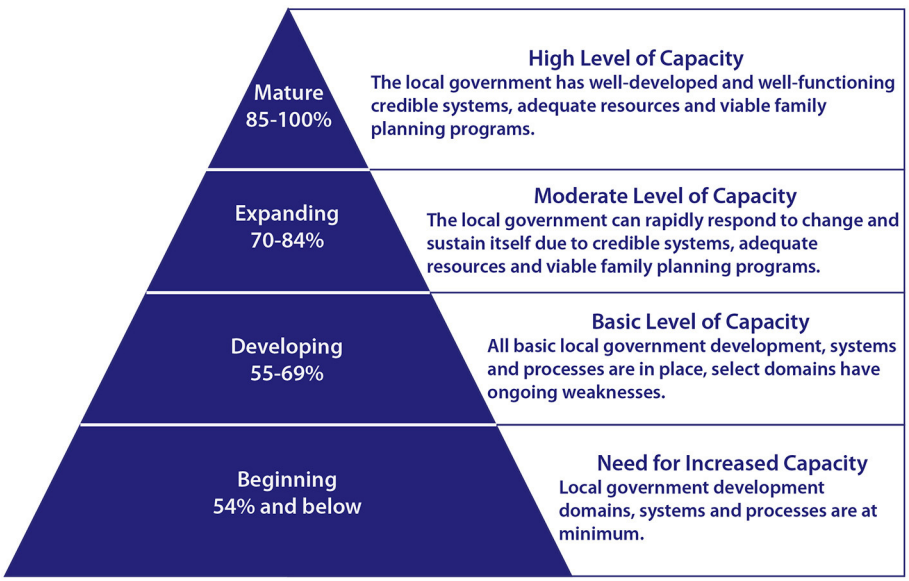

FIGURE 3 | Four levels of performance are possible when conducting a RAISE assessment.

In Nigeria, TCI helped advocate for a national HMIS tool with age-disaggregation to include adolescent age groups with 5-year age intervals. This would allow tracking for all conditions for which youth attend public health facilities, including contraceptive use. Likewise in India, TCI improved the use of an existing HMIS form to better track adolescent use of public health facilities.

Advocating for Youth-Friendly Cities

TCI advocates for increased government investment and leveraging of existing funding for AYSRH. TCI-supported city governments release resources for improving youth contraceptive access and underlying AYSRH conditions and needs. TCI also supports governments to integrate the engagement of youth and relevant civil society organizations in regular meetings—such as ministry of health meetings and multisectoral working groups. In Francophone West Africa, TCI-supported Jeunes Leaders Transformationnels (JLT) are youth ages 15–24 advocating to government and community leaders about AYSRH. In East Africa, TCI helps governments identify and coach youth champions ages 15–24 to become community advocates including implementing intergenerational discussions on AYSRH, conducting demand generation activities, and engaging in governance- level discussions. In Nigeria, TCI

works with state and local governments to identify and coach a diverse group of young people ages 15–35 as Life Planning for Adolescents and Youth (LPAY) ambassadors. These ambassadors are embedded in regular governance and community structures to elevate youth SRH needs, including technical working groups on adolescent health hosted by the state. In India, TCI supported the launch of AYSRH programs in cities through coordination workshops organized and managed by youth and attended by the National Health Mission as well as youth functionaries from state and municipal government.

Developing Engaging Messages for Youth and Their Influencers

Urban youth have intersecting identities that impact their SRH behaviors, and these behaviors are related to their age, marital status, education attainment, economic status, religion, and parenthood. TCI coaches governments to identify youth subgroups most in need and tailor approaches for effective reach with messages and resources for greatest impact. In India, where sexual debut is principally within marriage, TCI focused initially on first-time parents to improve contraceptive use among married young women with recent births. In Benin, Kenya, Senegal, Tanzania, and Uganda, TCI focused on unmarried youth because of high unintended pregnancy rates. TCI partnerships aim to decrease too-early, unplanned pregnancies that imperil health, while derailing education and life plans. In Nigeria, TCI and state governments primarily focus on reaching unmarried youth as well, but also recognizes cultural sensitivities in more conservative states where married youth are also a focus.

TCI helps cities strengthen the capacity of community health workers to reach young people with contraceptive information, referrals to health facilities, and other events for contraceptive methods. These community health workers are also coached on providing contraceptive counseling to clients based on age, marital status, and parity. TCI's demand generation work also engages youth with influencers who can control their access to contraceptives, such as religious leaders, parents, teachers, and male partners. In Nigeria and East Africa, TCI coaches local government stakeholders, youth leaders, and civil society organizations to host community dialogues for such influencers to discuss AYSRH issues leading up to an AYSRH service day in a nearby health facility.

Addressing Provider Bias and Service Quality

A core component of TCI's strategy of scaling high-impact AYSRH interventions is supporting governments to address provider bias toward youth contraceptive use in a sustainable way. TCI helps cities conduct technical and values-clarification exercises with health providers, equipping them with the knowledge and tools to provide non-judgmental, attitudinally respectful, and supportive care to young people (24, 25). In addition, TCI supports cities in conducting AYSRH whole-site orientations in facilities to sensitize all staff on young people's needs, including administrative and security staff (26). TCI also supports governments to improve the quality of youth-friendly health services through application of national checklists during routine supervisory visits (27).

In East Africa, TCI cities hold youth-focused integrated outreaches (community events) and in-reaches (in facility events) to increase access to contraceptives. In Francophone West Africa, TCI supports city governments in holding free family planning days for youth, where they can access free contraceptives. In India, ASHAs in TCI cities refer all first-time parents in their catchment areas to monthly Fixed-Day Services (FDS) for contraceptive methods at UPHCs. In addition to holding AYSRH whole-site orientations, TCI conducts social mobilization events to reach youth in Nigeria with referrals to youth-friendly health facilities.

Working With Private-Sector Pharmacies to Reach Youth

Condoms are a preferred choice of contraceptives for youth and pharmacies are preferred sources of condoms and other short-term contraceptive methods (including emergency contraception). TCI is helping make pharmacies more youth friendly in East Africa, Francophone West Africa, Nigeria, (28) and just starting in India. In Kenya, Tanzania, and Uganda, TCI is engaging pharmaceutical and drug shop associations to not only increase access to contraceptive services by young people but also improve the knowledge, attitudes, and skills of pharmacists and drug shop operators on how to deliver adolescent and youth-friendly services (29). The pharmacists and drug shop operators have been oriented on national guidelines for family planning and youth-friendly services, how to make referrals to nearby public facilities, and the importance of documentation and reporting on services provided as well as referrals made.

A Typical Process for High-Impact AYSRH Programming

Once a city's program design is approved, TCI supports activities simultaneously at the governance, health facility, and community levels with active youth engagement. The gap analysis conducted during the program design likely uncovered scarce age-disaggregated data for youth. Addressing this requires strategic advocacy for committed budget lines for AYSRH, including completion of staffing rosters during monthly or quarterly governance-level meetings. Youth engagement in these meetings are gradually ensured through community-level identification and coaching of relevant youth. The minutes from these meetings are tracked for commitments and fulfillment, which are monitored in regular TCI reporting.

At the facility level, specific staff are identified for offsite training using the government's AYSRH curriculum—but modified with high-impact interventions and tools from TCI-U. Once offsite training is completed, whole-site orientations are conducted with the entire facility staff from the Medical Officer-in-Charge to the cleaning staff. This ensures respectful, non-judgmental, and supportive services that adhere to the government's quality improvement/assurance (QI/QA) checklists are implemented. TCI also helps review checklists in accordance with national adolescent health standards and

WHO Guidelines on adolescent and youth-friendly health services. Checklist results are monitored for improvement on an annual basis with actions taken to address identified problems. TCI continues to track these on a regular basis. In addition, TCI supports the government's community outreach functionaries through orientation on TCI-U materials for generating community-level support for AYSRH. Advocacy and dialogue are supported with gatekeepers, with youth engagement, and interactions with existing community organizations that support health (e.g., women's clubs, male involvement, and community theater).

At the community level, TCI catalyzes demand generation from youth with support of peers, parents, and other gatekeepers in their communities. The key functionaries involved are community health workers and active youth groups supported by the Ministry of Youth using tools from TCI-U *via* face-to-face, print, and WhatsApp. TCI also monitors these steps regularly.

Assessing Performance and Adapting Accordingly

In addition to the performance monitoring outlined above, TCI's graduation strategy is part of its core principle of sustaining local financing and ownership to ensure continued leadership and city-led implementation of family planning and AYSRH programs. TCI's coaching and Challenge Fund support gradually diminishes as cities demonstrate increased capacity. City engagement with TCI ultimately culminates in a move toward greater self-reliance as a city takes strategic steps to graduate from TCI.

TCI uses data to inform local government problem-solving and decision-making, including HMIS, project records, population-based surveys, and qualitative methods such as the Most Significant Change (MSC) technique. TCI's Reflection and Action to Improve Self-reliance and Effectiveness (RAISE) performance assessment tool has specific criteria related to

TABLE 2 | RAISE assessments for six TCI cities and actions taken leading to improvements.

Location	RAISE scores by round	Program activities	
		Key areas contributing to increases	**Coaching activities contributing to increases**
KENYA Mombasa	Round 1: 80% Round 2: 92% (+12%)	• Financial commitment for AYSRH • Supportive supervision • Coaching • Community involvement • Adolescent and youth-friendly services	• Continuous political engagement • Continuous advocacy for more resources • Procure adequate tools • Referral and linkages • Follow up of coaches • Avail and print guidelines for volunteers
TANZANIA Ubungo	Round 1: 81% Round 2: 89% (+8%)	• Advocacy • TCI-U access and utilization • Coaching • Supportive supervision • Public-private partnership	• Use of FP champions for advocacy • Enroll and orient more TCI-U users • Conduct supportive Supervision • Partnership with private sector, i.e., pharmacies and other NGOs providing FP/AYSRH services
UGANDA Mukono	Round 1: 48% Round 2: 88% (+40%)	• Financial documentation and management • Family planning /AYSRH strategies/approaches • Coaching • Supportive supervision	• Non-technical coaching on financial management and documentation • Disseminate family planning/AYSRH best practices at all levels • Sisi-kwa-sisi coaching • Supportive supervision
FWA Ziguinchor, Senegal	Round 1: 43% Round 2: 74.5% (+31.5%)	• Strengthened collaboration between municipality and health system • AYSRH effectively layered onto TCI family planning program • Strong landscaping to identify gaps and needs • Strong political and health system commitment to AYSRH	• Supportive supervision for AYSRH • Implementation and monitoring of AYSRH best practices, including reduction of provider bias, whole-site orientation, comprehensive sexual education, home visits by community health workers, youth associations, social media, and the transformational youth leaders • Adolescent and youth-friendly checklist operationalized
INDIA Saharanpur	Round 1: 66% Round 2: 73% (+7%)	• Improved leadership for AY interventions • Youth participation in key meetings • Review of AY program at city coordination committee meetings • City leading AYFHS assessments • Improved referral system • Frontline health workers map and list adolescents and refer to UPHCs • Advocacy for inclusion of AY indicators and data from HMIS in review meetings	• Management coaching facility staff for timely upload of AY data on HMIS portal • Coaching LG to review data from facility and community at monthly review meetings • Follow up of master coaches • Re-stock and supplies (condoms, OCP, and EC) • Supportive supervision of AY counselors at District Hospitals and District Women's Hospitals • Partnership with private sector, including pharmacies
NIGERIA Edo State	Round 1: 53% Round 2: 69% (+16%)	• State adoption and scale up of best practices • Increased social mobilization and referrals for AY services • Improved provider behavior and increased availability of AYFHS	• Sensitizing policymakers on need for dedicated AYSRH programming and funding • Advocacy to create a budget line for AYSRH • Coach state team on scale up of best practices and train providers in AYFHS

available data and milestones to help local governments evaluate the quality and effectiveness of their activities.

Each quarter, a city's key health personnel evaluate the quality and effectiveness of their activities and implementation strength to make necessary course corrections. At RAISE assessment workshops, participants review relevant external data to validate their scoring. As participants work to reach consensus on scores, they provide evidence in the form of policy documents, program reports, budgets and expenditure reports. A score of 85% or better indicates a high-level of capacity (70–84% is a moderate level of capacity, 55–69% is a basic level and anything below 54% shows a need for increased capacity) (**Figure 3**). Both local health management teams and TCI use RAISE results to track the level of city readiness toward graduation along a 3-year continuum to achieve performance milestones.

With the RAISE tool as the primary data source, TCI assesses performance, identifies governments ready for graduation, and starts to engage government leaders to develop a data-informed graduation plan. So far, 25 cities implementing family planning interventions have graduated from TCI, but no AYSRH cities have graduated yet. The graduated cities' RAISE scores have held steady so far or risen in a few cases.

RESULTS

Table 2 details the results of two rounds of RAISE assessments related to AYSRH programming from selected cities. In all cases, scores increased from Round 1 to 2 due to targeted coaching from TCI on low-ranking areas in Round 1.

DISCUSSION

In just 3 years, TCI's platform has institutionalized a systems-strengthening strategy with city governments adding AYSRH interventions to family planning programming to improve youth access to contraception in urban slums. It did this across 24 socio-culturally diverse cities in sub-Saharan Africa and 15 cities in Uttar Pradesh by supporting activation of both public and private health systems, their community networks, and youth organizations. TCI's demand-driven approach ensured city government commitment, catalyzed by their contributions, with partnerships between municipal and health systems and youth organizations to facilitate community-level support for AYSRH in the urban space. Rapid scale-up of TCI interventions was facilitated by ease of access to and coaching on evidence-based interventions and "how-to" tools in TCI-U's AYSRH toolkit. Assessments using the RAISE tool identified what areas needed more support or coaching, leading to improved performance validated by repeat assessments. Of note, the RAISE assessments flagged the areas for improvement to include supportive supervision, public-private partnerships, adolescent and youth-friendly health services, and ensuring method mix.

STUDY LIMITATIONS

The lack of age-disaggregated facility data on clients and the absence of surveys hindered impact assessment on contraceptive uptake by method and measures of universal contraceptive services coverage.

CONCLUSION AND RECOMMENDATIONS

TCI's AYSRH systems-strengthening approach grounded in high-impact interventions rapidly scaled to 39 cities and multiple urban slums. TCI supported segmented demand generation with youth engagement, improving access to quality and affordable contraceptives and AYFHS. Its menu of interventions—including public-private partnerships with pharmacies and quality assurance in facilities using quick checklists—use an innovative coaching model and engage with youth as partners. This approach has improved youth access to reliable long- and short-acting modern contraceptive methods. Youth engagement at governance levels and with their communities added a layer of accountability as clients, while the RAISE tool brought in partner perspectives on achievement. In this decade of universal health coverage, it is imperative to complete assessments of sufficient coverage of quality contraceptive services for adolescents and youth. It will be necessary to triangulate a sample of age-disaggregated data from public and private facilities and pharmacies and/or conduct a population-based survey with comparison sites for both methods. The survey will have the added advantage of describing the pathways from information provision to ideation to becoming a contraceptive user with method choice.

DATA AVAILABILITY STATEMENT

The original contributions generated for the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

KB, KM, and KW contributed to conception and design of the study. PN, MLS, AB, DS, and TK contributed to East Africa data and text. HT and JA contributed to Francophone West Africa data and text. MS and DV contributed to India data and text. VI and DA contributed to Nigeria data and text. MM, KG, VM, and AF reviewed and edited data and text from East Africa, Francophone West Africa, India, and Nigeria. KB and KM wrote the first draft of the manuscript. All authors read, revised, and approved the submitted version.

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SUPPLEMENTARY MATERIAL

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REVIEW
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Urban Family Planning in Low- and Middle-Income Countries: A Critical Scoping Review

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Health agendas for low- and middle-income countries (LMICs) should embrace and afford greater priority to urban family planning to help achieve a number of the global Sustainable Development Goals. The urgency of doing so is heightened by emerging evidence of urban fertility stalls and reversals in some sub-Saharan African contexts as well as the significance of natural increase over migration in driving rapid urban growth. Moreover, there is new evidence from evaluations of large programmatic interventions focused on urban family planning that suggest ways to inform future programmes and policies that are adapted to local contexts. We present the key dimensions and challenges of urban growth in LMICs, offer a critical scoping review of recent research findings on urban family planning and fertility dynamics, and highlight priorities for future research.

Keywords: family planning, urban, Africa, Asia, intra-urban differences, critical scoping review

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INTRODUCTION

Urban family planning (FP) is a pivot point for efforts to achieve the 2030 Sustainable Development Goals (SDGs) because of its centrality to issues of gender, employment, poverty, and health (1). However, like many issues that require cross-sectoral cooperation to make meaningful progress, urban FP has failed to assume the prominence it demands. For the subfield of urban health, for instance, infectious disease, environmental health, and non-communicable diseases are more visible priorities (2). In the context of rapid urban growth and the urbanization of poverty in much of sub-Saharan Africa and South Asia, urban FP should be afforded greater recognition and priority within a broader health agenda.

The urgency of making the case for urban FP is raised by three main factors. Firstly, there is evidence of stalls and reversals in the fertility decline of some African cities, which will potentially sustain rapid urban growth rates in decades to come. Secondly, many urban populations of low- and middle-income countries (LMICs) continue to face high levels of unmet need for contraception, which impacts the socioeconomic trajectories of women. And thirdly, there is now evidence of strategies that can be used to improve effective FP. In particular, the emerging findings of evaluation research on large-scale urban FP programmes—including the Urban Reproductive Health Initiative and its successor The Challenge Initiative—demonstrate the efficacy of well-designed multilevel interventions for increasing the use of FP services among urban populations, including the urban

poor. While the efficacy of targeted donor-funded programmes is now established, urgent questions still remain around how best to locate and scale-up FP provision within the routine systems and processes of urban governance.

In critically reviewing the state of knowledge on urban FP in LMIC settings, we emphasize inter-urban and intra-urban dynamics (3). We do not ignore rural-urban comparisons (4–6), and address those differentials where relevant. It is increasingly recognized that an urban-rural dichotomy is insufficient for examining the social, economic, and spatial transformations accompanying contemporary urban growth, including changes related to fertility and health (3, 7, 8). With that in mind, our particular concern is to draw attention to the specific realities and challenges of FP in urban areas, where a growing proportion of LMIC residents live, in order to inform future research, policy, and programme development.

The article proceeds in three parts. First, we highlight the importance and urgency of affording greater priority to an urban FP agenda by presenting an overview of the pace and scale of urban growth in Africa and Asia, noting its attendant challenges in terms of the growth of slums and inequality. Second, we summarize the state of knowledge on urban FP, focusing on research addressing low-income urban groups and settings of sub-Saharan Africa and South Asia. The broad methodological and geographical dimensions of the field are outlined before evidence on intra-urban differences, and issues that are of particular salience in the urban context, are described. An overview of this kind is overdue given that the last review on the topic was published nearly 30 years ago, when the majority of LMIC populations were rural (9). Third, we discuss the implications of these trends and bodies of evidence for future research.

BACKGROUND: WHY IS URBAN FP IMPORTANT, AND WHY NOW?

The importance of recognizing and implementing an *urban* FP agenda is highlighted by demographic trends of LMICs. At least four trends are noteworthy. First, the pace and scale of urban population growth are remarkable. The United Nations Population Division predicts that an additional 2.5 billion people will be added to the global urban population by 2050, with almost 90 per cent of this growth taking place in Asia and Africa (10). The same data indicate that by mid-century the urban population of Africa is likely to almost triple, while that of Asia is set to more than double. By that point, slightly over half of the global urban population will be Asian, with Africa's share exceeding one-fifth. While the contemporary pace of *urbanization* in these regions is not unprecedented in world history, the rates of *urban population growth* are higher than those observed for comparable periods in the developed world. Also unprecedented is the increase in the number of cities with very large populations of over one million, with most located in developing regions. Even so, the majority of future urban growth in LMICs will take place in smaller cities and towns that host higher rates of poverty and are the least equipped institutionally to deal with the challenges arising from rapid growth (10–12).

Second, this growth is associated with significant poverty and material deprivation in the form of slum-like urbanism. In sub-Saharan Africa, ∼55 per cent of the urban population lives in slum-like conditions, compared with just over 30 per cent in the case of South Asia[1]. While slums are the focus of much research and practical literature dealing with urban poverty, the urban poor are not always concentrated in these areas—in India, for example, more than 80 per cent of poor urban households may in fact live in non-slum neighborhoods (11, 13). Moreover, we should note that a "slum" is sometimes an "informal settlement", however these terms are not synonymous (14) and as such this paper uses the specific terminology employed in the research under review. Regardless of terminology, the wider issue of inadequate housing and service provision for rapidly growing urban populations is a dominant theme of the planning literature, although it is never explicitly framed in relation to issues of fertility or FP (15–17).

Third, and contrary to popular belief, over half of the expected growth in urban populations of LMICs is due to natural increase rather than rural-urban migration (3, 18, 19). Indeed, a series of studies have made the forceful argument that urbanization—both historical and contemporary—is better understood as a demographic rather than a purely economic process, particularly if we are to account for the phenomenon of "urbanization without economic growth" so often discussed for the African context (18–22).

Fourth, urban fertility rates have unexpectedly plateaued in many sub-Saharan African countries at levels well-above replacement and in a few cases have actually increased. A detailed analysis shows that fertility has stalled in about half of Africa's capital cities, at an average level of 3.4 births per woman, with recent increases in a few countries, including Nigeria, Democratic Republic of the Congo (DRC), and Tanzania. In other urban areas, stalls are apparent in about one-third of countries (23, 24).

The causes of African fertility stalls—which have been identified for contexts in different stages of development and the fertility transition, with variable patterns of urban and rural distribution—currently are not well-understood (25, 26). Researchers have variously pointed to contemporaneous trends in socioeconomic development (27), declining national and international support for FP programmes leading to greater unmet need and lower contraceptive use (28), high levels of desired fertility related to socioeconomic uncertainty (29, 30), as well as disruptions to female education linked to the effects of economic crises (and ostensibly structural adjustment programmes) of the 1980s and 1990s (31, 32). Regardless of their precise drivers, if fertility stalls continue then existing rates of urban growth will be sustained in future decades, potentially undermining the influence of urbanization in driving wider fertility and demographic transitions (23). Continued high fertility rates may have negative implications for short- and medium-term progress in achieving the SDGs in cities and towns,

[1]Data drawn from World Bank Open Data at https://data.worldbank.org, accessed 15 June 2020.

perpetuating higher rates of poverty while placing pressure on housing stocks and urban services ranging from clean water and sanitation to public transport.

Taken together, these trends demonstrate the need for health research and policy to take greater account of urban demographic changes in LMICs, and to afford greater priority to urban FP interventions in those regions. There is a limited but growing body of research that examines urban FP dynamics in LMICs from a range of disciplinary perspectives. As a result, there is a need for an overview of the evidence of how FP supply, demand, and programmatic interventions take specific forms, with various outcomes, in different urban contexts.

APPROACH AND METHODS

A critical scoping review was undertaken of the urban FP literature to identify key topics of research interest as well as knowledge gaps or needs. While systematic reviews are widely applied in health and other disciplines, they are less useful when applied to a literature that is relatively small and comprised of diverse concepts, methodological approaches, and types of evidence. Scoping reviews are a more suitable approach when the purpose is to identify knowledge gaps, scope a body of literature, clarify concepts, identify the types of evidence available and used in a given field, and to examine how research is conducted on a particular topic (33). Critical reviews, for their part, move beyond the description of research findings to undertake additional analysis and critical reflection, usually with the aim of making a conceptual contribution to the literature (34, 35).

Applying a critical scoping approach, the objectives of this review are 4-fold. First, we identify the various methodological approaches and types of evidence employed in the study of urban FP in sub-Saharan Africa and South Asia. Secondly, we outline the geographies of this research interest at the regional, national, and urban scales. Thirdly, we describe the key findings of studies focusing on the intra-urban dynamics of FP. Finally, we present a set of themes and topics to inform future research in the field. The review process was guided by the question: *What literature exists on the topic of urban FP in sub-Saharan Africa and South Asia, what are its methodological and geographic dimensions, and what priorities for future research can be identified?*

The search strategy was iterative, constructed through the identification of relevant terms, concepts, and topics emerging during the search process. We searched Web of Science and Google Scholar online databases for English-language articles and reports published since the year 2000 with combinations of the terms "family planning," "contraception," "urban," "rural-urban," "urban-rural," "intra-urban," "migration," "slum," "informal," "neighborhood," "development," and "fertility." Gray literature not published in academic books and journals was included in the search. Identified works were mined for further references. Moreover, several key experts in the field were approached and asked for recommendations of significant recent studies and research focus areas that should be included. The search process took place between 1 May 2019 and 1 May 2020.

The criteria for including studies were as follows. First, they should be empirical research outputs (excluding descriptions of study protocols) with FP as a principal focus, or including a sustained engagement with FP issues within a wider health lens. Research only tangentially addressing FP as a minor aspect of more general health services and dynamics was excluded. Second, included works should focus on urban areas or communities, or show a sustained engagement with urban dynamics as they relate to those of rural areas. Those addressing "semi-urban" areas were excluded. Third, the research should address contexts of sub-Saharan Africa or South Asia, or examine such contexts within a larger LMIC ambit. Finally, we only included works that were published or released in 2000 or thereafter. Studies were selected by initially screening titles and abstracts to exclude irrelevant works; the full text of remaining studies were then assessed for eligibility. A total of 279 studies were deemed to have met all criteria for inclusion.

In addition, we employ Demographic and Health Survey (DHS) programme data on fertility, unmet need, and contraceptive use. These were accessed via the STATcompiler platform[2].

ANALYSIS

The 279 studies included in the analysis were categorized according to their predominant source of evidence and geographical focus (**Table 1**). Source of evidence groupings included surveys, interviews/focus groups, mixed methods, and ethnography. Those employing surveys were further broken down according to the specific use or design of those methods. A significant majority of studies rely solely on survey evidence. Of these survey-based studies, over 60 per cent are cross-sectional in design, employing either Demographic and Health Survey (DHS) programme data or other survey sources, while longitudinal studies comprise little under 15 per cent. Nearly one-fifth of all survey-based studies rely on data from one or more DHS rounds, which only provide information on national urban-rural differences or aggregate trends in capital cities. While ethnography is sometimes conducted in combination with other methods, only one study relied exclusively on ethnographic analysis.

Studies were then grouped according to their country and region of focus—individual countries were counted as a focus only if they formed part of a study addressing five or fewer city or country contexts. African regions were defined according to the categories employed by the African Development Bank[3]. **Table 1** demonstrates the prominence afforded to urban FP contexts and dynamics in West and East Africa, with those of South Asia as a lesser priority.

The priority given to African settings within the wider research field shows continuity with the region's emergence, since the 1990s, as the "new frontier" of FP (36): a frontier characterized by challenges related to high fertility rates, the HIV/AIDS epidemic, poor economic performance, the lowest

[2]https://www.statcompiler.com/en/, accessed 27 May 2020.
[3]See https://www.afdb.org/en/countries, accessed 17 July 2020.

TABLE 1 | Number and proportion of reviewed studies, by category.

Variable	Number of studies ($n = 279$)	Proportion of total (%)
Methodology		
Survey	225	80.6
Interviews/focus groups	30	10.8
Mixed methods	23	8.2
Survey design		
Other cross-sectional	114	40.9
Longitudinal	33	11.8
DHS cross-sectional	24	8.6
DHS multi-round	19	6.8
Multiple survey types	10	3.6
Quasi-experimental	10	3.6
Other multi-round	9	3.2
Randomized trial	4	1.4
Geographical region		
West Africa	80	28.7
East Africa	73	26.2
South Asia	51	18.3
Southern Africa	35	12.5
Multiple regions	31	11.1
Central Africa	7	2.5
Urban focus		
Large city	83	29.7
Multiple cities	70	25.1
National urban-rural	58	20.8
Urban/rural sites	20	7.2
Subnational urban-rural	18	6.5
Secondary city	14	5.0
National urban	12	4.3
Town	3	1.1
Specific urban focus		
Slum/informal settlement	23	8.2
Urban poor/non-poor comparison	23	8.2
Slum/non-slum comparison	19	6.8
Urban poor	8	2.9
Peri-urban	7	2.5

prevalence of contraceptive use of any world region, and high rates of adolescent pregnancy. The geographies of research interest identified by this review reflect the outcomes of recent large-scale programmes such as the Urban Reproduction and Health Initiative (URHI), which implemented interventions and monitoring activities in Nigeria, Senegal, Kenya, and India, resulting in significant publication output from those countries (**Figure 1**). The influence of donor-supported programmes is also demonstrated by the increase in the number of studies produced annually over the past decade; this is represented in **Figure 2**.

The ways in which the FP literature addresses urban spaces and dynamics varies, as revealed in **Table 1**. Large cities with populations of over one million are the predominant focus of this work, although it has become increasingly common for researchers (as with those linked to the URHI programmes) to employ multi-city methodological designs that may include both large and secondary urban areas. However, overall smaller cities and towns remain a lesser focus. Large-scale surveys such as the DHS produce nationally representative data and are often employed for the purpose of urban-rural comparisons—this was the approach taken by over one-fifth of all reviewed studies.

Only around 30 per cent of all included studies addressed intra-urban realities and differences. As shown in **Table 1**, the dominant approach has been to examine spatial inequalities (in the form of a focus on slums or informal settlements, or a comparison of slum and non-slum areas) and economic inequalities (in the form of a focus on poor urban populations, or a comparison of poorer and wealthier income groups). Only seven studies included a specific focus on peri-urban areas, although it should be noted that many slums or informal settlements are likely to be located on urban peripheries without this being specifically noted.

Studies were grouped according to broad thematic headings although, given the diversity of methodological approaches and empirical foci existing within the field, thematic analysis was not prioritized. Close to three quarters of all reviewed works examine issues related to FP demand and use. Thirty-two focus exclusively on supply-side issues, marginally fewer than those addressing a combination of supply-side and demand-side factors. Around 40 per cent of all works examine issues related to (or determinants of) FP use and outcomes, while approximately one-fifth provide more descriptive analyses of FP knowledge, attitudes, and practices. In lieu of a detailed thematic analysis, the following section summarizes the emerging evidence on key FP topics, highlighting what we know about inter-urban and intra-urban differences.

WHAT DO WE KNOW ABOUT FP IN URBAN AREAS?

Unmet Need

Generally, both the desire to limit family size and contraceptive use are higher in urban than rural areas. That said, unmet need for FP, defined as non-use of contraception among women wishing to limit or avoid pregnancy for at least the next 2 years, is often similar between the urban and rural sectors and, in some settings, urban levels are higher than rural. **Figure 3** shows the broad urban-rural comparison for sub-Saharan Africa. In 10 out of 39 African countries with relevant data, unmet need is higher in urban areas than in rural areas[4]. In South Asia, unmet need is generally higher for rural populations but only marginally so, as in the case of India (12.1 per cent urban vs. 13.2 per cent rural)[5]. More detailed spatial analyses reveal that patterns of unmet need in a country such as Ghana show significant geographic heterogeneity, including variations between particular urban communities, suggesting

[4]Data drawn from STATcompiler at http://www.statcompiler.com, accessed 11 June 2020.

[5]Data drawn from STATcompiler at http://www.statcompiler.com, accessed 26 May 2020.

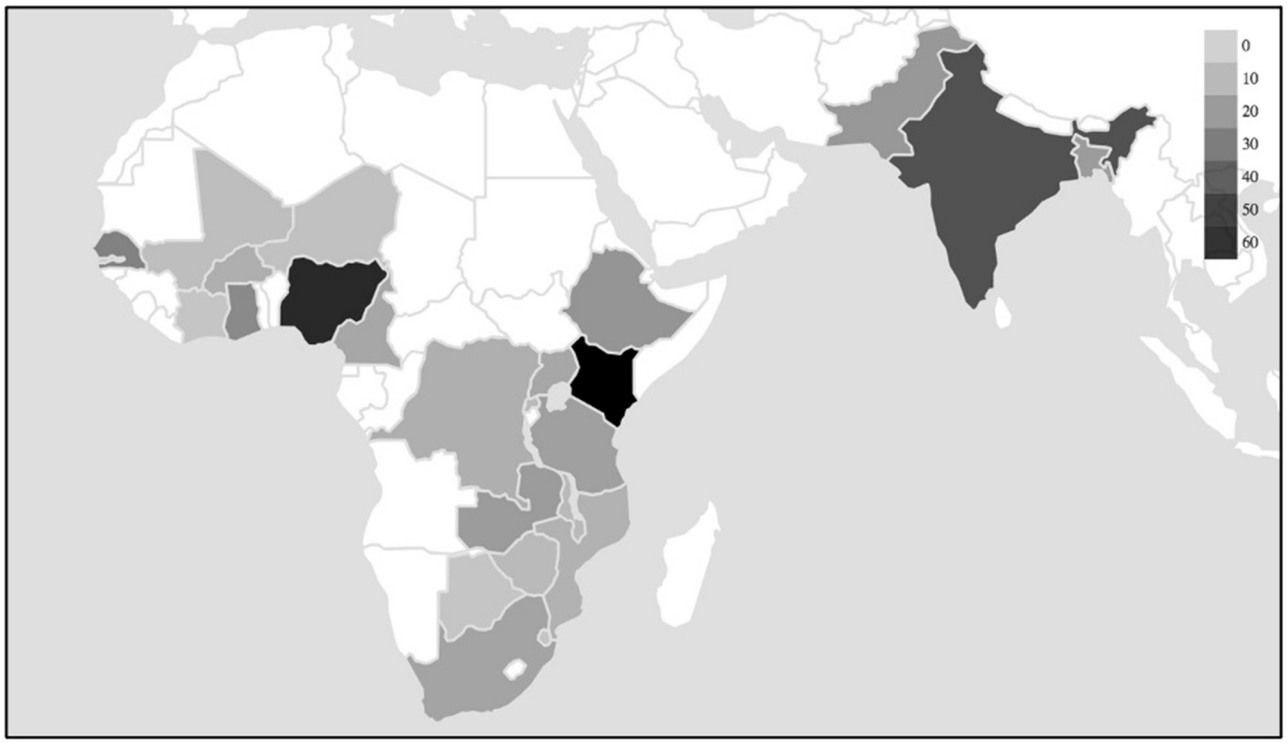

FIGURE 1 | Number of studies, by country.

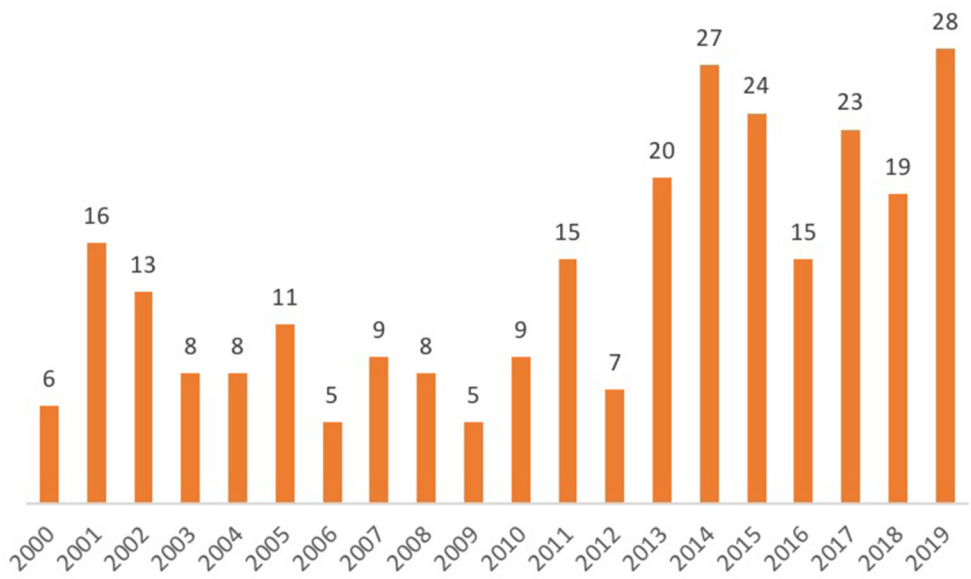

FIGURE 2 | Number of studies, by year.

that bridging inequality gaps in contraceptive use calls for area-specific programmes (37).

Large differences in unmet need and unwanted childbearing exist according to wealth status in urban areas (38, 39). In Kenya, for example, while the Nairobi region enjoys the lowest levels of unmet need nationally, in slum areas within Nairobi the proportion of women with an unmet need was double that of the city as a whole and higher than that of rural women (40).

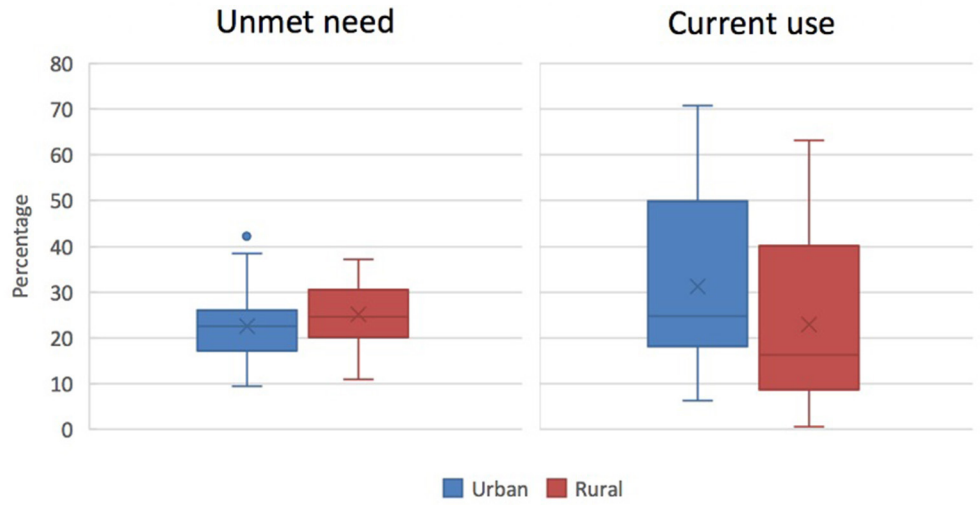

FIGURE 3 | Percentage of currently married or in-union women with an unmet need for FP (left) or currently using any modern method of contraception (right) in sub-Saharan Africa, according to place of residence (source: ICF, 2015. The DHS Programme STATcompiler. http://www.statcompiler.com. Accessed May 27 2020).

While a greater proportion of poor urban women might use contraception relative to rural women, unmet need can still be higher for the former group.

Aggregate urban trends mask inter- and intra-urban differentials in fertility and FP outcomes in sub-Saharan African contexts. For example, we know that poor urban youth are more likely to engage in high-risk sexual activity (41–46). Moreover, poor young urban women are at particular risk of experiencing unintended pregnancy (47). Research has shown that the determinants of unintended pregnancy may vary by city and by settlement type (48). For women living in slum areas of Nairobi, for example, age, parity and marital status each had a significant net effect on the likelihood of unplanned conception, while marital status and ethnicity were more significant determinants for those residing in less deprived areas of the city (49). One longitudinal study showed that women in one slum neighborhood of Nairobi were almost twice as likely to realize baseline fertility preferences than those living in a different slum area (50).

High levels of unmet need and unintended pregnancy reflect constrained access, broadly defined, to contraceptive services, though an additional influence is that the childbearing preferences for urban women, as well as rural women, may be ambivalent and changeable (51).

The urban dynamics of unmet need, unstable fertility intentions, and unintended pregnancy may be related to an increasing resort to induced abortion in urban areas. Lifetime abortion rates are remarkably high in many LMIC urban settings (11). In Yaoundé (Cameroon), over one-fifth of young women reported having had an abortion; over 8 per cent reported more than one (52). In some cases—particularly contexts with restrictive abortion laws—many procedures are performed under unsafe conditions and result in complications (53–56). In Malawi, for example, a significant proportion of poor urban women procure abortions from traditional healers (39 per cent) or perform it themselves (14 per cent). For this group, an estimated 55 per cent of procedures result in complications with 17 per cent of these going untreated (57).

Family Planning Supply

As mentioned above, high levels of unmet need in urban areas suggest the existence of supply-side barriers to FP commodities and services, among other kinds of obstacles. For example, weak governance systems affect FP supply in African urban areas due to fractured and confusing divisions of responsibility. These realities are true not just for reproductive health but all areas of urban management. In some cases, uncertainty over which part of government is responsible (legally, financially, or operationally) for FP provision has resulted from well-intentioned devolution processes that aspired to give more power to the local scale and to larger cities in particular. In Kenya, for example, the devolution of health services over the past decade saw the national government retain strategic oversight with subnational county governments tasked with decision-making and the delivery of services, including FP. The resulting mismatch of strategic capacity and local delivery mechanisms has resulted in national policies and guidelines that are less attuned to local contextual factors and needs; government ownership has been undermined and processes of funding, procurement, and monitoring complicated (58–60).

There may be limited overall penetration of public-sector FP services into LMIC cities, but especially into smaller towns and deprived areas and slums. This may be the case for various reasons. Smaller cities are not always seen as urban centers or are poorly connected into national supply and service chains. Even in larger cities, slum populations and settlements may lack legal recognition from public authorities and are thus neglected by formal service provision (38). In addition, the perceived dangers of working in such areas may increase absenteeism of health and FP staff (61). As such, poor urban populations are

often dependent on private sources that may offer services of low quality and high cost. This implies that the urban poor, particularly residents of slums, are likely to be most affected by disruptions to the public provision of FP services (38).

The importance of the private sector supply of FP in urban areas is demonstrated by recent research. Vulnerable and harder-to-reach groups in Kenya and Nigeria, for example, are more likely than other urban women to obtain their short-acting methods from drug stores or pharmacies (62). In Bangladesh, researchers found a trend toward greater use of private sources in poorer urban areas (63). While a previous study found little evidence to suggest that expansion in private sector supply is contributing to inequalities in the level of contraceptive use in urban areas (64), it is possible that in some contexts this expansion is associated with the generation of spatial inequalities in the supply environment. In Nigeria, for instance, urban areas served by a good public supply environment enjoy an increased likelihood of having a better private sector supply, suggesting that neither sector acts to address the other's supply shortfalls (65).

We know from Kenya that where urban women go to obtain contraceptive methods is influenced by issues of service quality, cost, distance, and the specific kinds of service offered. Some research suggests that Kenyan women seeking FP services are less likely to use public sector facilities (despite the lower cost and more expansive offering of methods at those facilities), preferring private and other non-public facilities for reasons including higher perceived quality, shorter waiting times, and better client-provider interactions (66, 67). Private sources may be attractive to many poor urban women for various reasons, but public facilities, including hospitals, nonetheless remain important sources of better quality, affordable, and professionally-administered FP services (66, 68). In some cases, service quality has been shown to exert a greater influence on FP practices than geographic access. Urban supply environments in Senegal, for instance, are already dense; increasing the number of facilities or the range of services offered at facilities are not likely to increase FP use (69). Such findings suggest that urban women often bypass their nearest facilities for reasons of quality.

Provider restrictions present another set of supply-side barriers to FP access in urban settings. Restrictions based on age, marital status, parity, and spousal consent have been identified in urban settings of sub-Saharan and South Asia (70–73). Urban women at greatest risk of unwanted pregnancy often face barriers in obtaining more popular contraceptive methods including the pill, condoms, and injectables (73, 74). In some cases, they are more likely to face restrictions from private providers than from other provider types—a problem given that significant proportions of urban populations rely on private sources (72, 74, 75).

Contraceptive Use

The use of modern contraceptives in LMICs is generally higher for urban than rural women. **Figure 3** represents this difference for sub-Saharan African countries. Urban-rural differentials in current use are often small in countries with higher overall contraceptive prevalence (76). For example, no significant geographical differences in modern contraceptive use can be observed in countries such as Malawi (61.4 per cent urban vs. 57.5 per cent rural), South Africa (54.6 per cent urban vs. 52.5 per cent rural), and Bangladesh (56.2 per cent urban vs. 53.2 per cent rural)[6].

Patterns of contraceptive use may vary significantly between population groups, regions, and cities within countries (77). Within cities themselves, women living in slum areas tend to report lower levels of use (78), although contexts such as India, Bangladesh, and Kenya (countries that have introduced concerted national FP programmes) have seen rapid increases in the use of FP by slum residents (39, 63).

With respect to method use, LMICs show markedly different contraceptive method mix profiles and preferences. It is therefore difficult to make any broad statements about urban and rural trends and differences (79). Trends away from the use of longer-term methods by urban populations have been observed for some South Asian and sub-Saharan countries. In urban areas of Pakistan, for example, the method mix has shifted away from sterilization toward an increased use of condoms (80). In Kenya, the trend has been for urban women to increase their use of short-term, often less effective, methods, with the proportion of women using long-acting methods (such as intrauterine devices and implants) dropping considerably in some cases (39, 81). Given that rates of discontinuation and failure are higher for short-term methods than for intrauterine devices or implants, a growing reliance on these methods may explain why urban areas of Kenya see high rates of unplanned pregnancies and births despite relatively high levels of contraceptive use.

In both African and Asian settings, there may be a general trend for more educated and wealthier urban residents to rely on traditional methods as part of a wider strategy of fertility regulation that can encompass occasional resorts to emergency contraception and safe abortion (82, 83). This may be linked to previous experiences of side effects from hormonal methods leading to method dissatisfaction (84). Ghana is a particular case in point of these trends, and has been extensively studied (85–89). Very high levels of traditional method use have also been documented in Ouagadougou (Burkina Faso), Lagos (Nigeria), and Kinshasa (DRC) (90–92). These kinds of ideas and practices can be expected to become more significant and widespread as urbanization proceeds and the middle-class grows in LMIC contexts, but presently it is unclear whether or how such attitudes and practices are diffusing among poorer urban women.

Method Satisfaction

Experience of side effects from hormonal methods leading to method-related dissatisfaction is commonly reported as a reason for the discontinuation of contraceptive use among urban women (85, 86, 93–95). DHS data shows that urban women in low and middle-income countries are more likely to cite "health concerns" as a reason for non-use of contraceptives than rural women (96). The role of health concerns in giving rise to method dissatisfaction can vary between urban and rural contexts and may be specific to certain methods. In Kenya, for example,

[6]Data drawn from STATcompiler at http://www.statcompiler.com, accessed 11 June 2020.

perceptions of safety surrounding the long-term use of injectables were found to have a significant effect on method satisfaction in the urban study site—a slum area of Nairobi—but not in the rural site (84).

Discontinuation and Switching

Generally, sub-Saharan African populations show high rates of contraceptive discontinuation and low probabilities of switching between methods, indicating high risks of unintended conception (97). Ambivalent, variable, or low motivations surrounding childbearing may be associated with discontinuation among urban African women, particularly if they experience method-related dissatisfaction (50, 51, 98).

Poor urban women experience high rates of contraceptive discontinuation (47). Among women living in slum areas of Nairobi (Kenya), almost half of all women who adopted a method during the postpartum period discontinued (primarily due to method-related dissatisfaction) within 1 year, a proportion far higher than the national estimate of 32 percent (94). However, the same women were also far more likely than the national average to switch to another method within 3 months of discontinuing, possibly reflecting a high degree of motivation to postpone pregnancy among couples living in slum areas. By contrast, urban women in Uttar Pradesh (India) who use multiple contraceptive methods were found to experience higher incidences of pregnancy and abortion, suggesting problems with switching and lapses in coverage between methods (99). From research in Senegal it is also evident that the likelihood of having an unmet need for contraception after discontinuation can vary significantly between particular urban contexts (100).

Determinants of and Barriers to Contraceptive Use

As mentioned, an emphasis of many urban FP studies has been understanding the specific factors and mechanisms that promote or inhibit contraceptive use. Research in this area has seen considerable progress toward the use of more sophisticated theoretical and methodological approaches. Two decades ago Casterline and Sinding (101) criticized mainstream research on unmet need for "simplistic theorizing" in the absence of sound models of behavior that consider how fertility *preferences* may operate under various *constraints*, and how they compete with other preferences. By contrast, some researchers now employ models of behavioral change such as the "theory of planned behavior" (102–104) and "theory of reasoned action" (105), emphasizing the study of intentions as a predictor of human behavior alongside the factors that inhibit the translation of intention into behavior. These may include personal factors (such as knowledge, skills, or self-efficacy) as well as wider social norms (106). Further, in recent scholarship greater emphasis has been placed on the role of communication in shifting urban FP intentions and behaviors (107).

Studies of the determinants of modern contraceptive use have often focused on the effects of individual-level factors (such as age, education, and parity) on the probability of modern FP use. Fewer have assessed how FP use is associated with household or community-level factors. However, there has been an increase in studies examining "contextual effects on health behaviors" (108). Accordingly, recent work explores how exposure to FP messages, interpersonal communication, perceived social risk, religious factors, ethnicity, and poverty affect reproductive intentions and behaviors among urban groups. For example, several studies show that partner or spousal discussion plays an important role as a mediating factor between exposure to FP messaging and contraceptive use in African cities (104, 109).

The study of social norms has long been an interest of health and FP researchers. However, there is evidence of growing emphasis on the role of social norms in influencing fertility behaviors at individual and collective levels, in addition to their effects on the supply of services (110, 111). Sex composition of surviving children and desire for male children have been shown to be important determinants of fertility behavior, contraceptive use, and method choice in urban slum areas of South Asia (112–114). In some Nigerian contexts, son preference is also associated with negative attitudes toward FP among poor urban men (or the perception of such attitudes held by their partners) (115). Pronatalist norms have been shown to retain important influence over FP behaviors in urban areas of Niger (102, 103). It is not clear how the nature or influence of such norms are changing with the progress of urbanization (with resulting changes to family structures, lifestyles, and cultural influences) but several authors have argued that this is happening in particular African and Asian cases (103, 116, 117).

There have been recent attempts (linked to the URHI country programmes) to examine the specific mechanisms through which normative factors influence FP opinions and behaviors, and in particular the role that communication plays in mediating the relationship between social norms and contraceptive use (107, 109, 110, 118). In one study researchers draw on the "theory of normative social behavior" alongside a mixed-methods approach to assess precisely the role played by injunctive norms (social sanctions for failure to conform) and interpersonal discussion (between spouses and others) in influencing the relation between perceptions of others' behavior (descriptive norms) and contraceptive use among the urban poor in India (110). They found that spousal influence and communication were indeed important determining factors in decision-making, noting that norms surrounding contraceptive use are changing rapidly in the context of urbanization and expanding access to health information. However, precisely how different types of norms influence specific kinds of decision-making behavior in particular urban contexts remains poorly understood (110).

Programme Interventions

Well-designed multi-component FP interventions, encompassing both supply-side and demand-side activities, can make a significant difference to contraceptive use among urban populations. Recent evaluation studies of programmes such as the Urban Reproduction and Health Initiative (URHI) and The Challenge Initiative (TCI) provide useful insights for urban programmatic planning. Positive effects on FP use linked to project interventions were observed for all country programmes (119–122). For example, the Kenyan programme helped to boost the proportion of urban women using modern

contraceptives from 45 to 52 per cent in the 4-year follow-up period (122). In Nigeria, that proportion increased from 21 to 31 per cent in the same period (120).

Studies such as these provide an informed basis to assess the impact of supply- and demand-side interventions on increased contraceptive use, particularly among the urban poor. Considering only the impact of supply-side interventions focused on increasing service availability and quality, a longitudinal and comparative assessment of the African URHI country programmes found that numbers of new acceptors at targeted facilities rose in all three contexts, while the overall number of clients increased in Nigeria and Kenya (123). The success of various supply-side interventions differed according to regional or national context—issuing information and educational materials at facilities increased users in Nigeria, but not in Kenya or Senegal, while enhanced provider training had a significant positive association with user numbers in Nigeria and Kenya.

For demand-generating activities specifically, in all URHI contexts outreach activities (implemented by FP or community health workers and local radio programming) were significantly and positively associated with increased modern method use by midterm (124). Television programmes had a significant effect on use in India and Nigeria, while exposure to project-related messaging and logos through various media were also significantly associated with improved use in Kenya and Nigeria (120–122). Results from Kenya indicate that demand-generating activities such as radio programming can be the most cost-effective means of promoting increased use of modern methods (122). FP outreach through mobile service delivery has been shown to be effective in increasing the use of FP services in four cities of Nigeria (107). These kinds of measures take on particular importance in poor urban contexts where security concerns, a lack of appropriate infrastructure, and high levels of built environment density may inhibit government service delivery efforts.

While such evidence demonstrates the effectiveness of targeted and multi-level interventions in increasing the use of contraceptives in urban areas, including among poor populations, their positive effects may not always be sustained beyond project completion. This highlights the need for programmers to consider longer-term strategies that would support the continued effects of project components following their implementation (125).

Some reproductive health programmes have specifically targeted the integration of FP with other healthcare services. In principle, integration offers an economy of service provision and is therefore valuable in contexts with limited resources. Recent studies provide evidence of the impact of such programmes. Evaluations of the Senegalese URHI programme suggest that the integration of FP services with those of maternal and child health presents a significant opportunity to reduce unintended pregnancies in urban areas (126). The equivalent Kenyan programme revealed that integration-related interventions had mixed results across different service areas, highlighting time and workload constraints on the part of providers as barriers to effective integration (127). Indeed, the South African experience shows that personnel and facility-level issues may be compounded by wider political and policy uncertainties and the problems of generally overburdened public health systems (128). These challenges point to the need for flexible partnership-based approaches to service integration involving communities, healthcare providers, and other actors (129). Based on randomized controlled trial evidence from Mumbai (India), partnership models (involving community resource centers operated by non-governmental organizations) for the delivery of integrated health services have been found to be a feasible and potentially replicable approach for promoting health in urban informal settlements (130, 131).

The overall implication of this research is that *context matters* in significant ways when designing FP and related healthcare programmes. Cities and towns—even those within the same country—all have unique social, economic, and political characteristics that affect how services should be delivered, and how those services will be taken up and used. While this conclusion may seem disabling in the search for universal lessons and recommendations, the significance of context highlights at least two points. First, it affirms the importance placed on appropriate monitoring and evaluation mechanisms to accompany FP interventions and thereby inform evidence-based planning and mid-term programmatic adjustments according to local conditions, as emphasized by recent initiatives such as URHI and TCI. Second, it calls for further research that moves past broad urban-rural binaries and national comparisons to examine the specific dynamics that unfold within and between various urban settings, as we discuss in the following section.

WHAT ARE THE IMPLICATIONS FOR FUTURE RESEARCH?

Enhanced FP interventions for the urban poor would bring considerable benefits for poverty reduction, maternal and child health, education, women's employment, and food security at multiple scales (38, 132–135). Some researchers argue that FP programmes—alongside industrialization or improved urban infrastructure and institutions—may be effective in slowing urbanization in poor countries and reducing the total share of their urban populations living in informal settlements (136). FP is thus a key strategy that governments can implement to support achievement of the SDGs (1).

However, to deliver on the potential of an urban FP agenda, we have some way to go to understand the precise nature of the challenges involved in improving the delivery and use of contraceptive services in different urban contexts. Here we discuss four broad priority areas for future research in the urban FP domain.

Neighborhoods and Poverty

While the concept of "neighborhood" has long been an important basis of urban research in the global North, particularly North America, it plays a limited role in discussions of urban demography and FP in LMIC contexts (3). Important exceptions include the longitudinal research emerging from the few cities that host health and demographic surveillance systems. This

work demonstrates the importance of the neighborhood context in shaping reproductive ideas and behaviors (50, 84). Recent studies analyzing health inequalities in Accra (Ghana) by linking satellite imagery with survey and administrative data have also taken a specific interest in assessing neighborhood effects (8, 137–139).

There is a need for further research assessing the role of neighborhood effects (including factors of social cohesion, social capital, collective efficacy, and community resources) in influencing sexual, reproductive health, and fertility behaviors and outcomes (3, 61). Researchers have made a start by describing "slum residence effects" for some LMIC settings (41–43). However, it should be recognized that not all "slums" are the same, and official definitions, material conditions, and socioeconomic characteristics of slum and informal settlements may vary substantially between urban and country contexts, and even within the same city (140).

In developing a more fine-grained understanding of the role of locality and place in affecting urban demographic change, the insights of sophisticated analyses of urban poverty and inequality should be retained. A key theme in this work is the analysis of heterogeneity, understood in both spatial and temporal dimensions (141–144). Among other things, the notion of spatial heterogeneity alerts us to the implications of particular slum-like conditions for FP service delivery and fertility patterns. This would include, for example, how the conditions of an older centrally-located settlement differ from those of a newly-formed community on the urban periphery in terms of access to healthcare, transport, and infrastructural services of all kinds. Moreover, the concept of heterogeneity highlights the diversity of experiences among the urban workforce and poor, including the specific kinds of barriers to reproductive healthcare faced by those working in the informal sector.

Governance

Where and precisely how should FP be inserted or strengthened within the complex array of urban actors and institutions encompassing public, private for-profit, private non-profit, sectoral, municipal, state/provincial, and national governments? Are there examples of properly "joined-up" (11, 141) approaches to the governance of urban FP? Can such approaches deal adequately with rapid change in the spatial dimensions of urban growth and peri-urbanization in LMICs? In what circumstances are place-based strategies (with a slum focus) or people-based strategies (with a focus on the urban poor wherever they may live) more appropriate and effective? Answering these and similar questions of governance remains a core challenge, while the urgency of doing so is underscored by ongoing reforms driven under the banner of decentralization and devolution (3, 145). It is important that lessons from countries that have devolved health and FP services, such as Kenya (58, 60), are captured and shared across different contexts undergoing similar reforms.

There is now a need for further empirical research that examines the precise operations of the governance system—extending across multiple sectors and scales—that shape the dynamics of FP supply and demand in towns and cities. While examining mechanisms of (and barriers to) improving FP supply organization and service delivery within the health sector is important and necessary (146–148), it is not enough by itself. It is imperative to improve understanding of how FP services fit in the wider network of urban services and infrastructures (such as housing, water/sanitation, or public transport) and the ways in which these are designed, funded, and maintained. Here FP researchers may benefit by engaging with work emerging from other urban disciplines on the "hybrid" and multilevel governance systems that complicate urban management and development in LMICs (149–152). Without a grounding in the processes and difficulties of managing cities, FP and reproductive health professionals will be unlikely to forge the effective partnerships with the urban sector on which innovation in service delivery will depend.

Grasping the "actually existing" urban governance relations, processes, and practices that shape the delivery of and access to FP (as opposed to a preoccupation with formal health institutions and structures) would have at least two additional benefits. It would not only enhance our understanding of the drivers, barriers, and outcomes of contraceptive use, but also inform wider governance arrangements linking FP to the management of urban change. In particular, this kind of knowledge would be well-suited to feed into the development of what should be given priority within national urban policies. These policies are and will be key to delivering on the new urban development agenda by calibrating the powers and responsibilities held across levels and sectors of governance. However, to date they have been weak on health and demographic issues (153, 154).

Migration and Displacement

While the majority of urban growth in LMICs is contributed by natural increase, migration remains a key trend and driver of that growth. Most research confirms that rural-urban migration has a downward effect on fertility rates, alongside positive effects on contraceptive use, indicating that migrants adapt to their new urban conditions and assume behaviors that are prevalent among permanent or more established populations (3, 155–158). Recent work has explored the precise influence of selectivity, adaptation, and disruption effects in particular contexts, noting that their relative influence may differ according to prevailing social, political, and economic realities (157, 159, 160).

Future research on FP and migration should take the diversity of migratory experiences into account. This means, first, recognizing that not all migrants are of similar age, that not all are poor and move into slum areas, that they may stay at their destination for differing lengths of time, and that some will move around urban areas more often than others during their lifetime. Second, the majority of migration studies focus on movements from rural areas into towns and cities, as such the literature is remarkably thin on how movements within and between particular urban areas affect reproductive behaviors and fertility (3, 161, 162). Third, there is a need for further work exploring how specific urban community contexts shape different migratory experiences, sexual transitions, FP needs, and fertility outcomes, particularly for large youthful migrant populations (163, 164).

At present we know little about the implications of increasingly significant urban migrant groups—including those displaced by civil unrest and disasters—for FP, including their particular service needs and the specific barriers to access they face (165–168). How to maintain FP and reproductive health services in disrupted environments will take on increasing urgency and a more urban character in the face of climatic, epidemiological, and political-economic threats and the "urbanization of displacement" (169–171).

Resilience

A resilience perspective on health and demography shifts the emphasis from vulnerability (for example, of falling pregnant unintentionally) to the reasons why some urban groups are able to cope with and respond to adverse conditions (141). This, in turn, can provide guidance for positive action. Here the key question is how FP can form part of strategies to enhance the agency of poor urban residents and communities to be more resilient in the face of both long-term risks and shocks. These risks and shocks could include the urban manifestations and effects of climate change, food security, and infectious disease, for example.

Regardless of debates surrounding the potential role that FP should play within a global climate response (172–175), it should be recognized that fertility exerts a powerful influence on urban growth. As such, increasing access to FP is critical for easing the urban adaptation burden and enhancing resilience, particularly among more vulnerable populations (174, 176, 177). Doing so calls for further study of the associations between climate variability and reproductive goals and behaviors among urban groups, so that changing FP needs can be assessed and met (178).

Finally, considering the documented links between poverty, household food security, nutrition, and maternal and child health (135, 179), more research is needed to examine the urban links between FP, food systems, health, and fertility in a range of LMIC contexts. Enhancing our understanding of how FP interventions and fertility change affect nutrition and food security will be critical if we are to plan urban food systems and foster communities that are more resilient in the face of food price volatility, climatic stresses, extreme weather events, and a range of other external shocks (180).

CONCLUSION

This review demonstrates that urban FP scholarship addressing LMIC settings is broad and varied in its specific objectives, methodological elements, and geographic and thematic foci. While limited in overall size, urban FP research output has increased significantly over the past decade as donor and government interest in urban population growth and urban health in LMICs has grown. However, key spatial and thematic gaps in our knowledge remain. FP research, as with urban health and development scholarship more generally, remains focused on large cities or broad urban-rural comparison, often overlooking transformations unfolding in smaller settlements and urban peripheries. We know too little about FP and demographic dynamics manifesting in different kinds of neighborhood and under various conditions of spatial and economic deprivation. Few studies examine or point to appropriate governance arrangements for FP in rapidly changing urban contexts. Diverse urban migratory pathways and experiences, with their implications for FP programming, remain understudied. So too do the precise roles of FP within strategies and processes to promote urban resilience.

We have argued for a closer link between the FP and urban sectors as a way to drive progress toward achieving the SDGs, and we have set out the initial parameters of a research agenda to inform that linkage. Practical steps are now required to move forward an urban FP agenda. Raising the profile of FP and its contribution to the long-term sustainability of urban areas and nations is the first essential step. This should be followed by engaging the commitment of urban leaders (such as city mayors), policymakers, planners, and other actors involved in multisectoral and multilevel urban reform. In drawing attention to this agenda, it should be emphasized that urban settings of LMICs, including locations within cities and towns, are diverse and rapidly changing. The development of FP strategies and priorities to address present and future needs must reflect those realities.

AUTHOR CONTRIBUTIONS

JD was involved in conceptualization, data curation, investigation, methodology, visualization, writing of the original draft, and reviewing and editing. JC, TH, MM, and IS was involved in conceptualization, writing of the original draft, and reviewing and editing. SP was involved in conceptualization, funding acquisition, supervision, writing of the original draft, and reviewing and editing. All authors contributed to the article and approved the submitted version.

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Factors Associated With the Utilisation and Unmet Need for Modern Contraceptives Among Urban Women in Kenya: A Cross-Sectional Study

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Background: Family planning (FP) is a key intervention in improving maternal and child health. Hence, we assessed the factors associated with utilisation and unmet need for modern contraceptives among urban women in Kenya.

Methods: The study used pooled data on 10,474 women 15–49 years from the seven rounds of the performance monitoring for accountability surveys collected between 2014 and 2018. The surveys were conducted in 11 of the 47 counties of Kenya using a multistage cluster design. Sample characteristics were described using frequencies and percentages while factors associated with utilisation and unmet need for modern contraceptives were assessed using multivariable logistic regressions.

Results: The prevalence of modern contraceptives use and unmet need for FP among urban women in Kenya was 53.7% [95% confidence interval (CI) 52.1–55.3%] and 16.9% (15.8–18.1%), respectively. The use of modern contraceptive was associated with the county of residence, age, marital status, parity, education, household wealth quintile, exposure to media, and survey year. Teenagers, poorest urban women, women with no formal or primary level of education and those who seek services at a dispensary or health centres had higher odds of unmet need for FP while women who resided in Kitui and Nyamira counties had reduced odds of unmet need for FP. The odds of unmet need decreased with the survey year while that of modern contraceptive use had an inverse trend.

Conclusion: Overall modern contraceptive use in urban areas is lower than the national average while the unmet need for FP is higher than national average, highlighting a potential urban-rural disparity in FP indicators in Kenya. Individual sociodemographic and socioeconomic and contextual factors are associated with the use of modern contraceptive and unmet need for FP among urban women in Kenya. Urban family planning policies and programmes in Kenya need to focus on strengthening urban healthcare systems to provide equal and accessible FP services, especially targeted towards teenagers and young women and those of low socioeconomic status.

Keywords: modern contraceptive use, family planning, unmet need, PMA survey, Kenya, urban

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BACKGROUND

Birth spacing and limiting using modern family planning (FP) methods have the potential to avert 1.5 million maternal deaths and about two million infant deaths annually and contribute to the overall economic growth and development (1, 2). Unfulfilled demand for FP, on the other hand, contributes to unplanned pregnancies and unsafe abortions (3, 4). Despite these findings, the availability and access to modern FP among women of reproductive age (15–49 years) remains a challenge globally and particularly in low- and middle-income countries (LMICs) (1). For instance, while 63% of women of reproductive age globally use some form of contraception, 11.5% have an unmet need for FP (5), with only about one in three women using contraception and 23.4% having an unmet need for FP in sub-Saharan Africa (1, 6).

In Kenya, remarkable progress towards attaining universal access to FP has been made with an increase in modern contraceptive prevalence rate (CPR) from 53.2% in 2014 (7) to 58% in 2020 (8); but still about one in ten women have an unmet need for FP (9). However, successive national demographic and health surveys have continued to show an urban-rural disparity in contraceptive use (7, 10). For example, in 2014, about 40% of urban women were not using modern contraceptives and a further 13% had an unmet need for FP (7, 10). Recent studies have also found a persistent low use of modern contraceptive and a high unmet need in urban areas (11, 12). This is despite, a general expectation that access to FP services is better in urban than rural areas hence a need to explore this phenomenon.

Furthermore, Kenya like most sub-Saharan Africa countries is experiencing rapid urbanisation; with the urban population growing from 7.8% in 1962 (13) to 31.1% in 2019 (14) and is projected to reach 45.7% in 2050 (15). This rapid urban population growth is attributable in part to rural to urban migration and majorly to natural population growth (16), reinforcing the need for improved FP services in urban areas. Unfortunately, inadequate infrastructure and housing in urban areas have resulted in 56% of the urban population living in slums and other informal settlements (17); 36% of whom live in Nairobi county (18). These informal urban settlements are often characterised by overcrowding, poor access to healthcare including reproductive health services (19) and poor sexual and reproductive health outcomes (20). Besides, only 73% of health facilities in urban areas in Kenya offer FP services compared to 91% in rural areas; and even fewer facilities provide specific FP methods and only 44% offering FP services for adolescents (21).

Although the urban fertility rate has been declining with an overall increase in modern contraceptive use, the unmet need for contraception is still high and greatest among the urban poor (9). Therefore, urbanisation, urban population dynamics and the rise of urban informal settlements cannot be ignored in the bid to achieve health goals including FP. Consistent FP programmes to build on gains of previous urban FP programs such as *Tupange* (22) are needed to address the increased demand and need for FP in urban areas but to also address other confounders of FP use including poverty, low education level, exposure to FP messages in the media and FP commodities' stockouts (11, 12). Also, while previous studies have consistently shown the prevalence of unmet need for FP to be lower in urban areas than in rural areas (11, 12), a possible rich-poor gap in unmet need for FP among urban women may be masked. Hence, to better inform urban FP programming and policies in Kenya, the study aimed to determine factors associated with modern contraceptive use and unmet needs for FP among urban women in 11 counties in Kenya.

Abbreviations: KDHS, Kenya Demographic Health Survey; CI, Confidence Interval; LMICs, Low- and middle-income countries; aOR, Adjusted odds ratio; cOR, Crude odds ratio; PMA, Performance Monitoring for Accountability; SD, Standard deviation.

METHODS

Study Setting

Kenya is a lower-middle-income country with a fertility rate of 3.6 births per woman (23) and a population of about 47.6 million−30.1% of whom lives in urban areas (14). It has a gross domestic product of US$ 1816.6 per capita, human development index of 0.6 and a gender inequality index of 0.5 (24). Health care services are provided through the six levels of care from community to national referral services. The 47 subnational (county) governments oversee health service delivery at the country level while the national government oversees health policy formulation, training, and management of national referral hospitals. Family planning services are provided at all levels of health care but only about 85% of health facilities currently provide FP services with 97 and 79% of government and private facilities, and 89–90 and 99% of dispensaries and health centres and public primary hospital providing the services, respectively (21).

Data Source

The study used pooled data from seven rounds of the performance monitoring for accountability (PMA) surveys (25–31). The PMA is a multi-country survey on the sexual and reproductive health of women of reproductive age (32). In Kenya, the survey has been conducted since 2014 in 11 counties (*Kericho, Kiambu, Nandi, Siaya, West Pokot, Bungoma, Kitui, Kilifi, Nyamira, and Nairobi*) using a multistage cluster design, with the counties as the strata. The included households were systematically selected from enumeration areas that were randomly selected from the Kenya National Bureau of Statistics (KNBS) master frame. In the sampled households, all females aged 15–49 years and who consented to the study were interviewed. The survey also included randomly selected service delivery point (SDP) offering FP services in the selected communities. The management staff in the sampled health facilities were interviewed on behalf of the facility. The survey methodology for PMA surveys has been described further elsewhere (25–31).

This study included data from women aged 15–49 years and from urban health facilities. A total of 35,792 women of reproductive age were interviewed; 13,154 of whom were from urban areas. Of the 13,154 urban women, 2,680 missing

TABLE 1 | Operational definitions of variables.

Variables	Questions and operational definitions	Sources
County of residence	Nairobi, Bungoma, Kericho, Kiambu, Kilifi, Kitui, Nandi, Nyamira, Siaya, Kakamega, West Pokot	(25–31)
Age in years	Respondents were asked "How old were you on your last birthday?" and their responses categorised into 15–19, 20–34, and 35–49 years	(25–31, 36–39)
Marital status	"Are you currently married or living together with a man as if married?" (Married/cohabiting, unmarried)	(25–31, 38, 39)
Education level	"What is the highest level of school you attended?" (No formal, primary, secondary, tertiary)	(25–31, 40, 41)
Household wealth quintile	Household wealth quintiles were computed from wealth index, generated using principal component analysis of household assets and materials for the dwelling floor, roof and external wall (Poorest, poorer, middle, richer, richest)	(25–31, 42, 43)
Parity	"How many times have you given birth?" (0, 1, 2–3, 4+)	(25–31, 44, 45)
Age at sexual debut	"How old were you when you first had sexual intercourse?" (Continuous variable in years)	
Facility type	The interviewer recorded the "Type of facility" as either hospital, health centre, dispensary, and pharmacy and others.	(11, 12, 25–31)
Media exposure	"In the last 12 months have you: (a) heard about family planning on the radio? (b) seen anything about family planning on the television? (c) read about family planning in a newspaper or magazine? (d) received a voice or text message about family planning on a mobile phone? (e) Seen anything on social media (i.e., Facebook, Viber, Twitter, WhatsApp or others) about family planning?" (Yes, No)	(25–31, 46, 47)
Stockouts	"Has the (METHOD) been out of stock at any time in the last 3 months?" (Yes, No)	(11, 12, 25–31)

observations were excluded resulting to a final sample of 10,474 women for analysis for modern contraceptive use. The analysis for unmet need for FP included 8,722 women after excluding 4,432 women (3,512 who were not sexually active, 577 infecund and 343 with missing observations).

Study Variables

Modern contraceptive use was defined as "*the use of a product or medical procedure that interferes with reproduction from acts of sexual intercourse*" (33) while unmet need for FP was defined as "*women who were sexually active, fecund, not using any form of contraception but did not wish to become pregnant at all or within the next two years*" (34, 35).

Unmet need for FP was assessed using the questions: "*Would you like to have a child/another child, or would you prefer not to have any / any more children?*" and "*Are you or your partner currently doing something or using any method to delay or avoid getting pregnant?*" (25–31). The second question was used to assess the use of modern contraceptive use. **Table 1** describes the explanatory variables included in the study and that were selected based on their availability in the datasets and their policy importance from the literature review.

Statistical Analysis

Sample characteristics were described using frequencies and percentages while factors associated with the utilisation and unmet need for modern contraceptives were assessed using bivariate and multivariable logistic regressions. For selection of variables for inclusion in the multivariable analyses, Hosmer and Lemeshow recommend that the variables to be included should be: (i) clinically important variable and (ii) variables in the univariable analyses with a p-value <0.25 (48). This less stringent threshold of $p < 0.25$ helps to address the stochastic variability (univariate analysis ignores the fact that individual variables that are weakly associated with the outcome can contribute significantly when they are combined). In this study, a forward stepwise method was used to enter variables into the multivariable model to identify the model of best fit, which included all the variables based on the criteria above (48). Stata 13.0 was used for analyses, which were adjusted for the sampling design and stratification using survey weight provided in the datasets. Statistical significance was set at $p \leq 0.05$.

RESULTS

Sample Characteristics

The study included 10,474 urban women of reproductive age; a majority of who resided in Nairobi County (25.0%), were aged 20–34 years (64.5%) and had two or more children (55.4%). The mean age at sexual debut was 18 years (standard deviation: 3.2). Most women accessed FP services from health centres and dispensaries (92%) and 16.1% of health facilities reported stockouts of contraceptives within 3 months preceding the survey (**Table 2**).

Prevalence and Factors Associated With Modern Contraceptive Use Among Urban Women

The overall prevalence of modern contraceptive use was 53.7% (95% CI 52.1–55.3%); highest among middle-aged (57.2%) and secondary educated (54.5%) women and those from richer households (56.3%). Also, a high prevalence of modern contraceptive use was seen among women with two to three children (65.9%), who resided in Kakamega county (62.8%), were exposed to FP messages in the media (54.3%) and had access to

TABLE 2 | Sample characteristics of urban women of reproductive in Kenya 2014–2018.

Variables	Categories	*n* (%)
Sociodemographic characteristics		
Age, years	15–19	756 (7.2)
	20–34	6,750 (64.5)
	35–49	2,968 (28.3)
Marital status	Married/cohabiting	6,847 (65.4)
	Unmarried	3,627 (35.6)
Socioeconomic characteristics		
Level of education	No formal	207 (2.0)
	Primary	3,950 (37.7)
	Secondary	3,780 (36.1)
	Tertiary	2,537 (24.2)
Household wealth quintile	Richest	4,202 (40.1)
	Richer	3,146 (30.0)
	Middle	1,645 (15.7)
	Poorer	829 (7.9)
	Poorest	652 (6.3)
Reproductive health characteristics		
Parity	None	2,029 (19.4)
	One	2,652 (25.3)
	Two to Three	3,828 (36.6)
	≥4	1,965 (18.8)
Sexual debut	Mean (SD)	18.1 (3.2)
Media exposure	No	690 (6.6)
	Yes	9,784 (93.4)
Health systems characteristics		
Facility Type	Hospital	459 (4.4)
	Health centre	5,695 (54.4)
	Dispensary	3,935 (37.6)
	Pharmacy and others	385 (3.7)
Stockouts	No	8,787 (83.9)
	Yes	1,687 (16.1)
Facility supports CHVs	No	3,885 (59.0)
	Yes	6,177 (37.1)
County	Nairobi	2,613 (25.0)
	Bungoma	842 (8.0)
	Kericho	1,370 (13.1)
	Kiambu	1,623 (15.5)
	Kilifi	988 (9.4)
	Kitui	798 (7.6)
	Nandi	798 (7.6)
	Nyamira	678 (6.5)
	Siaya	432 (4.1)
	Kakamega	166 (1.6)
	West Pokot	166 (1.6)
Year of survey	2014	2,556 (24.4)
	2015	2,932 (28.0)
	2016	1,690 (16.1)
	2017	1,658 (15.8)
	2018	1,638 (15.6)

CHVs, Community health volunteers; SD, standard deviation.

hospitals (63.4%). The prevalence of modern contraceptive use increased from 50.3% (95% CI 46.9–53.7%) in 2014 to 55.1% (95% CI 51.8–58.3%) in 2018 (**Table 3**).

Modern contraceptive use was associated with the county of residence, age, marital status, parity, education, household wealth quintile, exposure to media, and survey year. The odds of modern contraceptive use were higher among teenagers (aOR 1.39, 95% CI 1.04–1.86) and middle-aged women (aOR 2.02, 95% CI 1.76–2.31) compared to women above 35 years. Also, women exposed to FP messages in the media had higher odds of modern contraceptive use (aOR 1.30, 95% CI 1.03–1.64) and those with children had a 2- to 4-fold higher odds of modern contraceptive use compared to those with no exposure or childless. Unmarried, uneducated, primary, and secondary educated women and those from poorest household had 15–73% reduced odds of modern contraceptive use. Women who resided in Kitui, Nandi and Kakamega counties had between 53 and 69% increased odds of modern contraceptive use compared to those in Nairobi (**Table 3**).

Prevalence and Factors Associated With the Unmet Need of FP Among Urban Women

The overall prevalence of unmet needs of FP was 16.9% (95% CI 15.8–18.1%). It was highest among teenagers (34.6%), uneducated (30.0%), and poorest (29.5%) women and those with four or more children (24.0%), had access to health centres (18.7%) and were from Kilifi (22.7%), Kericho (22.6%), and Siaya County (21.8%) The prevalence of unmet needs of FP significantly decreased from 21.0% (95% CI 18.7–23.6%) in 2014 to 14.3% (95% CI 12.2–16.6%) in 2018 (**Table 4**).

Unmet need for FP was associated with the county of residence, age, marital status, education, household wealth, parity, facility type, and year of study. The odds of unmet needs for FP among women aged 15–19 years were 2.5 times (aOR 2.46, 95% CI 1.68–3.62) higher than those of women aged 35–49 years. Women with no formal education (aOR 2.77, 95% CI 1.57–4.87) and primary education (aOR 1.51, 95% CI 1.12–2.04) had increased odds of unmet need compared to women with tertiary education. Unmarried women had 43% (aOR 1.43, 95% CI 1.19–1.70) higher odds compared to the married/cohabiting while those from the poorest households had 59% (aOR 1.59, 95% CI 1.16–2.17) higher odds of unmet need compared to from the richest households. The odds of unmet need of FP were 64% (aOR 1.64, 95% CI 1.12–2.40) and 86% (aOR 1.86, 95% CI 1.24–2.79) higher among women with access to health centres and dispensaries, respectively, compared to hospitals offering FP services. The odds of unmet need of FP were 33 and 39% lower in 2015 and 2017/2018 compared to 2014 (**Table 4**).

DISCUSSION

This study found that slightly more than half of urban women of reproductive age used modern contraceptives while about 17% of them had unmet needs for FP. Our results show that there

TABLE 3 | Prevalence and factors associated with modern contraceptive use among urban women in Kenya, 2014–2018.

Variables	Characteristics	Prevalence		Bivariate			Multivariable		
		n	Weighted %	cOR	95% CI	*p*-value	aOR	95% CI	*p*-value
County	Nairobi	1,357	52.6 (49.7–55.5)	Ref			Ref		
	Bungoma	447	54.1 (50.9–57.1)	1.05	0.89–1.25	0.50	1.03	0.86–1.25	0.73
	Kericho	680	48.3 (44.3–52.3)	0.84	0.69–1.02	0.09	0.83	0.61–1.12	0.22
	Kiambu	978	57.7 (52.6–62.7)	1.23	0.97–1.56	0.09	1.30	0.93–1.81	0.12
	Kilifi	440	44.5 (40.5–48.6)	**0.72**	**0.59–0.88**	**0.002**	0.82	0.59–1.12	0.21
	Kitui	470	58.2 (53.8–62.6)	**1.25**	**1.01–1.55**	**0.04**	**1.53**	**1.04–2.24**	**0.03**
	Nandi	463	58.0 (52.2–63.7)	1.24	0.95–1.62	0.10	**1.54**	**1.02–2.33**	**0.04**
	Nyamira	358	55.0 (49.1–60.8)	1.10	0.84–1.43	0.47	1.21	0.86–1.71	0.27
	Siaya	241	56.1 (51.5–60.6)	1.15	0.92–1.43	0.20	1.15	0.86–1.55	0.34
	Kakamega	103	62.8 (53.2–71.4)	**1.51**	**1.00–2.28**	**0.05**	**1.69**	**1.16–2.45**	**0.006**
	West Pokot	73	44.8 (34.6–55.5)	0.73	0.47–1.14	0.17	0.83	0.44–1.56	0.56
Age, years	15–19	235	29.9 (25.6–34.5)	**0.41**	**0.33–0.51**	**<0.001**	**1.39**	**1.04–1.86**	**0.03**
	20–34	3,937	57.2 (55.2–59.1)	**1.30**	**1.15–1.46**	**<0.001**	**2.02**	**1.76–2.31**	**<0.001**
	35–49	1,438	50.7 (48.2–53.1)	Ref			Ref		
Marital status	Married/cohabiting	4,215	62.0 (60.3–63.6)	Ref			Ref		
	Unmarried	1,395	38.2 (35.4–41.1)	**0.38**	**0.33–0.43**	**<0.001**	**0.55**	**0.47–0.63**	**<0.001**
Parity	None	672	31.6 (28.5–34.9)	Ref			Ref		
	1	1,407	52.7 (49.5–55.9)	**2.41**	**2.05–2.83**	**<0.001**	**2.03**	**1.72–2.39**	**<0.001**
	2–3	2,452	65.9 (64.0–67.8)	**4.18**	**3.55–4.92**	**<0.001**	**4.21**	**3.46–5.12**	**<0.001**
	4+	1,079	55.1 (51.9–58.3)	**2.65**	**2.16–3.26**	**<0.001**	**3.91**	**2.96–5.17**	**<0.001**
Education	No formal	60	33.1 (24.8–42.6)	**0.42**	**0.27–0.64**	**<0.001**	**0.27**	**0.17–0.42**	**<0.001**
	Primary	2,112	53.7 (51.6–55.8)	0.99	0.86–1.14	0.93	**0.66**	**0.56–0.78**	**<0.001**
	Secondary	2,032	54.5 (51.9–57.1)	1.02	0.89–1.17	0.72	**0.85**	**0.74–0.99**	**0.04**
	Tertiary	1,406	53.9 (51.0–56.7)	Ref			Ref		
Household wealth quintiles	Richest	2,249	53.6 (51.2–56.0)	Ref			Ref		
	Richer	1,765	56.3 (53.6–59.0)	1.11	0.98–1.27	0.10	1.12	0.98–1.28	0.11
	Middle	867	52.2 (49.2–55.1)	0.94	0.80–1.10	0.47	0.95	0.78–1.14	0.57
	Poorer	433	51.2 (47.1–55.2)	0.90	0.75–1.09	0.30	0.84	0.67–1.04	0.11
	Poorest	296	45.2 (39.9–50.7)	**0.71**	**0.56–0.90**	**0.01**	**0.73**	**0.58–0.91**	**0.01**
Media exposure	No	300	43.7 (38.7–48.7)	Ref			Ref		
	Yes	5,310	54.3 (52.7–55.9)	**1.53**	**1.24–1.88**	**<0.001**	**1.30**	**1.03–1.64**	**0.02**
CHVs[†]	No	1,407	52.7 (49.5–55.9)	0.89	0.79–1.00	0.05	1.03	0.82–1.29	0.83
	Yes	2,452	65.9 (64.0–67.8)	Ref			Ref		
Sexual debut	Sexual debut		18.2 (3.0)	0.99	0.97–1.01	0.75	1.00	0.98–1.02	0.87
Stockouts	No	4,685	53.6 (51.8–55.3)	Ref			Ref		
	Yes	925	54.7 (51.1–58.2)	1.04	0.89–1.22	0.58	0.99	0.79–1.24	0.94
Facility type	Hospital	272	63.4 (59.1–67.6)	Ref			Ref		
	Health centre	2,891	51.5 (49.4–53.6)	**0.61**	**0.50–0.74**	**<0.001**	0.81	0.61–1.08	0.15
	Dispensary	2,252	56.6 (53.6–59.5)	**0.75**	**0.60–0.93**	**0.01**	0.77	0.58–1.02	0.07
	Pharmacy and others	195	49.9 (43.9–55.9)	**0.57**	**0.42–0.77**	**<0.001**	0.79	0.21–2.94	0.72
Survey year	2014	1,273	50.3 (46.9–53.7)	Ref			Ref		
	2015	1,627	55.1 (51.7–58.6)	1.21	0.99–1.47	0.05	**1.28**	**1.05–1.56**	**0.02**
	2016	908	54.0 (50.7–57.3)	1.16	0.95–1.40	0.13	1.21	0.98–1.48	0.08
	2017	905	55.4 (51.8–58.9)	**1.22**	**1.00–1.49**	**0.05**	**1.36**	**1.11–1.66**	**0.003**
	2018	897	55.1 (51.8–58.3)	**1.21**	**1.00–1.46**	**0.05**	**1.25**	**1.02–1.52**	**0.03**

Ref, reference category; cOR, crude odds ratio; aOR, adjusted odds ratio; CI, confidence interval; [†] facility supports community health volunteers (CHVs). Bold: Statistically significant at $p < 0.05$.

was an increase in the prevalence of modern contraceptive use and a decrease in unmet need for FP in urban areas between 2014 and 2018, a pattern observed in other studies in Kenya (11, 12). These improved FP indicators could be attributed to the overall increase in investment in government- and partner-supported programs in urban areas (22) and the government's

TABLE 4 | Prevalence and factors associated with unmet needs for FP among urban women in Kenya, 2014–2018.

Variables	Characteristics	Prevalence		Bivariate			Multivariable		
		n	Weighted %	cOR	95% CI	*p*-value	aOR	95% CI	*p*-value
County	Nairobi	370	17.1 (15.0–19.3)	Ref			Ref		
	Bungoma	135	19.3 (16.3–22.7)	1.16	0.90–1.50	0.25	0.98	0.73–1.31	0.897
	Kericho	238	22.6 (18.5–27.4)	**1.42**	**1.06–1.91**	**0.019**	1.00	0.64–1.55	0.998
	Kiambu	161	13.1 (10.7–15.9)	0.73	0.56–0.96	0.026	0.66	0.42–1.02	0.058
	Kilifi	178	22.7 (19.2–26.7)	**1.43**	**1.10–1.85**	**0.007**	1.07	0.70–1.66	0.746
	Kitui	73	11.1 (8.4–14.4)	**0.60**	**0.43–0.85**	**0.004**	**0.34**	**0.18–0.64**	**0.001**
	Nandi	120	17.5 (12.8–23.4)	1.03	0.69–1.53	0.88	0.70	0.40–1.23	0.220
	Nyamira	94	16.1 (12.1–21.2)	0.94	0.65–1.35	0.72	**0.56**	**0.32–0.98**	**0.042**
	Siaya	81	21.8 (16.5–28.2)	**1.35**	**0.94–1.97**	**0.11**	0.98	0.61–1.58	0.925
	Kakamega	23	15.8 (11.0–22.1)	0.91	0.59–1.42	0.68	0.94	0.62–1.43	0.779
	West Pokot	21	17.2 (10.6–26.6)	1.01	0.57–1.80	0.98	0.99	0.35–2.76	0.982
Age, years	15–19	186	34.6 (29.2–40.5)	2.23	1.71–2.91	**<0.001**	**2.46**	**1.68–3.62**	**<0.001**
	20–34	860	14.9 (13.7–16.1)	0.74	0.63–0.86	**<0.001**	0.85	0.70–1.04	0.110
	35–49	448	19.2 (17.1–21.5)	Ref			Ref		
Marital status	Married/cohabiting	1,051	15.9 (14.6–17.2)	Ref			Ref		
	Unmarried	443	20.6 (18.1–23.3)	**1.38**	**1.15–1.65**	**<0.001**	**1.43**	**1.20–1.70**	**<0.001**
Parity	None	286	20.5 (17.4–24.0)	Ref			Ref		
	1	301	13.9 (12.0–16.0)	0.62	0.48–0.82	**0.001**	0.77	0.59–1.01	0.063
	2–3	514	14.8 (13.4–16.4)	0.68	0.53–0.86	**0.001**	0.81	0.61–1.07	0.142
	4+	392	24.0 (21.2–27.0)	1.22	0.95–1.56	0.12	1.26	0.87–1.84	0.227
Education levels	No formal	46	30.0 (20.4–41.8)	**2.68**	**1.55–4.62**	**<0.001**	**2.77**	**1.57–4.87**	**<0.001**
	Primary	689	20.3 (18.4–22.4)	**1.59**	**1.27–2.00**	**<0.001**	**1.51**	**1.11–2.04**	**0.008**
	Secondary	492	15.3 (13.7–17.1)	1.13	0.87–1.47	0.36	1.06	0.80–1.41	0.666
	Tertiary	267	13.8 (11.6–16.4)	Ref			Ref		
Household wealth quintiles	Richest	522	14.8 (13.2–16.7)	Ref			Ref		
	Richer	414	16.6 (14.7–18.8)	1.14	0.94–1.40	0.19	1.01	0.79–1.27	0.962
	Middle	255	19.3 (16.5–22.5)	**1.37**	**1.09–1.74**	**0.008**	1.21	0.89–1.64	0.231
	Poorer	156	20.8 (17.7–24.2)	**1.50**	**1.18–1.91**	**0.001**	1.19	0.88–1.63	0.258
	Poorest	147	29.5 (24.7–34.7)	**2.40**	**1.82–3.17**	**<0.001**	**1.59**	**1.16–2.17**	**0.004**
Media exposure	No	136	21.1 (17.0–25.8)	Ref			Ref		
	Yes	1,358	16.7 (15.5–17.9)	**0.75**	**0.57–0.98**	**0.033**	0.92	0.71–1.20	0.529
CHVs[†]	No	604	18.8 (16.8–20.9)	1.18	1.00–1.40	0.053	1.12	0.80–1.56	0.500
	Yes	846	16.4 (15.0–17.9)	Ref			Ref		
Sexual debut	Sexual debut		17.7 (3.1)	**0.96**	**0.93–0.99**	**0.007**	1.01	0.98–1.05	0.494
Stockouts	No	1,285	17.1 (15.9–18.5)	Ref			Ref		
	Yes	209	15.3 (12.7–18.2)	0.87	0.68–1.12	0.254	1.07	0.76–1.50	0.706
Facility type	Hospital	50	12.0 (9.8–14.7)	Ref			Ref		
	Health centre	920	18.7 (17.1–20.4)	**1.68**	**1.31–2.16**	**<0.001**	**1.64**	**1.12–2.40**	**0.012**
	Dispensary	487	14.8 (13.1–16.7)	1.27	0.97–1.66	0.082	**1.86**	**1.24–2.79**	**0.003**
	Pharmacy and others	37	12.9 (8.6–19.1)	1.09	0.66–1.79	0.75	0.57	0.07–4.50	0.589
Survey year	2014	459	21.0 (18.7–23.6)	Ref			Ref		
	2015	424	15.9 (13.9–18.3)	**0.71**	**0.57–0.89**	**0.003**	**0.67**	**0.52–0.87**	**0.003**
	2016	214	15.6 (13.2–18.3)	**0.69**	**0.54–0.89**	**0.004**	**0.64**	**0.49–0.82**	**0.001**
	2017	204	14.5 (12.2–17.0)	**0.63**	**0.50–0.81**	**<0.001**	**0.61**	**0.48–0.77**	**<0.001**
	2018	193	14.3 (12.2–16.6)	**0.62**	**0.49–0.79**	**<0.001**	**0.61**	**0.47–0.78**	**<0.001**

Ref, reference category; cOR, crude odds ratio; aOR, adjusted odds ratio; CI, confidence interval; [†] facility supports community health volunteers (CHVs). Bold: Statistically significant at $p < 0.05$.

commitment to improving access to FP services in order to increase modern CPR to 66% in 2030 (8). However, despite the increase in modern CPR and the decrease in unmet need for FP, the rates are below the national average of 62 and 12% in 2020, respectively (9), which could indicate a possible urban-rural disparity in FP indicators and underscore the need to strengthen

health systems to improve and promote equal and affordable access to FP services, especially in urban areas. Furthermore, our findings highlight a possible subnational disparity in modern contraceptive use and unmet need for FP, with West Pokot, Kilifi, and Kericho counties having the lowest modern CPR and Kilifi, Kericho, and Siaya counties having the highest unmet need of FP; findings that reinforce the resolve to promote equitable access to FP services countrywide through advocacy and strengthening of the devolved health service delivery at the county level.

Similar to previous studies (36, 37), we found an association between modern contraceptive use and women's age, with teenagers and middle-aged women having higher odds of utilisation and unmet need of FP compared to women aged above 35 years. This could be explained by the early sexual debut (18.1 years), which may result in higher demand for FP that may currently not be sufficiently addressed. This observation is further supported by a survey that found that less than half (44%) of health facilities in urban areas in Kenya offer FP services to adolescents (21) and a study in five Kenyan cities that found that 58% of health service providers imposed minimum age restrictions on some FP methods like injectables hence locking out young women (49). These findings highlight the need for continued advocacy and investment in FP in urban areas in Kenya including the establishment of youth-friendly sexual reproductive health centres to address the unmet need of FP and increase the urban modern contraceptive use.

Married urban women had a high prevalence of modern contraceptive use compared to unmarried women, which could be attributed to their high contact with health facilities during prenatal, antenatal, and postnatal care (50) and the likelihood to discuss birth spacing and limiting with their partners (51–53). However, our study also found that unmarried women had a high unmet need for FP, which confirms findings from previous studies in urban Kenya (38, 39). While some unmarried women are sexually active and desire to have children, there are likely to be teenagers or young women and not in a stable supportive relationship, which could contribute to their unmet need. Also, some health providers are known to discourage unmarried women from using contraceptives due to risk of infertility or difficulty conceiving (49).

Urban women from the poorest households and with lower education levels had higher odds of unmet need for FP and lower odds of modern contraceptive use, a finding consistent with a previous study in urban Kenya (42). With more than half of the urban population in Kenya living in informal settlements (17), poor women in these settlements are more likely to pay for contraception than their richest counterparts (43) and have poor access to healthcare including reproductive services (19) due to fewer lower-level health facilities that are majorly accessed by poor women (54). This argument is supported by our finding that women who accessed FP services from health centres and dispensaries had higher odds of unmet needs for FP compared to those with access to hospitals. In Kenya, only 73% of health facilities in urban areas offer FP services, with better availability of contraceptives in rural facilities compared to urban (21). Also, fewer health centres offer FP services compared to higher-level facilities (21) and are often understaffed, understocked and less equipped to provide some FP services (55) contributing to missed opportunities for FP services (56). On the other hand, poor women are also likely to have a low level of education despite higher education levels being positively associated with modern contraceptive use (40, 41). Educated women tend to have high levels of knowledge on reproductive health and FP (57), and increased autonomy and decision-making power on their health (58) hence their ability to decide on FP use. The persistent socioeconomic disparity in contraceptive use and unmet need for FP may erode gains made by FP programs in Kenya and hence a need to promote equity in contraceptive use in urban Kenya by ensuring equal and affordable access to contraceptive to all urban women through strengthening all healthcare levels to provide FP services.

Consistent with previous studies in urban areas (44, 45), parity was associated with higher odds of use of modern contraceptive use. Women with children are likely to use FP due to the need to space or limit birth compared to nulliparous women. However, women with four or more children also had high prevalence unmet needs for FP; a pattern observed in LMICs (47). Multiparous women have been noted to be less educated, poor (59) and with limited access to health services (60); characteristics that are associated with poor use of contraceptives (42), hence the unmet needs. They are also likely to have experienced method failure which discourages them from using FPs. Despite this, we also found that women with exposure to FP messages in the media, similar to other studies (61), had 30% higher odds of contraceptive use. Women's exposure to FP messages is likely to dispel rumours, myths and misconceptions related to contraceptives and their side effects (46, 47). This finding underscores the key role that media plays in health education, and social and behavioural change communication resulting in increased utilisation of health services including FP.

This study sought to explore factors associated with modern contraceptive use and the unmet need for FP using nationally representative data; possibly making the results generalizable to urban areas in Kenya. However, it should be noted that the study only focused on the prevalence of modern contraceptive use and not the use of any contraceptive method, which may underestimate the proportion of urban women using FP. The study also cannot infer causation due to the cross-sectional nature of the data; and some important variables like religion and user fees on FP were not included due to a higher number of missing observations. Moreover, the study defined urban areas based on the KNBS classification, as used in the dataset (25–31). While the dynamics of urban settings in Kenya are varied, the study used the official classification of urban areas which also guides government planning, development, and policies, and to allow for comparison with previous studies (25–31).

CONCLUSION

Overall, slightly more than half of the urban women in Kenya used contraceptives while about one-fifth had an unmet need for FP. Over time, there was an overall increase in FP use and a simultaneous decrease in the unmet need for FP,

which were associated with sociodemographic, socioeconomic, and contextual factors. Urban areas are unlikely to reach the government FP targets by 2030 if interventions to strengthen the provision of FP services will not be put in place to address the high prevalence of unmet need for FP. These interventions should be targeted towards teenagers, young, unmarried, poor, and uneducated urban women to improve uptake of FP services. Future studies on contraceptives use and unmet needs for FP should disaggregated data by area of residence to unmask possible urban-rural disparities, which needs to be explored further in Kenya.

DATA AVAILABILITY STATEMENT

Data used in this study are publicly available. This data can be found here: https://www.pma2020.org/request-access-to-datasets.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Kenya Medical Research Institute. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

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

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