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Co-creating future social services

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Co-creating future social services

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Editorial: Co-creating future social services

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co-creation, social inclusion, social innovation, social policy, social services, social work, welfare state

Editorial on the Research Topic
Co-creating future social services

Overview

This Research Topic is an extension of the 32nd European Social Services Conference (Antwerp, Belgium, 26–28 June 2024), the European Social Network's annual event. This edition focused on co-creating future community-based social services. Event participants and others working or researching in this field were invited to submit their theoretical and empirical contributions examining co-creation regarding urban social inclusion, workforce management, and digital social service solutions. Emphasis was placed on challenging and refining the sociological, social policy, and social work theories that underpin assumptions about co-production, personalization, social inclusion, and diversity in service provision and evaluation.

Four journals were involved in this project: "Frontiers in Sociology," "Frontiers in Communication," "Frontiers in Digital Health," and "Frontiers in Public Health." The presented collection includes nine articles by 42 authors from China, Greece, Hungary, Indonesia, Israel, Italy, the Netherlands, Norway, and the United States. Four types of articles are included: six original research articles (Huang et al.; Jiao et al.; Li and Li; Lyu; Standaar; Trenggono et al.), one brief research report (Shraga et al.), one review (Lippai et al.), and one opinion (Galioto et al.). The call for papers was open and not limited to conference participants. As a result, the collection includes studies focused on cases from European countries such as Italy, the Netherlands, and Ukraine, as well as thematically related research from China and Indonesia. The studies are organized according to three themes.

Theme I: Co-creating cities' social inclusion

In the first study included in this Research Topic, Lippai et al. propose a meta-theory perceiving wellbeing as a socially constructed representation tied to individual and collective choices affecting quality of life and arguing that current public health approaches

are insufficient. This study advocates for a new "public wellbeing system" built on co-production, aligning with theories emphasizing user participation to meet societal needs. The model applies to co-creating inclusive cities by addressing collective wellbeing and social positioning via participatory service design.

The next two studies focus on cases from China. Li and Li examined Chinese childcare policies framed by social constructionism, which reveal a system dominated by government and institutional actors, highlighting challenges of urban-rural disparities and unequal resource distribution pertinent to social inclusion. The findings indicate insufficient co-creation involving communities and families in developing and implementing health-oriented childcare despite the acknowledged need for collaboration among diverse actors. Enhancing urban social inclusion requires improving negotiation among all stakeholders and sharing responsibilities.

In the next paper, Lyu shows that access to public health services significantly enhances migrant workers' intention to settle in Chinese cities, fostering urban social inclusion by improving their satisfaction and sense of belonging. While confirming service provision's positive impact, the findings highlight the need to tailor services to migrant workers' needs. Applying co-creation by involving migrant workers in service design/adaptation could be crucial for promoting their urban integration.

Theme II: Co-creating responses to manage the future workforce

Huang et al.'s study on hospital operational efficiency in Western China identified declining efficiency and suboptimal resource utilization, implicitly impacting the healthcare workforce environment and suggesting a need for strategic shifts in hospital management. The analysis points to factors such as personnel expenses and resource allocation as areas for improvement. Addressing future workforce challenges could thus involve co-creation and engaging professionals in designing quality-focused work systems and resource management.

The study by Trenggono et al. examined how a university rector utilizes communication patterns, including symbols and rituals, as adaptive strategies to manage the academic workforce and preserve institutional culture amidst challenges such as performance decline and scandals. However, the analysis highlights top-down communication efforts, contrasting with co-creation principles. Co-creation theories suggest that managing the future workforce requires moving beyond unilateral communication toward participatory processes, engaging staff in shaping cultural responses, building trust, and defining resilience.

Theme III: Co-creating digital solutions for social inclusion

The papers included in this section start with Standaar et al., who focus on digital health skills training in Dutch public libraries as a solution to foster social inclusion, revealing that despite identifying diverse, vulnerable groups, these programs struggle to reach beyond older adults due to accessibility issues and client barriers. The findings strongly advocate collaborations (libraries, healthcare, welfare, and community organizations) to enhance reach/diversity, reflecting social policy approaches emphasizing multi-stakeholder co-creation. Effective co-creation thus requires interorganizational partnerships and potentially deeper community engagement.

Jiao et al. provide an analysis of participation drivers in a web-based time bank in China, identifying this digital platform as an explicit form of co-creation aimed at fulfilling unmet social needs and potentially enhancing community social inclusion. Upon analyzing service request narratives, the research reveals that engagement is motivated more by extrinsic rewards (time credits) and intrinsic cues (social connection, personal value) than pure altruism. Understanding these motivations through sociological and social policy lenses is therefore crucial for effectively co-creating digital solutions for social inclusion.

Shraga et al. studied an international, phone-based psychological first aid program for Ukrainian civilians, presenting a digital solution delivered by an informal volunteer group to promote mental wellbeing and social inclusion for a vulnerable population lacking access to formal support. The intervention demonstrates feasibility and positive outcomes, but its informal nature shows limitations of co-creation between volunteers, recipients, and formal systems.

In the final paper, Galioto et al. argue that universities should integrate digital solutions such as social media and innovative technologies into their communication strategies to boost student engagement and sense of belonging, thereby fostering social inclusion within higher education environments. While highlighting the role of university management and researchers in implementing these tools, the emphasis on user interaction/empowerment points toward co-creation over top-down communication. Applying co-creation principles involves actively engaging students in designing/deploying these digital platforms to ensure they promote inclusion and empower diverse voices.

Conclusion

The research results presented in the articles of this collection allow for the formulation of at least five directions for further research. These are: (1) intersectionality in co-creating inclusive support services (Horvath and Carpenter, 2020; Gergen, 2023); (2) ethical frameworks for inclusive digital co-creation (Deserti et al., 2022; Lindberg, 2024); (3) co-designing platforms and building digital literacy for social inclusion (Jarke, 2021; Maciel, 2024; Suoheimo et al., 2025); (4) scaling sustainable co-produced initiatives (Edelmann and Virkar, 2023; van Gestel et al., 2023); and (5) evaluating co-produced social services and comparing them with traditional services (Loeffler and Bovaird, 2021; Nasi et al., 2024; Greve, 2025).

Author contributions

AK: Methodology, Conceptualization, Investigation, Validation, Supervision, Project administration, Writing – review & editing, Writing – original draft. RM: Supervision, Writing – review & editing, Validation. CO: Supervision, Validation, Writing – review & editing. HD: Writing – review & editing, Validation, Supervision.

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Conflict of interest

CO is a director at the Avedis Donabedian Foundation. HD is employed by the Myers-JDC-Brookdale Institute.

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

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Can public health services promote the settlement intention of migrant workers: empirical analysis from China

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Introduction: Enhancing migrant workers' settlement intention in cities requires ensuring they have equal public health rights as urban residents. Full access to public health services can strengthen their sense of belonging and improve the well-being of this vulnerable group. Evaluating the welfare impact of public health services from the perspective of city identification offers valuable insights and informs policies aimed at improving the quality of public health service provision.

Methods: This study utilizes data from the 2017 China CMDS survey. We employed various analytical methods, including the Probit model, IV-Probit model, Propensity Score Matching, and KHB decomposition, to empirically examine the impact of public health services on the settlement intention of migrant workers. Additionally, we explored the underlying mechanisms and heterogeneity of this impact.

Results: Public health services such as health records management and public health education significantly increase the settlement intention of migrant workers. The positive effect of public health services on the settlement intention is more pronounced among migrant workers who have moved across provinces and those who are married. Public health services indirectly enhance the settlement intention by improving urban satisfaction and sense of belonging, with the latter having a more substantial indirect effect.

Discussion: The current provision of basic public health services in China for migrant workers still needs improvement. This highlights the necessity of enhancing health record management, increasing health education and training, and tailoring services to better meet the needs of migrant workers. By improving the supply of public health services, we can effectively raise migrant workers' urban satisfaction and sense of belonging, thereby indirectly increasing their willingness to settle in cities. The findings of this study contribute to further optimizing the implementation of public health service policies and provide meaningful guidance for improving the urban integration of migrant workers.

KEYWORDS

public health services, health record, public health education, migrant worker, settlement intention

1 Introduction

In China, the rapid urbanization and industrialization since the reform and opening-up have led to a widening gap between urban and rural areas, prompting millions of migrant workers to move between these regions. In a broad context, migrant workers refers to individuals who leave their hometowns or places of origin to seek employment or job opportunities in other regions

or countries. In China, the term typically refers to rural laborers who migrate to cities for manual or low-skilled work (1). According to the results of the Seventh National Population Census, by 2021, the number of migrant workers in China reached 375.82 million, accounting for approximately one-quarter of the total population (2). Migrant workers have become a crucial component of China's labor market. According to data from the National Bureau of Statistics, there were 176.58 million migrant workers in China in 2023, an increase of 4.68 million or 2.7% compared to the previous year (3). Among them, 67.51 million migrant workers, accounting for 38.2% of the total internal migrant population moved across provinces. Meanwhile, 109.07 million workers, or 61.8%, migrated within their own provinces. However, due to China's rigid household registration (Hukou) system, most social welfare policies are based on this system, creating constraints under the dual urban–rural structure (4). As a crucial residency document for Chinese citizens, the hukou is an official record issued by the government that verifies an individual's legal residence in a specific area (5). As a result, migrant workers cannot fully enjoy the same social benefits as local residents. This suggests that public health services including programs like the establishment of health records and health education, were traditionally offered as a form of social welfare primarily to urban residents. Migrant workers often face significant barriers when accessing public health services (6). These barriers to accessing benefits have resulted in a "migratory bird" pattern of migration for many migrant workers, rather than permanent relocation. Consequently, the overall willingness of migrant workers to integrate into urban life remains low (7). Ensuring that public health services benefit the vast migrant worker population is a critical yet weak link in the construction of China's public health service system.

Improving the quality and degree of urbanization to promote healthy and stable urban development is a significant challenge faced by governments worldwide (8). Since the implementation of the reform and opening-up policy, a milestone in China's urbanization process, the country has successfully established a market economy. This has led to the migration of hundreds of millions of people from rural areas to cities. According to the National Bureau of Statistics, China's urbanization rate increased from 17.92% in 1978, at the start of the policy, to 66.16% in 2023, with an average annual growth of 1.07%. By the end of 2023, the number of cities nationwide had reached 694, with a total urban population of 673.13 million. Among these, 29 cities had populations exceeding 5 million, and 11 cities had populations over 10 million (9). The core of urbanization lies in the mindset and identity transition of internal migrants. As the primary agents of China's current urbanization process, migrant workers' willingness to settle in urban areas is a key factor in determining the success of urbanization. Multi-faceted urbanization policies, aimed at improving the welfare of migrant workers, play a crucial role in shaping their settlement intentions. The settlement intention of migrant workers refers to their desire to become long-term residents of the cities where they work. To enhance migrant workers' settlement intentions, the Chinese government has been continuously advancing reforms in basic public health services. Since the implementation of the "New Medical Reform" policy in 2009, a series of documents, such as the "Opinions of the Central Committee of the Communist Party of China and the State Council on Deepening the Reform of the Medical and Health System" and the "12th Five-Year Plan for the Development of Health Services," have been issued. These policies emphasize the importance of public health services for migrant workers, aiming to improve their sense of gain and settlement intentions by providing equitable public health services. Despite the expansion of public health services available to migrant workers in their destination cities, their willingness to settle permanently has been steadily declining. This declining settlement intentions has become a new challenge in the urban integration of migrant workers. While the national government places significant emphasis on the top-level design of public health services and has rapidly advanced their implementation, research on the role of public health services in the urbanization process of migrant workers has lagged behind.

The marginal contributions of this paper are reflected in three aspects: First, this paper utilizes data from the China Migrants Dynamic Survey (CMDS), organized by the National Health Commission of China, to systematically evaluate the impact of basic public health services on the willingness of migrant workers to remain in cities. It focuses on two aspects: public health education and health records management, and analyzes the underlying mechanisms at play. Second, this study provides new empirical evidence on how specific public health service measures can improve the living conditions of migrant workers and advance their urban integration process. Third, the findings of this study contribute to understanding the development process of equalizing public health services and offer meaningful theoretical guidance for promoting the equalization of public health services for the migrant population.

2 Literature review and research hypothesis

2.1 Literature review

Entering the 21st century, the number of migrant workers leaving their hometowns to work in cities has steadily increased, driven by China's deepening industrialization process. As the most important human resource in the current labor market, the settlement intentions of migrant workers is crucial for China's urbanization and urban development. Understanding the driving factors behind their settlement intentions is essential for formulating economic development policies. Despite substantial research on this topic, there is still debate regarding the determinants of migrant workers' settlement intentions. Theoretical studies often rely on economic or sociological frameworks to understand labor migration patterns and explore the historical development and future trends of migrant workers' urban integration. Specifically, previous research has used various theoretical frameworks such as immigration economics theory (10), labor market segmentation theory (11), neoclassical economics theory (12), spatial difference theory (13, 14), and income disparity theory (15). These studies have examined the institutional characteristics of the environments in which migrant workers live, individual characteristics, and migration characteristics as explanatory variables in a comprehensive analysis. On the empirical research level, past studies have explored various dimensions such as urban environmental quality (16), economic development policies (17), degree of urban integration (18), communication technology (19), living conditions of the migrant population (20, 21), economic status and public service (22). These factors have all been shown to be associated with the settlement intentions of migrant workers to varying degrees. Public services, as the core and essence of government functions and an important reflection of government responsibility, have a significant impact on migrant workers' willingness to settle in cities. This influence has been a focal point of numerous studies. Previous research has examined the effect of public services on migrant workers' settlement

intentions from both micro and macro perspectives. The study covers various service areas, including regional talent allocation, technology business incubation, cross-regional collaboration, higher education investment, and public health services (23). As a vital component of public services, public health services are a key pathway to achieving universal health coverage (24). When research is focused specifically on public health services, most existing studies concentrate on several key areas: the progress of public health service implementation, the various factors influencing the equalization of public health services, and the impacts these services have (25, 26).

Existing literature on the factors influencing migrant workers' willingness to settle in cities often focuses on public services such as labor protection, basic education, social insurance, and infrastructure development. These studies recognize the importance of these public services in enhancing the settlement intentions of the migrant population and promoting their urban integration. However, the impact of public health services is frequently overlooked or only included as a control variable in the analysis. Systematic research specifically targeting public health services is rare. Existing studies that treat it as an explanatory variable largely focus on the fairness of policy promotion and implementation (27). Some empirical studies have examined the impact of public health services on various aspects such as labor supply, the utilization level of medical services, health status, and capabilities (28, 29, 30, 31). From a core objective perspective, the fundamental value of public health services lies in ensuring that every resident has access to essential services for protecting and maintaining their health (32). Previous studies have explored the priorities of various countries regarding the value objectives of public health services. For instance, some countries focus more on balancing the quantitative allocation of healthcare within the public health service process (33). Long-term practice in public health services has led China's government health departments to recognize that providing high-quality and equitable public health services to all residents, including migrants, is of utmost importance (34). Migrant workers, as key participants and contributors to China's economic and social development, have nonetheless been marginalized in terms of access to public health services in previous research (35). For a long time, migrant workers in China have had relatively weak public health awareness and are more susceptible to diseases, making them a "vulnerable" group in health risk management (36). Therefore, the quality of public health services available to this group deserves greater attention.

2.2 Theoretical analysis and research hypothesis

Migration theory posits that institutional adjustments and the implementation of public policies are significant factors influencing population migration (37). Among these factors, the construction of institutions and implementation of policies related to public health resources have a significant impact on the institutional trust and settlement intentions of the migrant population in the applicable areas. According to institutional theory, public political trust stems from their confidence in the political system and their assessment of the system's performance (38). Within the existing institutional framework, government governance performance encompasses various aspects, including economic, social, and public resource provision. One crucial element is the accessibility of public health resources to individuals, which reflects the extent to which individuals can benefit from these resources (39). In fact, striving to achieve the equalization of public health resources has been a policy trend of the Chinese government in recent years, a trend that has become particularly prominent since 2009 (40). Equalization refers to the principle that the migrant population should enjoy public health services provided by the government on the same basis as the local registered population, without any differences (41). The ultimate goal of public health resource provision is to balance efficiency and equity, ensuring that all members of society have as fair access to public resources as possible (42). This accessibility is a rational reflection of governance performance from the subjective perspective of citizens. The essence of urban integration lies in granting migrant workers equal social rights, with access to public health services being one of the most fundamental of these rights. A key prerequisite for achieving this outcome is that migrant workers, as the primary group within the floating population, possess a desire for urban integration. This desire is rooted in their settlement intentions permanently. Migrant workers' settlement intentions are closely tied to the household registration hukou system. China's relatively rigid hukou system leads to significant variation in their intention to change residency status, as different regions impose different registration barriers (43). A reasonable policy approach, therefore, would be to optimize the provision of public health services to mitigate the impact of the household registration system. This would better protect the health rights of migrant workers and, in turn, increase their settlement intentions.

What is the mechanism through which public health service provision influences migrant workers' willingness to settle in cities? As a public service provided by the government, public health services were originally restricted by the household registration system. In the past, these services primarily focused on prioritizing the local registered population (44). The goal of optimizing public health service provision is to overcome the limitations imposed by the household registration system. This approach extends social rights to migrant workers, effectively allowing a partial transfer of social rights typically reserved for the local registered population (45). This transfer of social rights reflects the city's recognition of migrant workers as local social citizens. It helps reduce the psychological distance between migrant workers and the city, strengthens their sense of belonging and identification with urban life, and increases their willingness to remain in the city. A possible mechanism is that public health services foster a stronger sense of urban satisfaction among migrant workers, thereby increasing their settlement intentions. This identification typically encompasses various aspects, such as urban satisfaction and urban belonging (46). This perception of urban satisfaction reflects an individual's overall feelings about various aspects of their city's environment, including infrastructure, public services, and cultural values (47). According to the Theory of Planned Behavior, individuals make rational decisions based on their attitudes, subjective norms, and perceived behavioral control (48). According to the Theory of Planned Behavior, migrant workers' settlement intentions depends on their attitudes (city preference), subjective norms (identity recognition), and perceived behavioral control (migration motivation). Migration motivation directly influences their migration behavior, while city preference and identity recognition impact their behavior through their sense of identification with the city they move to (49). Settlement intention is constrained by this sense of identification. Migrant workers who have higher satisfaction with the city and a

stronger sense of belonging are more likely to settle in urban areas. Based on this analysis, this paper proposes the following research hypothesis:

> H1: Public health services significantly increase the willingness of migrant workers to settle in cities.
>
> H2: Public health services enhance the settlement intention of migrant workers by improving their urban satisfaction and urban belonging.

3 Materials and methods

3.1 Study design and data sources

This study utilizes data from the China Migrants Dynamic Survey (CMDS), which is an annual large-scale national survey of the migrant population organized by the National Health Commission since 2009. The survey includes migrant individuals aged 15 and above who have lived in their destination for more than 1 month and do not have local household registration, covering all 31 provinces, municipalities, and autonomous regions in China. The survey encompasses various aspects of the migrant population and their family members, including migration patterns and trends, health status, health record establishment, employment, income and housing, and marital status. For this study, we used data from the 2017 CMDS. The survey used the 2017 annual population mobility report data from all 31 provinces (autonomous regions, municipalities) and the Xinjiang Production and Construction Corps as the basic sampling frame. A stratified, multi-stage, probability proportional to size (PPS) sampling method was employed. The sample distribution covers 1,459 county-level areas, 3,776 townships, and 8,993 neighborhood committees across various provinces, cities, and counties nationwide, with a total of 169,989 survey responses. Given that the focus of this study is on migrant workers, only the agricultural household registration population that has migrated for work is retained. After excluding samples with missing key information, the final full sample includes 79,715 observations of migrant workers.

3.2 Variable measurement

3.2.1 Dependent variables: settlement intention

The dependent variable in this study is the willingness of migrant workers to settle in cities. We measure this using the 2017 CMDS questionnaire item from the "Migration and Settlement Intentions" section, which asks, "Do you plan to continue staying here for the next period?" The questionnaire provides six response options: "1–2 years," "3–5 years," "6–10 years," "more than 10 years," "settle permanently," and "undecided." Following previous research (50), we define the assignment rule as follows: if respondents are willing to stay in their current location for more than 5 years (including the options "6–10 years," "more than 10 years," and "settle permanently"), the settlement intention variable is assigned a value of 1; otherwise, it is assigned a value of 0. According to the sample data used in this study, 48.52% of respondents indicated a willingness to stay in their current location for more than 5 years.

3.2.2 Independent variables: public health services

Public health services are the core explanatory variable in this study. According to the "Pilot Work Plan for Equalization of Public Health Services for Migrant Populations," issued in 2013 by the former National Health and Family Planning Commission, basic public health services for migrant populations include multiple components: public health education, health records management, vaccination for migrant children, and maternal and child health management for migrant women and children. Referencing previous research (51) and considering the actual public health services provided by grassroots medical institutions, this study uses the establishment of health records and receipt of health education as proxy variables for public health services. In the questionnaire, the question regarding the establishment of health records is "Has a resident health record been created for you in this location?" Responses are coded as 1 for "Yes, established" and 0 for all other answers. The question regarding receipt of health education is "In the past year, have you received any of the following public health education topics in the destination location: nutritional health knowledge, occupational disease prevention, smoking control, mental disorder prevention, infectious disease prevention, etc.?" If respondents received at least one type of health education, they are considered to have received public health education, coded as 1; otherwise, they are coded as 0. Among the respondents, 73.85% received at least one type of health education, but only 29.53% had established health records.

3.2.3 Controlled variables

This study, based on the 2017 CMDS survey data and previous research (52), controls for several variables that may influence migrant workers' settlement intention. These variables include individual characteristics, family characteristics, and migration characteristics. The individual characteristic variables encompass age, gender, and education level. Family characteristic variables include marital status, family size, and average monthly household income. Migration characteristic variables cover the scope of migration and the duration of migration. Descriptions of these variables are presented in Table 1.

3.3 Statistical methods

To assess the impact of basic public health services on the urban settlement intentions of internal migrants, we use Stata 18.0 for the analysis. Given that the dependent variable, settlement intention, is a binary variable, a Probit model is employed for regression analysis. The specific model setup is as follows:

$$Probit\left(Settlement_i = 1\right) = F\left(\alpha_1 + \beta_1 FILE_i + \beta_2 EDU_i + \gamma_1 CONTROL_i + \varepsilon\right)$$

In this model, $\mathrm{Settlement}_i$ represents settlement intention, $FILE_i$ represents the establishment of health records, EDU_i represents the receipt of health education, $CONTROL_i$ serves as a control variable, ε is the random error term. β_1 is the coefficient representing the impact of establishing health records on settlement intention, β_2 represents the coefficient for the impact of receiving health education on settlement intention, γ_1 is the coefficient for the control variables. This

TABLE 1 Data definition and descriptive statistics.

Variable	Definition	Mean	SE	Min	Max
Settlement intention	Whether they are willing to live in the local area for 5 years and above: Yes = 1; No = 0	0.485	0.5	0	1
Health records	Whether or not a population health record has been established: Yes = 1; No = 0	0.295	0.456	0	1
Health education	Whether or not receive at least one type of health education: Yes = 1; No = 0	0.738	0.439	0	1
Age	Age in years	37.811	9.1	17	60
Gender	Male = 1; Female = 0	0.572	0.495	0	1
Marital status	Married = 1; Unmarried/Divorced/widowed = 0	0.835	0.371	0	1
Education level	Illiteracy = 1; Elementary school = 2; Middle school = 3; High school/vocational school = 4; 3-year college = 5; 4-year college = 6; Graduate = 7	3.331	1.029	1	7
The flow distance	Cross-provincial mobility = 1; Intra-provincial mobility = 0	0.505	0.5	0	1
The flow time	Time in years	8.084	6.029	2	47
Monthly household income	Income in months	7,255.776	5,421.658	50	200,000
Family size	Size in members	3.254	1.166	1	10

study's estimation model may face endogeneity issues. The impact of public health services on migrant workers' urban settlement intentions may involve a self-selection problem. The level of public health services that migrant workers receive depends not only on the public service provision in the destination city but also on the differentiated demand for public health services among migrant workers. Some migrant workers with a strong intention to settle in the city may be more proactive in obtaining public health services. Conversely, individuals who prioritize public service experiences may be more inclined to settle in areas with higher levels of public health service provision. This creates a bidirectional causality problem. Additionally, the estimation model may suffer from endogeneity due to omitted variables. To address these potential endogeneity issues, this study also employs the IV-Probit model and Propensity Score Matching (PSM) model. The IV-Probit model uses effective instrumental variables to handle problems caused by omitted variables, bidirectional causality, and measurement errors. This approach helps mitigate the endogeneity concerns and provides more robust results. PSM is an effective method for reducing confounding effects and addressing potential endogeneity issues in the model (53). In this study, we employ K-nearest neighbor matching, radius matching, and kernel matching methods to jointly examine health effects.

4 Empirical results

4.1 Baseline regression

The estimation results of the impact of public health services on the settlement intentions of migrant workers, obtained from the probit model regression, are presented in Table 2. Models 1 and 3 in Table 2 show the basic regression results of establishing health records and receiving health education on the settlement intentions of migrant workers, respectively, without including control variables. Models 2 and 4 incorporate individual characteristics, family characteristics, and mobility characteristics as control variables, providing adjusted regression results for the impact of health records and health education on settlement intentions.

In Model 1, the regression coefficient for establishing health records is 0.155 ($p < 0.01$). When control variables are added in Model 2, the regression coefficient is 0.121 ($p < 0.01$). For Model 3, the regression coefficient for receiving health education is 0.103 ($p < 0.01$), and with the inclusion of control variables in Model 4, it is 0.067 ($p < 0.01$). These results indicate that both establishing health records and receiving health education have a significant positive impact on the settlement intentions of migrant workers.

Regarding control variables, migrant workers who have a wider range of movement tend to have lower settlement intentions in cities. Higher settlement intentions are associated with being married, having a higher education level, longer duration of mobility, higher average monthly household income, and larger household size. Age and gender do not significantly influence the settlement intentions of migrant workers.

4.2 Endogenous tests

4.2.1 Instrumental variable estimation tests

To estimate using the IV-Probit model, suitable instrumental variables must be identified. These variables should be correlated with the improvement in public health service levels but should not directly influence the current urban settlement intentions of migrant workers. In this study, the diagnosis of chronic diseases (hypertension or diabetes) among migrant workers is used as an instrumental variable. This variable serves as a forward-looking indicator of basic public health service investment, significantly influencing subsequent efforts to enhance health record coverage and health education training. The worsening of chronic disease diagnoses among migrant workers prompts local governments to increase their public health service

TABLE 2 Regression results of factors influencing migrant workers' settlement intention.

Variables	(1)	(2)	(3)	(4)
Health records	0.155*** (0.010)	0.121*** (0.010)		
Health education			0.103*** (0.010)	0.067*** (0.010)
Age		−0.001 (0.001)		0.001 (0.001)
Gender		−0.001 (0.009)		−0.003 (0.009)
Marital status		0.272*** (0.016)		0.272*** (0.015)
Education level		0.171*** (0.015)		0.171*** (0.005)
The flow distance		−0.377*** (0.009)		−0.380*** (0.009)
The flow time		0.043*** (0.0001)		0.043*** (0.001)
Monthly household income (ln)		0.210*** (0.001)		0.209*** (0.001)
Family size		0.030*** (0.004)		0.030*** (0.005)
Cons	−0.083*** (0.005)	−2.983*** (0.079)	−0.114*** (0.009)	−2.999*** (0.079)
Observations	79,713	79,713	79,713	79,713
Pseudo R^2	0.023	0.068	0.010	0.067

Robust standard errors in parentheses. $^{**}p<0.05$, $^{***}p<0.01$.

TABLE 3 Instrumental variable estimation tests.

Variables	(1)	(2)	(3)	(4)
	The first stage	The second stage	The first stage	The second stage
Follow-up and physical examination	0.084*** (0.012)		0.583*** (0.086)	
Health records		1.395*** (0.420)		
Health education				0.201*** (0.060)
Control	Yes	Yes	Yes	Yes
Observations	79,715	79,715	79,715	79,715
Wald (chi 2)	11.00***		10.61***	

Robust standard errors in parentheses. $^{**}p<0.05$, $^{***}p<0.01$.

investments for the migrant population, generally without a direct correlation to the individual settlement intentions of these workers.

Table 3 presents the regression results based on the IV-Probit model. From the first-stage estimation results in columns (1) and (3) of the IV-Probit model, the diagnosis of chronic diseases among migrant workers has a significant positive impact on both public health education and health record management, indicating that the instrumental variable meets the relevance condition. The Wald test parameters for health record management and public health education in the IV-Probit model are 11.00 and 10.61, respectively, both significant at the 1% level. This suggests that public health education and health record management are endogenous variables, making the IV-Probit model's estimates more reliable than those from the Probit model.

In the second-stage estimation results in columns (2) and (4) of the IV-Probit model, establishing health records and receiving health education both significantly enhance migrant workers' urban settlement intentions. These findings are consistent with previous estimation results, confirming that the positive impact of public health services on the settlement intentions of migrant workers is robust, thereby further supporting Hypothesis 1.

4.2.2 Propensity score matching

This study uses PSM to further examine the impact of establishing health records and receiving health education on the urban settlement intentions of migrant workers. Three matching methods were employed: nearest neighbor matching, radius matching, and kernel matching. Table 4 presents the average treatment effects (ATT) obtained from the PSM analysis. The ATT coefficients for establishing health records are 0.051, 0.052, and 0.057, respectively. For receiving health education, the ATT coefficients are 0.032, 0.041, and 0.029. All differences are significantly positive at the 1% level. These findings indicate that both establishing health records and receiving health education significantly enhance the urban settlement intentions of migrant workers, consistent with the basic regression results.

Figures 1, 2 display the propensity score distributions for health records before and after matching, while Figures 3, 4 show the propensity score distributions for health education before and after matching. The matching method used in these analyses is one-to-one matching.

4.3 Robustness test

To further verify the robustness of the impact of establishing health records and receiving health education on the urban settlement intentions of migrant workers, we conducted robustness checks by substituting the dependent variable, using alternative analytical models, and adding control variables. The results of these robustness checks are presented in Table 5.

4.3.1 Dependent variable replacement

To ensure the robustness of our findings, we replaced the urban settlement intention variable with the intention to transfer household registration as the dependent variable. The intention to transfer household registration reflects migrant workers' willingness to change their residential registration, thereby indicating a long-term or permanent settlement in the destination city. Similar to the urban settlement intention variable, the intention to transfer household registration is set as a binary variable. The specific survey question was, "If you meet the local household registration requirements, are you willing to transfer your household registration here?" Responses of "yes" were coded as 1, and "no" were coded as 0. The estimation results are shown in columns (1) and (2) of Table 5, where columns (1) and (2) represent the impact of establishing health records and

TABLE 4 PSM result.

Variables	Matching types	Treated	Controlled	ATT	S.E	T-value
Health records	K-nearest neighbor matching	0.529	0.478	0.051	0.004	11.69***
	Radius matching	0.529	0.471	0.052	0.004	14.95***
	Kernel matching	0.529	0.472	0.057	0.004	14.60***
Health education	K-nearest neighbor matching	0.496	0.464	0.032	0.004	7.11***
	Radius matching	0.495	0.455	0.041	0.004	9.99***
	Kernel matching	0.495	0.467	0.029	0.004	9.16***

Robust standard errors in parentheses. **$p < 0.05$, ***$p < 0.01$.

TABLE 5 Robustness checks.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable replacement		Logit model		Add control variables	
Health records	0.041*** (0.010)		0.197*** (0.016)		0.114*** (0.010)	
Health education		0.003*** (0.001)		0.110*** (0.017)		0.070** (0.011)
Control	YES	YES	YES	YES	YES	YES
Constant	−1.000*** (0.076)	−0.999*** (0.076)	−4.862*** (0.130)	−4.888*** (0.130)	−2.961*** (0.079)	−2.977*** (0.079)
Pseudo R^2	0.012	0.011	0.069	0.068	0.074	0.073
Observations	79,713	79,713	79,713	79,713	79,713	79,713

Robust standard errors in parentheses. **$p < 0.05$, ***$p < 0.01$.

receiving public health education on migrant workers' intention to transfer household registration, respectively. The results indicate that public health measures such as establishing health records and receiving public health education significantly enhance migrant workers' intention to transfer household registration.

4.3.2 Model replacement

To further verify the robustness of our experimental results, columns (3) and (4) of Table 5 report the effects of establishing health records and receiving health education on the settlement intentions of migrant workers using a binary Logit model instead of the Probit model. The impact coefficients are 0.197 ($p < 0.01$) and 0.110 ($p < 0.01$), respectively. These estimation results demonstrate that public health measures such as establishing health records and receiving public health education significantly enhance migrant workers' intention to transfer household registration.

4.3.3 Add control variables

Previous studies have found that land ownership is a significant factor influencing the settlement intentions of migrant workers (54). This implies that migrant workers who own contracted land in their hometowns are less likely to settle in the destination cities. Based on this, models 5 and 6 in Table 5 incorporate the control variable "land ownership status." The specific survey question was, "Do you have a homestead in your registered hometown?" The regression coefficients for health records and health education are 0.010 ($p < 0.01$) and 0.070 ($p < 0.01$), respectively. The results indicate that the coefficients for health records and health education on the settlement intentions of migrant workers are significantly positive at the 1% level.

5 Further analysis

5.1 Explanatory mechanism

Given that the dependent variable in this study is binary, we use the KHB decomposition method (55) to examine the mechanisms through which public health services affect the urban settlement intentions of migrant workers. This method is suitable for situations where the dependent variable is discrete and has gained widespread application in recent research. We selected urban satisfaction and sense of belonging as mediating variables for our analysis. Urban satisfaction is measured by respondents' agreement with the statement "I like the city/place where I currently live" from the CMDS questionnaire. Sense of belonging is assessed based on agreement with the statement "I am very willing to integrate with the local people and become one of them." Responses are coded as 1 (Strongly Disagree), 2 (Disagree), 3 (Agree), and 4 (Strongly Agree). Table 6 presents the estimation results using the KHB method, illustrating how these mediating variables influence the relationship between public health services and the urban settlement intentions of migrant workers.

From columns (1) and (3) of Table 6, we can see that the indirect effect of urban satisfaction is significantly positive at the 1% level. This indicates that establishing health records and providing public health education indirectly enhance migrant workers' urban settlement intentions by improving their urban satisfaction. Similarly, columns (2) and (4) show that the indirect effect of sense of belonging is also significantly positive at the 1% level. This means that both establishing health records and receiving public health education increase migrant workers' urban settlement intentions by enhancing their sense of

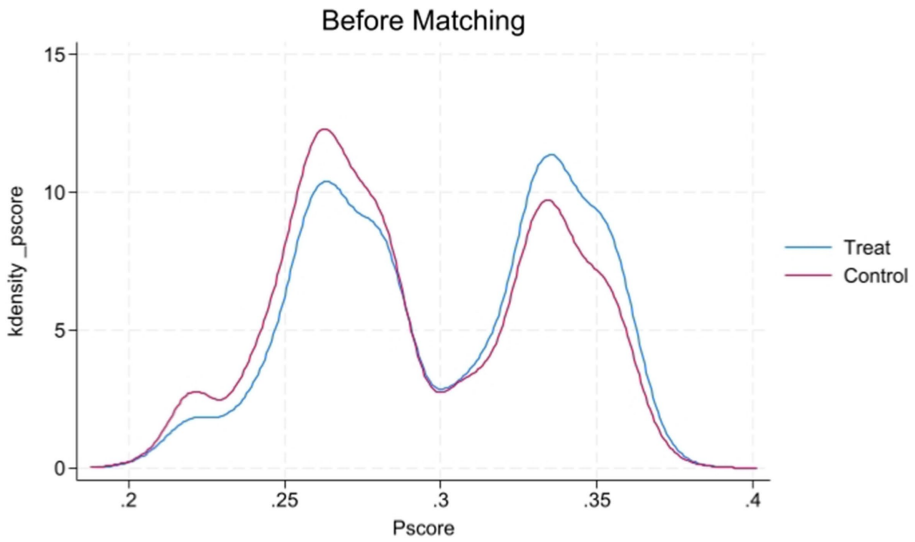

FIGURE 1
Kernel density plot of propensity scores before matching for health records.

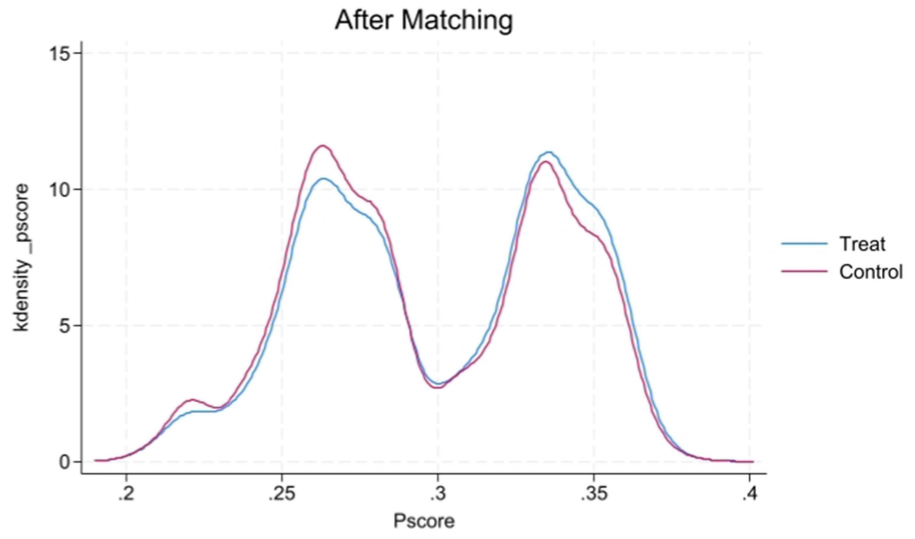

FIGURE 2
Kernel density plot of propensity scores after matching for health records.

belonging to the city. Further analysis reveals that the indirect effect of urban satisfaction accounts for 26 and 31% of the total effect of health records and public health education, respectively, on migrant workers' urban settlement intentions. The indirect effect of sense of belonging constitutes 34 and 46% of the total effect of health records and public health education, respectively. These findings indicate that public health services can indirectly increase migrant workers' urban settlement intentions by improving urban satisfaction and sense of belonging, with a greater indirect effect from sense of belonging. This further supports Hypothesis H2.

5.2 Heterogeneous analysis

Building on previous research and considering the impact of control variables on the dependent variable, this study conducts further heterogeneity analysis based on spatial and family dimensions. The analysis focuses on migrant workers with varying migration distances and marital statuses. Table 7 presents the results of the heterogeneity analysis.

Columns (1) and (2) of Table 7 report the differences in the impact of health records and health education on the urban settlement

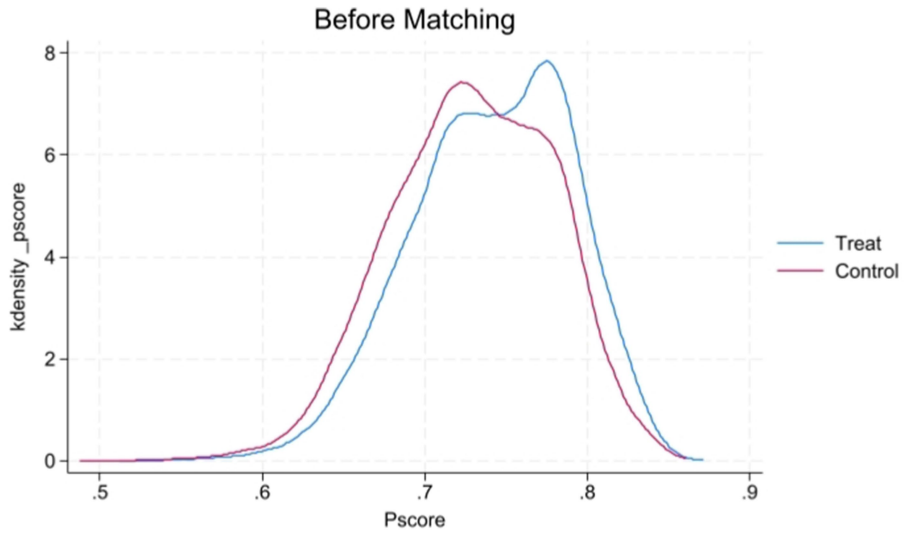

FIGURE 3
Kernel density plot of propensity scores before matching for health education.

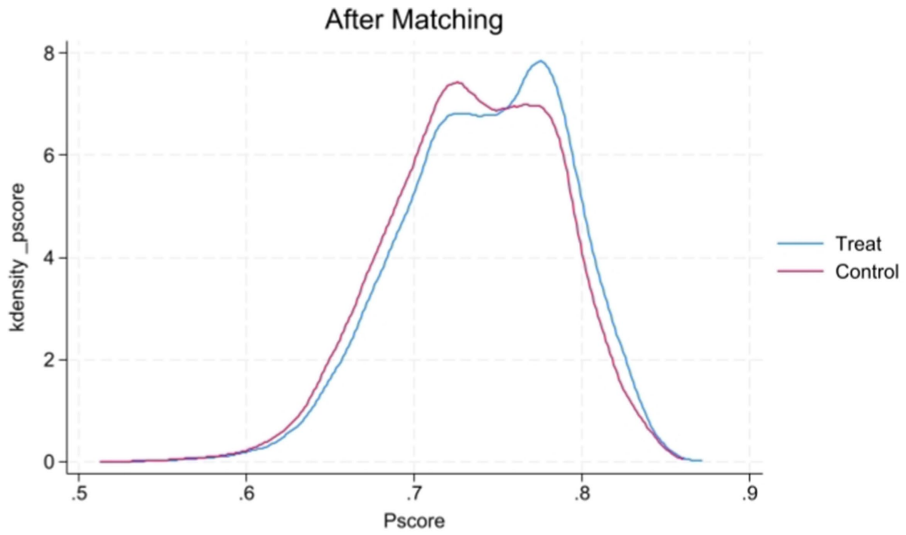

FIGURE 4
Kernel density plot of propensity scores after matching for health education.

intentions of migrant workers based on migration distance. The regression results indicate that the effects of establishing health records and receiving health education are more significant for migrant workers who move across provinces, with impact coefficients of 0.154 and 0.116, respectively, both significant at the 1% level. A possible explanation for this is that inter-provincial migration often involves greater challenges due to being far from home and family, as well as significant differences in lifestyle and culture. As a result, migrant workers who move across provinces face more difficulties in adapting to and integrating into urban society (56). In particular, in large metropolitan areas, this process represents an opportunity to shape urban life through access to various resources and opportunities. Establishing health records and receiving health education play a crucial role in helping migrant workers overcome these challenges, thereby significantly enhancing their settlement intentions in such cities (57). This situation requires greater attention and support from the city. Public health services such as health record management and public health education can precisely meet the needs of migrant workers, thereby enhancing their sense of belonging to the city and increasing their settlement intentions.

Columns (3) and (4) of Table 7 report the differences in the impact of health records and health education on the urban settlement intentions of migrant workers based on marital status. The regression results show that the effects of establishing health records and receiving health education are more significant for married migrant workers, with impact coefficients of 0.139 and 0.103,

TABLE 6 Explanatory mechanism.

Variables	Health records		Health education	
	Urban satisfaction	Urban belonging	Urban satisfaction	Urban belonging
	(1)	(2)	(3)	(4)
Total effect	0.062*** (0.004)	0.061*** (0.004)	0.042*** (0.004)	0.041*** (0.004)
Direct effect	0.046*** (0.004)	0.040*** (0.004)	0.029*** (0.004)	0.023*** (0.004)
Indirect effect	0.016*** (0.001)	0.021*** (0.001)	0.013*** (0.004)	0.019*** (0.004)
Control	YES	YES	YES	YES
Observations	79,715	79,715	79,715	79,715

Robust standard errors in parentheses. **$p < 0.05$, ***$p < 0.01$.

TABLE 7 Heterogeneous analysis.

Variables	(1)	(2)	(3)	(4)
	The flow distance		Marital status	
	Cross provincial	Intra provincial	Married	Unmarried
Health records	0.154*** (0.015)	0.122*** (0.014)	0.139*** (0.011)	0.092*** (0.026)
Health education	0.116*** (0.014)	0.060*** (0.015)	0.103*** (0.011)	0.010** (0.003)
Control variables	YES	YES	YES	YES
Observations	40,281	39,432	66,549	13,164

Robust standard errors in parentheses. **$p < 0.05$, ***$p < 0.01$.

respectively, both significant at the 1% level. From a family perspective, the settlement decisions of migrant workers are closely related to each family member. When choosing to migrate to a city, migrant workers aim to maximize expected benefits while minimizing risks to the family. Public health measures like health record management and health education can provide the necessary support and stability, making it easier for married migrant workers to settle in urban areas (58). For married migrant workers, the establishment of a marital relationship allows both partners to share life risks, which helps alleviate the pressures of living in the destination city (59). In this context, the impact of public health services on one partner's settlement intentions is likely to be transmitted through social relationships to the other partner. This finding aligns with previous research, which suggests that migrant workers who move together with family members (spouse, children) or in pairs tend to stay longer in the destination city compared to those who move alone (60). Moreover, the migration structure of migrant workers is gradually shifting from individual migration to family migration.

6 Conclusions and implications

Based on CMDS2017 data, this study empirically examines the impact of public health services, such as establishing health records and public health education, on the urban settlement intentions of migrant workers using a probit model. Furthermore, the study explores the mechanisms and heterogeneity of these effects. As one of the developing countries with the largest migrant population in the world, the findings of this research can help optimize the implementation of public health service policies and provide meaningful guidance for enhancing the urban integration of migrant workers.

The results of this study indicate the following:

First, as key aspects of public health service provision, establishing health records and receiving health education have substantially increased migrant workers' urban settlement intentions. The impact of establishing health records is even more pronounced. This conclusion remains robust after being tested through instrumental variable methods, propensity score matching, substituting dependent variables, modifying analytical models, and adding control variables.

Second, public health services have a greater positive impact on the settlement intentions of migrant workers who move across provinces and those who are married.

Third, the mechanism analysis reveals that public health services can indirectly influence migrant workers' urban settlement intentions through urban satisfaction and urban belonging, with the latter having a stronger indirect effect.

Based on these findings, the following policy implications can be considered to enhance urbanization processes and improve the efficiency of human capital allocation.

First, expand the coverage of electronic health records. Enhance the management of health records and promote related public awareness and guidance to increase the knowledge and utilization of public health services. In the context of the current digital transformation of public health services, efforts should be made to improve the creation rate of electronic health records and consequently improve health levels. Standardize data across health records and eliminate discrepancies in data standards among medical institutions and other government departments. This will lay a solid foundation for the widespread use of electronic health records, thereby further increasing the urban settlement intentions of migrant workers and other internal migrants.

Second, improve the quality and specificity of health education. Move away from traditional, uniform, and standardized education content and methods by tailoring public health education to local conditions. Considering the migration characteristics of migrant workers, focus health education efforts on the communities where they reside. Enhance the specificity of educational content, with particular emphasis on public health education activities targeting married migrant workers and those who have migrated across provinces.

Third, enhance social integration levels for migrant workers. Social integration is a key factor influencing the urban settlement intentions of migrant workers, necessitating further enhancement of public health services to boost urban satisfaction and urban belonging. Given that communities are the fundamental units of urban life, they should be the primary arenas for social interaction. Develop and strengthen community services and management systems that cover migrant workers, ensuring that communities effectively facilitate social integration. Foster a friendly and supportive community atmosphere to help migrant workers better integrate into the city, thereby increasing their sense of belonging and identification with the urban environment.

Data availability statement

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

Author contributions

TL: Writing – original draft, Writing – review & editing.

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Conflict of interest

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

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Division of childcare policy actors under health-oriented goals: thematic analysis of China's policy texts from the social constructionist perspective

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Background: Ensuring child health, as a key objective of global childcare policies, requires coordinated efforts between the government, social organizations and communities, institutions, and families. Despite China's progress in comprehensive childcare policy development, rapid economic growth, and urbanization, challenges persist, such as urban–rural disparities and unequal resource distribution, highlighting the need for effective collaboration between policy actors.

Methods: To collect textual data, this study searched for prefectural-level childcare policy texts issued since 2019 on government websites and legal databases, ultimately identifying 224 documents for analysis. This study reviewed the literature on the impact of childcare policies on child health and identified the enhancement of childcare quality as a current research focus. This study then conducted a content analysis using Nvivo12 Plus software and coded and analyzed the childcare policy content. Finally, it applied social construction theory to interpret the policy documents.

Results: Childcare policies were centered around child health and formed a responsibility and accountability framework between the government, social organizations and communities, institutions, and families, whose action shares accounted for 38.9, 22.89, 29.05, and 9.16%, respectively. The development of childcare institutions was a key aspect of the defamilialization trend. Compared to other policy actors, institutions played a larger role in child health policy aspects such as safety management (12.97%), health and hygiene (8.56%), and scientific parenting (10.93%).

Conclusion: Within China's health-oriented framework, the refamilialization and defamilialization processes coexist in terms of childcare policies, and limited community-based childcare resources extend beyond the family. The participation of diverse policy actors in China's childcare system is expected to persist, underscoring the increased need to enhance the policy actors' negotiation skills and bolster community-based childcare services in the future.

KEYWORDS

health-oriented goal, childcare policies, policy actor, social construction, China

1 Introduction

Child health is a global priority that impacts physical and psychological wellbeing and shapes social welfare and development potential in the future. Consequently, promoting child health is a key objective in the implementation of childcare policies worldwide (1). China, as one of the most populous nations, has introduced specialized childcare policies that emphasize child health and advocate for the involvement of diverse stakeholders. This approach benefits countless Chinese families and children and provides an informative model for other developing nations, meriting closer scholarly investigation.

The United Nations (UN) Convention on the Rights of the Child (CRC) forms a significant foundation of global childcare policy development. Adopted by the UN General Assembly on November 20, 1989, the CRC comprises a comprehensive framework that safeguards children's rights, health, and wellbeing. It also prioritizes the advancement of children's physical, psychological, and emotional health through a targeted care policy.[1] Ratified by 196 countries, the CRC has spurred a worldwide commitment to prioritize children's needs and rights within national policy frameworks,[2] and evidence indicates growing global endorsement of childcare policies (2). Globally, childcare policies can be divided into three models based on the policy actors involved. The first type, "optional familialism," involves government support and resources. It grants families the autonomy to choose between State assistance and private caregiving options, so as to promote diversity and flexibility in its implementation. France, for example, supports families by providing public childcare services, particularly for children aged 0–2 years, when parents still play a considerable caregiving role (3). In Nordic countries such as Denmark, Finland, Sweden, and Norway, early childhood education and childcare services are primarily State funded and are often free or subsidized, ensuring universal access to high-quality care (4–6). The second type, "implicit familialism," is characterized by minimal governmental support for family caregiving and a lack of policy to ease the caregiving burden. This approach subtly reinforces the family as the primary welfare provider, leaving them with substantial caregiving responsibilities. In response to the inconsistent quality of childcare services and the demand for improved standards, the United States (US) introduced the Quality Rating and Improvement System to assess and improve the quality of early childcare services to support children's cognitive and emotional development, with implementation across the US by 2017 (7). Meanwhile, East Asian nations are increasingly viewing childcare policies as essential for addressing declining birth rates. Japan, for example, has championed stakeholder engagement through the Comprehensive Support System for Children and Childrearing to foster a cohesive and high-quality early childhood education and childcare environment (8). Meanwhile, South Korea's childcare policies are increasingly regarding caregiving as a social responsibility and shifting toward family support systems, including formal support for multicultural families (9). The third type, "explicit familialism," involves deliberate government actions that empower families in their caregiving roles, albeit with limited alternative institutional support. Germany, for example, has introduced dual-earner family policies that encourage parents to balance work and caregiving responsibilities through public services, economic assistance, and flexible work policies, so as to support family caregiving for young children (10). In sum, the predominant trends in global childcare policies emphasize early childhood education and childcare, promote gender equality, and highlight the development of public service-led support systems. These initiatives emphasize the safeguarding of child health a crucial goal in the global implementation of childcare policies. However, achieving these health objectives requires the involvement of family units alongside effective collaboration between and support from various social actors (11, 12). Therefore, examining the roles of different policy actors within the childcare policy framework can enhance the understanding of and optimize the system's capacity to protect child health.

Under the CRC's influence, China's childcare policies have evolved along a systematic and refined developmental path and have been continuously updated and improved over time. Based on the CRC, China issued the 1992 *Outline of the Development Plan for Chinese Children in the 1990s* based on national conditions; this was the first national action plan that focused on children and promoted their development. Subsequently, the Chinese government has formulated and implemented the *China Children's Development Plan* (CCDP) every decade, with four editions published to date. Analyzing the release and execution of the CCDP provides the following valuable insights into the impact of China's childcare policies on child health over the past 30 years. First, in terms of its overall effectiveness, infant mortality and under-five mortality rates significantly decreased from 51 and 61% in the 1990s to 5.4 and 7.5% in 2020. By 2010, the national immunization program's vaccination rate had exceeded 90%.[3] Second, in its formulation of childcare policies, the Chinese government and relevant agencies have consistently adhered to the "child first" principle, prioritizing "children and health" as the central goal. Third, the focus of China's childcare policies has evolved over time, shifting from birth rates and disease prevention to the development of comprehensive child health service systems. These changes reflect the significant progress taken to reduce infant mortality and expand vaccination coverage. Driven by rapid economic growth, accelerated urbanization, and declining birth rates, the Chinese government has recently introduced and revised more holistic childcare policies that address healthcare, childcare services, nutrition, and safety. On May 9, 2019, the General Office of the State Council of China released the *Guiding Opinions on Promoting the Development of Care Services for Infants and Young Children Under 3 Years Old* (GOPD), which outlines the fundamental principles, goals, and tasks for advancing childcare services.[4] This is the first instance in which the Chinese government

1 Convention on the Rights of the Child. Available at: https://www.unicef.org/child-rights-convention.

2 Implementing the United Nations Convention on the Rights of the Child. Available at: https://www.qub.ac.uk/Research/case-studies/implementing-un-convention-rights-of-child.html.

3 The above data are from the *China Children's Development Plan (2001–2010)*, the *China Children's Development Plan (2011–2020)*, and the *China Children's Development Plan (2021–2030)*. Available at: https://www.gov.cn/zhengce/xxgk/.

4 Guiding Opinions on Promoting the Development of Care Services for Infants and Toddlers Under 3 Years Old. Available at: https://www.gov.cn/zhengce/content/2019-05/09/content_5389983.htm.

has established a dedicated policy for infant and childcare rather than addressing it within the broader child development scope. Additionally, the GOPD is the first policy to clarify the specific childcare responsibilities of government departments and emphasize the shared caregiving roles between families, the government, institutions, and social organizations and communities. Under the GOPD's guidance, local governments have begun to more intensively issue childcare policies, marking a shift in China's approach toward greater childcare systematization and refinement.

However, challenges persist, including disparities in care quality, non-disease-related health issues, and insufficient childcare resources, which families alone cannot adequately manage. Compared to general hospitals, children's hospitals are better equipped to offer community parenting support by tackling issues such as nursing, substance abuse, social needs, chronic disease management, and mental health (13). Additionally, overfeeding during the neonatal period has been linked to accelerated weight gain in children aged under 2 years, which increases the risk of childhood obesity (14). Therefore, it is imperative to develop robust public health policies that regulate early childhood nutrition. Moreover, pronounced disparities exist in the policy implementation between urban and rural areas, such as rural children having inadequate access to educational and healthcare resources (15), and infants aged 6–23 months failing to receive the minimum dietary intake from breastfeeding and complementary feeding, leading to increased morbidity with age (16). Further, the quality and safety of certain childcare facilities require enhancement, while childcare services in specific regions remain inadequate (17). While these urgent issues necessitate the involvement of various policy actors, they remain to be effectively addressed, highlighting the need for a reevaluation of the current childcare policy framework. Accordingly, this study explores the following questions: How do different childcare policy actors (i.e., the government, social organizations and communities, institutions, and families) allocate responsibility within the health-oriented framework? How have the roles of the family and non-family sectors evolved within China's childcare policy system?

The current research on the division of responsibilities among childcare policy actors in childcare policies has predominantly viewed childcare as the responsibility of individual actors, emphasized gender roles within families, and highlighted women as primary caregivers (18–20). Within the family, women share childcare responsibilities through two avenues. The first involves men's participation in childcare. Influenced by traditional gender roles and sociocultural norms, men often assume the provider role, which leads to their childcare contributions being marginalized and less visible (21). Social policies and institutional frameworks reinforce this dynamic, resulting in a rigid pathway to paternal practices (22). As more women enter the workforce and contribute to household incomes, paternal childcare involvement has gradually increased (23). However, men continue to face significant barriers in terms of engagement, including the need to overcome entrenched social perceptions (24). To address these issues, there is a need for supportive social policies that promote paternal involvement (25). The second avenue comprises the intergenerational care model. This model is prevalent among Chinese middle-class families, where grandparents collaborate on childcare to alleviate and redistribute family child-rearing pressure (26). However, this model introduces social pressure; for example, older caregivers may experience stress that can negatively impact child health (27, 28). Meanwhile, some studies have acknowledged that families cannot independently shoulder the childcare burden. When social policies integrate the protection of women's employment with childcare improvements, policy interventions can effectively alleviate women's work–family conflict (29) by assuming some responsibilities; however, the relationship between the government and families remains in flux (30). Moreover, childcare development initiatives are currently fragmented across various government sectors, including health, nutrition, education, childcare, and social security. To ensure that interventions are effective, well-informed, and sustainable, it is essential to adopt a child health-centered approach that fosters multisectoral collaboration (31). Additionally, the successful implementation of childcare policies necessitates the involvement of diverse policy actors. The extant research has highlighted the roles of market entities and civil society as intermediary forces in terms of childcare. However, for-profit childcare institutions encounter challenges related to market failure and information asymmetry (32), while community childcare institutions require systematic resource mobilization (33). Accordingly, notable research gaps exist: first, the roles of other childcare policy actors have not been thoroughly considered, including institutions and social organizations. Moreover, systematic interventions by multiple actors warrant further investigation. Second, the research has failed to examine the division of labor and the significance of policy actors in terms of child health objectives.

Accordingly, this study analyzes China's childcare policy texts to explore the allocation of childcare responsibilities between different policy actors (i.e., governments, social organizations, institutions, and families) in relation to various health-related tasks. Specifically, this study analyzes 224 childcare policy documents issued by Chinese prefectural governments since 2019 and treats them as a distinct policy system. These documents encompass multiple regions and reflect diverse local conditions, so as to capture the complexities and variations inherent in the policy implementation process. These also provide a nuanced and comprehensive representation of the division of responsibilities among the different policy actors within China's childcare sector. Utilizing a qualitative content analysis, this study then employs NVivo software to code the childcare policy texts. Guided by social construction theory, this study establishes a two-dimensional analytical framework that positions policy actors as the X-dimension and child health as the Y-dimension. This framework facilitates the examination of different policy actors' specific actions concerning child health objectives through the coding, categorization, and quantification of their actions within the childcare policy texts, enabling the systematic analysis of different policy actors' hierarchical roles in meeting child health objectives.

In so doing, this study contributes to the literature in three ways. First, it identifies the coexistence between refamilialization and defamilialization trends in China's current childcare policies. Consequently, this study argues that the government must better coordinate the responsibilities of family and non-family actors by increasing financial subsidies and providing training support for childcare institutions; doing so will prevent families from shouldering an excessive share of childcare duties. Second, this study highlights the insufficient role that communities play in child health objectives related to safety management, health and hygiene, and scientific parenting. Consequently, this study advocates for the establishment of inclusive, community-based childcare centers in urban and rural areas. These centers must offer accessible and supplemental services

that are closer to family homes, so as to address disparities in healthcare quality, standards, and childcare resources. Finally, this study emphasizes the importance of communication between different policy actors and proposes the creation of a platform for them to engage in collaborative dialog. Doing so will allow the government to better understand families' childcare needs and monitor the quality of services provided by social organizations and institutions.

2 Methods

2.1 Theoretical perspective

This study analyzed childcare policy texts using social construction theory, which refers to the prominent interactive construction and configuration features of the relationship or association between individuals and society (34). This study's application of social constructionism focused on two aspects. First, the diverse multisubject participation in the construction of child health. During this process, different subjects consciously or unconsciously play different roles in shaping, configuring, and influencing the original meaning and nature of others' actions (35). In China, childcare is diverse and mainly undertaken by families (36). Accordingly, the government has begun to formulate corresponding policies to meet families' childcare needs. With the encouragement of government policies, institutions have gradually joined in the provision of childcare, while social organizations and communities have formed constraints and supplementary childcare (37).

The second aspect emphasizes the practical social construction process of child health, which involves generating, practicing, and reflecting on multiple meanings, as follows (38). First, diverse subjects participating in childcare form action meanings and interact with each other during the interaction and construction processes. The transformation from subjective to external action meanings means that relevant policies are adjusted because the significance of child health is valued. Further, iterative adjustment and reflective monitoring (e.g., the examination, verification, and identification of problems in childcare policies by institutions, social organizations and communities, and families) enables the government to grasp new information and adjust, revise, and innovate policies accordingly (39).

2.2 Document selection

This study employed a systematic approach to the text selection via selection criteria, a preliminary screening, and the establishment of coded texts (Figure 1), as follows.

Step 1: this study searched for policy texts from May 9, 2019–March 18, 2024. On May 9, 2019, the General Office of the State Council of China issued the GOPD and directed local governments to develop feasible policy measures within this framework. This event marked China's initiation of the development of childcare policy as an independent system. Therefore, this study designated 2019 as the baseline year for the independent launch of childcare policies and concentrated on the initiatives introduced in various cities and provinces after May 9, 2019. The end date aligned with the most recent urban childcare policy implementation plan (the *Inclusive Childcare Service Development Demonstration Project*) released by the People's Government of Changzhi City, Shanxi Province, on March 18, 2024.[5]

Step 2: this study used the "childcare" and "infant and toddler care" search terms to conduct a preliminary screening, with a focus on the development of childcare services for children aged under 3 years. The research team established three selection criteria: (1) policies issued by the People's Government and Health and Hygiene Committees; (2) policies containing relevant provisions for developing care services for the target age group; and (3) documents that included plans, measures, and opinions but excluded responses, directives, and policy interpretations. To ensure the comprehensiveness and authority of the policy text sources, this study screened 270 documents using the aforementioned search terms across the official websites of national, provincial, and prefectural governments; health departments; and legal databases, such as *Peking University Law Treasure* and *Peking University Law Meaning*. This collection comprised 16 national-, 30 provincial-, and 224 prefectural-level documents (Table 1). All policy documents were in Chinese, so this study translated them into English for the subsequent analyses.

Step 3: this study focused on prefectural-level documents for the coding analysis. Since the number of national-and provincial-level texts was limited, they served as contextual supplementary material. The rationale for selecting prefectural-level texts as the coding sample was twofold. First, in terms of quantity, prefectural-level texts provide a substantial dataset for childcare policy compared with those from the other levels. Second, prefectural-level texts reflect the direction established by national and provincial policies and detail the specific actions undertaken by various policy actors. Consequently, this study identified 224 prefectural-level policy texts as the analysis subject and study database. The descriptive statistics and coding analysis were based on these texts.

To ensure the consistency and generalizability of the analysis, the sample excluded China's four municipalities that fall directly under the central government (Beijing, Shanghai, Tianjin, and Chongqing). As provincial-level administrative entities, these municipalities have policy development and implementation processes similar to those of provinces and autonomous regions, resulting in significant differences when compared to prefectural-level cities, which could compromise the consistency and comparability between the municipal-and prefectural-level policies. Further, these four municipalities generally have higher levels of economic development and resource allocation, allowing them to more robustly support childcare services. Therefore, the division of childcare policy roles may fail to accurately represent broader national trends. Consequently, this study excluded these four municipalities from the sample and analyzed the 224 prefectural-level texts.

5 *Notice from the People's Government Office of Changzhi City on Issuing the Implementation Plan for the Inclusive Child Care Service Development Demonstration Project in Changzhi City*. Available at: https://www.changzhi.gov.cn/xxgkml/zfxxgkml/szfgzbm/srmzfbgt/czsrmzf/zbwj/202403/t20240318_2877562.shtml.

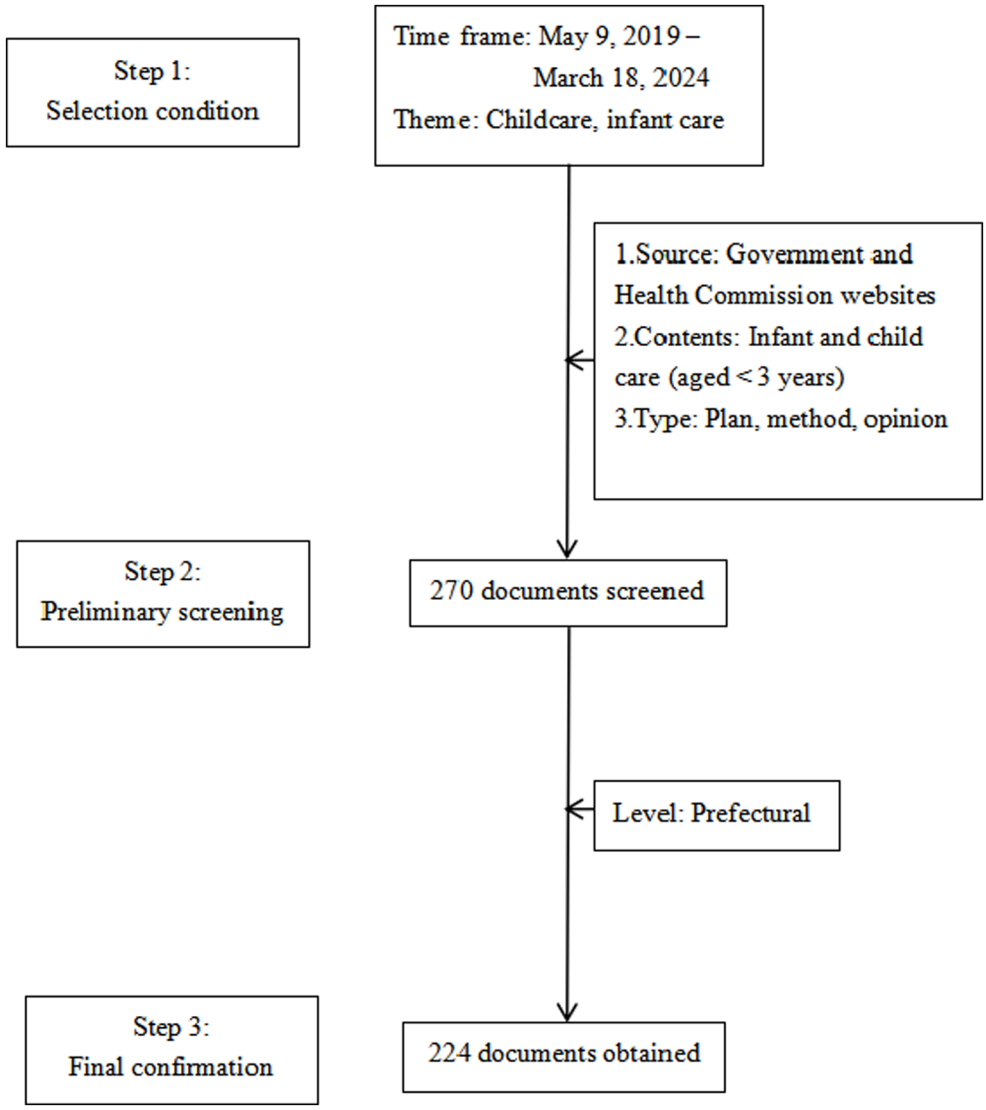

FIGURE 1
Childcare policy text screening process.

TABLE 1 Hierarchical distribution of preliminary screening policy texts.

	2019	2020	2021	2022	2023	2024
National level	3	2	2	5	3	1
Provincial level	11	18	0	0	1	0
Prefectural level	9	147	37	22	6	3

2.3 Study design

This study used Nvivo12 Plus software to analyze the 224 texts via open, axial, and selective coding (40). NVivo 12 Plus is suitable for analyzing various unstructured data, including text, video, and audio, as it possesses robust data coding and theoretical model-building capabilities, enabling the efficient and precise retrieval and coding of large datasets and the visualization of results within a systematic and scientific framework.

This study conducted a content analysis to provide an objective, systematic, and quantitative analysis of the policy texts (41). The essence of a content analysis lies in its scientific and rigorous coding of textual content, leading to in-depth qualitative conclusions. It serves as a powerful tool for exploring social phenomena, interpreting meanings, and uncovering both overarching and deep-seated social and cultural structures; therefore, this study deemed it suitable for use. This study then developed a two-dimensional analytical framework based on the content analysis of the policy texts, focusing on the policy actors and child health objectives. First, this study used open coding to analyze the policy actors' specific actions (the X-dimension). Then, this study used axial coding to determine their actions in relation to child health (the Y-dimension). This two-dimensional approach elucidated the division of responsibilities among different childcare policy actors within the health-oriented framework to highlight the development patterns of China's childcare policies. This process involved three steps.

Step 1: open coding. This study situated the specific action strategies outlined in policy texts within the hierarchical roles of social policy while further abstracting these strategies to their respective domains, which gradually emphasized the division of responsibility among the different policy actors (Table 2). The open coding process comprised three stages. First, this study coded the policy actions by extracting the child health actions from policy texts and identifying their coding elements, resulting in 28 primary codes. Second, this study focused on coding at the hierarchical level. Policy actors' hierarchical roles referred to the distribution of responsibilities and functions of actors during policy formulation, implementation, and evaluation (42). By aligning these hierarchies with the actors' corresponding policy actions, this study established seven categories as secondary codes. Finally, the coding process categorized the respective domains. Broadly speaking, contemporary civil society consists of four sectors: the government, private entities, the public sphere, and institutions (43). The effective functioning of social policies relies on collaboration between these sectors. By mapping the secondary codes of the relevant policy actor domains, four core categories emerged: the government, social organizations and communities, institutions, and families; these constituted the tertiary codes.

Step 2: axial coding. This study viewed the concept of child health in terms of constructing a child health service system with child health at its core. Based on the open coding results, the following categories linked all concepts: safety management, health and hygiene, scientific parenting, and the social environment (Table 3). This study then related these axial codes to the different policy actors' actions to verify their authenticity and reliability.

Step 3: selective coding. Using social construction theory, this study systematically linked the core category of child health to different policy actors, leading to the identification of two key categories (refamilialization and defamilialization) that formed the theoretical framework of how China's childcare policy affected child health.

3 Results

3.1 Descriptive analysis of policy texts

(1) Temporal distribution of policy texts. Figure 2 indicates that the implementation timelines of the 224 prefectural-level childcare policy texts demonstrates an inverted U-shaped trend, with 2020 representing the peak year for policy issuance In China, local governments typically formulate and adjust their policies within a framework established by central government directives and align them with the national agenda's goals and requirements. Therefore, following the central government's release of the GOPD in 2019, the local governments promptly responded by introducing childcare policies.

(2) Regional distribution of policy texts. Figure 3 shows that the 224 policy texts cover 25 provincial-level administrative regions. This represents a significant proportion of China's 27 provinces and provincial-level autonomous regions, indicating that most provinces and cities have implemented childcare policies. Regarding the prefectural-level policy text distribution, Guangdong Province (18 cities) has the highest number of implemented childcare policies followed by Sichuan Province (16 cities) and Shandong Province (15 cities).

(3) Word cloud analysis of policy texts. This study used NVivo to generate a word cloud visualization of the 224 childcare policy texts. Figure 4 presents the texts' key characteristics. The word cloud demonstrates over 100 words, and the size of each word reflects its occurrence frequency in the policy texts. Words such as "care," "infant," "toddler," "service," and "institutions" are the most frequent, confirming that the policy texts primarily focus on childcare services for children aged under 3 years. Words such as "childcare," "health," "development," and "department" also frequently appear, indicating the significant emphasis on child health within China's current childcare service development landscape for children of this age.

TABLE 2 Open coding (X-dimension).

First-level codes	Secondary codes	Tertiary codes
Direct regulation, formulate development plans, formulate industry standards	Organizer	Government (national domain)
Ensure safety, ensure hygiene, oversee and manage, construct information infrastructure	Person in charge	
Provide financial support, develop public services, implement tax incentives, train childcare professionals, provide land support	Resource provider	
Protect employment rights and interests, provide maternity leave support, provide public services	Environmental facilitator (employer)	Social organizations and communities (public sphere)
Affordable child care for the masses, community care, volunteer assistance	Provider of public services (NGO and community)	
Establish a model demonstration, offer diversified services, register in compliance with regulations, formulate staff entry regulations, consolidate safety responsibilities, establish a care brand, integrate child care and kindergarten, manage hygiene and health	Market service provider (kindergartens, daycare centers, caregivers, and suppliers of care products)	Institutions (market sector)
Strengthen maternal and child healthcare, study care-related knowledge	Service recipients (parents and other family members)	Families (private sector)

NGO, nongovernmental organization.

TABLE 3 Axial coding (Y-dimension).

Policy excerpt	Unit (Conceptualization)
Strengthening the Responsibility of Safety Entities. Various child care institutions bear the primary responsibility for the safety and health of infants and young children. The provision of child care services must comply with relevant standards and norms such as the *Trial Measures for the Establishment Standards of Child Care Institutions*, *Trial Measures for the Management Standards of Child Care Institutions*, and *Architectural Design Specifications for Nurseries and Kindergartens*, establishing sound safety protection measures, inspection systems, and emergency response plans for unforeseen events.	Safety management
Strengthening guidance and supervision of health care in child care institutions. Diligently implementing the principle of prevention first and combining health care with education, strengthening planned immunizations to ensure all necessary vaccinations are administered, supervising child care institutions to conduct daily morning checks, hygiene and disinfection, isolation of sick children, prevention and management of infectious diseases, preventing and controlling the incidence of infectious diseases, providing guidance on infant and young child dietary nutrition, conducting regular health check-ups for infants and young children, creating a good living environment for infants and young children, and safeguarding their physical and mental health.	Health and hygiene
Enhancing early development guidance for infants and young children. Organizing activities suitable for the physical and mental development characteristics of infants and young children, providing parents and caregivers of infants and young children with guidance on scientific care and related knowledge through activities such as parent–child activities, home visits, parent classes, and expert consultations. This aims to promote comprehensive development in infants and young children in terms of physical growth, motor skills, language, cognition, emotion, and social interaction, and to enhance the scientific parenting capabilities of families.	Scientific parenting
Enhancing social support. Accelerating the construction and renovation of barrier-free facilities and mother-and-child facilities in public places, opening up green channels for services, and providing convenient conditions for infant and young children's travel and breastfeeding to create a friendly social environment for child care.	Social environment

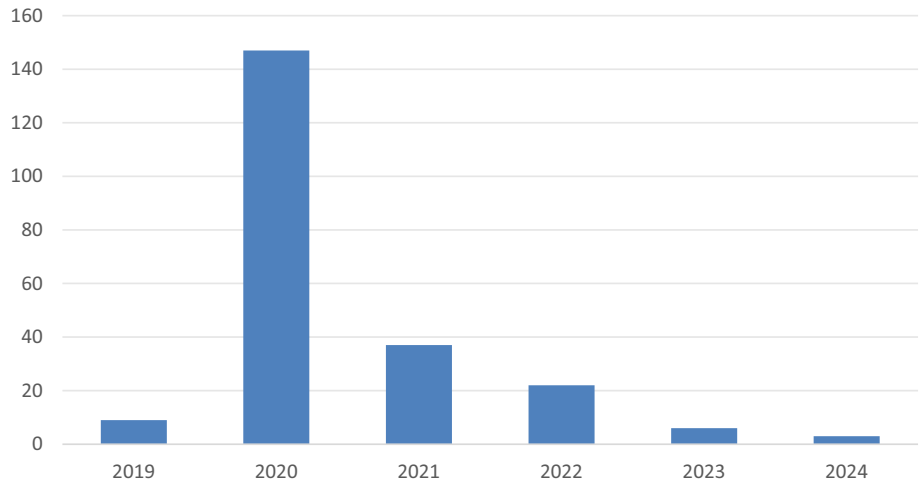

FIGURE 2
Temporal distribution of prefectural-level policy texts.

3.2 X-dimension: policy actor coding results

This study analyzed the policy texts using axial coding in NVivo with a focus on the different policy actors' specific actions (the X-dimension). The text analysis and conceptualization revealed actors' specific actions related to childcare, yielding 3,766 reference points. This study then categorized the different actors' childcare policy roles. The results (Table 4) show that the government plays the most significant role in childcare (38.9%) and is the responsible entity for and coordinator of policy actions. Its primary responsibilities include enhancing childcare capacity and safeguarding children's health. This is evident in the development of childcare policies and regulations, the mobilization of resources from various sectors, and the coordination of activities among the diverse childcare policy actors.

Families that are both demanders and beneficiaries of childcare services play a smaller childcare role (9.16%). Policymakers have recognized the insufficiency of families' independent caregiving capacity. While efforts have been made to change the traditional caregiving perception (which is predominantly female-centric) through policy advocacy that calls for the participation of all family members, there is a push to engage external policy actors, such as institutions and social organizations, in the provision of childcare.

Finally, the government, social organizations and communities, and institutions constitute considerable childcare service providers. The government offers public resources (20.92%) such as land support

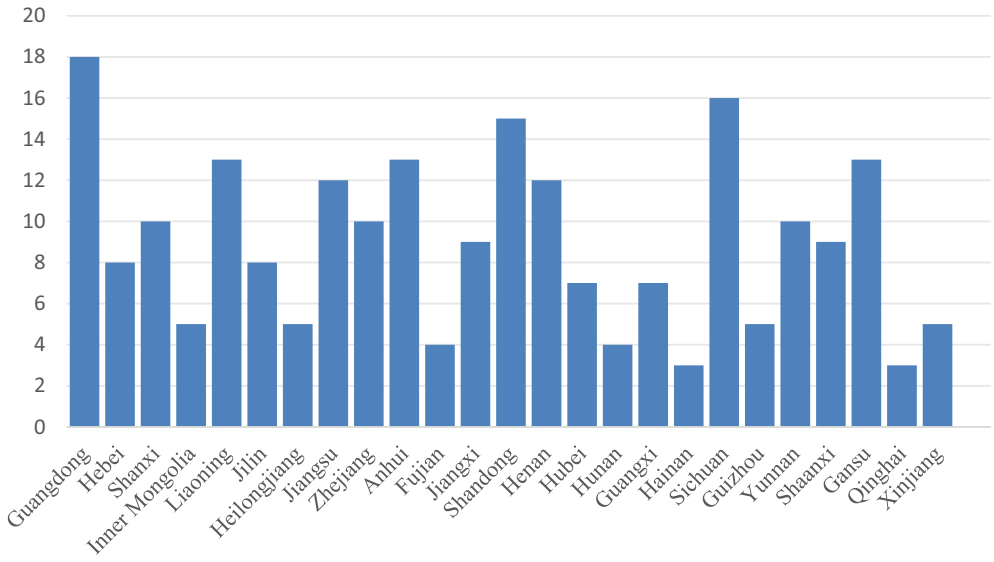

FIGURE 3
Provincial distribution of prefectural-level policy.

FIGURE 4
Word cloud of Chinese childcare policy texts.

and tax incentives; social organizations and communities provide public service support (22.89%) such as flexible parental leave and childcare assistance from public organizations (e.g., nongovernmental organizations); and institutions provide market services for childcare demanders (29.05%) such as nannies or childcare centers. Each policy actor responds to government requirements by supplying appropriate childcare resources (based on their available capacities) to address childcare seekers' needs; this process creates an institutionalized network of policy actors. Overall, China's childcare policies prioritize child health and have established a framework for responsibility-sharing and constraints between the government, families, institutions, and social organizations and communities.

3.3 Y-dimension: child health coding results

After delineating the policy actors' specific actions (the X-dimension), this study conducted coding for the Y-dimension (child health). This study identified 1,226 nodes in the two-dimensional coding. Table 5 shows the nodal distribution within each component of the child health dimensions. Overall, safety management comprises 238 nodes (19.41%). In this category, the government focuses on developing and regulating safety management guidelines for childcare facilities (80 nodes), while institutions are responsible for implementing the safety measures (159 nodes). Safety management is fundamental to childcare services and is reflected in four key areas: fire and building safety in childcare centers, enhanced oversight of personal safety for infants and toddlers, strengthened regulation of child food safety, and the enforcement of child safety protection protocols.

Health and hygiene comprises 287 nodes (23.41%) and involves all policy actors' engagement. Health and hygiene addresses children's nutritional requirements, disease prevention, and mental wellbeing, and encompasses both public health and children's physical and emotional health in family care throughout their developmental stages.

Scientific parenting comprises 362 nodes (29.53%). This aspect emphasizes caregivers' approaches to promoting children's health. Among the policy actors, childcare practitioners and families comprise the primary contributors (134 and 118 nodes, respectively). The government provides educational support for scientific parenting, such as by training childcare professionals and establishing parenting workshops (109 nodes). The role of social organizations and communities is more limited and primarily involves volunteer efforts to develop and expand teams for infant and toddler care (25 nodes).

The social environment comprises 339 nodes (27.65%). This aims to cultivate a supportive and harmonious atmosphere that fosters both childcare and collaborative efforts toward children's health. In China's childcare policies, social environment improvements are evident in terms of the accelerated construction and renovation of accessible

TABLE 4 Division of policy actors' responsibilities.

Policy actors	Policy roles	Code (Percentage)	Sum
Government	Organizer	176 (4.67%)	1,465 (38.90%)
	Person in charge	501 (13.30%)	
	Resource provider	788 (20.92%)	
Social Organizations and Communities	Environmental facilitator	459 (12.19%)	862 (22.89%)
	Provider of public services	403 (10.70%)	
Institutions	Market service provider	1,094 (29.05%)	1,094 (29.05%)
Families	Service recipients	345 (9.16%)	345 (9.16%)

TABLE 5 Child health coding results.

Child health	Code	Percentage
Safety management	238	19.41%
Health and hygiene	287	23.41%
Scientific parenting	362	29.53%
Social environment	339	27.65%

facilities, child-friendly amenities in public spaces, and green service pathways that facilitate travel and breastfeeding.

3.4 Two-dimensional analysis of policy texts

To further clarify the allocation of responsibilities among the different childcare policy actors, this study utilized a coding matrix query function to analyze the proportions of actions related to child health and the different actors' policy planning tendencies. Table 6 presents the distribution of policy actors and child health dimensions (X–Y). Under the safety management category, institutions account for the highest distribution (12.97%), and at the national and provincial levels, institutions' safety arrangements significantly impact child health. In the health and hygiene unit, institutions and families account for 9.71 and 8.56% of the distribution, respectively. Under the scientific parenting category, institutions and families, as direct childcare participants, account for 10.93 and 9.62% of the distribution, respectively. Under the social environment category, social organizations and communities account for 13.62% of the distribution. Overall, the government advocates for a child-friendly environment and encourages other policy actors to participate in policy promotion through the provision of public service facilities. Childcare institutions play a crucial role in ensuring child health and safety management, health and hygiene, and scientific parenting, which are key points for enhancing childcare quality in current and future policies.

4 Discussion

4.1 Roles of policy actors

This study used social construction theory to examine the division of childcare roles between different policy actors (i.e., the government, social organizations and communities, institutions, and families) under China's evolving childcare policy landscape. The prior research (34) contends that roles embody two levels of institutional order: first, through the specific expression of a role that reflects its core identity; second, through a role that encapsulates a comprehensive institutional network related to behavior (34). Therefore, in terms of China's childcare policies, the government, institutions, families, and social organizations and communities play different roles but are united under an institutional network. As a policy decision-maker, the government is responsible for regulating and managing child health through legislation, policy formulation, and resource allocation. The government's interest lies in safeguarding the country's future development, and child health serves as the foundation for achieving this goal. Accordingly, the government invests resources in healthcare, education, poverty alleviation, and other services to ensure the safety and hygiene of childcare environments, bolster scientific knowledge of childcare personnel, eliminate child health risks, and generally ensure child health. Therefore, the government must consider the needs and interests of other policy actors, such as social organizations and communities, families, and institutions, to create a supportive and friendly social environment for childcare.

As policy coordinators, social organizations and communities play a crucial role in child health by providing various services and support. Their interests lie in advocating for vulnerable groups, promoting social equity and justice, and advancing child health and development through various projects and activities, so as to create a supportive social environment for the implementation of childcare policies. Social organizations and communities typically rely on government funding and social donations; therefore, they must collaborate with the government and other institutions to jointly promote the development of child health initiatives.

As policy implementers, childcare institutions are among the key organizations that provide childcare and educational services. They bear the responsibility for child guardianship and education and contribute to child health and wellbeing. Childcare institutions' interests lie in providing high-quality services to meet parents' needs while ensuring child health and safety. Therefore, they must collaborate with the government and comply with relevant laws and policies to ensure the quality of services and protection of children's rights.

As policy beneficiaries, families are fundamental for ensuring children's growth and development, and they directly influence and bear responsibility for their children's health. Families' interests lie in nurturing healthy and happy future generations and ensuring that they receive adequate care and education. Therefore, families require support from the government and institutions, particularly in terms

TABLE 6 Two-dimensional distribution of childcare policy actors (X-Y).

Policy actor	Safety management		Health and hygiene		Scientific parenting		Social environment	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Government	80	6.53	40	3.26	109	8.89	125	10.20
Social Organizations and communities	0	0	23	1.88	25	2.04	167	13.62
Institutions	159	12.97	105	8.56	134	10.93	50	4.08
Families	0	0	119	9.71	118	9.62	0	0

of scientific parenting knowledge, to contribute to healthy child development. This support will enable families to better fulfill their responsibilities in terms of nurturing and educating their children.

In sum, the government, institutions, families, and social organizations and communities play crucial roles in fostering interdependence and cooperation to advance child health and wellbeing. This involves implementing multi-departmental interventions centered on child health and calling for social organizations and communities to provide childcare services (31, 32). Each actor undertakes specific actions at various policy development, implementation, and adjustment stages that are guided by their interests, roles, and influences (44). This division of roles reveal distinct trends in policy development (45). By focusing on child health, policy objectives highlight the simultaneous trends of refamilialization and defamilialization among the policy actors. Following this role division, the following explores the parties' actions and interactions throughout the policy formulation, execution, and evaluation stages.

4.2 Trends in China's childcare policies

First, family policy actions highlight the refamilialization trend in China's childcare policies, where families assume the primary childcare role. This study's two-dimensional analysis reveals that families are the key agents responsible for child health and hygiene. Policies seek to promote scientific parenting and emphasize children's physical and mental wellbeing through avenues such as online classes, so as to strengthen family caregiving capabilities. This trend is significantly shaped by traditional Confucian family ethics and the prevailing Chinese view of the family as the principal caregiver. Traditional Chinese family values also stress kinship, respect for the older adult, and care for the young. As such, children depend on parental support during their early years and subsequently provide care for their aging parents. Familial beliefs also influence the formulation of childcare policy objectives. For example, the GOPD asserts that childcare for children aged under 3 years should be family-centered, with the use of supplementary care services. Under this principle, the development of infant and toddler care services should focus on offering scientific parenting guidance to families and essential support for those experiencing caregiving challenges.

Second, China's socioeconomic development has led to a defamilialization trend in childcare policies. As more women join the workforce, responsibilities for child health, which were traditionally assigned to women, are now being transferred to other family members, and governmental and institutional benefits are redistributed. Defamilialization refers to the degree to which familial welfare responsibilities are transferred to entities outside the family through both public and market pathways (46). Regarding the public pathway, the government plays a central role in childcare policies. With child health as the primary objective, the government's focus has recently shifted from declining birth rates and disease prevention to the establishment of a comprehensive child health service system. As the authoritative political entity, the government surpasses policy actors' limitations related to concepts, capabilities, and status. Moreover, the government plays a vital role in organizing, coordinating, and balancing policy actors' interests to enhance childcare inclusivity that is characterized by mutual benefits and the fostering of social harmony. Regarding the market pathway, childcare institutions are pivotal actors in terms of policy actions related to safety management, health and hygiene, and scientific parenting. The government has established standards for institutions and has implemented registration and review processes. For example, on July 8, 2019, the National Health Commission's Population and Family Department issued the *Regulations on the Management of Childcare Institutions (Trial) (Draft for Comments)* and *Standards for the Setup of Childcare Institutions (Trial) (Draft for Comments)*. As of February 28, 2024, data from the Population Monitoring and Family Development Department of the National Health Commission indicate that nearly 100,000 institutions currently provide childcare services, with approximately 4.8 million available places.[6] This demonstrates that China's childcare institutions are evolving in a way that promotes child health and wellbeing.

Third, the current state of China's childcare policies reflects the simultaneous presence of refamilialization and defamilialization trends. This is particularly evident based on two key aspects. First, childcare policies tend to promote optional familialism, under which the government and institutions provide childcare services while offering maternity leave and subsidies for parents caring for children at home (47), and parents can choose between public and family care. Second, certain childcare policies incorporate defamilialization strategies while displaying refamilialization characteristics. These initiatives, primarily implemented by social organizations and communities, offer universal community-based childcare, provide care subsidies, and extend parental leave, so as to foster family development (48). Countries such

6 *Nationwide, Nearly 100,000 Childcare Institutions*. Website of the Central People's Government of the People's Republic of China, 2024-02-28. Available at: https://www.gov.cn/lianbo/bumen/202402/content_6934815.htm.

as Germany and Japan, which view the family as the primary childcare provider, actively support family caregiving roles by establishing comprehensive allowances and parental leave systems (49, 50). Conversely, they also promote a systematic approach to social care policies that encourage the government to assume greater childcare responsibility. China is still exploring developmental models of childcare policies. However, the defamilialization and refamilialization models of public family services are not mutually exclusive but coexist and interact with each another (37). Therefore, public policies must balance these two trends with greater precision. The defamilialization trend requires the government to expand public childcare service availability and increase childcare institutions' financial support. This will ensure the accessibility of affordable and high-quality childcare services across different Chinese regions. During this process, the government must act as both the resource provider and policy implementation regulator to ensure that institutions adhere to health and safety standards and scientifically-based child-rearing practices. Simultaneously, the ongoing refamilialization trend means that policy designs cannot overlook the critical role of families in childcare. Therefore, the government, alongside social organizations and communities, should adopt more flexible approaches toward offering families closer complementary and supportive childcare services in order to address disparities in healthcare quality, standards, and childcare resources. Further, it is essential to pay attention to family perspectives and meet their needs within the policy framework.

Finally, the shortcomings of China's childcare policies are reflected through community-based services' restricted capacity, highlighting a crucial area for the future enhancement of policy actors' roles. The two-dimensional analysis reveals that social organizations and communities primarily contribute to fostering a supportive childcare environment. However, their impact on child safety management, health, and scientific parenting remains limited. The success of childcare policies in promoting child health depends on their ability to systematically identify and address social determinants and ensure that families have access to additional community resources (51). The current delivery of quality childcare has several challenges, including urban–rural disparities, an increase in noncommunicable health issues, and inconsistent service quality. These issues exceed the individual families' capabilities and cannot be resolved solely through market-driven solutions. As such, community initiatives can play a vital role in supporting underprivileged areas and populations by bridging gaps in the public service infrastructure for childcare in rural and impoverished settings and fostering a societal emphasis on child health. Emphasizing inclusive, community-based childcare services can further rectify the shortcomings of market-oriented institutions through strategies such as increasing the availability of community childcare places, enhancing volunteer service quality, and improving training systems for community childcare providers. Positioning child health as a universal social welfare priority rather than a selective benefit can cultivate a socially-engaged environment that can collectively support the healthy development of childcare services.

4.3 Limitations of the study

This study's policy text sample focused on the prefectural level. Therefore, utilizing more detailed county-level data can better capture the nuanced relationships between these factors. Doing so will be particularly pertinent for the Chinese context, where significant developmental disparities exist between districts and counties. Moreover, as additional county-level policies are enacted, the future research should conduct further analyses of this study's policy texts to enhance the understanding of the regional variations in childcare policies and child health outcomes in China.

This study conducted its qualitative analysis using NVivo, which may have introduced some subjectivity when defining specific policy objective categories. As policies evolve, the future research should incorporate specific scientific indicators into the child health objective framework to offer more detailed guidelines for child health. These indicators could include nutritional status, immunization rates, and utilization of healthcare and community health services, so as to enhancing the rigor and relevance of the results.

5 Conclusion

This study presents three key conclusions from its analysis of China's childcare policies. First, within the childcare policy framework, the government plays a central role as an organizer, accountable entity, and resource provider, thereby establishing itself as the most significant policy actor. Second, China's childcare policies are undergoing concurrent refamilialization and defamilialization trends and are shifting from government-led initiatives to coordinated efforts by various policy actors. Third, China's childcare policies focus on establishing three aspects among childcare institutions: safety management, health and hygiene, and scientific parenting. The construction of community-based services is reflected in the creation of a social childcare environment. Therefore, the future childcare policies should focus on the development of community-based service systems.

This study provides several key insights for childcare policy actors. First, the government should clarify the responsibilities and obligations of each policy actor from the legal and policy standpoints to ensure children's healthy development. This involves providing communities and institutions with policy support, such as tax exemptions, operating subsidies, and skills training for staff. Doing so can help prevent families from bearing an excessive share of childcare responsibilities. Second, communities should establish inclusive childcare institutions. In economically-disadvantaged rural areas with high rates of child illness, grassroots medical units should be encouraged to enter into service agreements with childcare institutions to deliver health management services for infants and young children. These should include child health check-ups, nutritional guidance, and disease prevention measures. Meanwhile, in urban areas, complementary and supportive childcare services should be provided near residential areas; for example, by integrating childcare facilities into new housing development plans. Third, it is crucial to establish platforms that facilitate interaction and communication between diverse stakeholders. Families, as service providers and recipients, should have their perspectives valued. Therefore, creating a platform for childcare dialog will enable families to regularly communicate with government agencies about community childcare institutions' service quality, problems within institutions, and their overall satisfaction levels. Finally, to ensure effective oversight, the allocation of institutional subsidies should be tied to factors such as the number of complaints received, parental satisfaction ratings, and overall service quality. Ultimately, through efficient collaboration between

various policy actors, China's childcare policies can more effectively support child health and wellbeing.

Data availability statement

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

Author contributions

LL: Conceptualization, Data curation, Methodology, Resources, Software, Writing – original draft. JL: Supervision, Validation, Writing – review & editing.

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Conflict of interest

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

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Examining the role of intrinsic and extrinsic cues from service requirement narratives in web-based time banking participation decisions

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Introduction: Time banking, known as "Community/Neighborhood Pension," instantiates a form of co-creation that can provide a new solution to fulfil the unmet social service needs of community members with idle resources, which is a feasible solution to alleviate pension pressure. The sustainable operation of time banks relies on the co-creation and active participation of community members. Therefore, in this study, we investigate the motivation of members to participate in web-based time banks from a service requirement narrative perspective.

Methods: We collected data of 21969 service requirement projects from publicly available information on the website of Nansha Timebank (nstimebank.com, a web-based time bank platform in China). Using the data, we built a model to assess how the intrinsic and extrinsic cues underlying service requirement narratives affect the time bank participation decisions of service providers drawing on grounded theory. Then we conducted a regression analysis to test our hypotheses.

Results: We find that participants respond positively to time coins return and narratives highlighting social connection and value fulfilment but respond negatively to service hour costs and empathy-altruism cues.

Discussion: Our findings suggest that people who receive services in web-based time banking platform should utilize different linguistic cues in service requirement descriptions to improve service exchange results.

KEYWORDS

time banking, language cues, grounded theory, intrinsic motivation, extrinsic motivation

1 Introduction

The rapid and large-scale growth of global aging is one of the world's greatest unmet needs. According to the World Social Report 2023, the population of persons 65 years and older in many regions will double in 2050. This issue is also becoming increasingly serious in China and has drawn much interest from scholars and practitioners (1, 2). There were 280.04 million of persons 60 years and older, accounting for 19.8% of the total population in 2022 (3). The proportion of persons 65 years and older is predicted to reach approximately 34% in 2050. Even if there is an increasing need for social care of older people, the current system for meeting that demand is overburdened by the lack of facilities and their subpar quality. It is now critical to determine how to innovate the paradigm for social care of older people (4).

Time banking has emerged as an attractive complement to traditional means of social care for older people, which has been practiced in many countries (3). A time bank is a community-based exchange network where social services are exchanged for time rather than money (5). Community members use a shared space, usually through websites or mobile time banking platforms, to post their service offers and requests; then, they fulfill their service transactions face-to-face offline (6). Traditional social care services social care for older people are usually dominated by brick-and-mortar institutions, and web-based time banking platforms have greatly increased the number of potential service providers and recipients in the community by offering community members the chance to share idle resources (social services). Time banking as a sharing economy model is a sustainable approach and a reliable resource option to solve the deficit in service needs in society by increasing social inclusion and social capital (5). There are idle service resources waiting to be exploited in a community. For example, a time banking member provides services (such as an hour of tutoring) in his spare time and exchanges for time coins that are then exchanged for receiving services (such as an hour of yard work) from another member at a later time (7).

Despite the importance of time banking, scholarly knowledge about this topic is lacking, and the participation rate is relatively low (5). A thorough theoretical foundation is needed for the ongoing study of willingness to engage in time banking. Researchers have noted the vital role of user motivations in influencing participation decisions in sharing economy platforms such as prosocial lending and crowdfunding (8, 9). Time banking is a sharing economy model with traditional service exchange and a field of prosocial giving (10). Service providers evaluate both economic criteria, such as cost and benefit; and prosocial criteria, such as helping others and value fulfillment. Previous studies have focused primarily on diverse factors, such as different motivations (11–14), demographic characteristics (1, 15–17), members' social goals (18, 19), perceived values (5), social capital (4, 20, 21), and technological features (3, 10, 22), and their influence on the intention to participate. Qualitative data and questionnaire data were used by those studies. However, in web-based time banks, central to service request solicitation is the project narrative, which describes detailed information about the service needed, time coins returned, service hours requested and other personal details. Previous studies have proposed that narratives written by project initiators affect prosocial behaviors in sharing economy models such as prosocial lending and crowdfunding (8, 9). While these studies have advanced our understanding of the role played by project narratives in crowdfunding, we know relatively little about whether, or how, the content of time banking service requirement narratives influences the decisions of service providers.

To address this gap, we assess how service providers respond to both intrinsic and extrinsic cues embedded within service requirement narratives. In summary, this research aims to answer the following questions. (1) Why do service providers choose to engage in time banking? (2) How does the language contained within service requirement narratives convey intrinsic and extrinsic cues to service providers? (3) How do intrinsic and extrinsic motivational appeals affect service providers' decisions? To answer the research questions, we focused on a web-based time bank, the NanSha Time Bank in China, and collected 21,969 service requirement projects from the website (nstimebank.com). Intrinsic and extrinsic language cues were extracted from the service requirement narratives, and a theoretical model of the influencing factors of service providers' participation in time banking platforms was developed on the basis of grounded theory. Finally, the model was tested and verified via regression analysis.

This research contributes to the literature and time banking managerial practice in several ways. First, we developed a theoretical model based on grounded theory to explain how the language contained within service requirement narratives conveys extrinsic and intrinsic cues to service providers. We provide a means for researchers to assess how the presence of cues in service requirement narratives may stimulate intrinsic motivation. Second, we verify the effects of different intrinsic and extrinsic cues on service providers' decision behavior. Our findings suggest that people who receive services should utilize different linguistic cues in service requirement descriptions to improve service exchange results.

2 Research background

2.1 Community mutual assistance through web-based time banking

Time banking was first proposed by Edgar S. Cahn, who believed that the value of labor could be measured in terms of time and that any labor requiring the same amount of time was equivalent (23). Currently, the time bank is developed into a community-based exchange platform where the value of services is recorded as time coins. The value of labor time is egalitarian priced in a time banking platform regardless of the nature of the service; for example, 1-h house cleaning is valued the same as 1-h tutoring, both worth a time coin (24). Members earn time coins by providing services, deposit them into the time bank, and then spend time coins in exchange for other services (25). Time banking encourages people to join in value creation activities by using their time and skills to help others, which helps them build social capital regardless of their professional or income level. Moreover, people of different ages can benefit from time banking; for example, younger members provide services to deposit time coins and use them to exchange for services when needed (3). Thus, community mutual assistance for social care of older people can be achieved through time banking.

Given the social and practical importance of time banking in the fight to reduce endowment pressure, scholarly examination of time banking has recently begun to flourish. Given the relatively low degree of participation in time banking, researchers have started to explore factors that motivate members to participate. Past time-banking studies shows scholarly focus on several factors that affect time banking participation, including the demographic characteristics, motivations, values and goals, social capital and technological characteristics of the platforms. However, few studies have sought to examine factors that may cause service requests to be more or less attractive to service providers within the time banking context, particularly in terms of service providers that provide services through web-based time banking platforms.

Web-based time banking intermediaries that utilize time-banking platforms have become increasingly popular. Unlike formal brick-and-mortar mutual aid institutions, web-based time-banking platforms facilitate more efficient interactions for members and reduce the work of coordinators (25). There are a growing number of time banking platforms that provide services to members; thus, investigating how information displayed on a website can influence member participation is important for sustainable development of time banking.

2.2 Extrinsic and intrinsic factors influencing time banking participation

The time banking participation decision is a hybrid decision form. Time banking participation incorporates aspects of both traditional economic decision-making and psychological factors that influence prosocial giving decisions. According to self-determination theory, human behavior are driven by both extrinsic and intrinsic motivations. Intrinsic motivation arises from within the individual and is driven by a desire for personal satisfaction and enjoyment; extrinsic motivation is driven by external factors such as rewards and recognition (26, 27). Service providers weigh both the extrinsic factors regarding traditional economic behaviors (time coins return and service hours cost) and the intrinsic factors regarding prosocial decisions (help others, feel good about oneself, etc.). Both extrinsic and intrinsic motivations are crucial determinants of prosocial and mutual aid behavior (26).

Time banking is a model of the sharing economy in which service recipients and providers exchange service resources on the platform (6). Time banking began as a means to leverage untapped community capacity to fulfill the unmet service needs of its members (5). Alternatively, individuals are motivated to provide services to needy members in hopes of receiving a financial return on their work. Specifically, service requirement projects offer time coins return to service providers and provide service cost, time and labor. Thus, providing service may be framed as an extrinsic reward, time coins gain. External rewards such as time coins return can increase the likelihood of desired behaviors.

Researchers have also suggested that nonfinancial motivators can also play an influential role. Prosocial givers are motivated to participate because of the psychological gains (i.e., intrinsic rewards) that are garnered from the process of helping (28). Time banking also focuses on building a better society through community mutual assistance (11). In time banking platforms, the value of labor time is egalitarianly priced, and those with highly valued labor time (such as nursing care) opt out unless they are highly motivated by idealistic, social, or altruistic incentives. Thus, providing services on a time banking platform incorporates prosocial behaviors. The extent to which members are motivated to provide services may be influenced by the extent to which they perceive their engagement in the activity of time banking to help needy members (29, 30). From the perspective of self-determination theory, this suggests that individuals may seek to align with their personal goals and values, such as helping others, and be intrinsically motivated to participate in time banking.

The literature on cues has demonstrated that the ways in which language is framed can influence motivation; accordingly, we refer to these as extrinsic and intrinsic cues (31). The way in which individual service request presentations are framed varies across people who receive services, and task framing is known to impact motivation (8). Specifically, providing services may be framed in a way that suggests the existence of an extrinsic reward: cost benefit trade-off, or the existence of intrinsic rewards: helping others, self-satisfaction and social recognition. Previous studies have indicated that monetary incentives are crucial community policies that intrigue users' extrinsic motivation to inspire knowledge output behavior (32). Research on self-determination theory suggests that verbal praise, which enhances internal feelings of satisfaction, tends to increase intrinsic motivation (27). Thus, we intended to evaluate how extrinsic and intrinsic incentives influence service transaction results by analyzing the language cues displayed in service requirement narratives in time banking platforms.

3 Methods

3.1 Materials

In this study, we focused on members who sought service needs on the web-based time banking platform nstimebank.com. The Nansha Time Bank is a community mutual assistance service project launched by the Nansha District Government in December 2013. As of December 2021, the "Nansha Time Bank" has grown to 105,810 members, with 139,386 online posts and 89,576 completed services. As such, it represents a valuable context for the study of time banking.

The data for our study were derived from publicly available information on the website of the Nansha Timebank (https://www.nstimebank.com/). The platform provides data about service requirement projects, which include the service type needed, time coins return for the service, service hours request, service transaction result of the project and the description and introduction of the project. The transaction result of a project includes two statuses: completed and not completed. The web page of a service requirement project on the platform is shown in Supplementary Figure 1.

3.2 Procedure

We wrote a computer program using the Python computer language to extract information on all projects posted on the platform, collecting each service requirement project' s information between January 2014 and December 2021. We collected information for 21,969 projects from nstimebank.com. The following projects were removed to ensure validity and accuracy: (1) the word count of the project description text was less than 30; (2) projects with the same description information; (3) projects with incomplete information such as time coins return or service hours; and (4) project information not available to the public. Finally, 12,399 projects remained for analysis.

We conducted two studies to explore service providers' motivations to participate in web-based time banking from the service requirement narrative perspective. First, a theoretical model of the influencing factors of time-banking participation decisions was proposed on the basis of grounded theory. Second, hierarchical multiple regression analysis was conducted to verify the theoretical model. The study of these "best practices" enabled us to understand the effective language that induced service providers' motivation.

3.2.1 Analysis of the coding process

This part adopted the data coding method of grounded theory to model intrinsic and extrinsic motivational cues from service requirement project narratives. The inductive research process of programmed grounded theory is widely used and easy to perform (33). Coding, as the core of grounded theory, refers to the continuous and repeated comparisons between events and concepts to enable classification, feature formation, and conceptualization of data (34). The coding process of grounded theory can be formally divided into three interlocking coding processes: open coding, axial coding, and selective coding (35). The text data of service requirement project

information crawled from nstimebank.com were analyzed via Nvivo12, a qualitative research data analysis software.

Open coding involves breaking the data into blocks and assigning concepts to account for the data's meaning. After classification, 8 preliminary categories were extracted: time and effort cost, time coin returns, identity information of disadvantaged people, hardship in life, physical diseases, values from embodiment, helping others, and social desire (Table 1). Axial coding involves relating concepts to each other on the basis of the raw data. After conducting an inductive analysis of the 8 preliminary categories, we finally conceptualized and grouped them into 4 main categories: interest language, empathy-altruism language, values language, and social language (Table 2). Selective coding was a process of integrating and refining the theoretical framework. The main category was identified as the classification of intrinsic and extrinsic language cues that affect service providers' participation decisions. The intrinsic and extrinsic language cues were characterized as economic motivation, empathy-altruism motivation, values motivation, and social motivation. Finally, we conducted a theoretical saturation test by using 10% of the reserved text data that were randomly selected. The results indicated that no new theoretical viewpoints or new main categories were found. Therefore, the theoretical model established in this study is saturated. The results of the analysis were discussed between the authors to reach a consensus and to ensure the credibility of the interpretation. The research method framework of grounded theory is shown in Supplementary Figure 2.

3.2.2 Theoretical model construction

On the basis of the analysis and coding of the project information data, we construct a theoretical model of the influencing factors of service providers' participation decisions on a time banking platform, as shown in Figure 1. The theoretical model stems from a continuous data comparison process that breaks down data into codes, concepts, and categories until theory is saturated. The connotation of the theoretical model of this research mainly includes the following aspects: (1) Service transaction results work as the core category, and other categories influence it; (2) intrinsic language cues and extrinsic language cues, as influencing factors, directly impact service transaction results; (3) the service hours and time coins returns in human interest language are extrinsic motivations, which refer to the service cost and potential reward; and (4) empathy–altruism language, values language and social language are intrinsic

TABLE 1 Open coding results: the analysis of conceptualization and categorization.

Category	Conceptualization	Original statement (preliminary concept)
Time and effort cost	Demonstrate the service time and effort required to fulfill the service demand	A1: It will take approximately 1.5 h to complete the service. A2: The estimated service time is about half an hour. A3: Working hours are 10:00–12:00, Monday to Friday.
Time coin returns	Demonstrate that service rewards for service providers, such as time coins or subsidies	A4: The service offers 12 Time Coins. A5: The Nansha Time Bank Community Chest Fund is now responsible for covering the subsidy.
Information of disadvantaged people	Display identification information such as orphans, widows, older adults, the infirm, and the disabled in difficulty	A6: The service is aimed at senior citizens and particularly vulnerable older adults who live alone. A7: The service targets are community households of low income and enjoying five guarantees.
Hardship in life	Demonstrate low-income family financial situation and difficulties faced	A8: Living alone in a primary environment, frequently going without food, wearing worn-out clothing, and shivering in the cold. A9: They are financially difficult and can only make ends meet with the government's bare minimum guarantee.
Physical diseases	Demonstrate the poor physical condition of the person in need of the services.	A10: A person with secondary mental disabilities who is a chronic psychotropic drug user, unresponsive, slow-moving, hunchbacked, diabetic, and has frequent foot pain. A11: The client has dialysis 1–2 times per month because of his kidney failure.
Values form embodiment	Demonstrate the value of service, serve to create a better community, serve the public spirit of volunteerism, convey a positive energy, etc.	A12: To better integrate migrant workers into community life and strengthen their feeling of identity, belonging, and pride in their community. A13: To fervently promote the volunteerism spirit of dedication, love, mutual aid, and advancement. A14: To provide for the needs of the older adults and spread the noble virtue of optimistic thinking.
Helping others	Passing on information about the need for help	A15: Hoping some enthusiasts can help. A16: Hoping that someone in her way will help her renew the outpatient appointment. A17: I, Hong xx, have mobility problems and need someone to clean my house.
Social desire	Express requirements of social communication	A18: I often feel pretty bored at home, and I wish someone would join me for a conversation to break up the monotony. A19: I often feel lonely at home and wish someone would talk to me. A20: I am pretty depressed because of my disease and would appreciate some compassionate individuals coming to my home and chatting with me. A21: I'd like to spend time meeting new friends and participating in senior activities with them.

TABLE 2 Axial coding results: main categories formed by axis coding.

Main category	Preliminary category	Demonstration
Interest language	B1 Time and effort cost B2 Time coins return	The economic attributes of service exchange.
Empathy-altruism language	B3 Information of disadvantaged people B4 Hardship in life B5 Physical diseases B6 Helping others	Information on stimulating empathy and help-seeking messages in service requirement narratives.
Values language	B7 Values from embodiment	Information on ideology and values in service requirement narratives.
Social language	B8 Social desire	Information on social needs and social activities in service requirement narratives.

motivations, which refer to intangible returns. We draw upon past research in the area of the sharing economy, such as crowdfunding and P2P lending, which suggests that the identity information of the project initiator and the text word count of the description narrative are determinants of funding decisions (30, 36). Thus, the effects of text word count and identity information on service transaction results were controlled.

3.3 Hypotheses

Individuals are motivated to provide services to needy members in hopes of receiving a financial return on their work. The way in which individual service request presentations are framed varies across people who receive services, and task framing is known to impact motivation (8). Specifically, providing service may be framed as an extrinsic reward, time coins gain. The literature on cues has demonstrated that the ways in which language is framed can influence motivation; accordingly, we refer to these as extrinsic cues (32). The motivation provided by external rewards can increase the likelihood of desired behaviors. Consumers are rational individuals whose decisions are based on the ability of the behavior to satisfy their utilitarian goals. According to social exchange theory, individuals weigh costs and benefits before engaging in social activities (37). Banking members evaluate the benefit against the cost of providing services to maximize their interests. In the service need project information, service hours and time coin returns can represent the cost and benefit of providing services. Previous studies have also indicated that members engage in time banking for utilitarian goals (5, 11). Thus, when a service need project provides more time coins return and costs fewer service hours, it is likely to be more appealing to service providers. Formally:

> *H1*: More service hours needed to complete the service are associated with a decrease in the attractiveness of the service need project among service providers.
>
> *H2*: More time coins return is associated with an increase in the attractiveness of the service need project among service providers.

Altruism suggests that individuals are motivated to offer help for the purpose of benefiting others. Altruism is one of eight mechanisms affecting people's motivation to engage in philanthropic behavior (38). Empathetic concern to someone who is in need is an important source of altruistic motivation (9). When people acknowledge others' needs and difficulties, they feel empathetic and willing to help (39, 40). For example, members may feel empathy for the service recipient by acknowledging how difficult situation he/she is in from the narratives; then, they are more likely to help in time banking (41, 42). Thus, intrinsic cues in the narrative—a greater amount of empathy-altruism language—focus on the information of hardship, disadvantage, disease and helping others is salient to the service providers' reasons for participating. Formally:

> *H3*: Greater degrees of empathy-altruism language are associated with an increase in the attractiveness of the service need project among service providers.

Sociality is the primary driver of individuals' participation in collective behavioral organizations, which refers to the tendency of individuals to engage in social interactions to promote social cohesion (39). Time banking platforms enable members to mutually exchange useful services among themselves and build social capital, especially when most members are unemployed older adults. Time banking services are useful for alleviating loneliness and depression (20). Previous studies have also indicated that people with social motivations participate in time banking for opportunities to spend time with other people (11). Both providing and receiving services in time banking can improve social value, which refers to self-esteem and status benefits from social interaction, subsequently increasing members' behavioral intention to participate (5). Thus, we propose that a greater amount of social language, which focuses on the needs of companions, chatting and making friends in the narrative, may increase service providers' willingness to participate. Formally:

> *H4*: Greater degrees of social language are associated with an increase in the attractiveness of the service need project among service providers.

Values refer to an individual's principles, standards or beliefs, which are among the motivations for why people volunteer (11). Time banking platforms enable members to offer community volunteer services and help others, they participate in time banking to act on their values and create a better society, which increases self-satisfaction. Egoism is an explanation for helping, and the need to feel personally fulfilled is one of the reasons why people offer help (9). Self-determination theory also suggests that people engage in prosocial activities to achieve personal satisfaction (43). Previous studies have suggested that members who are motivated by their values are more willing to give time to the time bank (11, 19). Thus, we propose that the presence of value language, which focuses on personal values, beliefs, contributions, and virtues in the narrative, is associated with improved service transaction results. Formally:

> *H5*: Greater degrees of values language are associated with an increase in the attractiveness of the service need project among service providers.

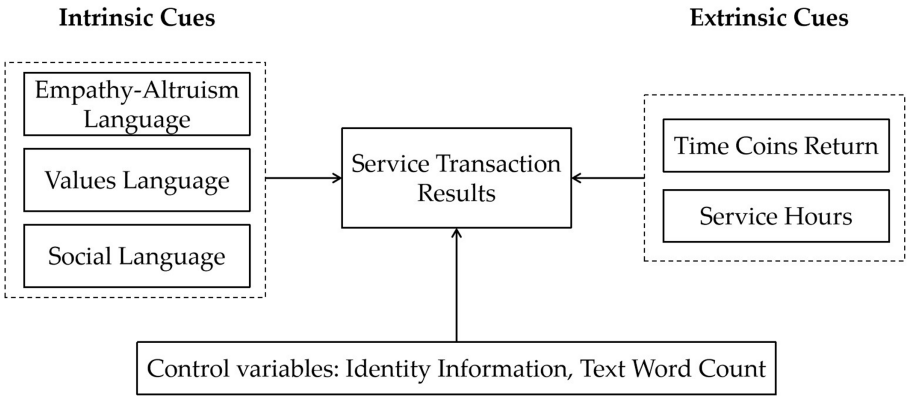

FIGURE 1
Theoretical model.

3.4 Text analysis

We tested the theoretical model of intrinsic and extrinsic cues in the narrative influencing time banking participation decisions in this part. We examined each project's descriptions written by people who receive services to study linguistic appeals that can trigger different types of motivations of service providers. First, we segment the text data by removing stop words; then, we extract keywords and construct a seed vocabulary from the processed text dataset on the basis of the extrinsic and intrinsic motivation cues. Since time coins return and service hours cost can be directly converted into quantifiable data for extrinsic motivations, three categories of intrinsic language cues—social, values, and sympathy-altruism—are subject to keyword extraction. We extracted the high-frequency words in the text data (the top 150 high-frequency keywords are shown in the Supplementary Table 1) and then calculated the term frequency-inverse document frequency (TF-IDF) value of each word (the top 20 TF-IDF calculated keywords are shown in the Supplementary Table 2). Five coding staff members were then recruited to annotate the three intrinsic language cues. Finally, the initial keywords for the classification of intrinsic language cues are shown in Table 3. Second, we expand the initial keywords by using the Chinese synonym toolkit Synonyms in Python to form an extended vocabulary (Supplementary Table 3). High-frequency keywords in the expanded vocabulary have been included in the expanded keywords for intrinsic language cues, as shown in Table 4.

3.4.1 Measures

3.4.1.1 Independent variables

The three intrinsic language cue items, social language, empathy-altruism language and values language, were measured on the basis of the word list in Table 4. The word list of social language is used to assess the extent to which a narrative concentrates on social activities. The word list of empathy-altruism language focuses on the people who needs will help; it provides a clear picture of the service recipient. The word list of values language is designed to assess the extent to which a narrative concentrates on the values of volunteering and charity. A project description with a specific category language appears was coded as 1; if a specific category language appears multiple times in the project narrative, then we take their sum. A project description may have multiple categories of intrinsic language; then, each category was coded as 1. Extrinsic language, including service hours and time coin returns, focuses on how much cost the provider needs to pay and how many time coins he/she would gain through offering service to a specific project. The extrinsic language cue items were measured directly from the project description. Each service requirement project was required to claim service hours needed and time coins return (see Supplementary Figure 1).

3.4.1.2 Control variables

The identity information refers to the name and address of the project initiator in the text. Some studies have shown that the identity information displayed in project descriptions increases users' willingness to participate by increasing their trust in the project initiator and reducing their perceived risk of participating (32, 44). This factor was controlled for as a dummy variable; projects with identity information were coded as 1, and those without identity information were coded 0. The text word count refers to the total number of text words of a project description. Related research has demonstrated that the richness of information presented in text affects users' decisions (36). This factor was controlled for as a continuous variable.

3.4.1.3 Dependent variable

Our dependent variable, the service transaction result, operationalizes the attractiveness of the service project to potential service providers by measuring whether the project was completed. The service transaction result of a project was a dummy variable: 0 = not completed; 1 = completed. The service transaction result of each project is displayed on the web page (see Supplementary Figure 1).

3.4.2 Regression modeling

On the basis of the theoretical model and the factors in the research model, an econometric model was developed to estimate the impact of intrinsic and extrinsic language cues on the willingness of time banking service providers to participate via the following equation.

$$Y = \alpha + \beta D_i + \gamma Z_i + \varepsilon_i$$

Y is the service transaction result. β is the regression coefficient, and γ is the control variable coefficient. α is the intercept. ε_i is the

TABLE 3 Initial keywords for intrinsic language cues.

Variables	Keywords
Social language	Chatting, relief, loneliness, boredom, depression, friendship, visitation, belonging, recreation, companionship.
Empathy-altruism language	Hardship, distress, illness, hardship, pain, help, low income, disadvantage, weakness.
Values language	Volunteer, public welfare, charity, community service, Lei Feng, model, virtue, social worker, respect for older adults, enthusiastic person.

TABLE 4 Expanded keywords for intrinsic language cues.

Variables	Expanded keywords
Social language	Chat, relieve boredom, loneliness, boredom, depression, friendship, visit, accompany, sense of belonging, recreation loneliness, sadness, grief, sadness, uninteresting, tedious, boring, depression, loneliness, chatting, depression, insomnia, schizophrenia, bipolar, pastime, play, pass the time, take pleasure, self-indulgence, visit, seek, look up, attend, return, escort, call on, accompany, pay a return visit, escort, leading, sport activities, recreational activities, cultural activities, cultural performances, socializing, feeling safe, feeling happy, talking, getting to know, making friends.
Empathy-altruism language	Difficulty, dilemma, disease, hardship, pain, help, assist, low-income, vulnerable, frail, Five Guaranteed People, low-income households, onerous, very difficult, difficulty, trouble, distress, dilemma, straits, poor, burden, poverty, peril, situation, illness, hidden worry, illness, complication, cancer, diabetes, infectious disease, chronic, permanent disability, disability, handicap, mobility, disabled, deaf, handicapped low income, low income, extraordinary hardship, low income, help, on behalf of, please, door-to-door, beg, kindness, help the poor, poor households, needy workers, support the poor, help, mutual aid, concern, bad, paralyzed, in poor condition, paralysis.
Values language	Volunteer, public welfare, charity, community service, Lei Feng, exemplary, virtue, social worker, respect for older adults, enthusiast, volunteer, voluntary service, charity, public welfare activities, public service, public welfare, charity, charities, fundraising, fundraising, community activities, service projects, social work, illuminate, character, traditional virtue, noble, sentiment, virtue, noble sentiment, social worker, positive energy, dedication, exemplary, learning from the lightning bolt, respecting the older adults and loving the children.

regression error term. D_i represents the explanatory variables. Z_i represents the set of control variables.

4 Results

We used binary logistic regression to analyze the relationships among the variables, investigate how the independent and control variables affect the dependent variables, and identify the main motivational factors that influence service providers' willingness to participate.

Table 5 presents descriptive statistics and correlations for our variables. 76% of the projects were completed, 49% of the projects displayed identity information of the service receiver. The average number of text words of a project description is 84. The average time coins return of the projects is 36.9, and the average service hours needed for a project is 2.9. As for language cues, empathy-altruism language appears an average of 1.93 times in all projects, the numbers for social and values language are 0.7 and 0.67, respectively. The absolute values of the correlation coefficients among the variables are less than 0.8 indicating that multicollinearity was not a threat. The coefficients are all significant at $p < 0.001$ or $p < 0.01$ level demonstrating statistical significance.

Table 6 presents the results of our regression analysis. All control variables were entered into Model 1. The two measures of extrinsic cues (time coins return and service hours) were entered into Model 2. Model 3 adds the composite measures of intrinsic cues (empathy-altruism language, social language, values language). Inclusion of control variables in model 1 accounted for a proportion of the variance (Nagelkerke $R^2 = 0.073$) in service transaction results. Inclusion of extrinsic and intrinsic language cues in Model 3 significantly increased variance explained (Nagelkerke $R^2 = 0.212$), which indicates that the explanatory power of our model is acceptable. The beta weights revealed significant effects of extrinsic language cues on service transaction results. Time coins return ($\beta = 0.453$, $p < 0.001$) and service hours ($\beta = -0.107$, $p < 0.001$) predicted service transaction results, thus Hypothesis 1 and Hypothesis 2 were supported. As for intrinsic language cues, social language ($\beta = 0.500$, $p < 0.001$) and values language ($\beta = 0.189$, $p < 0.05$) have significant positive effects on service transaction results, which provide support for Hypothesis 4 and Hypothesis 5. However, empathy-altruism language is negatively related to service transaction results ($\beta = -0.203$, $p < 0.05$), which is contrary to Hypothesis 3.

5 Discussion

In terms of extrinsic language cues, time coins return is positively related to service completion, and service hours is negatively related to service completion. The results indicate that greater service hours needed to complete the task would be associated with less willingness for service providers to participate; thus, the probability of the project being completed is lower. Further, more time coins return would be associated with an increase in the willingness of service providers to participate; thus, the transaction result of the project is more likely to be completed. The results confirm that extrinsic motives embedded in project description narratives have significant effects on rational service providers' decision-making behaviors when they pursue utilitarian goals.

With respect to intrinsic language cues, evidences are provided for positive effects of social language and values language. The results indicated that greater degrees of social language and values language would be associated with an increase in the probability of a project being completed. As expected, we found that intrinsic motives (social and values language) embedded in the project description narratives significantly increased service providers' willingness to participate. However, empathy-altruism language is negatively related to service completion. Contrary to our expectation, increasing the focus on empathy-altruism motives

TABLE 5 Correlations, means, and standard deviations (SDs).

	Variables	Mean	SD	1	2	3	4	5	6	7
1	Service transaction results	0.76	0.43							
2	Identity information	0.49	0.51	0.088						
3	Text word count	84.00	30.24	−0.147	−0.150					
4	Time coins return	36.90	45.40	0.104	0.126	−0.22				
5	Service hours	2.90	6.85	−0.098	0.103	−0.184	0.736			
6	Empathy-altruism language	1.93	2.17	−0.041	0.105	0.092	−0.119	−0.117		
7	Social language	0.70	1.13	0.069	0.079	0.064	−0.120	−0.100	−0.031	
8	Values language	0.67	0.47	0.049	−0.040	0.062	0.105	0.111	0.045	−0.072

N = 12,399. Correlations that exceed |0.01| are significant at $p < 0.01$.

TABLE 6 Table of regression analysis results.

Variables	Model 1	Model 2	Model 3
Identity information	0.270*** (0.082)	0.291*** (0.082)	0.290*** (0.084)
Text word count	−0.828*** (0.067)	−0.89*** (0.129)	−1.249*** (0.132)
Time coins return		0.560*** (0.092)	0.453*** (0.093)
Service hours		−0.114*** (0.025)	−0.107*** (0.025)
Empathy-altruism language			−0.203* (0.100)
Social language			0.500*** (0.088)
Values language			0.189* (0.090)
Constants	4.626*** (0.304)	8.245*** (0.773)	7.541*** (0.773)
Nagelkerke R^2	0.073	0.135	0.212
N	12,399	12,399	12,399

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; Standard errors in parentheses (#.##).

embedded in the service request narratives significantly diminished service providers' interest in the project. This result might be explained by the affective load theory (45). ALT recognizes that negative emotions such as anxiety, boredom, and frustration can increase the affective load, thereby inducing avoiding, resisting and giving up behaviors (46, 47).

Among the control variables, identity information has a positive effect on service completion. Identifying information can increase the credibility of a project; thus, people who receive services should try to include more accurate identity information when posting requirements. The text word count is negatively related to service completion, which indicates that too much text will make the service provider less willing to offer service. According to affective load theory, when users are exposed to too much information, it can lead to mental fatigue and prevent them from engaging in participation behavior (47).

6 Conclusion

In this study, we attempt to gain a deeper understanding of whether service provider attraction to service requirement projects is influenced by extrinsic and intrinsic cues embedded in project description narratives. By doing so, we provide the first examination of the role played by different types of cues in time banking platforms and propose a theoretical framework for predicting the participation decisions of service providers. Our findings support those of prior studies by suggesting that extrinsic and intrinsic motivations affect decisions in the time banking context. Given the importance of web-based time banking in community pensions, it is vital to develop an understanding of member participation in these fields.

Consistent with self-determination theory, this study distinguishes extrinsic motivations and extrinsic motivations and proves that both motivations play a role in members' participation decisions. People assess benefits and costs to maximize their interest in time banking participation decisions; specifically, external rewards increase service providers' intention to participate, and service hours decrease their intention (48). We also suggest the effects of intrinsic language cues, including social language and values language, in strengthening preexisting intrinsic motivations by using a content analysis methodology. Social and value motivations are the main factors that influence member participation in time banking. Positive information, such as social and value cues included in the service requirement narrative, can encourage providers to participate.

In our analysis, empathy-altruism has a significant negative effect on intrinsic motivation, which is inconsistent with previous findings in the charitable giving literature. Negative information about the service recipient's hardships, sorrows, and tragedies that intend to induce empathy-altruism motivation does not facilitate service transactions. The empathy-altruism language assesses the extent to which a narrative expresses how sympathetic the service recipient is and how desperately he/she is in need of help. The word list includes

dilemmas, diseases, hardship, pain, etc. When people are exposed to overload negative information, negative emotions arise and decrease their intention to offer help.

6.1 Implications for practitioners

For practitioners, web-based time banking platforms represent a valuable tool for bolstering community pension activities. Our research provides time banking platforms with managerial implications for how to effectively promote service transaction projects to community members and improve service providers' interest in participating. Our findings suggest that financial incentives are attractive to service providers. The return of time coins benefits service providers, and it is necessary for time banking platforms to improve the value of time coins. Thus, it is suggested that time banking platforms explore diverse time coin exchange systems, such as exchanges for commodities. It is also suggested that time banking platforms adopt differential pricing for different services and that members providing highly valued labor (such as nursing care) can gain more time coins than less valued labor (such as cleaning); thus, the services provided by time banking can attract more members to participate.

Furthermore, our results suggest that service need projects tend to be completed when their descriptions are framed to appeal to the intrinsic reasons (idealistic and social incentives) that service providers need to participate. In web-based time banking practices, using language cues can stimulate members' interest and motivation, which seems to be a better way than solely addressing financial rewards. It is suggested that people who receive services use more intrinsic cues that emphasize the role of service providers. To stimulate members to provide services in time banking, the service request project narrative should emphasize service providers' psychological gains, such as self-value fulfillment and social needs satisfaction. Moreover, our research suggests that intrinsic cues such as the hardship and sorrows of people who receive services are negative information that hinders service providers' intention. It appears that more empathy-altruism information does not lead to better results; thus, the service requirement narrative should not focus on the language needed to help others too much.

6.2 Limitations and future research

In this study, we focus on the effect of language cues on time banking participation decisions. The data of service requirement projects posted by people who receive services were collected from the website of a specific Chinese time bank platform. The results of this research seems to provide insights into China's time banking landscape, future research could collect data from other time banks and from regions with different social and cultural background. The constructs are measured via computer-aided text analysis, and the application of traditional manual content analysis to time banking narratives may reveal additional constructs for future investigations. For example, future studies may investigate how other extrinsic and intrinsic cues may affect service transaction results. This will provide more insights into the construction of service requirement narratives that maximize the effectiveness of time banking practices. The method of content analysis can also be applied to multimedia data such as photos, and future research can examine how image information included in service requirement projects affects participation decisions. The psychometric mechanism of how intrinsic and extrinsic cues in service requirement narratives influence motivations needs to be explored further. The use of an experimental method to explore how members decide to provide service is suggested. Members in the experiment could be presented with varying types of appeals, their behaviors can be tracked, and their motivation can be directly accessed via psychometric measurements.

Data availability statement

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

Author contributions

HJ: Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. ML: Conceptualization, Funding acquisition, Writing – review & editing. LM: Conceptualization, Funding acquisition, Project administration, Supervision, Writing – review & editing. MH: Data curation, Formal analysis, Writing – original draft. SY: Writing – review & editing.

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Conflict of interest

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

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Supplementary material

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Support in digital health skill development for vulnerable groups in a public library setting: perspectives of trainers

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Introduction: The digitalization of healthcare poses a risk of exacerbating health inequalities. Dutch public libraries offer freely accessible e-health courses given by trainers. However, there is limited knowledge on whether these libraries successfully reach and support those in need. This study aimed to explore trainers' perspectives on the challenges, successes, and potential improvements in digital health skill education in a library setting.

Materials and methods: Trainers of the e-health course were interviewed. Topics included: the role of the library in digital health skills education, the successes and challenges in reaching groups with a low socioeconomic position, the perceived impact of the digital health skills education, and strategies for future improvement in digital health skills education. A deductive analysis based upon the interview guide topics was performed. A second inductive analysis was applied to identify underlying patterns. Coding was done independently and cross-checked. Codebooks and themes were determined in discussion with authors.

Results: Three themes emerged. 1) Trainers' services, skills and expertise: Trainers identified older adults, youth, people with low (digital) literacy, the unemployed, and people from non-native cultural backgrounds as the groups most in need of support. Trainers felt equipped to address these groups' needs. 2) The libraries' reach: improving engagement, perceived accessibility, and clients' barriers: Despite trainers' efforts to adjust the course to the target groups' level of commitment, digital and literacy levels, and logistics, the digital health course predominantly engages older adults. Experienced barriers in reach: limited perceived accessibility of the public library and clients' personal barriers. 3) Collaborations with healthcare, welfare and community organizations: Trainers emphasized that collaborations could enhance the diversity and number of participants. Current partnerships provided: reach to target groups, teaching locations, and referral of clients.

Discussion: Trainers in public libraries recognize a various target groups that need support in digital health skill development. The study identified three challenges: accessibility of the digital health course, reach of the public library, and clients' personal barriers. Public libraries have potential to support their target groups but need strategies to improve their engagement and reach. Collaborations with healthcare, welfare, and community organizations are essential to improve their reach to those most in need of support.

KEYWORDS

digital health, health education, socio-economic factors, social services, older adults, health literacy, vulnerable populations, digital divide

Introduction

Rapid digitalization of healthcare imposes barriers in access to care for people with low digital health literacy or limited access to resources (1–3). Digital health, or e-health, is the use of information and communications technologies in healthcare to manage illnesses and health risks and to promote wellbeing (4). Digital health has a broad scope and includes the use of wearable devices, mobile health, telehealth, health information technology, and telemedicine (4). Known barriers to use digital health are a lack of access to hard- and software, a lack of language literacy, digital health literacy, digital skills, and limited awareness of the existence and the benefits of e-health (5–9). Digital health literacy is defined by Norman et al. as "the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem" (10). This leads to a growing concern that the increasing adoption of e-health will lead to increased disparities in health (11, 12). The Digital Divide Model by Van Dijk describes the existence of a socio-economic gradient to the availability of resources that lead to access, use and derived benefit from new media, such as e-health (13). These resources are categorized in temporal, material, mental, social and cultural resources (13). According to the Digital Divide model and related research, policies and laws are countries' instruments to redistribute public resources in an equitable manner to mitigate this divide (1, 13–20).

Scholars expect that the need for social services in a fast digitizing society and digitizing health care system will grow (21, 22). Public libraries have the opportunity to become key in facilitating education and support within a community setting increasing resilience to societal changes and improve inclusion of all citizens in modern society (23–25). International and national policies push the public library forward to facilitate support in the development of digital health literacy among citizens (26–34). Many studies underline the potential of libraries to educate citizens in digital skills and in health literacy, and increasingly in the combination of the two; digital health literacy skills (26, 28, 35–40). Libraries are viewed as accessible for anyone and well-rooted in society. Therefore, the library is considered a suitable avenue for reaching populations in need of support (18, 19).

Dutch public libraries are evolving from a source of written information towards an institute with a broad societal role, facilitating support in a variety of skills, including digital skills and accessing e-governmental services (31, 41–45). These developments show that the Dutch public library is a social services organization that is expanding their variety of services with the aim to help citizens to overcome challenges in current society. In this role, libraries predominantly focus on supporting people with limited language literacy, limited digital skills, in particular: older adults, parents with limited language skills, refugees and immigrants, and people with a lower socio-economic position (SEP) (46). Around 4 million Dutch citizens lack the language and numeric skills to participate in the knowledge-driven economy of the Netherlands (41, 42, 45). The public library estimates the level of language and numerical skills to be indicative for the level of digital skills (41, 42, 45). The Dutch library covenant (2021–2023) states the goal to reach 10%–20% of these citizens with support for the development of digital skills by employing effective interventions (42).

The Dutch government and the public library organization developed a program for digital inclusion (43, 44). Helpdesks [Informatiepunt Digitale Overheid] were opened in most libraries with the purpose to provide direct support in digital governmental, health and tax matters or refer clients to other forms of support offered by the library, such as courses or walk-in hours (43, 44). This study focuses on the digital health education provided in the public library, which is mainly facilitated via the trainer-led e-health course "DigiVitaler". We previously showed that participants of the e-health course valued the content of the course and felt supported in their digital health skill development (47) and, that the participants were predominantly older adults (47). The general aim of the public library is to reach and educate a variety of people who need support in digital skill development most (46). To gain more insight into how the support in digital health skill development is realized in daily practice and if, how this support could be improved, trainers of the e-health course are interviewed.

This research aimed to gain insight into trainers' perspectives regarding the challenges, successes, and possible future improvements in digital health skills education within the context of the Dutch public library. Results from this study provide grass-root level insights into what is needed to expand the role of the public library and the trainer as a valuable resource within the welfare and healthcare infrastructure in the context of digital health literacy.

Materials and methods

Setting

The organization DigiSterker develops courses for digital health skills, DigiVitaler and digital government skills, a.o. DigiSterker. Organizations that want to facilitate the courses have to purchase a license and trainers must follow a trainer education program (48). The public library organization has purchased the license of DigiVitaler for all public libraries to use (48). The course is available for public libraries to implement in their services since 2021 (49, 50). Each library needs to have a trainer that completed the trainer education program before offering the DigiVitaler course. The course DigiVitaler aims to enhance digital health literacy and is offered in 60 of 137 public library organizations in the Netherlands (2022) (49, 50). This course is structured into multiple classes, each covering a specific e-health topic, such as the patient portal, video consultations, and searching for online health information. Trainers introduce clients to the potential of e-health by providing hands-on experience with e-health applications in simulated digital environments. Libraries are free to decide what topics they offer and how the course is structured. There is no measurement of the level of digital skills before or after the course. In public libraries, participation in the course is free of charge.

Data collection

A qualitative research design with semi-structured interviews was used. DigiVitaler trainers were interviewed regarding their daily practices in providing support for the development of digital health skills for people with a low SEP. The interviews took place in June and July 2022. The topics discussed included: (1) the role of the public library in digital health skills education, (2) the successes and challenges in reaching low SEP groups, (3) the perceived impact of the content of DigiVitaler, and (4) strategies for future improvement in digital health skills education. The interview guide was developed in collaboration with authors Lucille Standaar (LS), Adriana Israel (AI), Lilian van Tuyl (LvT), and Anita Suijkerbuijk (AS) and can be found in Supplementary File S1. In addition, the age, sex, level of education, job description and years of work experience of each participant were recorded. The level of education was determined according to the International Standard Classification of Education (ISCED): 0–2 corresponds with low, 3–4 with intermediate and 5–6 with a high level of education.

Recruitment

Trainers were eligible for participation in this study if they worked as a trainer for the course DigiVitaler within a public library. Contact information for the DigiVitaler trainers was provided to the researchers through DigiSterker, the developer of DigiVitaler. The trainers were approached via email, phone, or face-to-face as part of a previous study to inquire if they were interested in participating in this study. Prior to the interviews, the trainers received digital information about the study and were asked to sign an informed consent form. Participants were provided the opportunity to ask questions about the study and the interview procedure via phone or e-mail. Informed consent forms were collected via e-mail prior to the start of the interview. Participants received a 15 euro digital voucher for their participation. The interviews were conducted online via Microsoft Teams by LS and AI. All the interviews were recorded and lasted between 30 and 60 min. The content of the interviews was discussed among LS and AI after each cycle of six interviews. After fourteen interviews, no new information was retrieved and after discussion between LS and AI, it was concluded that data saturation was reached.

Fourteen trainers participated in the study. The participants were predominantly female ($n = 10$), with a mean age of 54.8 years (range of 31–62 years). This is in line with the gender and age distribution of all employees within public libraries, as 83% is female (2022) and 87% of employees fall in the age range of 30–60+ years of age (2022) (51). Eleven trainers were employed by the library, two were volunteers, and one was self-employed. The trainers were recruited from twelve different libraries across the Netherlands, covering both rural and urban municipalities. Most participants ($n = 12$) were highly educated. The participants were involved in education of digital skills for 8 years on average (range 1.5–25 years). All participants completed the trainer education program from DigiSterker, the developer of the course DigiVitaler. A detailed overview of the participants' demographics is presented in Supplementary Table S2.

Data analysis

The interview audio recordings were transcribed verbatim by a professional transcription service. Data were analyzed with the Codebook Thematic Analysis approach (52). Codebook thematic analysis allows for a structured process of coding, theme development and conceptualization in a multidisciplinary team while maintaining the approach of reflective thematic analysis to explore the perspectives of the trainers in-depth (53). First, transcripts were read for data familiarization. A codebook was created based upon the topics from the interview guide. The first two interviews were double coded by LS, AS, LT, and AI who then collaboratively defined and fine-tuned the codebook. After reaching consensus, the interviews were coded and cross-checked by LS and AI, using MaxQDA for data management. This deductive analysis was performed to create an overview of the data gathered. A second, inductive, analysis was performed to identify underlying patterns. The following topics were analyzed inductively: libraries' services for digital health skills development, trainers' guidance, trainers' observations, target groups, collaborations, ideas for the future. The first 20% of the transcript segments per topic were inductively coded by LS and AI separately. After reaching consensus, the rest of the transcripts were coded and cross-checked by LS and AI. The inductive codes were arranged into candidate themes. Candidate

themes were then further defined through discussion between all researchers to determine the final themes. An overview of the final themes and the underlying codes can be found in Supplementary Table S1. Quotes were translated by using DeepL and checked by a native English speaker.

Ethical considerations

The study was declared to fall outside the scope of the Dutch Medical Research Involving Human Subjects Act by the Clinical Expertise Center of the Dutch National Institute for Public Health and the Environment (VPZ−559).Transcripts of the interviews and the informed consent forms are stored and protected at the Dutch National Institute of Public Health and the Environment.

Results

Three main themes were identified to describe the trainers' experiences in providing support in digital health skills development in a public library setting: (1) Trainers' services, skills and expertise, (2) The libraries' reach: improving engagement, perceived accessibility and clients' personal barriers, and (3) Collaborations with healthcare, welfare and community organizations. An overview of the themes and subthemes can be found in Figure 1.

Trainers' services, skills and experiences

Trainers' insight into the specific needs of their target groups

The trainers felt that specific groups might need more assistance to acquire the skills necessary to access digital health. Most of the trainers have years of experience and worked with a diverse clientele in terms of age, skills, cultural backgrounds, and language proficiencies. Trainers expected the following populations to need support: people who are unemployed or who are not used to digital work, older people, persons with a migration background or people with low literacy skills, and the youth. The need for support was not perse related to socio-economic status according to the teachers. It was often mentioned that trainers expect different target groups to have different needs in accessing digital health.

> 'A low-literate person may need help more often, but there are just people who have nothing to do with a smartphone or digital devices, but who are quite intelligent [..] they also need help. The immigrants who have just come to the country, who are still working on the language, but also need to know what DigiD is, [..] where they can go, what is on offer. So basically you are dealing with all layers.—Interview 13

> 'Yes, newcomers. [..] Yes, with them I do have to make a comment, because they are digitally proficient. Because very often they come.. They have these nice mobile phones and so on, but they also have to be able to find their way within the Dutch infrastructure. And so we have to teach them that. - Interview 04

Youth and people with migration backgrounds were often seen as digitally skilled but were perceived to have less knowledge about how the (Dutch) governmental digital systems work. Additionally, some trainers experienced that the youth had less awareness of what safe use of the internet is and how important that is regarding their intensive participation in the digital world. Trainers observe that people with a migration background and people with limited literacy would benefit from developing their (Dutch) language skills to be able to fully participate in the digital health services.

> "Youth are not so aware of what an app does and what information is stored. Who is the creator? Is it reliable? They are actually a little less concerned with that than would be good for them" - Interview 14

Trainers' skills in educating digital health skills

Trainers reported to feel highly skilled and equipped to support the development of digital health skills among their clients. Most trainers explained that taking time and asking questions about their clients' needs is important to be able to serve their clients best and adjust education efforts accordingly. Nevertheless, for each target group, different aspects of access to digital health are of importance and thus, a few trainers said to feel uncertain to best address the needs of some target groups. Their daily work includes providing courses, workshops, and directly accessible technical support to improve digital health skills of clients. Most trainers perceived the digital skills needed within digital health similar to other digital areas, as digital health often requires the use of a digital authenticator to log in, fill in forms or visit a website.

> 'I now also start more from the student's demand. In the beginning, of course, you have a fixed programme, and you want to run it. And then at a certain point I noticed that people had their own problems. So every course looks different and it kind of depends on what the course participants want.'—Interview 09

> 'It's mainly people who have been on welfare for a very long time. Yes, they are quite difficult to reach. And we know, we can't put our finger on that either, how digital-savvy are they actually?—Interview 04

Even though the trainers themselves feel well-equipped, they find that, in general, there is a lack of skilled and experienced workforce to strengthen their teams. The lack of skilled and experienced workforce poses a challenge on effectively

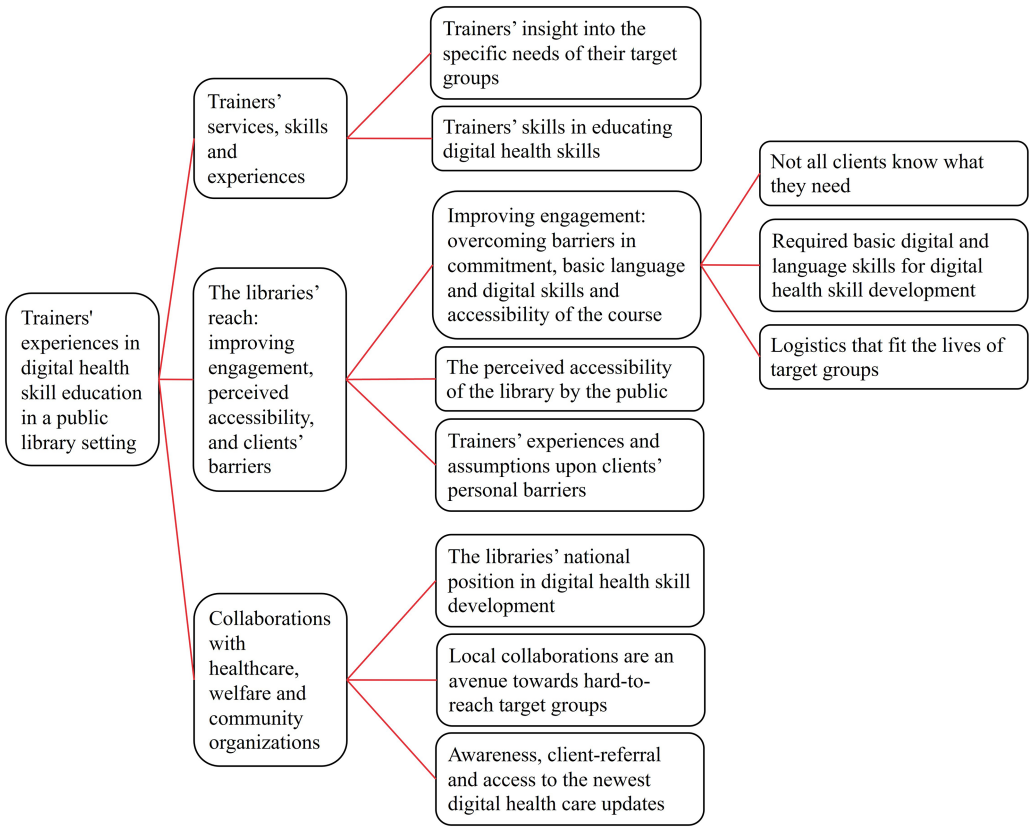

FIGURE 1
Overview of described themes and subthemes derived from the trainers' experiences in digital health skills education in a public library setting. Data was collected via semi-structured interviews (n = 14). Interviews were held with Dutch trainers in digital health skills who taught in public libraries.

educating their clients. Some trainers noted that they must depend on volunteers, which can occasionally result in education and support that does not fully meet the clients' needs. Others mentioned that, to improve the quality of the libraries' service, they would like to provide training in didactical skills and digital health for their volunteers and new library staff, but that they lack the stable financial funding for this type of development.

> 'It's also a choice for us to do that with professionals because you can also work with volunteers, you can also say, we have computers and people can just practice on their own but we do feel that we have to offer something more than that. We really have to guide people a bit in that, take them by the hand and also because of that, we spot what people are asking, what they are struggling with, and then of course we try to find an answer to that.'—Interview 01

> 'There is still some subsidy for it now, but suppose that disappears, you have a chance that it will only have to be done by volunteers. That would be a shame, though, so I actually hope that the national management [..]will continue to pay attention to it—Interview 07

The libraries' reach: improving engagement, perceived accessibility, and clients' barriers

Trainers experience that most clients who attended the course DigiVitaler were ethnic white female older adults of 60–80 years of age who were fluent in Dutch. Both successfully engaging diverse target groups in the digital health skill course and reaching target groups through the public library were experienced as challenging.

Improving engagement: overcoming barriers in commitment, basic language and digital skills and accessibility of the course

Not all clients know what they need

Trainers experience difficulty in balancing between the guidance needed for clients to learn new skills and the time-consuming effort that the development takes. Clients tend to overestimate their level of digital skills and rather commit to short courses. Most libraries had converted their multi-day courses into single workshops to address their clients' needs. Even though, most trainers expressed that long term courses delivered to small classes are the most effective way to learn digital skills.

> 'We thought of, shall we then extend our course? That we'll make it, say, six classes? But that's quite a long time span, that you're committing people and they don't want that so then you get that people aren't going to sign up again because the course is so long so it's a bit of a balancing act as well, a bit of a commercial story, but how do you get people in?'—Interview 14

Regardless, most trainers felt that the digital health skills course improves clients' confidence, skills and awareness in digital health, albeit it depends on the client how fast they progress in their skill development. Some trainers shared that people who only use the library for technical support tend to develop their digital skills less, as problems get solved for, and not by, clients.

> 'Of course we have the digital government information point where people are really helped with what steps to take. In that you don't really teach people to become proficient themselves, that's really more of a service and for me that's a bit of the dividing line because at the IDO [Information Point Digital Government] you help people with a question they have. But if people want to learn how to do that themselves, they can go to the digital house'—Interview 03

Required basic digital and language skills for digital health skill development

According to the trainers, the e-health course demands a certain level of digital and language skills that not everyone possesses yet. Some participants mention that they assess the digital skill level of the client before admitting them to the digital health skills course. If the digital skill level is assessed as too low, the client is directed to a general course in digital skills. Some trainers mention that the course material would be difficult to teach to people with limited Dutch fluency and would direct these clients to language courses. Others mention that with the right tools and enough time, they would be able to teach digital health skills to non-native Dutch speakers.

> 'You just ask some things. [..] Are they working with tablet? Are they working with a laptop? Or only on mobile? And what do they do then? [..] We have also recently developed a very short questionnaire that we ask people to fill in before they start taking courses. And then we can check whether, gosh, are they doing well or do they perhaps need to take another level [digital skills] lower or higher'—Interview 02

> 'Steffie's [a website that provides videos explaining various topics in easy language] videos. [..] To reach people in a clear way also for example low-literate people and also even non-native speakers, because with some of the videos it is also possible that to see the text in your own language Arabic or Turkish. So that's also how you reach that target group. So I also use those from time to time.'—Interview 09

Logistics that fit the lives of target groups

Trainers were aware of the importance of providing classes at times and places that suit their target groups. Some trainers offer classes according to the schedule and format (live/online) of their clients. One trainer mentioned that they offered the course at different times of the day to serve more target groups. Some trainers also offer their services in settings outside the library: community centers, in nearby villages without a library or during events from local associations such as older adults associations.

> If you [as a younger adult] would then want to know something, you go and look it up in the evening [..]. And whether we have to do that in the evening physically, or whether we have to do that via Zoom or those kinds of methods, I'll leave that in the middle. But not everyone also has the need to then leave the living room in the evening and leave that hot cup of coffee because they are going to the library for a course.—Interview 08

> 'We had a lot of courses during the day but we also deliberately made courses on evenings but that doesn't make much difference to the age group [..] the same people arrive there and we also switched evenings on occasion, saying, you know, is it because of Monday?'—Interview 06

> 'We also went back into the neighbourhoods since last year, we are now in two neighbourhoods, socially disadvantaged neighbourhoods so to speak. And from September we will enter a third neighbourhood, where we will also have a drop-in point and walk-in consultations in community centres. To make it accessible to more people, because for many people the library is a complicated thing and not very accessible, whereas it should be, but it's not in people's minds to just walk into a library.'—Interview 03

The perceived accessibility of the library by the public

Most trainers expressed that they experienced difficulties in reaching the target groups that need support. All trainers felt that the public library is an organization that is and should be accessible for everyone. Some trainers found that the difficulties in reach originate in limited awareness of the libraries' services or that the potential client was unable to commit to learning new skills due to limited time available or other priorities.

The perceived accessibility of the library by the public is mentioned as important for reaching the intended target groups. To improve the visibility of the course, trainers mention the use of various online and offline marketing methods, such as advertising in local newspapers, posters, flyers, word of mouth, and social media. Some libraries collaborate with older adults associations, general practitioners, pharmacies, and computer associations to use their network as an advertisement outlet. The trainers mentioned that most people that attend the course were made aware via newspaper advertisements or via local associations' advertisement outlets.

> 'I think you have to set it up as broadly as possible. And people who are actually confronted with it [digital healthcare] and don't know anything about it [digital healthcare], they will automatically come to you to start asking those questions'—Interview 08

Another perspective of the participants was that the library might be less accessible for certain target groups. Reluctance to visit the library may originate from perceived or experienced psychological, financial or logistic barriers. Trainers have mentioned that potential clients with limited literacy often avoid the library as they feel it is a place where they don't belong as they are unable to read. Others have mentioned that people may still have an old-fashioned image of the library; the library being a place for elites and where you can only read books. Some mention that for some people the library is too far away, travel is too expensive, or they experience discomfort leaving the familiarity of their neighborhood.

> 'People with a migration background [..] they don't like to come here (public library in the city centre) either. [..]they say, it has to be here in the neighbourhood because it's too far or I can't get there or they have to walk. It's a combination of not being able to and finding it scary. Or that they have no money for it, but also because they find it scary. The neighbourhood is safe and especially for people with a migration background, who often stay in their neighbourhood and take their children to school'—Interview 03

Trainers' experiences and assumptions upon clients' personal barriers

Some trainers experience that especially the youth and middle-aged adults are difficult to engage in digital skills courses, even though they do ask for information at the helpdesk and are offered the option to attend a course. Some trainers assumed that shame for being less digitally skilled, lack of time or lack of motivation to invest in digital skills could explain this.

> 'Yes, especially if we find that they [younger adults] could use some further training. And then we don't so much refer to that digital care, but more to the DigiD, working with DigiD and things like that. If we find that they are actually not that good with the computer at all, then it will also be the Klik & Tik [basic digital skill course]. [..]. Generally, they do take a leaflet with an offer, but I don't know whether they sign up then, you know. I think there is also a bit of shame there, I suspect. That they would rather go to one of these consulting hours just to ask for help again than to actually take a course.—Interview 07

Additionally, a few trainers also mentioned the importance of access to devices and awareness of the existence of e-health. The older adults and people with limited financial means often have less access to up-to-date devices. Even though libraries have devices available during the course, trainers feel that the course is less effective for people with little access to digital equipment. Clients may not have access to applications or websites due to outdated hardware or software. Some trainers mentioned that older adults are less aware of the possibilities of digital health because they might not be made aware as much as younger generations.

> 'There are also people who don't have a laptop or a smartphone, who do have a computer at home, but it is either very slow or gathering dust because, of course, it's no fun when it doesn't work properly or you can't use it much. They are often those discarded, you know, I have one left, mum, do you want it? That's how it often goes in families, so there are also students who don't actually have all those devices and still want to know how it works but then, it just remains theory because they can't then put it into practice.'—Interview 01

> 'A lot of people just don't know. Younger people know. Because they are made aware of it. So for example, my daughter knows about the app from the consultation office, the portal of the consultation office, because she has been made aware of it.'—Interview 12

One trainer mentioned that the digitalization of healthcare also involves a cultural change in how people interact with healthcare. Digital healthcare requires patients to take more initiative and, according to one interviewee, older adults and people from other cultures might not be used to this approach and need guidance to adjust to this new patient role.

> 'It's a big problem also culturally. So non-Western societies are much more hierarchical. My mother-in-law still has it very much, the doctor is still on a certain pedestal next to the mayor and the minister. And, for example, that is still the case in non-Western societies. So the idea that you can have your own direction in your health matters is completely insane to people.'—Interview 12

Collaborations with healthcare, welfare and community organizations

Most trainers regarded the establishment of collaborations with various partners as a solution to improve their reach to target groups. Five benefits from collaborations were mentioned: enlarging advertisement reach, increasing client referral, facilitation of support in the living space of the target group, improving awareness about digital health skills education among healthcare professionals and citizens, and opportunities to exchange information between libraries and organizations. The mentioned partners were governmental organizations, health organizations, local hospitals or general practitioners, municipalities, community centres, (local) social services, older adults organizations, computer clubs, local leisure and sport clubs and schools.

The libraries' national position in digital health skill development

The surge in (forced) digital health use during the COVID-19 pandemic revealed the gap in digital skills and digital health skills among the public, according to most trainers. As the need for digital health skills education was sudden, trainers felt that there was limited opportunity for the public library to fully establish their newly acquired position in the digital health field. Some trainers felt that due to the limited established position, healthcare organizations are unaware of the public libraries services or did not prioritize collaborations with the public library in the area of digital health skill development. Trainers also expressed that they felt that they didn't have the time or position to initiate larger scale collaborations. The enforcement of a network between the healthcare sector and the public library and a country-wide strategy for collaboration between the sectors is needed to improve the libraries' position and reach, according to some trainers. Trainers shared that country-wide or larger collaborations could lead to improved awareness about the importance of digital health skills and the services of the library among patients and healthcare professionals. In return, trainers could benefit from being on top of the developments in the digital healthcare field. Additionally, these collaborations could provide opportunities for client referral to the library on a large scale.

> 'Yes, much better cooperation with GPs and hospitals and maybe even health insurance companies. Because a lot of GPs don't yet know about the existence of DigiVitaler courses and they say 'we don't have time.'[..] I would say, yes, how do you reach them all? Because we distributed flyers to the GP practices. We very actively tried to raise our profile. And they say, 'no time, little time.' Yes, so in that we would very much like to cooperate more. Also hospitals very much like to cooperate.. Yes, that would be very convenient. From the hospitals and general practices and specialists people referred, actively referred to us'—Interview 04

> 'GPs and libraries, they have never had anything in common. So they have to start believing in each other first. You can't actually do that as an individual library. You have to do that nationwide.'—Interview 12

Local collaborations are an avenue towards hard-to-reach target groups

Trainers mentioned that by working together with local organizations, libraries can become part of a network within a neighborhood which makes their services more accessible to potential clients. Trainers provide different examples to how they reach youth, people living in low socio-economic neighborhoods, and older adults. One trainer elaborated upon a collaboration with local schools to reach youth by providing support at school. Multiple trainers mentioned collaborations with local organizations such as community centres and welfare organizations to facilitate education on locations within low SEP neighborhoods or in towns without a public library. Others mentioned collaborations with older adults associations and computer associations to use their advertisement avenues and presence at events to reach older adults. According to the trainers, collaborations with schools, older adults organizations, and computer associations were successful. These collaborations provided opportunities to reach target groups and to gain insight in the needs of the public libraries' target groups. Some trainers mentioned that for libraries to be fully present in target groups' neighborhoods, time and effort need to be invested in becoming locally known.

> 'With us, that goes through information staff, who have lots of contacts with schools and with all kinds of youth organisations, and they recently had a brilliant pizza session. They invited young people to come and order pizzas, have a bite to eat with us and in exchange we will bother you with all kinds of questions, and that was actually quite a success, and that way you quickly get a feel for them.—Interview 14

> 'In itself that is good, only there has to be some more awareness within those neighbourhoods too, that we are there. [..] Chatting, handing out flyers, then these things come to life as far as organisations are concerned [..]. And that just takes time and you have to keep repeating it, otherwise the information goes away again. So in itself I do think it works, but it could be much better.'—Interview 03

Awareness, client-referral and access to the newest digital healthcare updates

Some trainers reported that they are at the start of forming local collaborations with healthcare professionals, others mentioned that they wish to collaborate but have not yet found the time or the right contact person. The trainers found that collaborations with local healthcare organizations could improve the set-up of the digital health skills course by working together with healthcare professionals. According to the trainers, such collaborations would potentially provide opportunities for advertisement, client referral, and course locations.

> 'We now have a pilot with two GP practices [..] that we get a notification if they [potential clients] have digital questions or problems with digital skills or with Dutch language, because we are connected to our language house.'—Interview 03

> 'I am already trying to make contact with hospitals to see if maybe I can also give separate workshops about the hospital portal. And that the hospital then sends me patients or that I put information there in the form of a flyer. That they can go to the library if people just want to practice a bit more with the portal.'—Interview 09

Discussion

In this study, the perspective of trainers on digital health skills education in public libraries was evaluated. The aim of this study was to gain insight into trainers' perspectives regarding the challenges, successes, and possible future improvements in digital health skills education in the context of the Dutch public library.

Three main themes were identified that cover the experiences of the trainers of the digital health skills course offered by Dutch public libraries: (1) Trainers' services, skills and experience, (2) the libraries' reach: improving engagement, perceived accessibility, and clients' barriers, and (3) collaborations with healthcare, welfare and community organizations. Trainers find the public library a fitting organization to facilitate support and education in digital health skills, however, to realize the public libraries' potential, improvements are needed in the reach of the public library and the accessibility of the digital health skills course.

Trainers view the establishment of new collaborations as key in broadening the reach of the public libraries services and to realize the library's intention to reach diverse target groups that are in need of support (Theme 3) (42). By forming these collaborations, trainers expect that the public library will gain traction with a diverse clientele, improve awareness around digital health skills, and information exchange. Our previous research and other findings showed that motivation to learn digital health skills stems from awareness of e-health and its potential benefits, a sense of urgency because of a health issue or the feeling that participation in the digital world is inevitable (47, 54–56). Ramtohul describes that the existence of support in e-health use lowered the barrier for e-health use, but that a general interest in health, a health need, and saving costs were main triggers for end-users to use e-health (54). Results from this study show that trainers also assumed that feelings of shame about digital illiteracy, limited awareness and limited access to devices might cause barriers to seek support in digital health skill development. In our view, the healthcare sector, social welfare sector and the government should actively encourage and support citizens to adopt and adhere to e-health services, emphasizing the importance of developing digital health skills. Coetzer et al. identified a equivalent sentiment emerging from existing literature (57). Literature described the barriers of e-health use more often as individual-bound whereas suggested solutions to overcome these barriers were more often systemic-bound (57). Coetzer et al. argues that the barriers in e-health use are often framed as individual-bound, disregarding the role of systemic factors within these barriers (57). Consequently, Coetzer et al. concluded that access to e-health is a systemic responsibility, rather than only an individual one (57). Additionally, the literature showed that it is unclear how to translate these systemic solutions into real world settings (57). Similarly, the potential of the public library to improve (digital) health literacy is often mentioned in literature (18, 35, 36, 58–60); yet, evidence on how to realize the libraries' potential is limited. Frank et al. describes how collaboration between the library and partners ensured access to devices, internet, and digital authentication via the library for vulnerable groups in rural America (61). Future research into collaborations between stakeholders from the healthcare sector, social welfare sector, and the government, as well as the capacities of stakeholders involved in digital health skill development, is needed. Such research could provide valuable insights into the development and enhancement of partnerships between the healthcare and social welfare sectors and what these partnerships could deliver to reduce digital health inequalities.

Trainers reflections upon who would benefit from an e-health course revealed that diverse target groups are at risk to possess limited digital health skills (Theme 1). Furthermore, trainers experienced that this risk lies in socio-economic, cultural and age related factors. Consequently, the trainers assume that different target groups require different approaches to improve digital health skills. Regardless of the trainers' educational skills, awareness of their target groups needs and their intention to reach a wide population, predominantly older adults participate in the digital health skills courses (Theme 2). In reference to the Digital Divide model, trainers find that the course DigiVitaler resulted in the development of digital skills (mental resource), a formal point of contact that assists in digital health use (social resource) and the stimulus to form habits and stay up to date in digital health use (cultural resource) (13) for those who attend (Theme 2). Although the course is of quality according to the trainers, trainers experienced that some clients that did attend the digital health skills course have limited time and motivation to learn digital health skills. This causes trainers to provide workshops instead of multiple day courses to improve engagement, eventhough trainers assessed that this would be required for their clients to better develop digital health skills. The trainers mentioned that other and further course adjustments might be needed to successfully engage and educate different target groups.

Additionally, some trainers expressed concern that the perceived accessibility of the library might be a barrier for certain target groups, leading to the absence of target populations participating in the e-health course (Theme 2). The trainers mentioned that the prejudices regarding the library, the unfamiliarity with the library, and limited accessibility in terms of proximity and travel costs can pose a barrier to some target groups. Several researchers found similar findings (62–64). Results from Goedhart et al. describe that mothers with a low SEP view the library as an institute where people go who are already skilled in using the computer, and that they do not belong there (64). Evjen & Audunson and Goedhart et al. mention the importance of the integration of social services in one place to make the public spaces, such as the public library, more accessible (62, 64). A few scholars have provided practical insights into strategies that could improve libraries' promotion of services, evaluation of their services and appropriation of their services to vulnerable groups (28, 59, 61, 65, 66). Dervin describes the need for collaborative approaches with the library consumer to improve the effectiveness of providing support in health information seeking and use (65). Two studies outside the library context provide examples of designing digital health skill education via co-creation with various stakeholders (67–69).

Perestelo-Perez et al. described the co-creation process of massive open online courses (MOOC) to improve digital health literacy for specific groups such as youth, older adults, diabetes patients and pregnant or postpartum women (67). Whitney et al. provides examples of other education methods that were employed by libraries with the goal to reach and support a broader audience including children, older adults and people with a non-native language proficiency (66). These examples involved train-the-trainer principles, storytelling, and the use of new media such as virtual reality, gaming, and social media (66). Using such innovative methods can help reach and engage different target groups. Other studies describe different digital health skill development approaches. A literature study from Verweel et al. reports about the use of digital interventions to enhance digital health literacy skills from people with chronic illnesses, offering programs that often both target (digital) health literacy skills and the chronic condition at hand (70). These findings suggest that the integration of multiple goals in one program might be attractive for people who suffer from chronic illnesses. Dong et al. provided insight in the literature concerning digital health skills education for older adults, where both face-to-face and online educational approaches were described (71). Findings describe that theoretically underpinned, face-to-face education programmes with a duration of more than four weeks were more effective for improving e-health efficacy (71). Online methods were less effective but have other benefits according to Dong: flexibility in scheduling, opportunities to repeat lessons at home and improved access for those who already have sufficient digital skills and access to devices (71). Of the four identified online educational approaches one was co-created with the target group (69), one study recruited older adults with high digital skills (72), two were taught in a blended setting with help of a facilitator who provided technical assistance (73, 74). Findings suggests that both face-to-face and (blended) online educational approaches could be considered when designing digital health skill courses for older adults, the latter for those with sufficient digital skills and access to devices.

Our study had strengths and limitations. The interviewees were all experienced in digital skills education within the library setting and were recruited in different libraries across the country, ensuring a reliable information source to answer our research question. The interviews were conducted until data saturation was reached, indicating the robustness of our findings. A limitation of this study is that the findings are derived from a single perspective within the library organization and should be interpreted as such. The perspective of trainers provides a grass-root level insight to the successes and challenges the public library faces in digital health skills education. Future research into the insights from the public libraries' leadership and relevant stakeholders such as the target groups, policy makers and health organization leaders would enrich the results from this study. Additionally, most of the interviewed trainers were employed by the library and had a high education level. This might have influenced the results of this study. Being highly educated and employed might influence the interviewees' ability to understand the perceptions of those with less education or financial stability. However, there were limited opportunities to overcome this potential bias. At the time of data collection, the DigiVitaler course was new and predominantly implemented and taught by library staff with a job description that requires a certain level of education. Among our interviewees there were two volunteers and one self-employed trainer, yet this did not enhance the diversity in terms of educational background.

Implications and directions for future research

Our findings showed that public libraries have potential to support Dutch citizens in the development of digital health skills. Our findings show that trainers have difficulties in establishing an effective outreach and education method. Regardless of their efforts to reach their intended target groups that ranged multiple age, socio-economic and cultural groups. Additionally, the trainers showed awareness of specific barriers for specific target groups, but potential solutions to increase engagement and reach lacked this detail. Literature reviews by Vassilakaki et al. and Barr-Walker identified similar challenges in American library settings (35, 36). These studies discussed the following solutions for creating effective health literacy programs: staff education, development of evaluation tools, beneficial partnerships and organizational leadership (35, 36). Our results and the literature reviews of Vassilakaki et al. and Barr-Walker (35, 36), imply that difficulties to effectively educate and reach diverse target groups is common among public libraries. These findings and the literature implicate two things. First, that the need for support in digital health skill development is not only caused by a socio-economic gradient, but that cultural and age related factors also play a role. Secondly, that there is limited insight into how public libraries can reach and educate their target groups and what the needs of target groups are in this matter. Most literature of the existing research within the library setting is focused on the American context. Findings outside this context indicate that co-creation of education materials with the target group, designing education materials that target multiple goals that are of importance for the target group and different online and offline approaches are potential avenues for improved reach and engagement (67–71). This presents opportunities to explore and research the needs and methods for reach and engagement for different target groups in other contexts. Our findings underlined that the perceived accessibility of the public library by the public was of importance according to the trainers. This factor was not identified in the literature reviews of Vassilakaki et al. and Barr-Walker (35, 36). Therefore, it would be interesting to create further understanding on how the image of the public library affects its perceived accessibility and the attendance of support in digital health skill development.

Our findings from a trainers' perspective suggest that expanding library services to include support for digital health skills requires efforts at both local and national levels to fully realize its potential. Multiple models describe the process of interdisciplinary collaborations within the sphere of health and

healthcare (75–77). Bronstein, Weinstein et al. and Corbin and Mittelmark all described a model with two levels of factors. First level factors describe the service users, practices, organizations and professions involved (75–77). Second level factors describe the process of interaction between different professions, people, organizations and practices (75–77). Several scholars have described the processes and in lesser extent the outcome of interdisciplinary collaborations between the healthcare sector and the social services sector. A literature review from Cameron et al. describes that organizational, cultural and contextual factors facilitate or hinder integrated collaboration efforts (78). Notably, studies reported the lack of appreciation of the contribution of different professions, the lack of understanding of the aims of integration and concern that the contribution of community health and social care services might be marginalized by the interests of the acute sector (78). Cameron finds that, although limited evidence is available, integrated collaborations can be effective upon health outcomes and reduce cost (78). Brewster et al. describes that within collaborations, high centrality of healthcare institution and co-sponsorship of healthcare institutions and social services for specific programs were correlated with high performing collaborations (79). The theoretical models and empirical results underline that successful integrated collaborations require careful design and demand at least (financial) commitment, clarity on aims and procedures and appreciation of all professions involved. At the organizational level, enhancing collaborative networks and improving coordination among stakeholders is essential to ensure that the support reaches those who it is meant for. Beyond trainers' reflections on the potential roles of stakeholders in terms of reach, it is crucial to consider the extent in which public libraries can effectively enhance the digital health skills of target groups and fulfill their needs.

Conclusion

Digitalization of healthcare requires large, diverse groups of people to invest in their digital skills. Digital health skills trainers within a public library setting estimate, based upon their previous experiences, that different target groups have different needs for digital healthcare use. Additionally, teachers identified their target groups' needs to be socio-economic, cultural, and age-related. Challenges in providing support in digital health skill development are found in the accessibility of the digital health course, the reach of the public library, and clients' personal barriers towards digital health and digital health skill development. From a trainers perspective, collaborations with healthcare, welfare, and community organizations are essential to improve the public's and stakeholders' awareness of the libraries' services in digital health skill development. This study shows that the public library has potential to become a partner in enabling a successful digitalization of the healthcare system. To realize this potential, research and practice should focus on identifying new methods to engage and educate different target groups. Furthermore, the enforcement of the network between the healthcare sector and the welfare sector is needed to realize access to digital health skill education for those who need it most.

Data availability statement

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

Ethics statement

Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

LS: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. AI: Data curation, Formal Analysis, Methodology, Writing – original draft, Writing – review & editing. RvdV: Supervision, Writing – original draft, Writing – review & editing. BK: Writing – original draft, Writing – review & editing. RF: Supervision, Writing – original draft, Writing – review & editing. MB: Supervision, Writing – original draft, Writing – review & editing. LvT: Supervision, Writing – original draft, Writing – review & editing.

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

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fdgth.2024.1519964/full#supplementary-material

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A global framework for integrating public health into wellbeing: why a public wellbeing system is needed

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There is a growing focus on public health initiatives that prioritize wellbeing. The main question of our study is whether this, in its current form, can really represent a new response to the challenges of previous strategies, or whether there is a greater chance that it will essentially reproduce the problems associated with the paradoxical situation of public health. Based on a review, analysis and evaluation of the literature on wellbeing in public health, we outlined the foundations of a new meta-theory of wellbeing and a possibility for its social application. In our view, wellbeing is seen as a social representation of a combination of positive and negative freedom of choice concerning the quality of everyday life, used in a positioning process involving both individual and collective aspects. Health is a particular aspect of the social representation and positioning of wellbeing, which encompasses aspects of the physical, psychological, social and spiritual functioning of individuals. The wellbeing meta-theory also opens up the possibility for more effective solutions to the social challenges related to wellbeing and salutogenetic health. It underscores the importance of the need for a dedicated social subsystem where the goals and organizational culture of the organizations involved are focused on wellbeing and health promotion. In our study, we consider this to be the Public Wellbeing System (PWS). Our conclusion is that the development and operation of a new set of institutions—the Public Wellbeing System (PWS)—based on the co-production of services that meet the needs and demands of society, and dedicated to the promotion of wellbeing, may provide an opportunity to overcome the public health paradox.

KEYWORDS

quality of life, psychological wellbeing, public health, happiness, social determinants of health

1 Introduction

It is becoming increasingly clear that our approach to public health needs to be renewed. This is evidenced, for example, by the unstoppable obesity epidemic (1), persistent health inequalities (2), or the critique of the coronavirus epidemic (3). The growing recognition of the links between health and sustainability (4), biodiversity (5),

ecosystems (6), and the climate crisis (7) makes it more urgent than ever to develop new approaches that address these issues.

This is not the first time in the history of public health that such a need for renewal has been at issue. The need for renewal is driven by accumulated experience and new knowledge, and some experts believe it can be traced to distinct phases in the history of public health. A group of researchers on the European side of the Atlantic label these phases' waves' (8) and claim that we are already in their fifth, while on the other side of the Atlantic, they are labeled as major public health improvements and we are said to be in the third (9). There is no consensus on the use of labels. This is evidenced by the fact that the Culture for Health label, referred to as the fifth wave in the UK, no longer appears on NHS websites and in NHS documents (10). And how successful has the implementation of the proposed changes, labeled Public Health 3.0, been in the US? In 2021, DeSalvo, the "mother" of Public Health N3.0, and colleagues proposed almost identical recommendations to those made 7 years ago for policymakers to consider as the nation charts a course for the post-pandemic era (11).

It can also be observed that the development of public health is closely linked to the integration of results from other disciplines. In the field of psychology, the integrative theory of behavior change, the spread of COM-B (12), and the health insights of positive psychology (13) should be highlighted. Systems science has had a truly revolutionary impact on public health by revealing the characteristics of complex systems and developing a methodology to study them (14). It has also stimulated the health sciences, which have developed a health model based on a systems approach (15). In sociology, the methodological experience of action research (16) and the concept and practice of "citizen science" (17), in cultural anthropology and cultural studies the recognition of the role of culture in health behavior (18, 19), in public policy the identification of social problems as "wicked problems" (20) that seem intractable, have significantly changed the way public health problems are understood and addressed. Knowledge of implementation science has led to further fundamental changes in the implementation and evaluation of interventions to address public health problems (21).

Despite these achievements, the need for public health renewal suggests that public health efforts to date have only been partially successful. One reason for this is the paradoxical social situation of public health, i.e., the fact that the social challenges for which public health is responsible can only be partially addressed by a public health system based on the perspective, priorities, and scope of the healthcare system (22, 23). To resolve this paradox, *health promotion* has been proposed [again, see (24)], to ensure social influence among the "healthy" to adopt healthier lifestyles and to have the necessary and supportive living conditions (22). What was originally a Canadian initiative was taken to an international level by the WHO's Ottawa Charter in 1986. The Charter established the concept of health promotion as a new approach to public health. The concept was developed based on the evidence-based recognition that health, and therefore its promotion, is not only a healthcare function but also an individual and community endeavor that goes beyond a healthy lifestyle to include wellbeing (23).

More than three decades on, however, it is clear that the social organization of health promotion that was the hallmark of the Ottawa Charter has only been partially achieved. The problems are well illustrated by the WHO (25) assessment of school health promotion, which shows that although the concept has been partially implemented in some countries, health promotion is still not an integral, sustainable part of the functioning of the public education system. The scope and lack of pedagogical competencies of public health professionals focusing on public education do not allow them to sufficiently integrate health promotion into the daily life and professional tasks of public education organizations, beyond biomedical public health tasks. Mostly, education professionals do not feel that they have this responsibility, and do not understand what right and basis they have to promote health (25). Similar issues arise in all settings relevant to health promotion: the workplace, cultural and community settings, local communities, families, and policy-making.

More recently, WHO has sought to address the public health paradox through its "Health in All Policies" initiative. In our view, and in line with the analysis of Greer et al. (26), this program has also reached its limits. The main reason is that "engaging other sectors has often proven difficult. In some cases, policymakers have supported measures that are damaging to health, often drawing on overly narrow economic arguments that prioritize short-term benefits to some sectors over long-term costs to society—for example, by promoting polluting extractive industries. Some policymakers have reservations that Health in All Policies means health ministers expect other people to solve their problems" (27).

We are currently witnessing the emergence of a new WHO strategy to address the public health paradox with a focus on wellbeing, marked by new foundational documents such as the Geneva Charter for Wellbeing (28) or the Global Framework providing guidelines for the promotion of wellbeing (29). It is worth taking a closer look at whether this wellbeing-focused public health initiative is indeed a new response to the challenges of previous strategies, or whether it is more likely to be a new incarnation of the problems associated with the public health paradox.

In this context, our study has three objectives. We examine the theoretical and practical implications of the wellbeing narrative on which the current WHO wellbeing initiatives are based. In other words, is it sufficient to replace the word 'health' with 'wellbeing' to bring about the public health revolution that the WHO hopes for?

Based on this analysis, we propose a wellbeing meta-theory as an alternative approach to the public health paradox. Finally, we present the possibilities and limitations of the social operationalization of this meta-theory.

2 Steps toward a wellbeing meta-theory

2.1 The public health narrative of wellbeing—current situation

Although there have been many attempts to conceptualize wellbeing in different disciplines such as psychology, economics,

sociology, and philosophy, there is still no consensus on the theoretical basis of the concept (30–32). The problem of definition has been present and pronounced in the wellbeing literature for decades, i.e., there is currently no consensus about the definition of wellbeing. Typically, the authors of studies on wellbeing establish this fact and then go on to present a new concept of wellbeing that is worthy of consensus (30, 33–35).

In the *health sciences*, wellbeing has been considered for some time as a possible broader way of thinking about and exploring human health. It is essentially used to counterbalance a narrower disciplinary approach focused on individual physical functioning (36).

The WHO Glossary of Health Promotion defines wellbeing as "Wellbeing is a positive state experienced by individuals and societies. Similar to health, it is a resource for daily life and is determined by social, economic, and environmental conditions. Wellbeing encompasses quality of life, as well as the ability of people and societies to contribute to the world with a sense of meaning and purpose. Focusing on wellbeing supports the tracking of the equitable distribution of resources, overall thriving, and sustainability. A society's wellbeing can be observed by the extent to which they are resilient, build capacity for action, and are prepared to transcend challenges" [(37), p. 10].

This definition provides an opportunity to channel several findings from the multidisciplinary wellbeing research of recent decades into public health. It emphasizes the salutogenetic aspect of wellbeing (38), which it sees as a subjective state of the individual or society. It stresses the importance of resource orientation and social determinants. In addition to the quality of life as an objective variable, subjective variables such as meaningfulness (38), purpose, or human capacity (39) are also emphasized. By emphasizing equity in the distribution of resources, growth, and sustainability, WHO also links social values to the concept of wellbeing (4, 39). In this approach, social wellbeing is made visible through resilience, agency, and willingness to change.

In summary, the glossary (37) essentially interprets wellbeing as the positive side of the health-disease continuum, emphasizing its subjective and social aspects without specifying how the two concepts differ. But can such a narrative provide an interface between the scholars in psychology, economics, sociology, philosophy, and many other disciplines, and the society outside the health-care system?

In our view, it cannot. By defining wellbeing as a concept "like health," WHO inadvertently and unintentionally privileges health sciences and healthcare (again) at the expense of other disciplines and specialties. In essence, it expects other sectors to take appropriate action to achieve wellbeing, as WHO has done with the slogan 'health in all policies'. With such an approach, wellbeing cannot become a field for multidisciplinary and multisectoral cooperation. It cannot achieve this even though, thanks to the diversity resulting from its integrative aspirations, public health could be an excellent *mediator* of cooperation.

However, in the absence of a partnership approach, there is a risk that this mediating role, even under the guise of "wellbeing," will not be accepted by society and that the public health paradox will be effectively reproduced, i.e., that society outside the health sector still does not feel responsible or competent to do anything about health.

This is not just a "theoretical" question. The basic WHO documents on wellbeing (28, 29) mentioned above also use the glossary definition (36), so it may be crucial from a practical point of view to recognize the limitations of this definition and to analyze possible alternatives.

In our study, we've put forward two proposals to overcome the public health paradox and move beyond the limitations of the current WHO definition of wellbeing. On the one hand, we propose a meta-theory of wellbeing that could provide an opportunity to synthesize wellbeing research that has been treated separately by disciplines. On the other hand, we also propose a public wellbeing system based on the wellbeing meta-theory, which could provide an opportunity to coordinate professional efforts to improve wellbeing, which have so far been separated across social sectors.

2.2 The assumptions of scientific wellbeing narratives

A systematic review of the diverse and eclectic literature on wellbeing in philosophy, psychology, economics, health, sociology, and many other disciplines is beyond the scope of this paper. However, after reviewing some key disciplinary summaries and conceptualizations of the topic (30–36, 39–41), we have found that the very different narratives of wellbeing in different disciplines share elements that can be considered common across disciplines. The starting point for developing our meta-theory of wellbeing was therefore to identify a set of often unspoken premises that may be common to most of the existing models of wellbeing. We also explored whether they could be built upon in the development of a meta-theory of wellbeing. For our study, two such premises proved relevant to our analysis.

Premise 1: The principle of "the more is better" prevails when it comes to wellbeing. In our view, the majority of scientific narratives (30–36, 39–41) focus mainly on the idea that an increase in wellbeing requires a quantitative increase in some material, psychological or social dimension. There is a need for more material goods, health, happiness, cultural capital, social cohesion, etc. to increase wellbeing.

This assumption, which seems logical at first glance, obviously has its limitations, which we believe are not sufficiently taken into account. In our view, relatively little attention is paid to the so-called Easterlin paradox, which explores the principle of diminishing marginal utility in a broader context, as it is known from economics. The essence of this phenomenon, described in the mid-1970s, is that an increase in income is associated with an increase in happiness only up to a certain point. After a turning point, the increase in income is no longer associated with an increase in happiness, the two phenomena become independent of each other. This turning point may be different not only for each individual but also for each culture and nation (42).

It is also worth considering that in many individual or social situations, the application of "the more is better" principle *can*

cause significant individual and collective harm. This is illustrated, for example, by the psychological model of the *hedonic treadmill*. This means that the effect on happiness of any change in our circumstances is only temporary because the psychological adaptation to change happens very quickly. Even in the case of large lottery winnings, and relatively large changes in health or even living conditions, there is empirical evidence that their effects are temporary and that happiness levels return to their pre-change baseline after a while (43).

This creates many public health traps at both individual and collective levels. On the individual level, the importance of the hedonic merry-go-round in addiction is striking. Their danger is illustrated by the *tolerance* that develops in the misuse of psychoactive substances, which indicates a correlation between increasing doses of substances and decreasing psychoactive effects [e.g., alcoholism, drug abuse, etc.; cf. (44)]. On the collective level, it may also be an individual component of the overconsumption that drives economic growth to levels that threaten sustainability, alongside the socio-economic factors that fuel it [see (4, 36)].

It probably also matters *when* the more is better. In Ainslie's model of behavioral economics (45), the early satisfaction of intrinsic desires before their optimal time is motivated by hyperbolic discounting, i.e., intertemporal decision processes. It is the surprise, the novelty, that can confirm the desire, which is often accompanied by unbridled emotions. It is only through the will that one can overcome the unbridled emotions of inner origin, which, if too successful, can reduce the power of the reward associated with that emotion (45).

And even when it comes to *freedom of choice*, it is not clear that more is better. An example of this is Elster's behavioral economics analysis of "weakness of will" (46), which analyses decision situations from a behavioral economics perspective where *less is better*. There are also examples of someone—like Odysseus, who listened to the sirens and was tied up well in advance—taking preliminary strategic steps "against himself" to make it difficult or even impossible to fail the implementation of the rational alternative. Therefore, according to Elster, there are situations where it is desirable to limit the consumer's choice (46).

Premise 2: Individuals' subjective assessments of wellbeing are "perfectly reliable" from both an individual and a collective perspective. Another common point of scientific narratives of wellbeing (30–36, 39–41), especially in the case of individual- or collectively-oriented models that emphasize subjective wellbeing, maybe that the most reliable measure of wellbeing is individual assessment.

However, several findings from cognitive psychology, decision theory and social psychology warn against this. Human perception is shaped by perceptual and attentional constraints, schema categorization biases, decision heuristics, and attribution biases, as well as influences of emotion, cognitive dissonance, reference group norms, and peer comparison, to name a few variables from a long list (47). And people's judgments, decisions, and evaluations of situations are shaped by their perceptions of objective reality, not by objective reality itself. Moreover, even with an accurate perception of objective reality, we cannot be sure that individual wellbeing simply adds up to a collective construct of wellbeing.

This does not mean that there is no need to explore subjective wellbeing. On the contrary, it is very important to explore the perceptions and distortions of individual wellbeing to help individuals and communities identify and address the perceptual and evaluative biases that affect their wellbeing.

The search for wellbeing is therefore a reflective process and has implications for wellbeing itself. In the scientific modeling and research of wellbeing, individuals, families, small groups, organizations, local communities, professional communities, and societies not only communicate about wellbeing but also shape it through their reflections.

In the scientific understanding of wellbeing, it is also worth remembering that the act of research itself changes the object of research (48). It is, therefore, preferable to define wellbeing research as a process of promoting a systemic, multi-level (individual, family, small group, organizational, local community, and societal) self-reflection on wellbeing.

The WHO concept of wellbeing (37) is also permeated by these two premises and their associated dilemmas. 'The more is better' principle is also reflected in the promotion of quality of life resources, resilience, and empowerment. There is also a reference to the importance of sustainability, but no guidance on how to reconcile growth and sustainability.

Similarly, premise 2 is also reflected in the WHO definition. The glossary distinguishes between individual and societal levels of wellbeing and identifies their main dimensions of assessment, but does not specify the reference points for addressing their consensual nature and dynamics.

3 A possible meta-theory of wellbeing

We argue that the above two assumptions and their difficulties in scientific narratives of wellbeing, including the WHO definition of wellbeing, become more manageable *when wellbeing is seen as a social representation of a combination of positive and negative freedom of choice regarding the quality of everyday life*. This concise definition of wellbeing can be elaborated as follows.

3.1 Wellbeing as social representation

Social representation, as defined by Moscovici (49), is the multidimensional space resulting from the creative interaction between social-societal and individual cognition, stretched by the concepts of different phenomena and shaping individual and collective action. Social representation therefore includes social factors that derive from social status, role and culture as well as individual perception. However, it focuses primarily on the actual outcome of the dynamic interaction of these factors. It moves from the social relations established in interpersonal relationships to individual reactions and attitudes. It represents the creative process in personal and mass communication as well as the cognitive structure that is present in it (49). Doise sees social representation as a social-societal metasystem of individual cognition that shapes individual cognition. It provides reference dimensions for individual cognition, but unlike social norms, it

does not prescribe an individual's point of view. This metasystem provides a common perspective along which individual and group differences can be articulated (50). The social representation of wellbeing is thus a multidimensional space, stretched by the concepts of wellbeing at the individual, family, local community or the whole society level. The notion of social representation provides the flexibility needed to scientifically capture the gender, cultural, ethnic and social diversity and over time changes in the concept of wellbeing.

3.2 The process of wellbeing positioning

In the meta-theory of wellbeing, we propose, that wellbeing is a dynamically changing social representation used in a positioning process that includes both individual and collective aspects.

Wellbeing positioning is the process by which individuals or communities evaluate their current situation using a dynamically changing frame of reference of the social representation of wellbeing. In essence, then, the individual or community situates itself in the multidimensional space in which, through the social representation of wellbeing, their complex set of aspects related to the quality of everyday life is *currently* constructed.

At the individual level, this complex process, which includes cognitive, affective, and behavioral aspects, can also be referred to as *subjective wellbeing*, the phenomenological experience of which is perhaps best captured by Antonovsky's concept of coherence (38), and the mood aspect of which could be expressed by the concept of happiness (30).

However, wellbeing positioning also takes place concerning the family, the organization, the local community, the region, society, and humanity, in a way that affects all or some dimension of its multidimensional space. Subjective wellbeing is therefore an important form of wellbeing positioning, but the positioning process at other levels can be just as important.

3.3 Freedom of choice is the crystallization point of wellbeing

In our meta-theory, which builds on the work of Amartya Sen, *freedom of choice* is at the center of representation and valuation processes in the social representation of wellbeing (39). In our concept, the social representation of wellbeing refers not only to the criteria that individuals, families, communities, and societies *currently* use to account for the factors that limit or enhance their *freedom of choice*. It also includes how individual and collective considerations are constantly shaping the social and societal metasystem itself. On the collective side, the social representation of wellbeing can be influenced by scientific models and research findings as well as by current political, religious, and cultural discourses. However, in the dynamics of the construction and use of social representation, individual perceptions, experiences, and emotional relations have as much role and significance as the social-societal communication of individuals.

Inspired by Berlin's (51) work on political freedom in conceptualizing freedom of choice, we believe that freedom of choice, which is also the basis for understanding and assessing wellbeing, should be further analyzed in terms of *positive and negative freedom factors*. These two independent (orthogonal) factors provide a good approximation of the multidimensional space of the social representation of wellbeing. In other words, these factors bring the many different aspects used to assess wellbeing into a common denominator and can be used to illustrate and interpret wellbeing positioning to a good approximation.

In our metatheory, the *positive freedom of choice* factor of the social representation of wellbeing is constituted by all aspects of everyday quality of life whose availability, possession or affordability is represented as important and beneficial for individuals, communities or society. The factor of positive freedom of choice is therefore constituted by the positive (achievable) preference structure in the social representation of wellbeing, and its extent is the extent to which individuals, communities or society perceive that these positive preferences are successfully implemented in everyday life. This positive preference structure, which includes both existing and desired aspects and reflects both individual and collective perspectives, is a constantly changing construct due to individual, community and societal changes.

A key observation is that, from a research perspective, the positive freedom of choice factor can be segmented according to the objective and subjective consequences associated with a given value of positive freedom of choice (see chapter The positive freedom of choice factor of wellbeing).

In our metatheory, the *negative freedom of choice* factor of the social representation of wellbeing includes aspects of everyday quality of life whose *absence or avoidance* is represented as important and beneficial for individuals, communities or societies. The negative freedom of choice factor is thus constructed from negative (avoidable) preferences for the quality of everyday life, which is also dynamically shaped by individual, community and societal changes.

The factor of negative freedom of choice in the social representation of wellbeing is thus the negative preference structure of individuals, communities and societies, and the extent to which they are perceived to be able to enforce these negative preferences in their everyday lives. Individual aspects (e.g., self-control) can play a role in whether negative preferences are enforced, as can community (e.g., cultural norms, group norms) or social aspects (e.g., the legal system) that help or hinder them.

Again, it is important to note that from a research point of view, the negative freedom of choice factor is also considered segmentable (see chapter The negative freedom of choice factor of wellbeing).

These factors are analyzed in more detail below. The dynamically changing measures of wellbeing, referred to as positive and negative freedom of choice, will also be the basis for individuals, communities and societies to assess their own position, as presented in our chapter on the wellbeing positioning process.

3.4 The positive freedom of choice factor of wellbeing

The study of factors that influence wellbeing and influence positive freedom of choice is a high priority in academic research (30, 41, 52). However, we argue that the importance of the *degree*

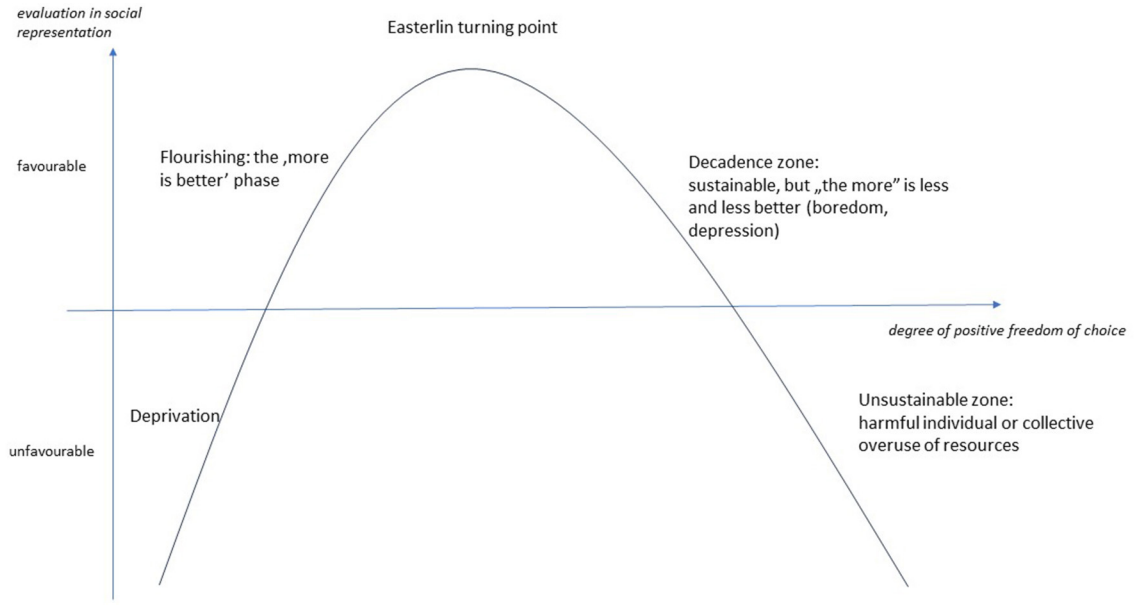

FIGURE 1
Relationship between evaluation in the social representation of wellbeing and the degree of positive freedom of choice.

of positive freedom is less recognized due to "the more is better" bias presented earlier. However, a few arbitrary examples from wellbeing research illustrate that the degree of positive freedom of choice is not a negligible factor in wellbeing. This relationship is illustrated in Figure 1.

In our model, the absence or low level of positive freedom of choice is deprivation, which is clearly disadvantageous and negative. At this stage, all resources are still devoted to mere biological or societal survival, but even for that is not fully sufficient. In this phase, the lives of individuals and communities are on a limited trajectory, with a minimum of room for maneuver due to the necessities of survival. From a public health perspective, this zone receives particular attention, for example in the Social Determinants of Health (SDoH) model (34, 53).

The increase in positive freedom of choice is accompanied by an increasing amount of "surplus" energy, time, and resources in the lives of individuals and communities, which are not used for mere biological or societal survival, but also provide opportunities—in a relatively autonomous way—for the realization of other kinds of goals and aspirations. At this stage, the principle of 'the more is better' applies, with all its positive individual (flourishing) or collective consequences. In health sciences, the specificities of this zone can be found, for example, in the work of Antonovsky, especially in the context of general resistance resources (38).

However, based on the Easterlin paradox presented earlier (42), it is reasonable to assume that an increase in positive freedom of choice is only beneficial up to a certain level, and after a turning point, it may be neutral or even unfavorable.

If the positive freedom of choice exceeds the turning point, the individual or the community cannot or does not want to deal with the "excess" energy. In the absence of prospective goals, the increasing positive freedom of choice, and the growing general resistance resources, lead to increased boredom. The importance of the societal and economic problems resulting from boredom, and the importance of literate consumption in preventing these problems, was already shown by Scitovszky in the 1970s (54).

Ultimately, as the negative effects of over-indulgence in positive freedom become more pervasive, "the more is better" principle finally fails, and over-indulgence becomes a source of individual or social-societal crisis. According to Caplan (55), a crisis is a turning point after which life can no longer go on as before. It can lead to destruction or renewal, but a lifestyle that reflects a certain degree of positive freedom of choice causes increasing individual or collective harm and is not sustainable in the long term.

3.5 The negative freedom of choice factor of wellbeing

One of the cornerstones of our concept of wellbeing is that analyzing wellbeing only in terms of positive freedom of choice leads to significant distortions. Most of the current narratives on wellbeing present a one-sided picture, with an emphasis on growth driven by "the more is better" principle, and on the internal and external obstacles that can hinder growth despite our best intentions. Little attention is paid to the deliberate and conscious brakes and counterbalances that enable the growth of individual and collective wellbeing to be a controllable, manageable, and sustainable process, at both individual and collective levels. These negative preferences acting as a brake and counterbalance are necessary for the development of wellbeing to be a manageable process. To use an analogy, wellbeing is currently treated as a vehicle that can only accelerate and can only be stopped by traffic obstacles. Such a vehicle without brakes is useless in practice because it is unsuitable for safe driving.

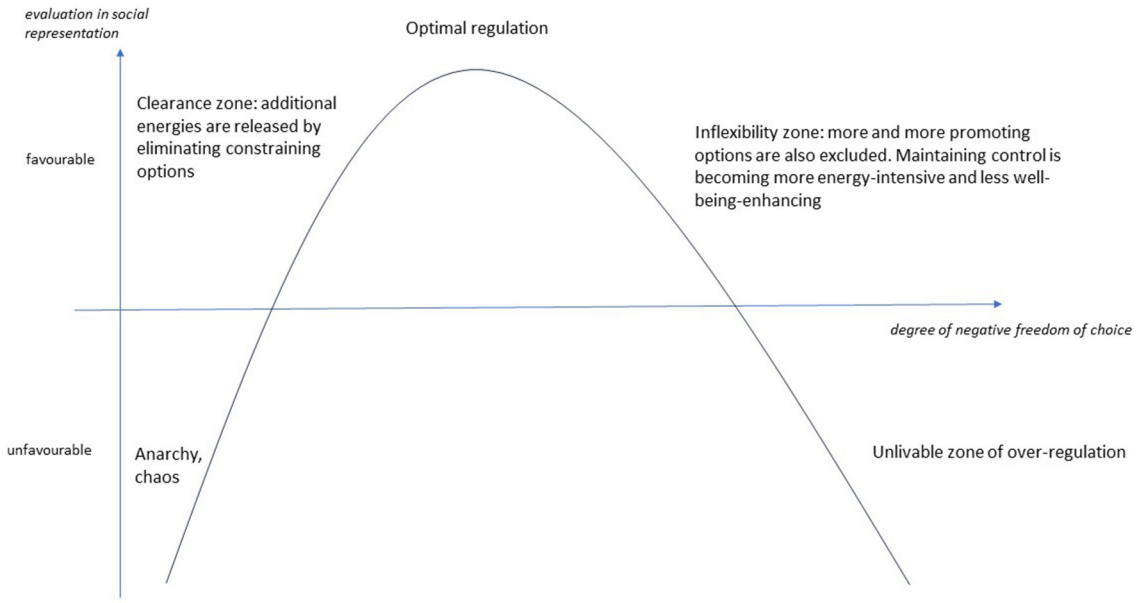

FIGURE 2
Relationship between evaluation in the social representation of wellbeing and the degree of negative freedom of choice.

Consequently, we also analyzed the association of the negative degrees of freedom of choice with wellbeing, and the results are summarized in Figure 2.

For understandable reasons, scientific narratives of wellbeing focus on the unlivable zone of over-regulation from societal aspect (53), because the entrenched principles of disenfranchisement, exploitation, and unequal opportunity are overtly threatening and dangerous to wellbeing. This phase can therefore be interpreted as a proliferation of negative preference structures.

But just as dangerous and threatening can be the absence of negative preferences, which we have marked on our diagram as the zone of anarchy and chaos, where "nothing is forbidden" and anyone can do anything and to anyone, anything can be done. The lack of stability and predictability derived from norms and rules is as threatening to wellbeing as the unlivable tyrannical over-regulation (39).

Negative freedom of choice can therefore have a positive aspect in terms of quality of life. Self-control, the "art" of saying no, etc., is about being able to commit to an individual or community negative preference. Even if our commitment means saying no to some of our positive preferences. Therefore, perseverance, determination, moderation, concentration are signs of experiencing a favorable range of negative freedom (41).

The importance of negative freedom of choice lies not only in the exclusion of decision options but also in the ability to delay immediate decisions and to consider long-term aspects (45). In our model, the clearance zone marks the point at which individuals and communities experience that "less can be better." The individual and collective benefits of principles, norms, and rules are also reflected in the reduction of cognitive dissonance, less energy, and time needed to make decisions, by excluding certain options. This clarity increases wellbeing (46). In the optimal range of negative freedom of choice, we can exclude all relevant hindering factors and thus focus on the relevant promoting factors (56).

A life with too few options makes it impossible to set and achieve achievable goals. As the power to determine possibilities based on dogmas expands the scope of maneuvering, the chances of achieving goals increase, while dogmas limit the ability to adapt to the challenges of reality and thus succeed. In our concept, the inflexibility zone is reached when options that promote wellbeing are increasingly excluded. This is when rules and norms start to lose their original significance, and control for its own sake becomes more and more important. The intensification of negative freedom of choice becomes over-regulated when the prevalence of self-serving control makes life unlivable at an individual and/or collective level (57).

3.6 Wellbeing is characterized by a combination of positive and negative freedom of choice

By placing the two types of *freedom of choice* on a single coordinate system based on their social representational valuation, the combination of positive and negative freedom of choice valuations can be analyzed. To represent the two-factor values together, the factors were treated as two intersecting surfaces and projected onto a two-dimensional coordinate system (see Figure 3).

In our concept, the two types of freedom of choice can be seen as independent of each other. For example, the flourishing zone of positive freedom of choice can be combined with the anarchy and chaos of negative freedom of choice [e.g., internet use by young people in the USA (58)], and also with unlivable over-regulation [e.g., internet use in China (27)]. To illustrate the explanatory

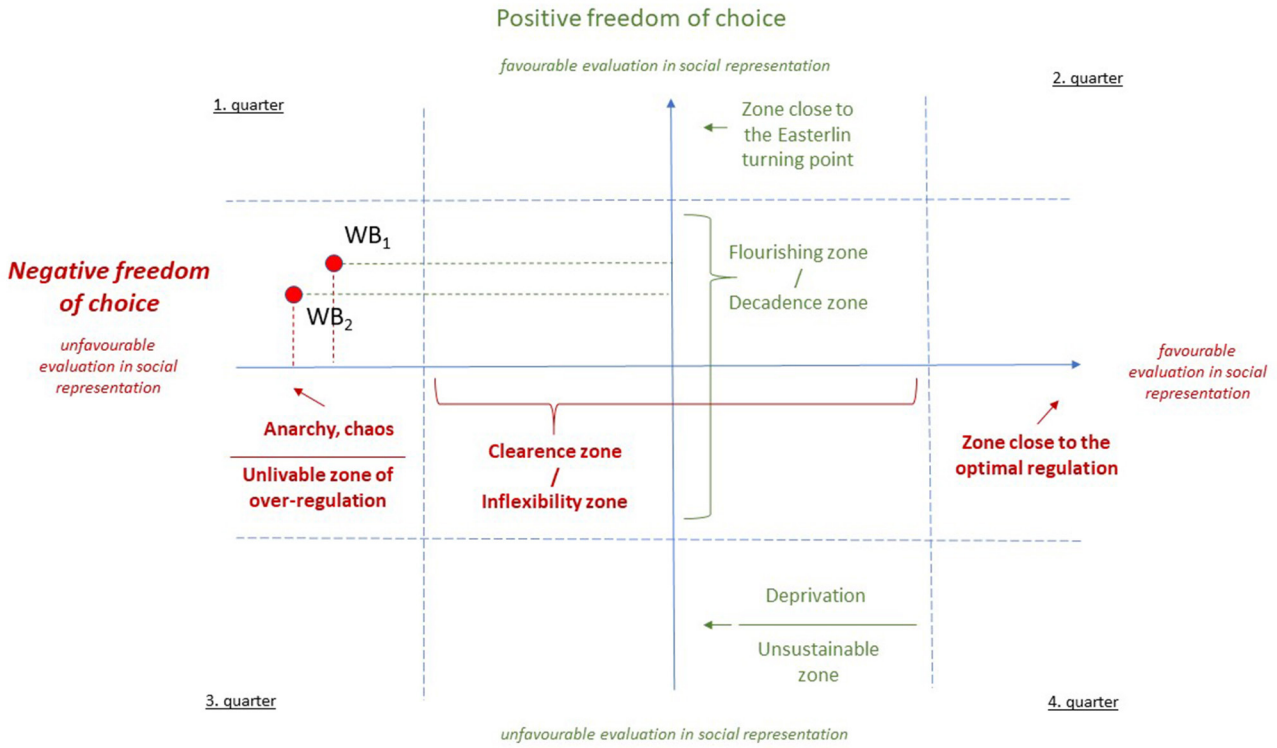

FIGURE 3
Coordinate system characterizing the social representation of wellbeing by the degree of positive and negative freedom of choice.

power of our meta-theory, we have also plotted it with the two hypothetical points in Figure 3: WB1, as the US situation, and WB2, as the Chinese situation.

Our concept can be applied at all levels of analysis relevant to wellbeing: individual, family, organizational, local community, regional, societal, and humankind. Furthermore, in addition to the concept of wellbeing, it can also be used as a framework for analyzing the social representation of a specific topic (e.g., internet use, healthy nutrition, etc.) or subject area (e.g., quality of life). Research on the social representation and positioning of wellbeing will require a combination of qualitative and quantitative research methods. However, we would like to emphasize that the practical relevance of our concept is primarily that it allows us to track the dynamic changes in the combination of dimensions used in the social representation of wellbeing and the positional evolution of wellbeing at the given level of analysis, whether for a specific individual, family, workplace, school, region, or society.

3.7 Health in the wellbeing meta-theory

In our wellbeing meta-theory, *health* is a specific aspect of the social representation of wellbeing and the wellbeing positioning based on it, which includes aspects of physical, mental (cognitive and emotional), social (social and societal), and spiritual functionality and functioning of *individuals* and their evaluation. This aspect can shape both positive and negative freedom of choice factors of wellbeing.

Health is therefore an important part of the meta-theory of wellbeing, but not the whole. The question of what we use our functionality for is outside the scope of health. It is difficult to understand from the perspective of a health science narrative, but much more meaningful from other narratives of wellbeing, that there are individual and collective choices where health is *not* the priority. At an individual level, people in dangerous and self-sacrificing professions, such as police officers, soldiers, and health professionals, have chosen to prioritize their vocation and profession over preserving their health. But even in the most mundane tasks and situations, we often focus more on our goals and consciously do not prioritize maintaining our functionality.

These individual choices are also reflected at a societal level. The Lalonde report (22) already pointed out that in a significant number of cases, the healthcare system is now facing the harmful and significant consequences of not giving sufficient priority to maintaining health for one reason or another. One of the main reasons for this is that societies prioritize the achievement of their current political, economic, and cultural goals, and the preservation of the functionality of the population is relegated to the bottom of the priority list. Both the health and social care systems, as represented in the wellbeing meta-theory, tend to concentrate their efforts on the areas that are rated as unfavorable in terms of both positive and negative freedom of choice—the third quarter—and focus on mitigating the damage here (cf. Figure 3).

The health and social care system performs necessary and important societal functions. However, as shown earlier, this does not affect the positive and negative aspects of freedom of choice

that are beneficial to the quality of life and does not trigger the need for deliberate and direct interventions to improve wellbeing and health. The health promotion efforts outlined in the introduction (23) or Antonovsky's salutogenetic health model (38) already reflect the recognition that real progress in terms of wellbeing and health in society goes beyond damage control, i.e., takes place in the second quarter of the wellbeing coordinate system (cf. Figure 3). This is essentially the public health paradox we outlined at the beginning of our study. The societal challenges to be addressed by public health are considered in the 3rd quarter, while the tools and methods needed for greater efficiency can be derived from the 2nd quarter, which focuses directly on improving wellbeing. However, this is beyond the scope of the public health system, as promoting the individual, family, local community, school, workplace, and policy changes needed to achieve the goals and priorities is outside the scope of public health.

The advantage of our wellbeing meta-theory may be that it provides a framework for understanding and developing social representations of the combination of positive and negative freedom of choice in the quality of everyday life and the wellbeing positioning based on them, in which all the different disciplines, professions and social subsystems can play a role so that none of them is in a privileged position.

In our study, we argue that the development and operation of a new institutional system—a so-called Public Wellbeing System (PWS)—*alongside* the current health and social care system, dedicated to the promotion of wellbeing and characterized by the above meta-theory of wellbeing, could provide an opportunity to overcome the public health paradox.

4 The promotion of wellbeing: the public wellbeing system

Public Wellbeing System refers to a system of governmental and non-governmental organizations at local, regional and national level whose primary strategic mission is to improve wellbeing and health, mainly by identifying and representing the interests of different social strata and groups using scientific methods and by identifying and coordinating the opportunities for wellbeing development in different sectors. The arguments for developing and operating a public wellbeing system (PWS) are summarized below.

1. Exploiting the public health potential of the wellbeing brand more effectively. We believe that one of the obstacles to the further development of public health is, paradoxically, the word 'health' itself. As the word is still mostly used in the sense of ill health, the majority of professionals and the general public understand the term mainly in a biomedical connotation. *Non-medical professionals* may well have the question, why and how should they be involved if they are not doctors or health professionals? Why and how should they be involved if their work is not about preventing and curing disease? This can be a barrier not only to communication but also to interprofessional cooperation. Wellbeing as a new social marketing brand can provide opportunities to better communicate a broader view of health while creating new opportunities for inter-professional cooperation.

2. PWS also has the potential to bring about the qualitative change in health that is needed to move beyond the inherent limitations of the Health in All Policies Directive. Since the Ottawa Charter, WHO has advocated the principle that health should be integrated into all aspects of life. Grossman and Scala (59) aptly put it that in society there is a social subsystem for illness (the health-care system), but no such subsystem for health. Health must therefore be integrated into all social subsystems. The development of a new social subsystem can bring about a qualitative change in this area, which promises more results than the continuation of the current public health and health promotion strategies, extended with "wellbeing" (29), but unchanged in approach.

3. PWS can be a credible representative of health promotion in society through its organizational goals and organizational culture focused on wellbeing and health promotion.

The dichotomous concept of health, based on discrete categories of illness and health, is not only a lay concept but is also reflected in current social subsystems. "Present health-care systems focus on illness. The treatment of illness is not only better organized but also apparently easier to organize than health. [...] Organizations are made to solve problems; illness is a problem, but health is not" [(59), p. 26]. The Ottawa Charter (23) was born out of the need for a paradigm shift in healthcare. While risk management is part of a goal-driven, salutogenetic (38) approach to health promotion, it does not replace the need to develop a 'target system' for real development. A systems approach to health promotion encompasses medical thinking and the biomedical framework for disease prevention and treatment but also goes beyond this to where people "learn, work, play and love" in everyday life (23). For the health-care system, health promotion is a secondary task compared to curing, and therefore it cannot be expected to fully represent its approach and values in society.

It is worth noting that the need for a renewed focus on wellbeing rather than health, including the fundamentals, was raised by Prilleltensky as early as 2005: "It is high time for a paradigm shift in health and human services, ... only a new approach that focuses on strengths, prevention, empowerment, and community conditions can make considerable progress toward the achievement of wellbeing for all." [(40), p. 53]. At present, none of the existing social sub-systems can take on this task without the risk of distorting this challenge in the direction of their existing social tasks. For this reason have we in our introduction included what we hope will be constructive criticism of the current WHO core documents on wellbeing (23, 29). And this justifies the creation of a social subsystem whose main social task is to promote wellbeing and health.

4. We already have some insight into the main guidelines and methods of PWS. The main task of a public wellbeing system can be the preparation, implementation, and evaluation of coordinated multisectoral activities to raise the level of wellbeing. This will enable a more targeted and efficient use of societal resources. Public wellbeing is an issue that can be used to mobilize all sectors of society for wellbeing and can be aligned with a wide range of political and social interests. The core activity of PWS is therefore the systemic facilitation of individual, community, and societal developments that promote wellbeing (and health promotion within this). This also requires an intervention methodology that is primarily based on the involvement and participation of those

concerned, i.e., it focuses on cooperation and co-creation rather than care.

5. PWS is currently a utopia, but it is a utopia toward which it is worth taking steps in the present, in which public health can play a key role. In the case of PWS, it is also worth considering Gall's "law," which states that functional complex systems always evolve from a simple but functional version, through evolutionary development (60). As a consequence, there is little chance that a complex system such as PWS can be developed in its entirety from "behind a desk." But promising steps can already be taken, and are essential if a new social subsystem is to emerge.

5 Discussion

We have argued in our study that the main reason for the paradoxical situation of public health is that the societal challenges for which it is responsible can only be partially addressed by a public health system based on the perspective, priorities, and scope of the health-care system.

The strength of our wellbeing meta-theory is that it can be used to identify "game-changer" interventions that can lead to tangible changes in the social representation of wellbeing, can be financed at the given level of socio-economic development and have a significant public health relevance. Just one example. The issue of food aid for the hungry in a society is undoubtedly an important social policy issue with high public health relevance. But what can explain the fact that even at a theoretical level we are not addressing the question of how to make the possibility of a healthy nutrition available to all as a basic right? Public health, building on its health promotion tradition, could very well be a facilitator of such projects pointing in this direction. The application of our meta-theory, and ultimately the operation of PWS, can highlight such opportunities and can be an effective tool for preparing governmental and non-governmental decisions, for assessing state and needs at municipal and organizational levels, and for facilitating intersectoral cooperation.

A limitation of our study is the complexity of the wellbeing meta-theory and PWS, and the lack of sophisticated interdisciplinary methodology. With the meta-theory of wellbeing we have developed in this paper, we have attempted to outline the possibility of a model that provides a common denominator for the diverse narratives of wellbeing in different disciplines. In developing our meta-theory, we have made a conscious effort to draw on as many disciplinary perspectives as possible, but not to give any one narrative more weight than the others. The *diversity in the content* of social representations of the combination of positive and negative freedom of choice in the quality of everyday life cannot be captured from the perspective of a single discipline. This task requires the synthesis of results from many disciplines, which is not possible without a common denominator, an overarching meta-theory.

An important element of our perspective is that the health science narrative of wellbeing is only one of many valuable narratives of wellbeing. We therefore see a need for public health to do more than it has so far to develop an equal partnership with other disciplines in the field of wellbeing.

A striking sign of this endeavor, and at the same time an indispensable one for the development of wellbeing societies, would be the development of a systemically mediated, development-oriented institutional system based on the principles of participation, which is dedicated to the development of wellbeing and is a coherent network of organizations with such goals and culture. In particular, the experience of health promotion in line with the spirit of the Ottawa Charter can be very useful.

According to our meta-theory, the development of wellbeing cannot effectively be subordinated to the promotion of health, because health is an important part of human wellbeing, but not the whole of it. But promoting wellbeing is also an important public health issue because it offers an opportunity to organize our health knowledge more effectively in society, without the risk of narrowing the focus back to health and the prevention and treatment of disease.

Author contributions

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Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Measurement of the operational efficiency of tertiary public hospitals in Western China: evidence from Guangxi from 2019 to 2022

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Objective: The continuous increase in health care costs and the growing demand for health services among residents make it an urgent priority to improve the operational efficiency of the health system in Chinese society. In this study, data on the operational efficiency of tertiary public hospitals in Guangxi were analyzed to identify issues in hospital management within the context of performance assessment, which thereby enhanced the social service capacity of hospitals.

Methods: A comprehensive evaluation index system was constructed based on the "national monitoring indicators" of operational efficiency. The indicators were analyzed using data envelopment analysis with Banker, Charnes and Cooper (DEA-BCC) and Malmquist index models. The Tobit regression model was used to analyze the major factors affecting the efficiency of public hospitals.

Results: Between 2019 and 2022, the pure technical efficiency (PTE) of 61 tertiary public hospitals in Guangxi remained at a relatively high level. The results of the Malmquist index showed a downward trend. The technical progress (TC) indicator became the main factor affecting the decline in the operational efficiency of hospitals. Tobit regression analysis revealed that plenty of factors exerted a significant impact on the operating efficiency of hospitals. These factors included the number of beds, the ratio of outpatient and inpatient patients relative to total patient numbers, the proportion of discharged patients undergoing surgery among total patients, business expenditures and total annual revenue.

Conclusion: The scale of tertiary public hospitals in Guangxi is prominently unreasonable. It is necessary to raise the efficiency of resource utilization. The operation and management situation is not optimistic. Hospitals should accelerate the transformation of their development model, rationally allocate medical resources and shift from scale expansion to the improvement of quality and efficiency. Meanwhile, they should actively participate in establishing the hierarchical medical treatment system, controlling operating costs and reasonably increasing the proportion of personnel expenses to improve operational and management efficiency.

KEYWORDS

Guangxi tertiary public hospital, performance appraisal, operational efficiency, DEA-Malmquist, Tobit returns

1 Introduction

Some countries including China are facing the dual challenges of rising health care costs and low hospital efficiency. Specifically, China is currently dealing with an accelerating aging population, a slowing population growth rate and a shift in the disease spectrum, all of which are driving an increasing demand for health services of high quality. Public hospitals, the primary providers of social health services, bear tremendous pressure in response to the growing demand for these services. Research by Hu et al. (1) reported that the health resource allocation and service provision in China are inefficient. The inequitable distribution of medical resources has potentially threatened social stability. Therefore, policymakers need to improve the utilization efficiency of health resources to enhance the social service capabilities of hospitals. Strengthening hospital operations management is crucial to ensure efficient medical resource utilization, achieve refined hospital management and promote a transition from scale expansion to quality and efficiency-oriented development. In 2019, a unified performance assessment indicator system for tertiary public hospitals was set up for the first time, which marked the beginning of a nationwide performance evaluation of these hospitals. The performance assessment of tertiary public hospitals serves as a "guiding rod" for the development of public hospitals. It is of great significance to expedite the establishment of a tiered diagnosis and treatment system, build a modern hospital management system and enhance the operational management capabilities of hospitals. In 2020, the "Guiding Opinions on Strengthening the Operational Management of Public Hospitals" was issued by the National Health Commission of China and the National Administration of Traditional Chinese Medicine. This document highlighted that strengthening the operational management of public hospitals is an important means of leading high-quality hospital development with new development concepts, deepening comprehensive reforms in public hospitals and alleviating economic operational pressure in these hospitals. This policy further elevated the operational management of public hospitals to a strategic development level. Health resources are significantly fewer in the western region of China compared with other regions (2). In Western China, hospitals have weaker operational management capabilities. It is of great importance to promote national unity with many methods. Such methods involve using limited health resource inputs to meet the growing demand for health services while keeping pace with deepening medical reforms, updating internal hospital management systems, addressing internal operational management weaknesses (3) and fairly allocating health resources. This is also a key issue of common research interest in both the Chinese academia and political arena.

At present, data envelopment analysis (DEA) is the most extensively used method for studying and evaluating the operational efficiency of hospitals (4). It was proposed by Charnes, a renowned American operations researcher, and other scholars in 1978, and later introduced by Nunamaker to the field of hospital management (5). This method can consider a variety of input and output indicators simultaneously and avoid evaluation difficulties caused by different units of measurement. Internationally, scholars have examined hospital efficiency from various dimensions. In terms of research at the national level, Afonso and Aubyn (6) used DEA to assess the health efficiency of 30 Organization for Economic Cooperation and Development (OECD) countries and considered efficiency scores with environmental variables. Top et al. (7) evaluated the efficiency of health systems in 36 African countries. Regarding research within the same country but across different regions, Mazon (8) assessed the technical efficiency of public health expenditures in the municipalities of Santa Catarina and their connection with health management outcomes. Ngobeni (9) measured and compared the technical efficiency of healthcare delivery across the nine provinces of South Africa. Bates (10) used DEA and multiple regression analysis to empirically examine the impact of multiple market structure factors on the technical efficiency of hospital services in major United States (US) metropolitan areas. Ferreira et al. (11–13) applied extended DEA models like log-DEA and bootstrap to analyze the Portuguese health care system. From the perspective of health resource control: Zhang et al. (14) analyzed tertiary public hospitals in nine provinces along the Yellow River and found that the Coronavirus Disease 2019 (COVID-19) pandemic greatly affected technological changes in hospitals. They proposed that government departments reasonably control the flow of health resources and that hospitals enhance the application of technology. Li et al. (15) statically analyzed 30 hospitals in Shanxi and concluded considerable redundancy in hospital inputs, which suggested a need to transform hospital management models to improve operational efficiency. From the angle of scale efficiency (SE): He et al. (16) analyzed tertiary public hospitals in Heilongjiang and concluded that "SE" is the primary factor causing the imbalance of hospital development. There is a need to further improve operational efficiency and avoid the unregulated expansion of hospitals. Qin et al. (17) analyzed the cross-sectional data of public hospitals in Hunan by use of the DEA-Tobit model and emphasized the necessity of improving the efficiency of public hospitals and strictly controlling the scale of tertiary hospitals.

This study is the first to combine the "national monitoring indicators" from the "Performance Assessment of Tertiary Public Hospitals" to investigate and evaluate the operational efficiency of hospitals in the western region of China. To be specific, it makes the following contributions: Firstly, existing studies have all focused on the overall level of a region and provided limited guidance for individual hospitals despite having used the DEA or Malmquist model to evaluate public hospitals. This study breaks away from the integrative evaluation framework of other papers and evaluates Guangxi tertiary public hospitals from a micro perspective. It presents the evaluation results of 61 hospitals, identifies hospitals with significant issues, and offers valuable insights into the management practices of other hospitals. Secondly, qualitative (18) and quantitative (19, 20) approaches were combined to select indicators. This scientific method avoids the pitfalls of relying on a single approach. Thirdly, based on DEA, the Tobit model was employed to perform regression analysis on the factors influencing comprehensive efficiency (CE),

pure technical efficiency (PET) and SE. This provides a more comprehensive analysis and control of real-world issues affecting the operational efficiency of public hospitals. The present study provides evidence-based support for gradually improving the operational management model of tertiary public hospitals in the western border regions of China and promoting their high-quality social health services.

2 Materials and methods

2.1 Data source

The data were obtained from the statistical yearbooks and financial statements of 61 third-tier public hospitals located in the Guangxi Zhuang Autonomous Region and from the "Performance Evaluation of Third-Tier Public Hospitals" covering the years 2019–2022. The sample comprised 44 general hospitals and 17 specialized hospitals. Among them, 20 provincial hospitals, 36 municipal hospitals and five county-level hospitals were included. The sampled hospitals were systematically coded from H1 to H61.

2.2 Indicator system construction

According to an important empirical rule of DEA theory, the number of indicators in DEA studies should be considered concerning the number of decision-making units (DMUs). The inclusion of too many indicators in the model can lead to insensitive efficiency results, low differentiation and ineffective evaluations. Thus, the number of DMUs is supposed to be at least two to three times the sum of input and output indicators (19, 20). Based on the three-dimensional approach of human resource, physical resource and cost inputs developed by Ozcan et al. (21), an input indicator library related to operational efficiency from the "National Tertiary Public Hospital Performance Assessment Manual (2024 Edition)" was constructed in this study, as detailed in Table 1 (22–27). Cluster analysis was used to evaluate the indicators in the input indicator library (Figure 1), to minimize the collinearity effects among indicators of the same type (18, 28). Ultimately, it was concluded that the indicator representing the human resource input dimension is X3: the ratio of doctors to nurses; the physical resource input dimension is denoted by X4: the number of hospital beds; the cost input dimension is indicated by X8: average outpatient medical expenses per visit; X9 represents average outpatient drug expenses per patient. Output indicators were selected based on the "National Tertiary Public Hospital Performance Assessment Manual (2024 Edition) (29)." Revenue and expenditure structure and cost control were used as second-level indicators, and nine national monitoring indicators were taken as third-level indicators (Table 2). The DEAP 2.1 software was utilized for analyzing the input–output indicators of sample hospitals, and the operational efficiency of tertiary public hospitals in Guangxi was evaluated systematically. Additionally, indicators that may affect the static efficiency of hospitals were chosen based on the four dimensions of operational efficiency, sustainable development, medical quality and satisfaction from the "National Assessment" (Table 3). Tobit regression analysis was performed using the Stata 18 software (30–34).

In the context of DEA analysis, it is essential to conduct positive and standardized processing when interval and negative indicators within the input–output indicator system are addressed. The majority of articles in this field employ the reciprocal method to transform negative indicators into positive ones. This non-linear approach has the potential to alter the distribution characteristics of original data (35). Hence, the Min-Max reverse indicator formula (Equation 1) was used in this study to process negative indicators (36), where X_{ij} stands for the original value of the j indicator for the i evaluation object. The medical surplus rate and asset-liability ratio were processed using the interval-type attribute standardization method with the standardization formula (Equation 2) (16). In the formula, [a,b] represents the optimal attribute interval; a_j^0 stands for the intolerable lower limit; a_j^* denotes the intolerable upper limit, with b_{ij} converted maximum value being 1 and the minimum value being 0.

$$x_{ij} = \frac{\max_i X_{ij} - X_{ij}}{\max_i X_{ij} - \min_i X_{ij}} \tag{1}$$

$$b_{ij} = \begin{cases} 1 - \dfrac{(c - a_{ij})}{(c - a_j^0)}, a_{ij} \in \left[a_j^0, c\right) \\ 1, a_{ij} \in [c, d] \\ 1 - \dfrac{(a_{ij} - d)}{(a_j^* - d)}, a_{ij} \in \left(d, a_j^*\right] \\ 0, else \end{cases} \tag{2}$$

TABLE 1 Hospital resource input indicator library.

Category of indicator	Evaluation indicators
Human resource input	X1:number of physicians;X2:number of nurses;X3:ratio of doctors to nurses
Physical resource input	X4:number of hospital beds;X5:annual energy consumption of hospitals
Cost input	X6:medical staff expenditure; X7:medical expenditure; X8:outpatient average medical expenses per visit; X9:average outpatient drug expenses per patient; X10:average medical expenses per discharged patient; X11:average outpatient drug expenses per patient; X12:assets of hospitals

2.3 Methods

2.3.1 DEA-BCC model

Common DEA static models include the Charnes, Cooper and Rhodes (CCR) model measuring constant returns to scale (CRS) and the Banker, Charnes and Cooper (BCC) model assessing variable returns to scale (VRS). Health production theory suggests that the production technology within health systems is characterized by VRS. Consequently, the BCC model was used in the current study for static analysis of sample hospitals (37). The BCC model enables the calculation of CE and returns to scale (RTS) in hospital operations. CE can be further decomposed into PTE and SE, which is represented by

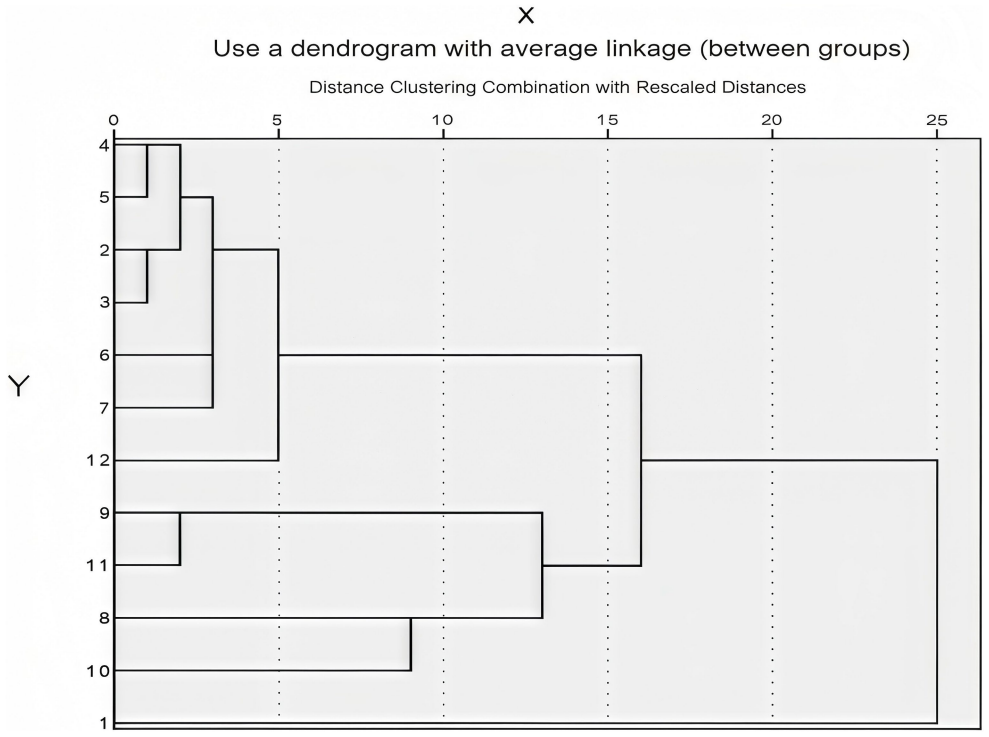

FIGURE 1
Clustering results of input indicator library. The Y-axis from 1 to 12 corresponds to the indicators X1 to X12 in the indicator library, respectively.

the equation CE = PTE × SE. The BCC model incorporates convexity constraints and reflects its assumption of VRS, which is opposite to the CCR model. Below is the linear programming formulation (Equation 3):

$$(\mathrm{BCC})\begin{cases} \min\theta = V_D, \\ \text{s.t.}\sum_{j=1}^{n} x_j\lambda_j + s^- = \theta x_0, \\ \sum_{j=1}^{n} y_j\lambda_j - s^- = y_0, \\ \sum_{j=1}^{n}\lambda_j = 1, \\ s^- \geq 0, s^+ \geq 0, \lambda_j \geq 0, j = 1, 2, \cdots, n. \end{cases} \quad (3)$$

The optimal solution of the linear programming problem is described as follows:

If $\grave{e}^0 = 1$ and $s^-=0, s^+=0$, the DMU DMU_{j0} is DEA efficient. In this case, its production activities have SE and technical efficiency.

If $\grave{e}^0 = 1$ and $s= s^-+s^+ >0$, DMU_{j0} is slightly inefficient according to DEA. In this case, its production activities are not simultaneously efficient in terms of SE and technical efficiency.

When $\theta^0 < 1$, DMU_{j0} is considered DEA inefficient. In this case, its production activities have no SE and technical efficiency.

2.3.2 Malmquist index model

In 1953, the Malmquist index was initially introduced by Sten Malmquist, a Swedish economist, to analyze variations in consumption indices across different periods (38). Subsequently, this concept was adapted by Caves for production analysis, to measure dynamic efficiency changes in production activities. On this basis, Fare and colleagues developed the Malmquist index by employing the geometric average of the indices from two consecutive periods to assess the trend of total factor productivity (TFP) changes from a specific period t to t + 1 (39). The model is represented as follows (Equation 4).

$$M\left(x^t, y^t, x^{t+1}, y^{t+1}\right) = \left[\frac{D^t\left(x^{t+1}, y^{t+1}\right)}{D^t\left(x^t, y^t\right)} \times \frac{D^{t+1}\left(x^{t+1}, y^{t+1}\right)}{D^{t+1}\left(x^t, y^t\right)}\right]^{\frac{1}{2}} \quad (4)$$

TFP is influenced simultaneously by two key factors: technical efficiency change (TEC) and technology progress (TC), which can be expressed as TFP = TC × TEC. Furthermore, TEC can be further broken down into the product of PTE change (PTEC) and SE change (SEC). Thus, the expression for TFP can also be articulated as TFP = TC × PTEC × SEC.

The Malmquist index has a threshold value of 1:

M = 1 indicates that efficiency remains unchanged.

M > 1 indicates that the efficiency in period t + 1 is on an upward trend compared to that in period t.

M < 1 indicates that the efficiency in period t + 1 is on a downward trend compared to that in period t.

2.3.3 Tobit model

In the process of performing regression analysis, continuous dependent variables may sometimes be constrained to a specific range due to truncation or censoring, which can result in inconsistent estimators. As defined by Davidson et al., truncation means the systematic exclusion of certain observations from the sample, whereas censoring refers to a scenario where no observations are excluded but

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TABLE 2 Input-output indicator system for operational efficiency of tertiary public hospitals in Guangxi.

Primary Indicators	Secondary indicators	Third-level indicators	Explanation of indicators	Indicator attributes
Input indicators	Human resource input	Ratio of doctors to nurses	The ratio of medical personnel to patients in a hospital or medical institution.	Positive indicators
	Physical resource input	Number of hospital beds	The actual number of beds open in a hospital refers to the fixed number of beds that are actually available at the end of the year.	Positive indicators
	cost input	Outpatient average medical expenses per visit	The average cost of medical services for outpatient patients per visit	Negative indicators
		verage medical expenses per discharged patient	The average cost of medical expenses for discharged patients per hospitalization	Negative indicators
Output indicators	Income and expenditure structure	The proportion of revenue from medical services	Medical service revenue÷medical revenue×100%	Positive indicators
		Percentage of personnel expenses	Personnel expenses÷Medical activity expenses×100%	Positive indicators
		Annual energy consumption share	Annual total energy consumption÷annual total revenue×10,000	Negative indicators
		Medical surplus ratio	Medical surplus÷Medical activity revenue×100%	Interval Indicator
		Debt-to-Asset Ratio	Total Liabilities÷Total Assets×100%	Interval Indicator
	Cost Control	The average increase in outpatient consultation fees	(The average medical expenses for outpatient patients this year—the average medical expenses for outpatient patients last year)÷the average medical expenses for outpatient patients last year×100%	Negative indicators
		Increase in the average cost of prescription drugs per outpatient visit	(Average Prescription Cost per Outpatient Visit this Year—Average Prescription Cost per Outpatient Visit Last Year)÷Average Prescription Cost per Outpatient Visit Last Year×100%	Negative indicators
		Increase in the average cost per hospitalization	(Average Cost of Medical Services per Discharged Patient in the Current Year—Average Cost of Medical Services per Discharged Patient in the Previous Year)÷Average Cost of Medical Services per Discharged Patient in the Previous Year×100%	Negative indicators
		Average Inpatient Drug Cost Increase	(Average Per Patient Drug Cost for Discharged Patients in the Current Year—Average Per Patient Drug Cost for Discharged Patients in the Previous Year)÷Average Per Patient Drug Cost for Discharged Patients in the Previous Year×100%	Negative indicators

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TABLE 3 Estimation results of static efficiency of 61 third-tier public hospitals in Guangxi province using Tobit model.

Dimension of Indicator	Explanatory variable	CE (95% confidence interval)	PTE (95% confidence interval)	SE (95% confidence interval)
Functional positioning	Bed size scale	0.0428** (0.0151,0.0705)	0.1036** (0.0151,0.1920)	0.0275** (0.0066,0.0485)
	Jurisdictional Level	−0.0161 (−0.0408,0.0086)	0.0175 (−0.0373,0.0724)	−0.0177* (0.0368,0.0013)
	Ratio of outpatient to inpatient patients	0.0014* (−0.0001,0.0029)	0.0019 (−0.0037,0.0075)	0.0010* (−0.0000,0.0021)
	The proportion indicator of discharged patients undergoing surgery	−0.0033** (−0.0059,-0.0008)	−0.0013 (−0.0070,0.0043)	−0.0027** (−0.0047,-0.0006)
Operational efficiency	Business expenses	−0.0000** (−0.0000,0.0001)	−0.0000 (−0.0000,0.0001)	−0.0000** (−0.0000,0.0001)
	annual total revenue	0.0000** (−0.0000,0.0001)	0.0000 (−0.0000,0.0001)	0.0000** (−0.0000,0.0001)
Sustainable development	The structure of healthcare professionals' ranks	0.0182 (−0.1269,0.1636)	0.1436 (−0.2102,0.4974)	−0.0042 (−0.1152,0.1067)
Satisfaction	Satisfaction of healthcare workers	0.0015 (−0.0010,0.0040)	0.0029 (−0.0030,0.0089)	0.0008 (−0.0010,0.0028)
	Patient Satisfaction in Outpatient Department	−0.0008 (−0.0072,0.0056)	−0.0024 (0.0179,0.0130)	0.0000 (−0.0048,0.0049)
	Satisfaction of Inpatient Patients	−0.0039 (−0.0129,0.0051)	0.0087 (−0.0124,0.0299)	−0.0041 (0.0110,0.0027)
	Constant	1.3197 (0.6151,2.0242)	0.0045 (−1.608,1.6178)	1.3540 (0.8079,1.9001)

* indicates $p < 0.1$, ** indicates $p < 0$.

some are limited to a particular threshold. Both truncated and censored variables are collectively termed restricted dependent variables (40, 41). Also called the censored or truncated regression model, the Tobit model is frequently employed in regression analyses involving restricted variables. Its fundamental form is represented as follows (Equation 5):

$$y_i = \alpha + \beta x_i + \upsilon_i \quad (5)$$

In this study, dependent variables including CE, PTE and SE exhibited a value range of (0, 1), and were categorized as censored data. Consequently, the Tobit model was employed for analyzing the influence factors for the static efficiency of sample hospitals and exploring both the direction and magnitude of these effects. The model can be formulated as follows (Equation 6):

$$\begin{aligned} EFFit = \alpha + X1it + X2it + X3it + X4it + X5it + \\ X6it + X7it + X8it + X9it + X10it + \\ X1\,1it + X12it + X13it + \ldots\ldots + \end{aligned} \quad (6)$$

Where EFFit represents the operational efficiency of the pilot hospital; α stands for the constant term; β denotes the coefficient for the impact of independent variables on efficiency; i refers to the serial number of each observation (1, 2, 3, …, 61); t indicates the year (2019, 2020, 2021 and 2022); ϵ is the random disturbance term.

3 Results

3.1 Static analysis of the BCC model in third-tier public hospitals in Guangxi

As shown in Table 4, CE serves as an indicator of the production capacity of a hospital within the healthcare industry (42). From 2019 to 2022, the proportion of DEA-effective hospitals (those with a CE value of 1) among the 61 tertiary public hospitals in Guangxi was recorded at 49.18, 31.15, 36.07 and 39.34%, respectively, which demonstrated an initial decline followed by a gradual recovery trend. Only 12 hospitals (19.67%) maintained DEA-effectiveness throughout the four years, including six in Nanning, two in Liuzhou and one each in Wuzhou, Yulin, Baise and Laibin. Notably, over 80% of these hospitals did not operate on the efficient frontier, which indicated the failure of their resource inputs to achieve optimal output levels relative to best practices. PTE, which assumes CRS, quantifies the gap between the production capacity and the frontier of a hospital. This metric is an indicator of both technological proficiency and managerial competence. Over four years, 14 hospitals (22.95%) achieved a DEA value of 1 for PTE. Moreover, 27 hospitals experienced fluctuations in performance but successfully returned to the production frontier in 2022. The overall strong performance of the sampled hospitals was closely tied to the robust initiatives of the region that were aimed at advancing healthcare system reforms. Given the current level of technology, SE assesses the disparity between the actual and optimal production scale of a hospital. This metric is instrumental in determining whether a hospital should expand or contract its operations to enhance operational efficiency (43). During the investigation period, 36 hospitals (59.01%) exhibited a fluctuating decline in SE. The proportion of hospitals demonstrating DEA-inefficient SE was recorded at 50.82, 68.85, 63.93 and 60.66% over the four years. Of note, only 12 hospitals (19.67%) achieved a DEA value of 1 for SE throughout this period, which underscored the issue of irrational production scale within hospitals. Decreasing Returns to Scale (DRS) refers to the variation in output that occurs when the proportions of various production factors within a hospital are altered, while other conditions remain constant. In the past four years, the number of hospitals experiencing DRS was recorded as 31 (50.82%), 36 (59.02%), 39 (63.93%) and 35 (57.38%), respectively, which indicated a need for adjustments in their production scale.

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TABLE 4 Static decomposition of 61 tertiary public hospitals in Guangxi from 2019 to 2022 unit: [*n*(%)].

Hospital	2019				2020				2021				2022			
	TCE	PTE	SE	RTS	TCE	PTE	SE	RTS	TCE	PTE	SE	RTS	TCE	PTE	SE	RTS
H1	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H2	0.919	1.000	0.919	drs	0.810	0.858	0.944	drs	1.000	1.000	1.000	-	0.994	1.000	0.994	drs
H3	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H4	0.876	1.000	0.876	drs	0.911	1.000	0.911	drs	0.917	1.000	0.917	drs	0.750	1.000	0.750	drs
H5	1.000	1.000	1.000	-	0.914	1.000	0.914	irs	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H6	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H7	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H8	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H9	1.000	1.000	1.000	-	0.976	0.989	0.987	irs	0.986	1.000	0.986	drs	0.833	0.866	0.962	drs
H10	1.000	1.000	1.000	-	0.813	0.896	0.907	drs	0.868	1.000	0.868	drs	0.814	1.000	0.814	drs
H11	0.846	1.000	0.846	drs	0.848	0.919	0.923	drs	0.906	1.000	0.906	drs	1.000	1.000	1.000	-
H12	1.000	1.000	1.000	-	0.941	0.942	0.998	irs	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H13	0.931	1.000	0.931	drs	0.860	1.000	0.860	drs	0.980	1.000	0.980	drs	1.000	1.000	1.000	-
H14	0.869	1.000	0.869	drs	0.768	0.821	0.935	drs	0.920	1.000	0.920	drs	0.917	1.000	0.917	drs
H15	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H16	1.000	1.000	1.000	-	1.000	1.000	1.000	-	0.858	1.000	0.858	drs	0.841	1.000	0.841	drs
H17	0.776	1.000	0.776	drs	0.636	0.791	0.804	drs	0.758	0.908	0.835	drs	0.840	1.000	0.840	drs
H18	0.956	1.000	0.956	drs	0.816	0.959	0.851	drs	0.680	1.000	0.680	drs	0.728	1.000	0.728	drs
H19	0.856	1.000	0.856	drs	0.796	0.889	0.895	drs	0.819	1.000	0.819	drs	0.855	1.000	0.855	drs
H20	1.000	1.000	1.000	-	0.797	0.870	0.916	drs	0.846	1.000	0.846	drs	0.892	1.000	0.892	drs
H21	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H22	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H23	0.841	1.000	0.841	drs	0.876	0.958	0.915	drs	0.953	1.000	0.953	drs	0.888	1.000	0.888	drs
H24	0.800	0.993	0.806	drs	0.813	0.935	0.870	drs	0.789	1.000	0.789	drs	0.806	0.893	0.903	drs
H25	0.796	1.000	0.796	drs	0.758	0.900	0.842	drs	0.840	0.947	0.887	drs	0.823	1.000	0.823	drs
H26	0.890	1.000	0.890	drs	1.000	1.000	1.000	-	0.965	1.000	0.965	drs	1.000	1.000	1.000	-
H27	1.000	1.000	1.000	-	0.892	0.908	0.982	drs	0.976	1.000	0.976	drs	1.000	1.000	1.000	-
H28	0.886	1.000	0.886	drs	0.921	0.974	0.945	drs	0.819	1.000	0.819	drs	1.000	1.000	1.000	-
H29	0.873	0.998	0.876	drs	1.000	1.000	1.000	-	0.949	1.000	0.949	drs	0.822	0.832	0.988	drs
H30	0.851	1.000	0.851	drs	0.834	0.884	0.943	drs	0.839	1.000	0.839	drs	0.934	1.000	0.934	drs
H31	0.933	1.000	0.933	drs	0.975	0.995	0.980	drs	0.955	0.973	0.981	drs	1.000	1.000	1.000	-
H32	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H33	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	0.999	1.000	0.999	irs
H34	1.000	1.000	1.000	-	0.984	0.985	0.999	-	0.935	1.000	0.935	drs	0.897	1.000	0.897	drs
H35	0.991	1.000	0.991	drs	0.888	0.918	0.967	drs	0.938	0.950	0.988	drs	0.874	0.890	0.982	drs
H36	0.903	1.000	0.903	drs	0.806	0.836	0.964	drs	0.998	1.000	0.998	drs	0.650	0.658	0.988	drs
H37	0.856	1.000	0.856	drs	0.859	1.000	0.859	drs	0.895	1.000	0.895	drs	0.940	1.000	0.940	drs
H38	1.000	1.000	1.000	-	0.756	1.000	0.756	drs	1.000	1.000	1.000	-	0.788	1.000	0.788	drs
H39	0.939	1.000	0.939	drs	0.741	0.781	0.949	drs	0.938	1.000	0.938	drs	0.899	1.000	0.899	drs
H40	1.000	1.000	1.000	-	0.881	1.000	0.881	drs	0.908	1.000	0.908	drs	0.997	1.000	0.997	drs
H41	0.949	1.000	0.949	drs	0.867	0.913	0.950	drs	0.963	1.000	0.963	drs	0.827	0.840	0.985	drs
H42	0.760	0.847	0.897	drs	1.000	1.000	1.000	-	0.941	1.000	0.941	drs	0.886	1.000	0.886	drs
H43	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-

(Continued)

TABLE 4 (Continued)

Hospital	2019				2020				2021				2022			
	TCE	PTE	SE	RTS	TCE	PTE	SE	RTS	TCE	PTE	SE	RTS	TCE	PTE	SE	RTS
H44	1.000	1.000	1.000	-	0.952	1.000	0.952	drs	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H45	1.000	1.000	1.000	-	0.941	0.948	0.992	irs	1.000	1.000	1.000	-	0.990	1.000	0.990	drs
H46	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H47	1.000	1.000	1.000	-	0.851	1.000	0.851	drs	0.883	1.000	0.883	drs	0.856	1.000	0.856	drs
H48	0.801	1.000	0.801	drs	0.706	0.870	0.812	drs	0.743	0.885	0.840	drs	1.000	1.000	1.000	-
H49	0.897	1.000	0.897	drs	0.844	0.869	0.971	drs	0.887	1.000	0.887	drs	0.909	1.000	0.909	drs
H50	1.000	1.000	1.000	-	1.000	1.000	1.000	-	0.986	1.000	0.986	drs	1.000	1.000	1.000	-
H51	0.976	1.000	0.976	drs	1.000	1.000	1.000	-	0.885	0.903	0.980	drs	0.826	0.830	0.995	irs
H52	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H53	0.896	1.000	0.896	drs	0.816	0.817	0.999	drs	0.959	0.987	0.972	drs	0.978	1.000	0.978	drs
H54	0.832	1.000	0.832	drs	0.852	1.000	0.852	drs	0.787	1.000	0.787	drs	0.787	1.000	0.787	drs
H55	0.950	1.000	0.950	drs	0.921	0.971	0.948	drs	1.000	1.000	1.000	-	0.997	1.000	0.997	drs
H56	1.000	1.000	1.000	-	0.817	1.000	0.817	drs	0.893	1.000	0.893	drs	0.903	1.000	0.903	drs
H57	0.894	1.000	0.894	drs	0.856	0.909	0.942	drs	0.900	1.000	0.900	drs	0.912	1.000	0.912	drs
H58	0.871	0.996	0.875	drs	0.916	0.976	0.938	drs	0.961	1.000	0.961	drs	0.731	0.761	0.960	drs
H59	1.000	1.000	1.000	-	0.898	1.000	0.898	drs	1.000	1.000	1.000	-	1.000	1.000	1.000	-
H60	0.870	1.000	0.870	drs	0.887	1.000	0.887	drs	0.931	0.958	0.972	drs	0.940	1.000	0.940	drs
H61	1.000	1.000	1.000	-	0.801	0.802	0.999	irs	1.000	1.000	1.000	-	0.942	1.000	0.942	drs
Mean	0.939	0.997	0.942		0.898	0.952	0.943		0.934	0.992	0.941		0.922	0.977	0.945	

The symbol "-" denotes constant decreasing returns to scale, "drs" signifies decreasing returns to scale, and "irs" indicates increasing returns to scale.

The trend of mean values for SE, PTE and CE from 2019 to 2022 is illustrated in Figure 2.

3.2 Dynamic analysis of the Malmquist index for third-tier public hospitals in Guangxi

Overall, from a dynamic perspective, the Malmquist index decomposition indicators for sample hospitals from 2019 to 2022 demonstrated an initial increasing trend followed by a subsequent decline, as illustrated in Table 5 and Figure 3. The values for technical efficiency, TC, PTE and TFP that experienced a decrease from 2021–2022 compared to the period from 2020–2021 were recorded at 0.054, 0.373, 0.062 and 0.433, respectively. This suggests that resources are still significantly underutilized and a marked regression remains in comprehensive management and technological capabilities within the operation and management of tertiary public hospitals in Guangxi. Although SE was maintained at a level of 1, neglecting proper attention and effective control may result in subsequent issues concerning the rationality of the hospital production scale. From a microscopic perspective, 19 hospitals (31.15%) had TFP exceeding 1 over the observed years. Hospitals that demonstrated improvement solely attributable to the TC indicator included H6, H21, H32, H44, H50 and H59. Of the 42 hospitals exhibiting a TFP of less than 1, 13 (30.95%) experienced a decline in their TFP that was solely ascribed to a decrease in the TC indicator. Despite maintaining all other indicators at or above 1, six hospitals had a TFP of less than 1 owing to the influence of the TC indicator. The aforementioned situation reveals that the primary issue contributing to the decline in the operational management of third-tier public hospitals in Guangxi was significantly influenced by the TC indicator. Figure 4 displays this phenomenon in detail. Hospitals H9 and H35 had all indicators less than 1, which necessitated an increased focus on operational management.

3.3 Tobit regression analysis of tertiary public hospitals in Guangxi

In this study, the likelihood ratio (LR) test was conducted on the CE, PTE and SE values of 61 tertiary public hospitals in Guangxi. The *p*-values of CE, PTE and SE were 0.029, 0.000 and 0.023, respectively, all of which were below 0.05. This indicates that a mixed-effects Tobit model should be established. The results of the regression analysis on the influencing factors for CE indicated that variables such as bed size scale, the ratio of outpatient to inpatient patients and the percentage of discharged patients undergoing surgery within the dimension of functional positioning were statistically significant in the sample model. In specific terms, both the hospital scale and the ratio of outpatient to inpatient patients exerted a positive influence, whereas the percentage of discharged patients undergoing surgery had a negative effect. This suggests that tertiary hospitals should actively adjust their patient demographics and attach importance to

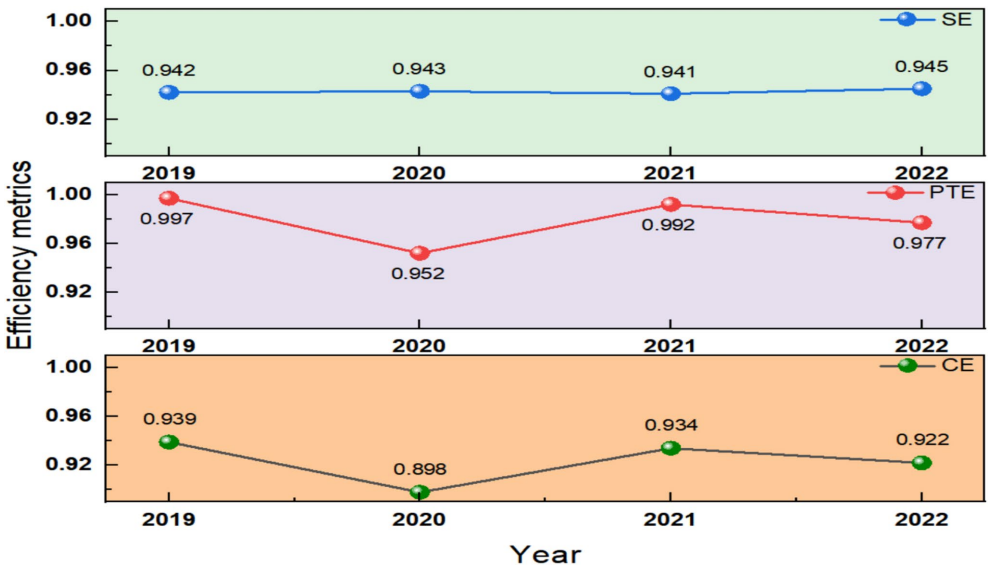

FIGURE 2
Comparison of average static decomposition indicators from 2019 to 2022.

treating patients requiring high-difficulty surgeries. From the perspective of operational efficiency, it was revealed in this study that business expenses exerted a negative influence on the CE of hospitals, whereas total annual revenue had a positive effect. These findings indicate that hospitals should prioritize controlling medical activity costs while increasing revenue and minimizing expenses. The results of the regression analysis on the factors influencing PTE indicated that the effects of all other indicators were not statistically significant except the bed size scale within the dimension of functional positioning. The results of the regression analysis on the factors influencing SE indicated that all the indicators within the dimension of functional positioning exhibited statistical significance for the sample model. Concretely, both the bed size scale and the ratio of outpatient to inpatient patients had a positive impact, while jurisdictional level and the percentage of discharged patients undergoing surgery among discharged patients exerted a negative influence. In the dimension of operational efficiency indicators, the business expenditure metric exhibited a negative impact, while the total annual revenue metric demonstrated a positive influence. The effects of sustainable development and satisfaction dimension indicators on SE showed no statistical significance. Please refer to Table 3 for further details.

4 Discussion

4.1 The SE indicator reveals inappropriate hospital production scale

The results of the BCC static model demonstrated that the fluctuation and decline in CE among sample hospitals were primarily driven by SE from 2019 to 2022. From the micro perspective of various DMUs, SE emerged as the main factor influencing overall efficiency. Among hospitals with a CE value of less than 1 during this period, those rendered DEA-ineffective because of invalid SE were numbered 27, 12, 30 and 29, respectively, for each year, which accounted for 87.10, 28.57, 76.92 and 78.38%, respectively. Except for the year 2020, these proportions consistently exceeded 75%. Furthermore, more than half of DEA-ineffective hospitals observed over these years operated under DRS, which indicated a certain risk of excessive expansion among tertiary public hospitals in Guangxi. This result was consistent with that reported by Kirigia and Asbu, who suggested that most hospitals suffer from low efficiency on account of inappropriate scale (44). A detailed analysis of specific survey data revealed that some hospitals saw a continuous increase in inputs like the number of healthcare personnel and actual open bed counts in several years. However, key output indicators including the proportion of medical service revenue, debt-to-asset ratio, medical surplus rate and the proportion of personnel expenditures did not improve alongside hospital size expansion or increased resource input. With the expansion of the hospital scale, operational costs also increased.

Therefore, it is critical to fully leverage the "conductor's baton" role of performance assessment policies in tertiary public hospitals. This can promote a shift in the development model of public hospitals from scale expansion to quality and efficiency and in their management model from extensive administrative management to comprehensive performance management.

4.2 The TC indicator is key to improving the operational efficiency of hospitals

The Malmquist dynamic analysis results indicated that the TFP of 61 public tertiary hospitals in Guangxi was primarily influenced by a combination of TC, TEC and SEC. From a positive perspective, it can be observed that 31.59% of the hospitals experienced an increase in TFP solely due to improvements in the

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TABLE 5 Malmquist index decomposition of 61 tertiary public hospitals in Guangxi from 2019 to 2022.

Hospital	TEC	TC	PTEC	SEC	TFP	Hospital	TEC	TC	PTEC	SEC	TFP
H1	1.000	0.526	1.000	1.000	0.526	H32	1.000	1.114	1.000	1.000	1.114
H2	1.026	0.921	1.000	1.026	0.945	H33	1.000	0.982	1.000	1.000	0.981
H3	1.000	0.926	1.000	1.000	0.926	H34	0.965	0.959	1.000	0.965	0.925
H4	0.949	1.000	1.000	0.949	0.950	H35	0.959	0.986	0.962	0.997	0.945
H5	1.000	0.877	1.000	1.000	0.877	H36	0.896	0.988	0.870	1.031	0.885
H6	1.000	1.101	1.000	1.000	1.101	H37	1.032	1.034	1.000	1.032	1.067
H7	1.000	0.630	1.000	1.000	0.630	H38	0.924	0.987	1.000	0.924	0.912
H8	1.000	0.813	1.000	1.000	0.813	H39	0.986	1.006	1.000	0.986	0.992
H9	0.941	0.869	0.953	0.987	0.818	H40	0.999	0.993	1.000	0.999	0.992
H10	0.934	0.938	1.000	0.934	0.876	H41	0.955	1.060	0.944	1.012	1.012
H11	1.057	0.941	1.000	1.057	0.995	H42	1.053	1.004	1.057	0.996	1.057
H12	1.000	0.868	1.000	1.000	0.868	H43	1.000	0.970	1.000	1.000	0.970
H13	1.024	1.034	1.000	1.024	1.058	H44	1.000	1.024	1.000	1.000	1.024
H14	1.018	0.957	1.000	1.018	0.974	H45	0.997	0.965	1.000	0.997	0.962
H15	1.000	0.937	1.000	1.000	0.937	H46	1.000	0.966	1.000	1.000	0.966
H16	0.944	0.980	1.000	0.944	0.925	H47	0.949	1.029	1.000	0.949	0.977
H17	1.027	0.982	1.000	1.027	1.008	H48	1.077	0.960	1.000	1.077	1.033
H18	0.913	0.928	1.000	0.913	0.847	H49	1.004	0.997	1.000	1.004	1.002
H19	0.999	0.947	1.000	0.999	0.947	H50	1.000	1.055	1.000	1.000	1.055
H20	0.962	0.935	1.000	0.962	0.900	H51	0.946	0.949	0.940	1.006	0.898
H21	1.000	1.009	1.000	1.000	1.009	H52	1.000	0.973	1.000	1.000	0.973
H22	1.000	0.905	1.000	1.000	0.905	H53	1.030	1.000	1.000	1.030	1.030
H23	1.018	0.951	1.000	1.018	0.968	H54	0.982	0.963	1.000	0.982	0.945
H24	1.003	0.952	0.965	1.039	0.954	H55	1.016	1.003	1.000	1.016	1.019
H25	1.011	0.940	1.000	1.011	0.951	H56	0.967	1.058	1.000	0.967	1.023
H26	1.040	0.930	1.000	1.040	0.967	H57	1.007	0.941	1.000	1.007	0.947
H27	1.000	0.958	1.000	1.000	0.958	H58	0.943	0.966	0.914	1.032	0.911
H28	1.041	0.965	1.000	1.041	1.005	H59	1.000	1.029	1.000	1.000	1.029
H29	0.980	1.001	0.941	1.041	0.981	H60	1.026	1.016	1.000	1.026	1.043
H30	1.031	0.933	1.000	1.031	0.962	H61	0.980	0.981	1.000	0.980	0.961
H31	1.023	0.995	1.000	1.023	1.018	Mean	0.993	0.956	0.992	1.001	0.949

TC indicator. Conversely, from a negative standpoint, 30.95% of the hospitals saw a decline in TFP exclusively owing to changes in the TC indicator. It is worth noting that none of the TEC, PTEC and SEC independently contributed to a decline in the TFP of these hospitals. Despite the progress made by hospitals H2, H11, H14, H23, H25 and H30 in other indicators, the decline in the TC index led to a decrease in TFP. This indicates that the TC index is crucial for improving the operational efficiency of tertiary public hospitals in Guangxi. It suggests that some hospitals are encountering challenges like outdated operational management techniques and methods, and the inefficient use of funds. This result was in line with that reported by Chen (45), who believed that the TC indicator should be the priority direction for improvement to improve the operational efficiency of hospitals. Through field investigations, it has been found that tertiary public general hospitals in Guangxi mostly have no separate operational departments. Instead, the financial department is primarily responsible for managing hospital operations. This arrangement makes it challenging to assign specific responsibilities to corresponding departments or individuals during actual work processes, which results in low operational efficiency and difficulties in implementing refined management practices. In addition, some hospitals are confronted with issues where existing information systems fail to satisfy operational management needs. For the time being, a majority of hospital operation management information system modules concentrate mainly on basic functions such as accounting, cost management and asset management. Only a few hospitals possess modules for risk control, operational analysis and project management related to scientific research and education. More than that, compatibility

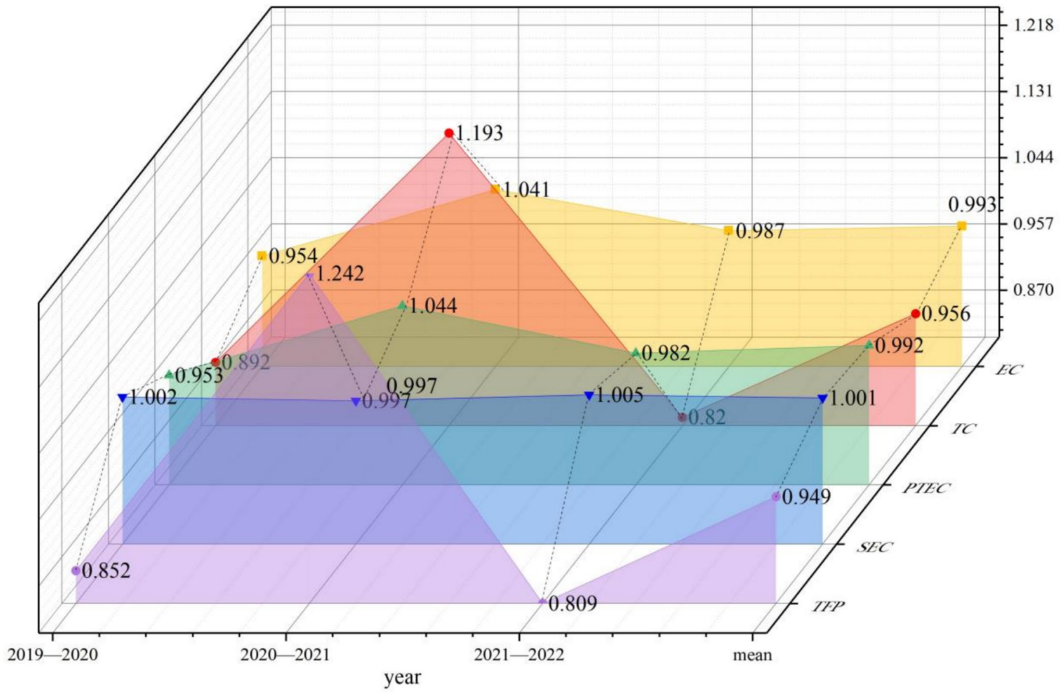

FIGURE 3
Dynamic efficiency value decomposition from 2019 to 2022 for Guangxi's 61 tertiary public hospitals (EC stands for technical efficiency, TC for technological change, PTEC for pure technical efficiency, SE for scale efficiency, and TFP for total factor productivity).

issues also exist between different systems within hospitals that pose technical barriers to the implementation of refined management practices.

In light of the aforementioned issues, on the one hand, healthcare institutions ought to establish a structured operational management system and standardize the creation of operational management departments to enhance operational efficiency. On the other hand, they must advance the informatization of operational management and facilitate a transition from the traditional "process-driven" model to a "dual-driven" approach integrating both data and processes.

4.3 The imbalance in the operational development of hospitals remains a concern

According to the analysis of the Malmquist dynamic model, six (31.58%) provincial-level hospitals had a TFP of greater than 1 from 2019 to 2022. At the municipal level, 11 hospitals (57.89%) achieved a TFP of greater than 1. At the county level, only two hospitals (10.53%) obtained a TFP of greater than 1. This reflects the unbalanced operational development among hospitals of different jurisdictional levels. From a micro perspective, the M index indicated that five tertiary public hospitals in Nanning four in Guilin, three in Liuzhou and two each in Hechi and Yulin across various cities had a technical efficiency value of greater than 1. Beyond that, Wuzhou, Beihai, Laibin and Guigang each have one such hospital. The hospitals in the remaining cities experienced no growth in their TEC indicators. This further demonstrates the imbalance in the operational development of tertiary public hospitals across different regions of Guangxi. The exploration of underlying factors showed that Guangxi exhibits a relatively weak economic foundation featuring disparities in economic development across multiple regions and an imbalance in health financial investment. These conditions inevitably lead to differences in the operational development of hospitals. During the observation period, Guangxi grappled with the COVID-19 pandemic, which had varying effects across different areas. The responsibilities associated with epidemic prevention and control, nucleic acid testing tasks, the consumption of protective materials and labor expenses for dispatched medical staff differ among hospitals of varying levels as well. These external factors further influence hospital operations to differing degrees. A study by Androutsou and Lupu also demonstrated that COVID-19 exerted a huge impact on the operational efficiency of hospitals (46, 47).

As a result, hospitals should start from the actual situation of resource allocation to enhance resource utilization rates. Concurrently, they must strengthen cost management and accurately control the "revenue generation" and "cost saving" of hospitals to maximize operational management benefits. In addition, it is suggested that hospital management departments consciously balance the disparities in inputs among hospitals within a region, formulate rational regional health plans, and supervise and regulate hospital operational efficiency (48).

4.4 Structural adjustment supports the advancement of hospital operations to a higher level

The Tobit regression analysis results demonstrated that the proportion of surgical patients discharged from hospitals had a negative

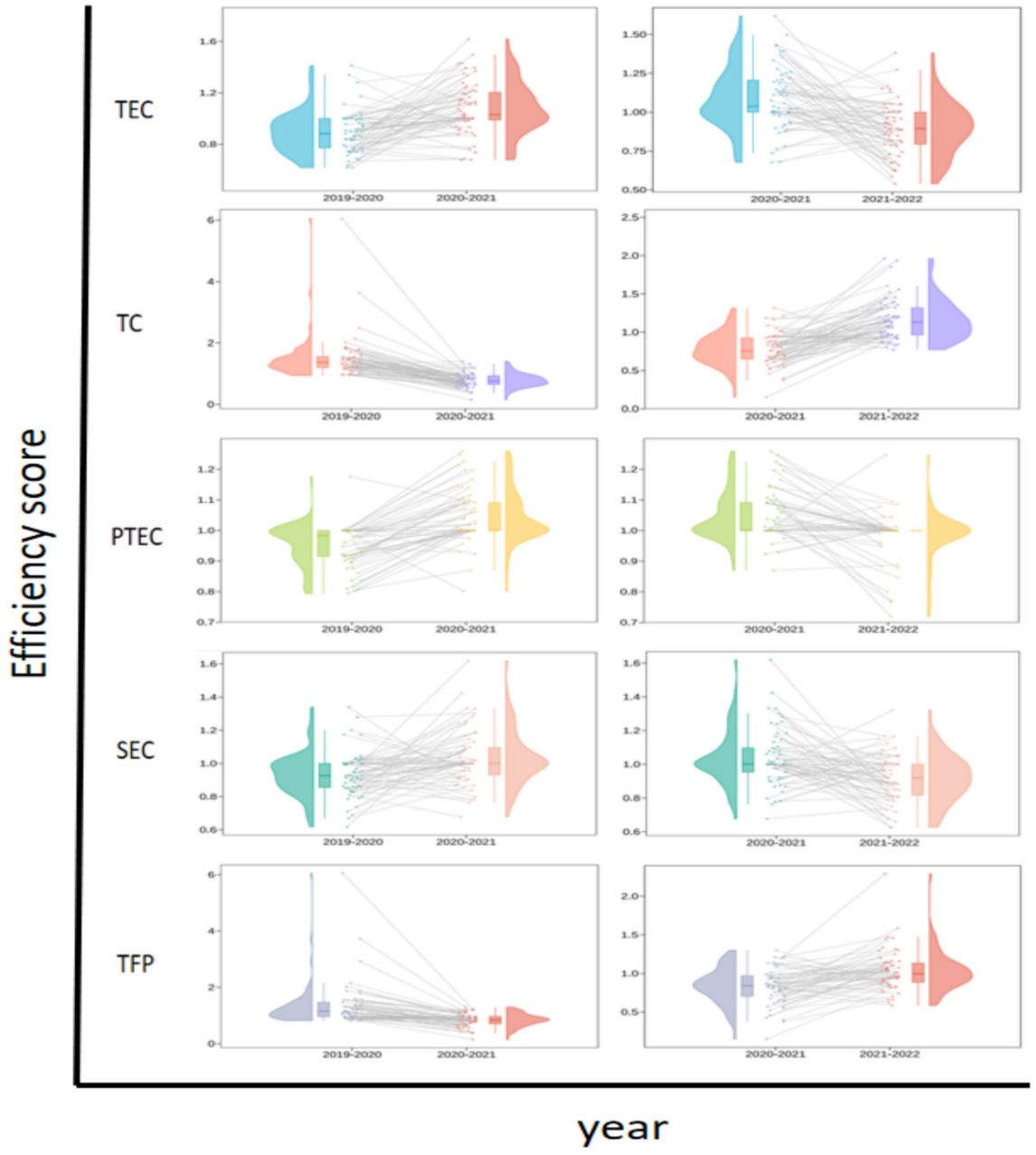

FIGURE 4
Changes in TFP and relative efficiency in secondary tertiary hospitals in Guangxi province from 2019 to 2022.

impact on the operational efficiency of 61 third-level public hospitals in Guangxi. This finding contradicts conventional empirical judgments. Nevertheless, it is important to note that all the sample hospitals included in this study are classified as third-level or above public hospitals in China, and specifically defined as institutions primarily focused on treating complex and challenging diseases and emergencies. Therefore, they need to receive patients with higher treatment difficulty (49). An investigation into the quadruple-level surgery situation of sample hospitals revealed that Hospital H7 consistently had the highest proportion of level 4 surgeries from 2019 to 2022, with ratios of 42.79, 41.71, 37.11 and 41.74%, respectively. The hospital with the lowest proportion was H42 in 2019, with a ratio of 0.05%, while Hospital H58 had the lowest proportion from 2020 to 2022, with ratios of 0.14, 0.42 and 0.37%. In 2019, 2020 and 2022, only Hospital H7 in Guangxi reached the full score value (≥ 40%) for level 4 surgeries as per the "National Performance Assessment Full Mark Value" for tertiary public hospitals. In 2021, however, no hospitals in Guangxi achieved this full score value. This indicates that the patient intake structure of hospitals and their capacity to provide high-difficulty medical services still have room for adjustment. The business expenditure indicator also had a reverse effect on the operational efficiency of sample hospitals. The business activity expenses of hospitals encompass labor wages, fixed asset depreciation, costs of drugs and consumables, official expenses, etc. When controlling business expenditures, hospitals should also abide by national guidelines and reasonably increase personnel expenditures to retain talents. Research data indicate that the hospital

with the highest proportion of personnel expenditures was consistently H6 over the four years, with values of 70.52, 72.05, 74.76 and 74.12%. In 2019, the hospital with the lowest proportion of personnel expenditures was H36, with a ratio of 28.3%. In 2020, the hospital with the lowest proportion of personnel expenditures was H53, with a ratio of 29.51%. Between 2021 and 2022, the hospital with the lowest proportion of personnel expenditures was H35, with ratios of 28.65 and 31.44%, respectively. The number of hospitals failing to reach the "national performance assessment full mark value (38.09%)" for tertiary public hospitals in the four years were 34 (55.74%), 31 (51.67%), 28 (46.67%) and 18 (30.00%), respectively. While the personnel expenditures of various hospitals continued to increase, a significant portion of hospitals remained unable to achieve the full mark value set by the national assessment.

Therefore, hospitals should actively align with the tiered diagnosis and treatment system by adjusting the admission structure for surgical patients and gradually referring common and frequently occurring diseases, as well as patients in the stable or recovery phase, to lower-level medical institutions. They should also progressively lower the proportion of outpatient visits for common ailments at urban tertiary general hospitals. This is aligned with the performance assessment goals for national tertiary public hospitals (27). Meanwhile, hospitals should vigorously develop new technologies and projects, keep enhancing their capacity to provide high-complexity medical services, strengthen their radiating capabilities and improve the quality and level of social services.

5 Limitations

This study has several limitations: First, it only secured data from 2019 to 2022, which is a relatively short period. Nonetheless, the findings remain beneficial to assessing the short-term impact of hospital inefficiency. It is necessary to monitor data over a greater number of years for further validation in the future. Second, the evaluation was confined to tertiary public hospitals, and the authors had no access to data from secondary or primary hospitals. Thus, it is essential to evaluate the operational efficiency of hospitals at other levels in future research. Third, only hospitals in Guangxi were evaluated, which limited the generalizability of the findings. This limitation is common in research, but hospitals from this province were fortunately included in this study. Moreover, the province studied represents the western regions of China in terms of average economic and social development levels. Therefore, the findings remain applicable to public hospitals in the western regions of China.

6 Conclusion

In the present study, the operational efficiency of 61 hospitals in Guangxi was analyzed, and the factors influencing the operational efficiency of hospitals were explored from macro and micro perspectives. The results indicated that tertiary public hospitals in Guangxi have relatively low overall operational efficiency, with most facing the issue of excessive scale expansion. Tobit regression analysis showed that bed size scale, the proportion of discharged patients undergoing surgery, business expenditures and total annual revenue affected hospital operational efficiency to a large extent. Public hospitals should consider the economic conditions of the region while seeking development, and ensure both efficient operation and sustainable development.

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 authors.

Author contributions

JH: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. HY: Conceptualization, Data curation, Formal analysis, Project administration, Resources, Supervision, Validation, Writing – original draft, Writing – review & editing. YW: Conceptualization, Formal analysis, Investigation, Project administration, Software, Validation, Writing – review & editing. HW: Conceptualization, Data curation, Investigation, Methodology, Software, Writing – review & editing. XL: Formal analysis, Investigation, Project administration, Resources, Validation, Writing – review & editing. BW: Data curation, Funding acquisition, Methodology, Resources, Supervision, Visualization, Writing – review & editing. MZ: Conceptualization, Investigation, Methodology, Project administration, Resources, Software, Supervision, Visualization, Writing – review & editing. PZ: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Project administration, Resources, Supervision, Visualization, Writing – review & editing.

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Conflict of interest

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

Generative AI statement

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

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpubh.2025.1546402/full#supplementary-material

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University, social media, and student engagement: the challenge of "trust" in organizational communication. A voice from European university researchers to foster inclusion in higher education

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Background

Since educational institutions have reported higher performances in terms of both students and organizational wellbeing, contemporary academic life has been increasingly boosting communication in multiple ways (Leonardi et al., 2013; Alshuaibi et al., 2018; Zhang et al., 2024). Moreover, the interplay between higher educational context and student engagement seems to promote the connection with positive attitudes, which are required to facilitate the learning process and critical thinking development (Alalwan, 2022; Galindo-Domínguez et al., 2024; Zhang et al., 2023).

Following the comprehensive view painted in a recent study conducted by Pawar (2024), who addressed the most relevant areas for marketing in higher education using social media, we want to chiefly draw attention to the crucial role of organizational management in student engagement through the implementation of digital methodologies. While academics are committed to customizing a consensus about a set of values, practices, and ideas to enhance the organization's identity and the university branding to spread their accountability worldwide (Chowdhury et al., 2023; Pawar, 2024), researchers should invest in communication studies for promoting student evolvement and sense of belonging in learning environments (Alalwan, 2022; Dhanesh et al., 2022; Fabris et al., 2023).

This means to dare, experimenting with new strategies for didactics implementation in the perspective of a stable and effective set of innovative technologies, digital tools, and social media networks, integrated into institutional practices, to foster user engagement and encourage the general audience empowerment with greater interaction in virtual scenarios and digital spaces (Guillory and Sundar, 2014; Taylor and Kent, 2014; Gopika and Rekha, 2023; Young et al., 2020; Capriotti et al., 2024).

The COVID-19 pandemic has disrupted traditional methodologies, and digital communication has become strategic not only to keep alive a worthy public image but also to hold people involved in a community, seeking to provide feelings of safety and consideration: Despite distances and prohibitions, social media have ensured individuals to communicate with families, friends, and peers (Cho et al., 2023). Nowadays, more than half of the global population uses social media, and it happens not just to experience them: People tend to use networks to connect with others as a social need (Brandtzæg and Heim, 2009): Nevertheless, while institutions need to equip themselves properly with the ambition to produce impactful digital storytelling of "what they are" through "what we see," educators and institutional managers have the responsibility to enhance new embedded canals to educate and train students, from schools to universities, exploiting the timeless power of social media platforms (Sanz-Labrador et al., 2021).

In addition to this functional aspect, suppose now the priority for social media platforms is to attract and keep their audience involved and entertained: following this view, institutions sharing content through social media have the same purpose to entertain and engage their communities as partners for building a shared public identity (Ihlen et al., 2011; Dhanesh et al., 2022).

The more people feel they are part of an institution, the more the management can count on them and have the chance to influence new trends. From this perspective, we want to focus on universities, leading the idea that digital community development, interactions between academics and staff through social media, and student engagement promotion are deeply linked and can significantly contribute to improving the sense of a collaborative community in learning contexts (Ansari and Khan, 2020; Lu et al., 2024).

Along with a general agreement on the beneficial effects brought on students by feelings related to a sense of community and inclusion (Allen et al., 2021) and their capacity to lessen disparities and ethnic matters among students during their academic experiences (Gopalan and Brady, 2020), researchers are still debating the most effective way to generate engagement among users and how to measure it (Smith and Gallicano, 2015).

As researchers detecting digital environments within universities, we cannot ignore the relevant key role raised by emotional wellbeing in academic performance and student living: educators have the responsibility to turn the impact of social media's use on everyday life into an innovative path to promote health among students, aiming at a sustainable educational evolution and exploring new tactics to succeed in human progress (Kent and Taylor, 2021; Li, 2022).

Innovating digital solutions for social inclusion

At Palermo University, one of the biggest universities in Italy, we are seeking to investigate students' feelings while managing an institutional official account on social networks: our research team has launched an investigation among students that includes heading, for a scheduled period, a meta business account (Facebook and Instagram) owned by the Department of Psychology, Educational Sciences, and Human Movement (SPPEFF). In line with an experimental approach to the organizational communication plan led by this department, the objective of our research is to measure the feeling of inclusion before and after a period of social network account management.

Organizing and sharing content from an institutional account (SPPEFF Department) of an important institution such as the University of Palermo can be challenging and exciting for students, even if perceived as a task of responsibility. We are committed to involving, within an experimental educational design, persons attending programs from this department, engaging them in the natural process of building the digital identity for our institution under a collaborative view: we understand this could reveal an explosive power in terms of concern and interest. Nevertheless, we are aware that this digital enterprise needs special attention on policy aspects related to privacy and informatics risks; moreover, this experimental editorial plan should be validated and supported by a team of experts based on well-structured rules, scientific rigor, timing, and scope.

The literature has reported some municipalities in Italy that have already experimented with citizen-based management activities for a while, in the framework of specific engagement objectives, and the results were encouraging (Ducci et al., 2019).

The SPPEFF department training offer is characterized by themes referring to psychology, pedagogy, and other person-centered specific educational courses related to the development of knowledge and skills to deal with people throughout the lifespan, from children to adults.

We are confident that digital innovation initiatives led by a research unit in a social media laboratory, where human relationships, care, and trust are considered strategic for developing a fruitful collaboration, will improve not only people's autonomy and academic self-efficacy in students attending the program but also an overall sense of community and inclusivity (Montgomery, 2018; Aldossari, 2023; Alshuaibi et al., 2018; Ansari and Khan, 2020).

Strengthening an innovative institutional communication approach that is student-based, fully immersed in the learning environment, and grounded in loyalty and reliability as the roots of a long-lasting social pact looks to be a sustainable way to progress in organizational communication, influencing an ideal cultural evolution (Whittaker and Montgomery, 2014).

Author contributions

MG: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. FP: Conceptualization, Project administration, Visualization, Writing – review & editing, Supervision. AV: Conceptualization, Visualization, Writing – review & editing. AL: Conceptualization, Supervision, Visualization, Writing – review & editing. AB:

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Psychological first aid for Ukrainian civilians: protocol and reflections on a volunteer international phone-based intervention

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Informal mental healthcare groups often provide telephonic and text-based interventions to support communities affected by natural and man-made disasters. Operating outside formal regulations, these groups offer flexible and innovative care; documenting their practices is crucial for evaluating service quality. This paper presents a protocol of an international, informal Psychological First Aid (PFA) telephone-based initiative and a reflective account from a volunteering therapist. The initiative aimed to support Ukrainian civilians affected by the Russian-Ukrainian war through crisis intervention and resilience-building. Guided by PFA principles, theoretical first aid models, and evidence-based practices, the telephone interventions focused on reducing distress, providing moral support, and restoring functioning. A Russian-speaking therapist assisted 34 Ukrainian civilians, primarily addressing acute stress, anxiety, and panic attacks. Using an autoethnographic approach, this study integrates the therapist's retrospective reflections, cultural context, and professional learning to examine PFA implementation in a crisis setting. Individuals who received telephone-based PFA reported decreased distress and enhanced coping strategies, suggesting effectiveness. The initiative's three-year continuation illustrates its sustainability. The therapist's reflections highlight the importance of professional preparation, shared linguistic and cultural backgrounds, and a sense of purpose in delivering effective support. While limitations include the absence of standardized measures and potential self-selection and volunteer biases, this study demonstrates the feasibility of providing remote psychological first aid to civilians through informal international groups. Critically evaluating practices adopted by these informal organizations is essential for understanding their effectiveness, improving future implementation, and co-creating best practices for crisis intervention and support services that embrace "Care Without Address" models.

KEYWORDS

informal international organizations, Psychological First Aid (PFA), phone-based therapeutic interventions, protocol & guidelines, realist autoethnographic reflective report

1 Introduction

Psychological First Aid (PFA) is an evidence-based approach endorsed by the World Health Organization (WHO) to provide immediate emotional and practical support to individuals experiencing crisis-related distress, including war and displacement (1). Unlike formal psychotherapy, PFA prioritizes stabilization, safety, and connection, helping affected individuals feel supported and guided toward appropriate resources (2). The WHO's Look, Listen, Link framework emphasizes recognizing distress signals, offering compassionate listening, and connecting individuals to further care (1). PFA is particularly critical in war-affected populations, where individuals endure acute trauma, uncertainty, and loss (3). By equipping volunteers and frontline responders with essential crisis intervention skills, PFA plays a crucial role in mitigating immediate distress and fostering resilience, laying the foundation for long-term recovery (4).

The rise of telehealth has revolutionized mental healthcare delivery, enabling innovative, scalable, and accessible interventions, including those based on PFA. This transformation accelerated during the COVID-19 pandemic, shifting traditional, location-based care models toward "Care Without Address" approaches, which prioritize accessibility over physical infrastructure (5). Telehealth has proven particularly valuable in crisis settings where formal mental health services are inaccessible, unaffordable, or unreliable (6). Informal volunteer-based PFA programs operating through digital platforms have pioneered highly adaptable and scalable approaches to emergency psychological support. Documenting and critically evaluating practices adopted by these informal organizations is essential for understanding their effectiveness, improving future implementation, and co-creating best practices for crisis intervention and support services that embrace "Care Without Address" models.

On February 24, 2022, the Russian invasion of Ukraine triggered widespread psychological distress, exacerbating existing mental health vulnerabilities. Ukrainian civilians faced resource shortages, displacement, and profound uncertainty, with many women and children fleeing to western Ukraine and neighboring countries such as Moldova, Poland, and Slovakia (7). Although Ukrainian mental health professionals had prior training in cultural and clinical trauma, addressing the unique complexities of war-related trauma —including displacement, combat exposure, loss, and atrocity— required additional expertise (8). To address longstanding regional needs, especially in Donetsk and Luhansk, the Ukrainian government approved a national mental health reform plan in December 2021 (8). However, just months later, the escalation of conflict damaged healthcare infrastructure, displaced professionals, and further depleted the already limited pool of trauma specialists, creating a critical gap in mental health care (7).

In response, on February 24, 2022, an Israeli social worker mobilized Russian-speaking mental health professionals to provide telephone-based PFA to Ukrainian civilians. Initially, 15 professionals shared their personal phone numbers on Facebook, offering free psychological support via WhatsApp, Viber, and Telegram. This initiative, Increasing Resilience Israeli Support (IRIS), within six weeks expanded to 200 volunteers and has continued operating for the past three years, demonstrating sustainability. In February 2022, more than 50 individuals were contacting IRIS daily for assistance. Between March 1st and December 31st, 2022, a total of 2,505 calls were received. Figure 1 depicts 50 most used words in these requests, illustrating urgency of their needs.

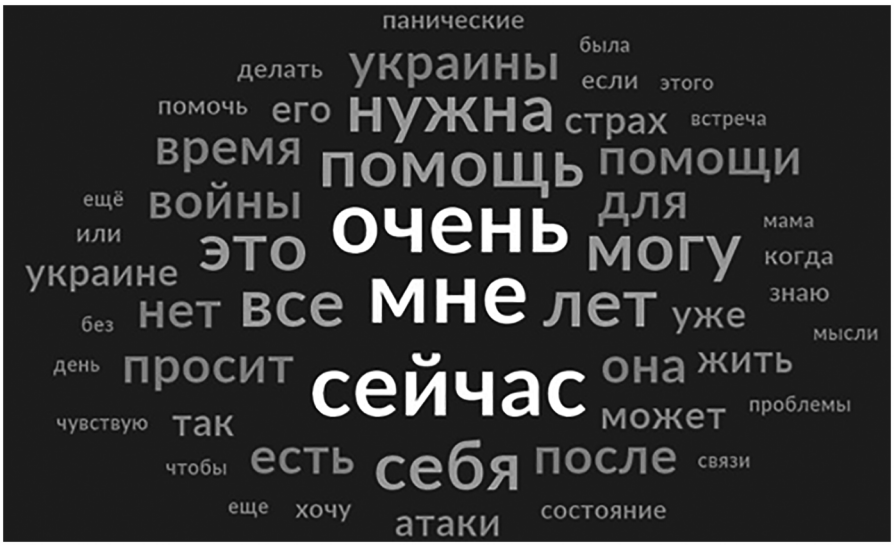

FIGURE 1
Word cloud of 50 most used words (in Russian) in callers' requests received by IRIS between February and December 2022. Most used words: "***очень мне сейчас*** *нужна помощь*" = "***really right now I*** *need help*". Total 2,505 requests were received using a digital intake form by IRIS coordinators between March 1st and December 31st, 2022. The form included a question "What help do you need?" Answers to this question were analyzed using NVivo 1.7.1. Figure depicts a resulting word cloud of 50 most used words.

The purpose of this paper is to leverage experience of an IRIS volunteer to contribute to the development of best practices for crisis intervention and support services that transcend geographic barriers by:

(1) Presenting the protocol of an international informal telephone-based PFA initiative.
(2) Using a realist autoethnographic approach to reflect on its real-world implementation through a volunteer's experience.

Throughout this paper, we use the following terms: "therapists" for all volunteers, irrespective of their formal qualifications, "initiative" for the informal international telehealth-based PFA initiative IRIS, and "callers" for all individuals seeking assistance. All procedures were developed in accordance with recognized PFA guidelines (1, 9) and were approved by the Institutional Ethics Committee of Ben-Gurion University of the Negev.

2 Methods

First, we outline IRIS's objectives, organizational structure, operational procedures, therapeutic approach, and the strategies used to implement this approach through digital platforms. Next, we adopt a realist autoethnographic approach (10–13) to examine the implementation of Psychological First Aid (PFA) in a crisis setting, based on the reflections of a volunteer. This will include a narrative case study of one of the individuals who receive PFA through the initiative, providing a concrete example of how therapeutic strategies were applied and experienced in practice.

Autoethnography combines first-person narrative with cultural analysis (14, 15), aiming to provide an insider's factual account of an organization, a social group, or cultural practice while minimizing the researcher's subjective influence. A *realist* approach to organizational *ethnography* emphasizes objectivity and factual accuracy (12), making it well-suited for evaluating IRIS's operational procedures and therapeutic strategies to inform future implementation of crisis interventions aligned with "Care Without Address" models of social services. The volunteer's long-term engagement provides valuable empirical insights into operational procedures and social practices that are hidden from public view (16). The therapist's reflections on therapeutic models, presented through a narrative case study, offer a deeper understanding of the process of therapy (17). These observations are integrated with a cultural analysis of how the therapist's linguistic and cultural background shaped therapeutic interactions, how shared Soviet and post-Soviet norms facilitated rapport-building, and how prior professional experiences informed the delivery of PFA to war-affected populations.

A realist autoethnographic approach can provide critical insights when more quantitative methods, such as large-scale surveys of volunteers or the administration of standardized distress-assessment instruments before and after an intervention, are not feasible for practical or ethical reasons. Quantitative methods are often limited by logistical constraints, including sample size, access to participants, and the sensitive nature of the context in which crisis interventions occur (11, 18). For instance, in crisis settings, individuals seeking assistance may be experiencing acute psychological distress, making it ethically problematic to subject them to standardized assessments that could exacerbate their symptoms or compromise their willingness to engage with support services (19). Thus, in contexts where quantitative methods are limited by feasibility or ethical concerns, realist autoethnography offers a powerful tool for generating actionable knowledge and informing best practices in crisis intervention.

A narrative case study allows for a detailed exploration of the therapist's subjective experience of interacting with a caller, highlighting how the intervention was conducted, how the therapeutic relationship evolved over time, and how the caller responded to the intervention (20, 21). This approach captures the nuanced emotional and relational dynamics involved in PFA, providing deeper insight into the effectiveness and emotional impact of the intervention (22, 23). Additionally, it helps identify adaptive strategies and challenges encountered during the intervention, offering practical guidance for improving future crisis responses (24, 25). Narrative case studies are particularly effective for examining complex, context-dependent phenomena where human relationships and emotional responses play a central role (22, 23).

3 Protocol for the informal international telephone-based PFA initiative

3.1 Objectives, organizational principles, and therapeutic approach

3.1.1 Objectives

The initiative focused on addressing mental distress and promoting resilience among civilians affected by war. War represents an extreme ordeal that impacts entire populations, causing severe mental distress, including anxiety, depression, fear, anger, and hopelessness among civilians in conflict zones (26). However, individuals coping with the aftermath of war can also demonstrate resilience, with hopefulness being a critical predictor of recovery (27). To foster resilience, therapists prioritized nurturing hope and conveying a steadfast commitment to ongoing support.

3.1.2 Organizational principles

Volunteers were professionals in psychology, psychiatry, social work, or art therapy. Participation was voluntary. Psychological first aid typically consisted of 1–4 sessions per caller. Interventions followed the PFA guidelines aiming to reduce distress, provide moral support, and restore functioning. For cases requiring extended care, callers were referred to local services.

3.1.3 Psychological first aid model

The initiative's therapeutic approach aimed to alleviate mental distress and foster resilience by following Psychological First Aid (PFA) guidelines (1, 9), theoretical first aid models (3, 28–32),

and evidence-based research. It relied on studies indicating that early cognitive-behavioral interventions can prevent PTSD and reduce depressive symptoms (2, 32, 33). Digital interventions, including phone- and internet-based approaches, have also demonstrated effectiveness (34–40). This section briefly summarizes the key PFA models that informed the initiative's protocol.

Hobfoll et al. (3) developed an evidence-based PFA framework, Five Principles, integrating research and expert consensus to establish five core principles for building resilience: (a) promoting a sense of safety; (b) calming the individual; (c) enhancing feelings of capability, self-efficacy, and familial and communal robustness; (d) strengthening beneficial social ties; and (e) creating hope. Hobfoll's COR theory (28), which centers on the preservation and restoration of existing resources to mitigate stress and enhance overall resilience. This model ensures that interventions prioritize conserving and rebuilding personal and environmental resources, thereby preventing resource loss, which can exacerbate stress (28).

Farchi et al. (29, 30) introduced the Six Cs Model—a framework for immediate cognitive psychological first aid —imed at helping an affected individual transition from a state of helplessness and passivity (i.e., the "freeze" response) to a functional and active state shortly after a traumatic event. Six Cs stand for Cognitive Communication, Challenge, Control, Commitment and Continuity. While Hobfoll's COR approach emphasizes psychological stabilization and the conservation of resources, the activation–oriented SIX Cs model encourage individuals to be active and develop effective functioning. It prioritizes Cognitive Communication to diminish emotional overwhelm and bolster cognitive functioning. It introduces a Challenge for active engagement, Control for cognitive management of situations, Commitment from the helper to reduce loneliness, and Continuity to ensure narrative coherence.

Lahad et al. (31) developed the BASIC PH model, which highlights individual differences in preferred coping styles and emphasizes that resilience is strongest when multiple mechanisms are available. The BASIC PH model identifies six coping strategies: Belief (spirituality, meaning-making), Affect (emotional regulation), Social (relationships, support systems), Imagination (creative coping), Cognition (rational problem-solving), and Physiological (body-based strategies like breathing and movement). Lahad's model guides discussions with affected individuals about possible coping strategies and helps them recognize new ways to manage stress.

Ruzek et al. (32) developed the Core Actions model of PFA, which consists of eight key actions: contact and engagement, safety and comfort, stabilization, information gathering, practical assistance, connection with social support, coping support, and linkage to collaborative services. Ruzek's PFA provides a structured intervention focused on reducing immediate distress and promoting active adaptive functioning. Ruzek's model and the BASIC PH model formed the foundation of the initiative's hybrid approach, which combined initial stabilization (calming techniques) with effective coping strategies, ensuring a flexible, holistic intervention tailored to the evolving needs of callers.

3.2 Adaptation for a telehealth setting

The adaptation of PFA models for a virtual setting includes training on ethical concerns (e.g., confidentiality in digital spaces), managing technological barriers, and crisis escalation protocols to ensure safe and effective intervention.

3.2.1 Ethical considerations

The initiative strictly followed ethical principles for the practice of telepsychology and PFA guidelines (1, 41). Confidentiality was ensured by using end-to-end encrypted platforms (WhatsApp, Telegram, Viber). The therapist-maintained session notes, text messages, and reflective journals were stored in password-protected files and restricted-access cloud systems; identifying details were removed.

Cultural considerations played a pivotal role in the initiative's approach, as they are crucial for the appropriate expression of empathy and the development of therapeutic rapport (42). Only Russian and Ukrainian speaking individuals were involved in the initiative. Volunteers with Russian phone numbers (recent immigrants to Israel or other countries) did not contact the callers directly, acknowledging the sensitivity of the situation. They either used their Telegram login or obtained a new non-Russian number. Calls were conducted respecting callers' language and gender preferences. The initiative included therapists experienced in addressing LGBTQ+ concerns. The initiative therapists, all immigrants from former USSR territories, shared with Ukrainian callers preserved over generations elements of Soviet cultural norms (43, 44). For instance, during the first conversations, callers exhibited considerable politeness towards the therapists, even in chaotic situations or while under fire. This politeness reflects ingrained in Soviet norms respect towards professional authority. Soviet culture dictates a restrained display of unpleasant emotions, such as anger or rage, fear and generally discourages expressing these emotions within families to protect loved ones (43). In contrast, anonymous conversations with therapists encouraged openness and candor. One male caller likened this therapeutic relationship to "*meeting a stranger on a train and talking to them about your troubles*," a common phenomenon in Soviet culture.

3.2.2 Technical considerations

Because of the technical limitations during wartime, the initiative prioritized telephone communication, considering it the primary means of contact (45). In case of call interruptions, incomplete sessions were rescheduled via texts. Free applications like WhatsApp, Telegram, or Viber were used to conduct calls and texts. Challenges included issues like poor internet or cellular service, the lack of technological literacy among some callers, and maintaining the pace of interventions (46).

3.2.3 Crisis escalation protocols

All therapists were mental health professionals with training and experience in identifying escalating distress and in providing immediate emotional support and stabilization to callers, using

active listening, maintaining calm communication, and ensuring a sense of safety. The initiative developed relationships and maintained communication channels with local agencies to facilitate follow-up or in person care.

3.3 Volunteer recruitment and training

All PFA volunteers were professionals in psychology, psychiatry, social work, or art therapy, primarily from Israel, but also from the U.S., and several European countries. Recruitment occurred through professional connections and social networks. The initiative's founder, a social worker, interviewed each volunteer to assess credentials and relevant experience. Volunteer participation fluctuated. While 15% (mostly therapists and social workers) remained consistently active throughout 2022, others participated intermittently or for shorter periods, with new recruits added as needed. Caseloads varied—in March 2022, the three busiest therapists handled 45, 30, and 28 calls, while most responded to fewer than 20. This pattern continued, with 15%–20% of therapists taking on the most active roles each month, rotating responsibilities over time.

The initiative prioritized therapists' mental health and training needs, offering expert-led lectures and training. World-renowned trauma specialists conducted sessions 5–6 times a week in early 2022, later shifting to 1–2 times per month. These trainings followed the WHO-based PFA framework, emphasizing trauma-informed communication, cultural competence, and implementation using digital means. Various digital mental health interventions, including mobile apps and computer-based therapy, have proven effective in crisis settings (47). Successful approaches include clinical evaluation, psychoeducation, problem-solving therapy (PST), and cognitive-behavioral therapy (CBT), particularly for anxiety and depression (45). Such interventions also benefit war victims (47), often serving as the only practical means of delivering critical mental health support, including diaphragmatic breathing exercises and techniques for managing intrusive thoughts (18). All therapists received targeted training in these methods.

Clinical supervision and debriefing sessions were held 5–6 times per week via Zoom, covering case consultations, translation support, and resource-sharing. One organizer managed conflict prevention and resolution, fostering a supportive community and maintaining quality care.

3.4 Telephone-based implementation framework

Only end-to-end encrypted platforms (WhatsApp, Telegram, Viber) were used for communication. In the first week, callers contacted therapists directly via personal phone numbers. To streamline operations, a digital request form replaced personal numbers on March 1. Call coordinators assigned numerical codes to requests, shared them with therapists, and therapists selected cases matching their expertise. Each call was assigned to a therapist. Complex cases were assigned to experienced trauma specialists. Coordinators tracked call statuses ("new," "assigned," "repeat," "closed," "no response," "wrong number") and therapist workloads. Of 2,505 calls received between March 1st and December 31st, 2022, 96 callers did not respond to the therapists' attempts to reach them, 13 provided incorrectly formatted phone numbers, and the remaining individuals spoke with a therapist. Therapists aimed to respond to each call on the same day, with a median response time of less than 30 min. Call volume peaked in February 2022 at 50 + calls daily, then declined as Ukraine's mental health infrastructure recovered—averaging 30 in March, 15 in April, 9 in May, and stabilizing at ~5 per day for the rest of 2022. This decline in demand was anticipated, as Ukraine's mental health infrastructure was being rebuilt (48). Figure 2 summarizes call trends between March 1st and May 31st.

3.5 Standard operating procedures

Standard operating procedures followed WHO PFA guidelines, were evidence-based, and adapted to callers' needs (1, 31, 32). Below is the typical intervention structure used by the first author.

3.5.1 Creating an effective empathetic connection

Began with initial text interactions, during which the therapist introduced herself and her role. The callers were given options to choose the preferred day, time, and mode of communication (via call or text) with the therapist. Focusing on developing an empathetic connection, the therapist dedicated complete attention to the callers during these initial interactions. She responded promptly and attentively, respecting and accommodating the individual preferences of each caller.

3.5.2 Ensuring physical safety and a sense of security

Was crucial for many callers, especially as they faced their first wartime encounters with air-raid sirens and bombings. The therapist provided guidance on identifying safe locations nearby—places to seek shelter—and instructed them on appropriate behavior when the air-raid sirens sounded, followed by bombings. Drawing upon her experience living in Israel, where the public is well-versed in handling such situations, she shared verified practical emergency instructions with the callers.

3.5.3 Initial collection of patient background information

Began with questions about the callers age, location, and who was present with them. They were then asked to identify their most pressing concerns and describe their current conditions and behaviors. Recording these responses was pivotal for identifying immediate needs and tailoring personalized interventions. Moreover, engaging the callers in this dialogue allowed them to "connect fragmented sequences" and organize their thoughts (49). This therapeutic approach demands flexibility and common sense from the therapist, who must exercise situational judgment regarding the questions asked and the amount of information gathered.

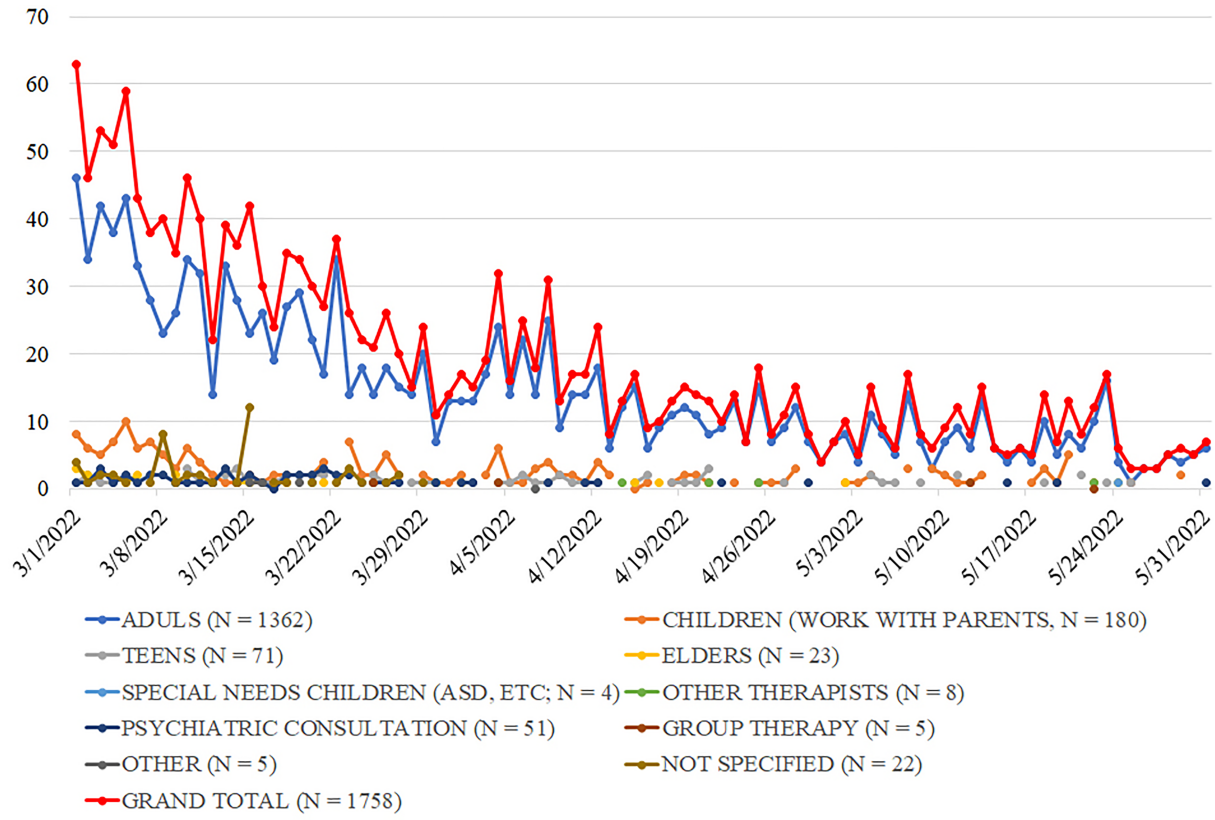

FIGURE 2
Call trends between march 1st and May 31st.

3.5.4 Calming the callers and providing practical solutions to their problems

Most callers were experiencing acute stress and mental distress. Employing normalization techniques, grounding methods, and addressing immediate concerns proved highly effective in reducing distress (32). Callers were reassured that their reactions were normal, natural, and expected given the circumstances. The therapist alleviated their fear of going crazy by attributing the distress to the initiators of the war, explaining that it was they who did not act rationally and humanly. Additionally, breathing exercises and grounding techniques were taught to alleviate distress and induce calmness. Next, the therapist assisted the callers in pinpointing their primary immediate problems or concerns, discussing possible practical solutions, including specific actions.

For example, some callers sought assistance in managing feelings of anger or rage, emotions they had not experienced before the war. Following the normalization step, the therapist discussed acceptable methods for expressing anger that would be less harmful to both the callers and their loved ones. Various options were considered, including creative outlets like writing a letter to Russian President to express anger. Other callers struggled with extreme anxiety and experienced autonomic symptoms, such as shaky hands and a racing pulse, during sirens. The therapist instructed them on how to seek refuge in nearby safe spaces and taught gradual exposure techniques to desensitize to siren sounds. Each caller, following a session that included skill-building exercises, received a written summary outlining the tools and approaches discussed.

3.5.5 Connecting to strengths and enhancing capabilities

Involved asking the callers about their methods of managing previous life crises, identifying their sources of support and previously used coping strategies. This component aimed to access sources of resilience that had been successful in the past. Talking about these past successes also helped to enhance callers' sense of capability, to strengthen their ability to manage their lives, and to reshape their self-image toward more positive.

3.5.6 Providing information about available resources and new coping techniques

In this phase, the therapist introduced coping strategies once the caller felt calm, acknowledged their reactions as normal, and was ready to engage. The goal was to identify and implement the most suitable strategies. BASIC Ph model (31), which has been shown to be effective in Israel and other countries, was adapted to support Ukrainian citizens. The model was introduced to callers in Russian, guiding them through its various components and familiarizing them with a range of resources and coping strategies.

This approach empowered callers to select strategies most relevant to their personal circumstances, thereby expanding their coping toolkit. After the session, the caller received a written summary for reference. While many callers had relied on social support and cognitive strategies before the war, they found techniques like breathing exercises and grounding methods more effective in the wartime context. These simple, practical exercises were well-suited for those confined at home. The discussion then shifted to establishing a daily routine incorporating self-care and supporting others—such as family, elderly neighbors, or wounded soldiers—fostering empowerment, control, and well-being.

3.5.7 Conveying commitment to support

Unlike a typical therapy session that upholds a degree of professional neutrality, providing psychological assistance to Ukrainian civilians represents "a stance of solidarity," showcasing the therapist's alignment and cooperation with the suffering of "the other" (50). In each session, the therapist conveyed a reassuring message: "*I'm here with you and will remain as long as you need me*." At the session's conclusion, the therapist praised the callers' personal strength and courage, expressed confidence in the resilience of the Ukrainian nation, and offered follow-up sessions to continue support, monitor well-being, and assess the callers' utilization of new resources and coping strategies. For complex cases, efforts were made to arrange extended support with professional therapists in Ukraine or their current place of residence.

4 Reflective report on volunteer experience

Quantitative and empirical evidence on the impact of early PFA remains scarce. The primary challenge is that immediate support for crisis-affected populations takes priority, making structured research protocols impractical. This is especially true for informal groups like IRIS, which emerge spontaneously in response to urgent needs. Therefore, we examine the use and impact of PFA delivered through this international, telephone-based initiative qualitatively, using realist autoethnographic retrospective reflective report from an IRIS therapist.

4.1 Therapist's background

The first author, a trained educational psychologist fluent in Russian, specializes in psychological first aid for war victims. During the first three months of the war, she received 34 calls from Ukrainians—30 women (including patient K, described below) and four men. All callers were over 18, most under 42, with the eldest being 72. Primary concerns included acute stress, anxiety, and panic attacks. Some struggled to stay composed during sirens and explosions, feeling out of control and experiencing autonomic symptoms (e.g., shaky hands, racing heartbeat). Others were in shock, unable to accept their reality, fearing for their sanity. Many felt extreme anger, sometimes directed at family, while others faced helplessness, indecision, and loneliness. Some grappled with whether to stay home or seek refuge.

Drawing on her experience working with conflict-affected populations in southern Israel, the therapist conducted 1–7 sessions per caller, focusing on distress reduction, empowerment, and effective coping strategies. Interventions ended once callers successfully applied coping techniques or were referred to local resources. The first author reflects:

> "Intensive prior training and work experience in a stress center during times of security threats have allowed me to become familiar with effective actions and techniques for providing psychological first aid. I found the Core Actions of the PFA approach and the BASIC Ph model to be the optimal and most efficient approaches for working with individuals affected by stress."

4.2 Narrative case study

A woman in her fifties, we call her K, contacted the initiative at the end of May 2022. At the time, she stayed in Kiev with relatives. Originally, she was from Mariupol, a city that was under siege by the Russian Army and that suffered heavy bombing attacks for about three months. In her digital intake questionnaire, K wrote that she does not know how she can go on living. She shared that she suffered emotion distress and difficulties coping with painful memories. She functioned daily (taking care of her sister's baby).

The therapist held four phone sessions with K. During the first session, after introducing herself, the therapist asked K to share her story and discuss her concerns. K detailed her life in the besieged city. Before the war, she held a senior management position, lived in a high-rise apartment building, and served as the condo association president. As the war started, her city faced heavy bombardment, leaving residents without basic utilities like electricity and water, leading to cold and starvation. K spoke passionately about her deep sense of responsibility towards her neighbors. She recalled how, with the help of the Ukrainian military, she arranged for a huge tanker truck to deliver water to the residents. Then, she organized delivery of wooden planks to the condo residents, allowing them to build fire for warmth and boiling water. She also recalled a story of a young boy who lived in her condo and who was wounded in a bombing attack. The young woman, a professional nurse, fainted after she saw the boy's injuries and could not treat him. So, K was the only one left to help the boy. Despite the city's intense bombardments and numerous casualties, K remarked, "No one in my condo lost their lives; we all survived." The therapist listened attentively, acknowledged the difficulty of K's experiences, and then reviewed the extraordinary events. She told K that her story revealed K's many triumphs. K expressed surprise. So, the therapist elaborated K's achievements, that included not losing her wits while treating the wounded boy and effectively caring for the condo's residents.

While the therapist's reframing of K's story did not change any of the facts, it enabled K to see her experiences from a more positive perspective.

The first author reflects:

> "Establishing positive short-term therapeutic connections quickly during telephonic intervention required therapists to demonstrate attentive listening, empathetic expression, and the ability to create a sense of solidarity with the callers. Providing psychological assistance to Ukrainian citizens fundamentally represented 'taking a stand of solidarity,' reflected in the therapist's emotional attunement and shared connection with' the suffering of the other' (50). During each session, the caller was reassured with the following statement: "I'm with you and will stay with you as long as you need me. We support Ukraine."

The second session focused on K's emotional well-being. K described distressing memories that caused her pain, and anxiety. To alleviate her distress, the therapist utilized emotional normalization techniques. Emphasizing that such thoughts and feelings were common reactions to extraordinary circumstances, the therapist guided K in using her body as an anchor to manage distress. During the session, they practiced various techniques together. This involved breathing and grounding exercises, identifying the bodily sensations, and self-hugging. Additionally, they explored a self-distraction technique for releasing painful memories, reciting verses from a beloved song, and using calming personal affirmations, such as: "Now I'm in a safer place!' The therapist also guided K in recognizing automatic negative thoughts and memories, suggesting a deliberate choice not to dwell on them all day. Instead, the therapist introduced the concept of allocating a specific, limited time slot—no more than 30 min—dedicated to addressing these thoughts. This technique, known as "scheduling time to worry," enhances one's ability to manage automatic negative thoughts, providing relief from persistent preoccupation throughout the day (36).

The first author reflects:

> "The callers' culture expected them to restrain emotional expressions of anger, rage, fear, and pain, viewing such emotions as negative or undesirable. Initially, I focused on normalizing these emotions in order to acknowledge and accept them, fostering a sense of safety. Only after the caller felt secure did I introduce strategies for channeling negative emotions in a constructive manner."

During the third session, the therapist and K explored further methods of handling distressing thoughts and memories. They discussed various approaches, including sharing her thoughts with family members, or addressing them during therapy sessions. The therapist introduced the BASIC Ph model and discussed its relevance to K's experiences. They also focused on identifying enjoyable daily activities for K, such as cooking, baking, or knitting items for her family. The therapist encouraged K to allocate dedicated time in her daily routine for these activities.

The first author reflects:

> "Since 2009, I have used the BASIC Ph model to provide Psychological First Aid (PFA) to patients experiencing security-related stress. This model has proven effective with a diverse range of patients, including children—through the use of drawings—and adults, in both face-to-face and telephone-based interventions. The model helps patients identify effective coping mechanisms, become aware of their existing strengths, expand their coping strategies, regain functioning, and feel more secure. Similarly, K. was surprised and pleased to discover effective coping methods within herself, as well as to recognize and adopt new ones, such as physiological coping strategies like relaxation breathing and grounding techniques."

During the fourth and final session, K talked about her successful experience to discuss painful memories with her family members and sought reassurance if it was acceptable. The therapist offered encouragement, affirming that whichever method K chose was acceptable. Towards the end of this session, the therapist suggested a long-term care service in Ukraine to assist with managing traumatic distress. Towards the conclusion of the session, K expressed her belief that she could overcome her condition and eventually resume a somewhat normal life.

The first author reflects:

> "Over the course of four sessions, I felt a warm and open connection develop between us. K spoke openly, received recommendations, examined them, and chose those that suited her. She mentioned that during these sessions, she 'felt my hand that did not let her sink, that kept her afloat.' I, too, felt warmth and closeness toward her, as well as an appreciation for her strengths. It was important to me that after the terrorist attack in Israel, she reached out to me with concern for my well-being and words of support. I valued and understood that she was truly okay."

Given the circumstances, no standardized distress-assessing instruments were administered before and after the intervention. In such cases, comparing pre- and post-intervention subjective self-assessments of overall functioning, proficiency in diverse coping skills, and readiness to seek further help when needed is recommended (32). K's self-assessment progressed from "*I do not know how 1 can go on living*" to "*I believe I can overcome my challenges and will eventually return to a somewhat normal life*," indicating the intervention's effectiveness. This impression was affirmed during a subsequent follow-up call initiated by the therapist several months later. During this call, K conveyed that she had followed the therapist's advice and had sought long term therapy. She expressed feeling more organized in her life and eagerly anticipated the arrival of spring and Ukraine's victory in the war, despite neither having occurred yet. Nevertheless, she remained confident that both would eventually come. At the end

of the call, she asked the therapist to record and share her story with the world.

4.3 Reflection on strengths and challenges

Psychological First Aid (PFA) is widely recognized as a "do no harm" approach to providing immediate support in the aftermath of a crisis (1). The first author did not encounter any instances where the intervention caused harm to those receiving assistance. All therapists involved in the initiative were mental health professionals, with formal academic training and professional experience that prepared them to deliver PFA. Many had prior experience providing PFA in various trauma contexts, enabling them to effectively transfer their skills to the telephone-based setting.

Callers reported reduced distress, enhanced sense of safety, strengthened social connections, and raised hope. A key aspect of remote PFA delivery was assisting callers in reconnecting with people in their social circles or identifying trusted individuals with whom they felt comfortable speaking, as such conversations could be soothing. Additionally, therapists helped individuals access support centers and local resources. The initiative developed relationships with volunteers and support centers in multiple cities across Ukraine, allowing therapists to provide callers with phone numbers and addresses for assistance. After stabilizing individuals emotionally, therapists explored ways in which callers could assist vulnerable community members, such as elderly neighbors, children, or injured soldiers. Encouraging active participation in helping others reinforced self-efficacy and restored a sense of control. The first author reflects:

> "Two key factors enable providing effective PFA remotely. First factor was an exceptional professional preparation for delivering PFA, based both on prior experience and on ongoing training and peer support. The second was the shared linguistic and cultural background rooted in Soviet and post-Soviet norms, which facilitated rapport between therapists—many of whom had immigrated to Israel from the Soviet Union—and Ukrainian callers."

> "Research has documented the slow evolution and preservation of cultural norms over several generations, including in immigrant communities and post-soviet states (43). For instance, Soviet and post-Soviet norms emphasize controlling negative emotional expressions. As a result, callers often found it difficult to speak openly with family members about painful emotions, fearing they might cause distress or burden their loved ones (43). However, conversations with Israeli therapists provided a different dynamic. Callers were able to disclose personal experiences early in the interaction, contributing significantly to the establishment of strong rapport. The anonymity of remote intervention appeared to foster greater openness and honesty."

> "Another expression of Soviet norms emerged during initial interactions. Even in crisis situations—sometimes under fire—callers responded with notable politeness when I introduced myself. While such courtesy is not typically characteristic of people in crisis, it reflects the deeply ingrained Soviet and post-Soviet value of showing respect to professional authorities. Additionally, Soviet norms often discourage the open expression of negative emotions such as anger or rage within families to protect loved ones (43). When callers expressed distress over experiencing intense outbursts of anger—unfamiliar to them before the war—I focused first on normalizing and validating these emotions to foster a sense of safety. Only after the caller felt secure were strategies introduced to channel anger constructively, ensuring minimal harm to themselves and others."

However, while fluency in Russian facilitated communication, it also presented challenges. Some callers refused to engage in therapy in the language of their invaders, requiring referral to Ukrainian-speaking therapists, when available. This delayed assistance and, in some cases, increased initial mistrust.

Additional challenges arose in occupied cities, where maintaining communication was difficult. Callers often could not speak on the phone due to safety concerns, requiring therapists to rely on written communication, which complicated interventions. These individuals often needed more extensive support. The first author reflects:

> "One young woman from an occupied city in southern Ukraine initially focused on concerns about her parents, grandparents, and younger siblings. Her written communication extended over seven sessions (rather than the typical three to four) before she felt comfortable discussing her own emotional state."

4.4 Learning and professional growth

The outbreak of war in Ukraine was a deeply shocking and painful event for many immigrants from the former USSR, leaving them feeling paralyzed and powerless. The first author reflects:

> "The news of the war's onset in Ukraine was a heavy and painful shock for me. I have lived in Israel for 30 years but was born and raised in the Soviet Union. It felt as though I were under bombardment alongside the frightened and suffering people. Photographs of tanks on snow-covered fields and the familiar names of cities where air raid sirens sounded stirred up family memories of the Second World War, intensifying the pain."

> "Interestingly, in this situation, I experienced and observed a shift in my personal and professional identity—from a psychological Israeli identity to that of an immigrant from the former Soviet Union. I felt a strong sense of obligation to assist those affected. With extensive experience and

> professional training in providing psychological first aid during wartime, I realized I could not remain passive—I had to do something to help the suffering people. But what could I do from afar?"

Volunteering with the initiative provided a sense of purpose and empowerment, helping many to cope with personal distress. During the first months of the initiative, daily supervision sessions played a pivotal role in therapists' success and well-being. For instance, in a session with Dr. Mendelson, therapists reflected on how the war evoked memories of World War II. They discussed the concept of "intergenerational transmission of trauma" and how volunteering in crisis intervention helped them process both personal distress and their families' historical memories of war.

Additionally, the combination of intensive training, supervision, and hands-on work with war-affected individuals significantly accelerated professional growth, particularly during the early months of the war.

4.5 Areas for improvement

The initiative never formally advertised its services. Therapists reached out to people in need largely via Facebook. Many callers learned about the initiative through their friends who already received assistance. Investing time and effort in promoting the visibility of the initiative could have helped reaching out to more people. Further training opportunities could enhance therapists' skills, particularly in navigating linguistic barriers and managing complex cases remotely. Expanding language accessibility and ensuring faster matching of callers to appropriate therapists could reduce delays in crisis response.

4.6 Limitations

This study has several important limitations. First, due to the exigencies of wartime, findings rely on subjective unstructured self-reports and observational data, limiting the ability to conduct a formal efficacy evaluation. Additionally, selection bias may be present, as only individuals who actively sought help were included, potentially excluding those in greatest need who lacked access or willingness to engage. Furthermore, volunteer bias may affect the findings—the IRIS initiative was volunteer-driven, which may limit the generalizability of results to formal crisis intervention programs. Finally, the shared linguistic and cultural background between therapists and callers likely facilitated rapport, meaning these findings may not extend to populations without similar common ground.

5 Conclusion

The implementation of Psychological First Aid (PFA) within an international, volunteer-based initiative utilizing digital platforms demonstrates the feasibility of delivering effective mental health support beyond traditional healthcare infrastructures. IRIS has continued operating for 3 years, demonstrating sustainability of the adopted protocol. But the critical role of international telephone-based groups during times of crises, including wars, is illustrated by the extremely high volume of calls, received during the first days of the escalated conflict—more than 50 a day. Recall that these calls were made to complete strangers, not associated with any formally accredited mental health group, living in a different country thousands of miles away, and advertising themselves on Facebook that is commonly perceived as a source of misinformation (51). The IRIS experience underscores the urgent need to develop social services "without address" (5) that transcend geographic limitations and provide crisis intervention in settings where local formal care is inaccessible.

Several studies have examined the implementation of Ruzek et al.'s Core Actions in telehealth settings, demonstrating that this PFA model can be effectively delivered through digital means (52, 53). Of these, Ching et al. (54) most closely align with the present study, describing a pilot remote mental health support program in which an international group of seven volunteers from England provided assistance to six young adults affected by the 2020 ammonium nitrate explosion in Beirut, Lebanon. While Ching et al. found the intervention largely successful, they noted that its capacity for outreach and delivery was limited due to its pilot nature and reliance on volunteers (p. 3). In contrast, the IRIS experience demonstrates that an informal international volunteer group can be scaled up to reach thousands in need and sustain operations for three years.

Informal international mental health groups can play a crucial role in bridging gaps within overburdened healthcare systems, particularly during large-scale crises. However, this also presents regulatory challenges, highlighting the need for regulatory frameworks that balance urgency and accessibility with ethical considerations and professional oversight. Critical evaluation of practices adopted by these informal organizations is essential for understanding their effectiveness, improving future implementation, and co-creating best practices for formal crisis intervention and support social services that embrace "Care Without Address" models.

By situating our study within the broader context of co-creating future social services, we highlight the importance of balancing top-down service structures with community engagement in addressing both local and global challenges. Co-creation methodologies enable practitioners, service users, and policy-makers to collectively envision and design offerings that not only respond to emerging community needs but also tap into the expertise and experiences of diverse groups—such as immigrant communities—who can contribute invaluable insights for improving well-being in their countries of origin. The web serves as a crucial connecting network between cultures, bridging geographical distances and empowering communities to share knowledge, collaborate effectively, and bolster mutual support (55). Marginalized groups can benefit significantly from these interconnections, as digital platforms and cross-border collaborations offer new avenues for resource-sharing, advocacy, and mutual support that might otherwise be difficult to access (56). This empowerment process benefits both the host country and home communities, illustrating

how knowledge transfer and collaboration can span boundaries. Moreover, the collaborative and participatory nature of co-creation fosters mutual learning, ensures diverse perspectives are integrated, and helps develop more inclusive and sustainable service models. Ultimately, by grounding our work in these principles, we contribute to the evolution of forward-thinking service ecosystems that remain agile and responsive to rapidly changing realities at local, national, and global levels.

Future research should focus on standardized assessments, explore diverse cultural contexts, and examine the long-term sustainability and efficacy of informal telehealth PFA initiatives in crisis settings.

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 humans were approved by Institutional Review Board of Ben-Gurion University of the Negev. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

YS: Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing, Investigation, Methodology, Project administration. HP: Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing, Visualization. OS: Conceptualization, Supervision, Writing – original draft, Writing – review & editing.

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

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Communication patterns and adaptation in maintaining academic culture among women leaders: a study of symbols and rituals at the University of Lampung (2023–2024)

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The communication pattern of the University of Lampung's rector for 2023–2024 is noteworthy, portraying a distinct knowledge framework. Two critical issues arise, namely, (1) the recurrent decline in institutional performance during leadership transitions at Unila, and (2) corruption scandals encompassing university leaders in 2022. To address these issues, the current work adopted a cultural communication perspective. Peters suggested that communication can be identified through various messages, events, and behaviors. Data were collected using a constructive research method, primarily through intensive interviews. Study identified three key communication patterns. First, the rector introduced the slogan "Be Strong," initially launched without adequate socialization, symbolizing resilience and institutional recovery amidst challenges. Second, drawing from Carey's ritual communication perspective, the focus was on internal dynamics to foster a strong academic community. Third, while leadership communication lacks a robust application of symbols and rituals, it demonstrates efforts to preserve academic culture. These patterns highlight the leader's adaptive strategies in navigating challenges and fostering acceptance and trust within the academic community.

KEYWORDS

academic culture, adaptation, "Be Strong", resilience, University of Lampung

Introduction

For a female leader, assuming office typically entails navigating two significant challenges: (1) gaining acceptance in a masculine environment that prioritizes speed and strength; and (2) successfully fulfilling her leadership responsibilities, even within a university context. Consequently, the present research on communication and academic culture aims at exploring the perspectives of the rector and leadership officials at the University of Lampung (Unila) Indonesia during their tenure from 2023 to 2024. The rationale for this research stems from Unila's vision and mission to secure a position among Indonesia's top 10 universities by 2025. Nonetheless, several obstacles persist: (a) a consistent decline in Unila's ranking with each leadership transition (Trenggono, Karomani, Wardhani, and Sulistyarini, 2021), and (b) a corruption case encompassing Unila's leaders in 2022, which significantly damaged the university's reputation (theconversation.com, 2022).

The academic culture at Unila has evolved since 1998 through three leadership periods: 1998–2007, 2007–2015, and 2015–2019. These eras established Unila as either a research university or a

teaching university, both contributing positively to its ranking (Trenggono, Karomani, Wardhani, and Sulistyarini, 2021). During the 2019–2023 period, Unila achieved significant milestones, ranking among Indonesia's top 10 universities. Nevertheless, the 2022 corruption scandal severely impacted its performance and rankings (Profil Unila, 2024). On January 18, 2023, a new rector was appointed and initiated a recovery process under the slogan "Be Strong." This work specifically examines the rector's communication patterns in preserving academic culture during her first year in office, from 2023 to 2024.

The Minister of Education has emphasized that university rankings are designed to encourage Indonesian universities to attain global standards. To support this goal, the Ministry offers endowment funds for research at Indonesia's leading universities. According to Webometrics 2020.1.1, which evaluates universities based on presence, impact, openness, and excellence, Unila ranked 28th nationally and 3438th globally. Nonetheless, the July 2023 Webometrics report exhibits a decline, with Unila slipping to the 34th position among Indonesian universities (Profil Unila, 2024).

Other ranking data also reflect a downward trend:

- World University Rankings 2021 (14th), 2022 (20th), 2023 (14th), and 2024 (16th);
- Webometrics Rankings 2021 (10th), 2022 (10th), 2023 (13th), and 2024 (17th); and
- Scimago Institutions Rankings 2021 (10th), 2022 (16th), 2023 (9th), and 2024 (15th).

In light of these challenges, this research addresses the following questions:

1. How did Unila's rector build communication strategies to restore the university's reputation during her first year in office?
2. How did the rector's communication patterns contribute to preserving the academic culture during this period?

This research seeks to achieve understanding by interpreting the meanings surrounding events from the perspectives of the individuals involved. The approach assumes that every social situation is underpinned by a network of meanings created through communication. The research does not aim to track institutional developments but rather to comprehend how communication addresses institutional challenges. Insights from this study are anticipated to inform strategies for institutional growth and the achievement shared objectives.

Perspective

According to Edgar H. Schein, organizational culture is defined as follows: "A pattern of shared basic assumptions developed by a group as it addressed challenges of external adaptation and internal integration proven effective, enough to be considered valid and, thus taught to new members as the appropriate way to perceive, think, and respond to those challenges."

This definition encompasses three cultural levels:

- Surface level (artifacts): This includes tangible elements such as technological designs, language, artistic products, and visible behaviors or rituals.
- Standardized values (espoused values): These represent leaders' proposed solutions to organizational challenges, encompassing ideas, attitudes, and actions.
- Deepest level (basic assumptions): These are, espoused values that value become unconsciously accepted as truths within the organization (Schein, 1992).

Kotter and Hesket (1992) distinguished between visible and invisible organizational culture (Kotter and Hesket, 1992). Similarly, Stephen W. Littlejohn explained that both the visible and invisible aspects of culture can be observed through symbols (Littlejohn, 1996; Natalya, 2018). Research on basic assumptions and visible values has been conducted in the Strategic Industry Management Agency (Trenggono, 1995). Additionally, Irena and Rusfian (2019), and Herminingsih (2011), explored the positive influence of transformational leadership on performance, engagement, adaptability, and organizational mission achievement.

Concerning leadership communication, the current research employs the existential feminism perspective initiated by Jean-Paul Sartre and Simone de Beauvoir. In *The Second Sex*, de Beauvoir described the position of women and the challenges they face in attaining self-identity. She also proposed four strategies for women to equalize themselves with men. (1) working outside the home to establish themselves as subjects; (2) becoming intellectuals to attain equality with men; (3) working toward societal transformation to exert broad influence; and (4) rejecting the perception of women as "the other," highlighting women as subjects, Aizid, (2024). Research on forms of women's existence commonly involves activities such as working, pursuing intellectual roles, rejecting subordination, and becoming influential figures (Azzahra, 2022). The existential view of women is supported by the philosophical horizons of Sartre, Kierkegaard, Nietzsche, Camus, and de Beauvoir (Patel and Sharma, 2022). Current studies have highlighted that women worldwide still suffer from male dominance and economic dependence (Albtoush, 2020).

The initial step of this research employs James W. Carey's ritual communication approach. The ritual perspective predates the transmission model of communication. In ritual communication, terms such as sharing, participation, fellowship, association, and collective belief replace the notion of transmitting information. This perspective is not aimed at overwhelming the public space with information but at maintaining societal cohesion over time. Moreover, it emphasizes not the act of conveying information but the representation of shared beliefs. The essence of the ritual perspective lies not in the transmission of information but in the construction and preservation of order, cultural meaning, and social norms, which serve as mechanisms for control and frameworks for human behavior (Carey, 1989).

Carey affirmed that, communication processes represent, maintain, adapt, and share the beliefs of a society during its time. In this context, communication serves as a process that cultivates societal transformation, encompassing sharing, participation, association, fellowship, and the cultivation of mutual trust. The concept of rituals involves two key aspects: meaning and religious connotations. The connection to religion highlights activities such as ceremonies and the processes that shape shared beliefs (Carey, 1989).

The theoretical framework for this research develops by incorporating the existential feminist perspective previously discussed

and subsequently utilizing the resilience communication approach. The application of resilience communication theory is particularly relevant, considering that Unila faced the COVID-19 pandemic in 2020 and leadership corruption in 2022. According to Wikipedia, resilience refers to the ability to adapt and remain steadfast during challenging situations (Reivich and Shatte, 2002; Resiliensi, 2025).

The Editor of the *Harvard Business Review* (Ovans, 2015) defines resilience as the capacity to recover from setbacks, adapt effectively to change, and persist through adversity (Gusfa, 2023). Resilience theory provides an essential framework for understanding how individuals, small groups, organizations, and communities collectively find meaning, resolve uncertainties, and respond to crises. When addressing organizational crises, three primary objectives are pursued: (1) prioritizing the restoration of balance; (2) establishing a new equilibrium through revised processes and policies; and (3) integrating both approaches (Seeger et al., 2024). Research on resilience theory, particularly in the context of communication activities, examines the adaptive capacities of nonprofit networks. The findings confirm that formal structures offer conditions conducive to organizing informal and adaptive activities (Doerfel et al., 2022).

Research on the role of emotions in female leadership can be classified into two perspectives: emotions as strength and emotions as weakness. Singh examined the relationship between gender, leadership, and emotions using bibliometric analysis and the Theory Context Characteristics Methods. Their findings identified two key themes: the emotional expression and emotional competence of women in leadership and career development (Singh et al., 2023). This study aligns with Karl Weick's notion that organizations are ongoing processes of organizing, where structures is shaped by interrelated communication behaviors (Pace and Faules, 2000).

Method

The current work is constructive or interpretative in nature. The Hegel method underscores understanding individuals, institutions, actions, or individual work styles as documents, manifestations, or expressions of a larger morphological unit (meaning) underlying the data. Meanwhile, Max Weber viewed individuals as carriers of meaningful behavior. Concepts such as values, institutions, symbols, rituals, and others represent distinct categories of human interaction and communication. Drawing on Weber's perspective, this study aims at translating these concepts into actions or communication that can be understood. Weber referred to his perspective as interpretative or understanding sociology (Weber, 2006). Therefore, this research method is in accordance with Charmaz's approach, namely constructivist grounded theory. In this case, researchers and informants mutually construct meaning (co-construction) during data collection and analysis (Charmaz, 2014: 32–34).

Data collection was conducted through in-depth interviews. The questionnaire employed in this work was semi-structured, meaning that the questions were organized according to general categories created beforehand. Nonetheless, in practice, during in-depth interviews, questions within each category could be freely developed to obtain abundant and varied data (Johnson, 2002).

The in-depth interviews seek to undertake the following: (a) to seek deeper information and understanding; (b) to offer insights beyond general explanations; (c) to uncover deeper assumptions, practices, and interests of the individuals being examined; and (d) to allow for capturing and articulating various perspectives, views, and meanings of distinct activities, events, and specific cultural objects (Fontana and Frey, 1994).

This research began by analyzing the slogan "Be Strong," not from a cognitive dimension, but as a study of *verstehen* (Weber), seeking to understand experiences, capture interlevel or inner life (Dilthey), immerse in the mental world, and position the researcher within the subjects' perspective. The interviews targeted Unila's leaders and officials, who are also academics fulfilling the *Tri Dharma* functions of teaching, research, and community service. The research activities were assisted by eight interviewers tasked with conducting in-depth interviews with 16 key informants. These informants encompassed university leaders (five informants), deans (eight informants), heads of institutions (two informants), and heads of technical implementation units (one informant).

The key informants interviewed involved the following: the Rector for the 2023–2027 period, inaugurated on January 18, 2023; four Vice Rectors for the 2023–2027 period; the Head of the Institute for Research and Community Service; The Head of the Institute for Learning Development and Quality Assurance; eight Faculty Deans; and six Head of the Technical Implementation Unit for Information and Communication Technology. Considering the busy schedules and availability of the key informants, the in-depth interviews were conducted in two stages. The first stage took place from August 15 to August 30, 2024, while the second stage occurred from September 1 to September 15, 2024.

Results and discussion

Time utilization

The current study initially focuses on time management for completing daily tasks. Although holding leadership roles within the university, faculties, or institutions, individuals retain their status as lecturers with full responsibility for fulfilling the Tridharma of higher education: teaching, research, and community service. Academics who hold structural roles such as Rector, Vice Rector, Dean, Chair/Head of Institutions, and Heads of Technical Implementing Units (UPT) fundamentally remain lecturers, educators, researchers, and community servants. These structural roles are essentially supplementary duties.

Nonetheless, in practice, these additional roles demand additional time, focus, and performance. Consequently, much of their daily work time is allocated to these supplementary tasks, generally referred to as administrative or leadership duties. Most of their time is spent on these additional responsibilities. Despite these obligations, structural officials must still perform their Tridharma duties. They are required to teach, conduct research, and offer community services. This results in additional time being spent on structural roles while reducing time for academic functions. As per regulations, work hours are from 8:00 AM to 4:00 PM. Nevertheless, time dedicated to Tridharma activities may decrease due to additional responsibilities that come with holding structural positions. Consequently, officials commonly extend their work hours until 6:00 or 7:00 PM daily.

Lecturers with extensive experience in leadership roles or a progression of structural positions tend to manage their time more

efficiently. They are familiar with the scope of work and the tasks at hand. For instance, a lecturer appointed as Dean previously served as Vice Dean. Thus, when taking on the role of Dean, they already understand the nature of the job, its challenges, and problem-solving strategies, and the planning and budgeting processes. As faculty leaders, they primarily coordinate the responsibilities of the Vice Dean and delegate tasks to the faculty staff.

As lecturers, the use of time differs before and after taking on additional duties. The workload is broader compared with prior roles, encompassing technical and administrative issues. University officials must sign performance agreements with the Rector, report monthly, and coordinate all activities. In addition to their mandatory responsibilities, they also participate in university events such as new student admissions, anniversary celebrations, and graduation ceremonies.

Structural tasks within the university are not new. The initial focus is on reviewing the planning set by previous officials, strategic plans, and organizational work guidelines. Discussions with staff regarding planned activities and program execution follow. Learning from predecessors' practices and identifying ineffective measures for improvement are crucial. Communication plays a crucial role in, ensuring a clear understanding of priorities.

In fulfilling core duties as lecturers, such as teaching, seminars, and supervising student final projects, schedules can be organized efficiently. The Rector emphasizes that leadership roles are supplementary tasks assigned to lecturers, with primary teaching duties remaining the priority. Balancing teaching and leadership responsibilities enables tasks to be completed effectively, encompassing team teaching and supervising students. Clear agreements and organized schedules facilitate task completion. Post-pandemic, in-person interactions are preferred, for both meetings and teaching, with online tools like Zoom employed only when necessary. While technology aids in overcoming obstacles, face-to-face interactions are prioritized. For teaching or meetings that encounter scheduling conflicts, adjustments are made, and online tools are utilized as a last resort.

Communication with leaders is primarily conducted in-person, through direct meetings or coordination sessions. Zoom meetings are employed when direct meetings are impossible. Familiarity with such technology facilitates communication. Additionally, the corruption case has led to increased caution in organizational operations, creating a tense atmosphere. This, combined with the pressures of responsibilities and workloads, underscores the significance of synergy, collaboration, and teamwork to streamline work processes and attain desired outcomes.

The assertion made by the rector on various formal and informal occasions that officials in the university environment are basically a lecturer who is given additional duties, is a "low profile" attitude in contrast to previous university officials who were "high profile" in terms of scientific fields. However, communication performance is an organizational politics behavior created to strengthen the understanding of the current leadership that prioritizes "simplicity," which also justifies the new leadership adaptation pattern to the university environment which is mostly senior officials. Officials in the university environment displaying a "humble" attitude together is an improvisation that runs within the organization, strengthening the fellowship, not owned by the leaders as individuals.

This perspective of communication performance as culture was proposed by Pacanowsky and O'Donnell-Trujillo (2009). Communication performance is interactional, contextual, occurs in episodes, and is improvisational, a process that happens as it happens, happens according to its composition and is always undergoing improvement. There is flexibility in how a communication episode occurs, and although the same communication performance will occur again, it is never repeated in exactly the same way and runs continuously (Littlejohn, 1989). This is in accordance with Weick's organizational studies approach, that organizations as organizing, structures as communication activities, or structures are more determined by interlocking behaviors (Pace and Faules, 2000).

Symbolic communication

The initial concept for "Be Strong" as a slogan or symbol originated during the rector election process. A team was formed to design the vision, mission, and programs for Lusmeilia Afriani, a candidate for the position of Rector at the University of Lampung (Unila). During internal discussions, it was highlighted that from 2020 to 2022, the COVID-19 pandemic severely impacted normal activities due to the widespread virus and its fatal consequences. Consequently, work-from-home policies were implemented for lecturers and administrative staff, with university services being conducted online. This encompassed lectures, thesis consultations, and academic administrative services.

After the pandemic subsided, Unila faced turbulence on August 20, 2022, when the Rector, Vice Rector I, and the Senate Chair were arrested on corruption charges related to illegal monetary solicitations from the parents of prospective medical students through independent selection channels. This incident significantly damaged Unila's reputation nationally, especially within the Ministry of Education and Culture and the Directorate General of Higher Education. Consequently, Unila found itself in a state of disarray, struggling to regain its standing.

On Indonesia's Independence Day, August 17, 2022, the government introduced the slogan "Recover Faster, Rise Stronger" to address the impact of the pandemic. Inspired by this, Unila adopted the phrase "Be Strong" to signify recovery and resilience. An informant remarked, "We must be strong, unyielding, and resilient; we must rise and truly become strong."

The team agreed that "Be Strong" is not solely a slogan but a representation of Unila's vision, mission, and programs encompassing essential values that must be implemented. The breakdown of the acronym is as follows: The letter "B" stands for business, finance, investment, and assets. Unila has the potential to advance its status as a state-owned legal entity university, becoming independent. The university's financial strength is not solely dependent on tuition fees; it also involves owning enterprises, developing investments, utilizing assets, and fostering effective financial management. The letter "E" represents the empowerment of human resources. As of 2024, Unila has a significant workforce comprising 1,405 lecturers, 1,136 administrative staff—encompassing 392 civil servants, 731 non-civil servants, and 13 government employees under contract—and a student population of 48,720. These resources are continuously being enhanced in quality.

The letter "S" stands for services for community, underscoring the spirit of service and community dedication. The letter "T" signifies teaching, aligning with the university's Tridharma principles. Additionally, the letter "R" is for research; and the letter "O" represents

organizational partnership. Here, the rector emphasizes the concept of helix collaboration. The letter "N" refers to network infrastructure, emphasizing Internet-based technological networks. Lastly, the letter "G" stands for governance, risk management, and compliance.

Under the rector's leadership, the use of time indirectly encourages the leadership team to work beyond the standard working hours. Time management is adjusted according to the type of work and tasks being performed. This reflects the expression of the slogan "Be Strong." The emergence of the "Be Strong" text is not merely a slogan, but a way to become stronger after the corruption event involving previous leaders. During its formulation, the founders felt that it would be a waste if "Be Strong" were to remain only as a symbol. Thus, an acronym was created for each letter of "Be Strong," aligning with the university's vision, mission, and programs, and reflecting the desire to rebuild and restore the institution's integrity after the challenging events.

"Be Strong" represents the rector or the mindset imparted by the rector. All the values are outlined in the strategic plan. The values of "Be Strong" have been implemented since and have been running throughout 2023–2024. Naturally, these values continue to be refined, thereby becoming a binding force, as "Be Strong" acts as a binding template that builds emotions and a shared mindset. Moreover, "Be Strong" is internalized into the entire academic community. The strength referred to here is the ability to adapt in various situations. Integrity is upheld, as an institution with strong integrity gains the trust various groups, facilitating the development of partnerships. In the implementation of Tridharma, "Be Strong" serves as a foundation that cannot be easily influenced or pressured by external parties.

Currently, the leadership team is fostering a penthelix collaboration between the university, government, and industry. This collaboration pattern also refutes the external perception that Unila's leadership is more focused on internal matters. While internal communication is indeed strengthened, it is carried out done in stages by under the rector's guidance. The rector actively promotes open communication as widely as possible. This is implemented through making frequent visits to faculties to listen to complaints, suggestions, and feedback. Both formal and informal communication methods are employed ensuring that there are no barriers to conveying aspirations.

In vision 2025, Unila aims to become one of the top 10 universities in Indonesia, serving as a driving force continuous quality improvement. According to the rector, the "top 10" vision is just a number utilized as a benchmark. She also emphasized that the most significant aspects to optimize quality and achievements. A vision is a goal to be achieved strive for and it to make it work, a big dream is needed. A big dream requires big hopes and, strong spirit, and it cannot move forward without significant actions.

The values embedded in "Be Strong" were transformed into guidelines for the rector, vice rectors, deans, and other structural elements leaders implement. In life, the recovery process through "Be Strong" necessitates thoughtful planning. Thus, over the course of a year, the rector has consistently led meetings, coordination sessions, or limited leadership meetings to implement "Be Strong." Hence, working hours often extend beyond the scheduled time, and Saturdays are frequently used to completing outstanding tasks. The meetings and communication between the vice rectors are intense.

"Be Strong" embodies core values to prepare Unila to become a world-class university. The initiative began by integrating "Be Strong" into the Unila logo. This requires that every work unit, form administration to smaller entities like faculties and technical service units, display the logo prominently. It is featured in the rectorate building, open spaces, workrooms, uniforms, official work attire, and all areas associated with university activities. "Be Strong" becomes a symbol that directs Unila toward becoming an independent university. "Be Strong" is derived from English, but it also represents the rector's vision, mission, and work programs. Its values stem from the capacities already possessed and are reinforced to build a more independent university based on the power of scientific knowledge and innovation. Previous incidents, such as corruption, were attributed to individual errors, rather than systemic flaws, through the principle of "Be Strong," measures are in place to ensure such mistakes are not repeated, as an individual mistake can disrupt the institution's existence.

The rector has invariably emphasized that the university must keep moving forward toward improvement, because to become better, strength is required. "Be Strong" has two meanings: first, as the English phrase meaning strong, and second, as an acronym for the vision, mission, and programs, meaning that the campus must have self-sustaining income, with financial sources not solely dependent on student tuition fees. The university's business should have the characteristics of a university, such as research results, collaborations among lecturers, and student innovations. All these should be integrated into the university's business. If the business grows, then Unila can elevate its status to become an independent university. The rector's perspective prioritizes focuses on more advanced programs; and university trends must always show exhibit progress. "Be Strong," which signifies constant strength, must also be flexible to change, as change is the only constant. The strength of the entire academic community is necessary to become a better higher education institution. Unila must practice cooperation, loyalty, and work together to become greater in the present and future.

A motto reflects the unique character of a university, shaped through its faculties and academic culture. Unila is on its way toward being on par with major universities in Indonesia or entering the world-class level. Progress is already visible, with gradual improvements at the national and international levels. The "Be Strong" symbol has a meaning that aligns with the changing times. The slogan "Be Strong" is written and expressed to mark a distinguishing feature. Just as Universitas Gadjah Mada is represented by the elephant, (symbolyzing the source of knowledge), Unila is defined by "Be Strong." This slogan elaborates its values with measurable parameters.

It is hoped that at least in Sumatra, Unila will become a respected university, achieving the same level of success as major universities in Java. Interest in enrolling Unila is currently high attracting applicants from Java, Sumatra, and Lampung. Unila is essentially a national university institution in Lampung, a promising public university for the future. Thus, the academic community—lecturers, students, and staff—should not only recognize the meaning of "Be Strong" but also manifest its values in their daily activities. "Be Strong" should be displayed in the implementation of Tridharma, making it better, stronger, more advanced, and superior to previous standards.

The "Be Strong" text is prominently displayed in the second-floor meeting room of the rectorate as a background. The "Be Strong" symbol is presented in various locations around the university in, outdoor media, and is promoted with distinctive lettering. Additionally, when posing for group photos, the "Be Strong" symbol is marked by clenched fists. Previously, the "Be Strong" style was not

recognized; and the formal style was more common. However, the "Be Strong" style has now become customary.

The "Be Strong" slogan serves as a source of spirit and motivation. It can now be felt collectively. In this environment, the academic community strengthens and motivates each other to enhance performance. There is a spirit to encourage oneself and colleagues. This spirit is also present in Tridharma activities—teaching, research, and community services—where the "Be Strong" spirit should be embedded. Research activities are framed around the "Be Strong" theme. Research assignment schemes and results reinforce the "Be Strong" goal. While the interpretation of "Be Strong" may differ across faculties or fields of study, they all lead toward the same goal. Research and community service activities are inspired by the values of "Be Strong." In teaching, the values of "Be Strong" are considered to inspire learning and teaching practices. Thus, the values contained in "Be Strong" truly permeate Unila's Tridharma activities.

From all the explanations in the symbol communication section, it can be further elaborated that the presence of female candidates in the competition for the election of the Rector of Unila for the 2023–2027 period confirms the validity of the existential feminism perspective. In terms of the four strategies carried out so that women have equal bargaining value with a male-dominated environment, namely (1) working outside the home so that women become subjects; (2) becoming intellectuals so that women are equal to men; (3) working for the purpose of transforming society to have a broad influence on their environment; and (4) rejecting the perception that women are "the other," but women are subjects (de Beauvoir in Nafila, 2022; Rizem, 2024). The communication strategy of the Rector of Unila to reject the perception of women as "the other" is interesting, because it is done symbolically and is not directly related to her position or interests as rector.

The slogan "Be Strong" is directly introduced as a new ritual in every activity held at Unila. Usually after an activity is completed, a group photo session is opened and all participants make a fist with their right hand as a symbol of strength. The meaning instilled and understood by the members of the organization, that the photo or video scene together was carried out symbolically marking the emergence of revival, recovery, strength, and optimism after experiencing the COVID-19 virus pandemic (2020–2022) and corruption committed by the old rector (2022).

Do not stop at the slogan "Be Strong," the rector spurred the improvement of all rectorate building spaces, institutions, faculties, technical implementation units, student affairs, and beautifying the university environment such as auditoriums, parks, roads, and lakes marked by the slogan "Be Strong". Thus, all academicians and employees of Unila can feel the changes and comfort in their working environment. All elements of university leaders and officials who carry out activities outside the university must be stated as representing the interests of the institution, not representing the rector. The rector's communication strategy expressed in three communication patterns, namely the slogan "Be Strong," the construction of building spaces, parks, roads and the environment, as well as all outside activities as a representation of the interests of the institution; in a long time process is actually part of the communication strategy of creating a new balance under the leadership of the rector (Seeger et al., 2024). The rector embodies patterns of adaptation so as to create resilience of organizational sustainability and stable leadership legitimacy.

Ritual communication

In terms of rituals, each leadership period typically has its own policies or ritual practices. The way to recover is a ritual performed to restore dignity and honor that may have been diminished and this ritual is not difficult. The practices conducted can be consistent if supported by a team, trust, empowerment, goals, measurable outcomes, and support. In various rituals, the rector tends to emphasize togetherness, the family spirit, and mutual reminders to maintain commitment and integrity. This is repeatedly stressed to the leadership team. It is also emphasized that officials are lecturers who receive supplementary responsibilities. Hence, emerging issues are addressed through deliberation, discussion, and collective consideration, with the issues viewed from a broader perspective to find the best solution for each issue that arises.

In terms of ritual, the rector has a distinctive practice in leadership. One practice is making various visits across all faculties at Unila. Surprise visits are conducted intensively to build rapport with lecturers, educational staff, and students. This approach is crucial because it makes problem-solving easier when issues merge. These visits are not confined to lecture days; they extend to religious holidays, such as Halal bi Halal (an event for mutual forgiveness during Islamic holidays), during which rector visits various faculties. Beyond regular meetings with all faculties, the rector also visits external campuses, encompassing the Panglima Polim campus, the Metro campus, and the Way Kanan campus. These visits are part of the rector's efforts to emotionally connect with and foster a sense of togetherness among all members of the university.

In addition to formal approaches, informal communication is conducted, as formal communication is conducted by existing norms. Informal communication is considered effective in creating emotional connections within leadership team. Another ritual involves development. The visible outcomes of development are seen in campus improvements, such as building renovations, enhanced garden, flower pots, sidewalk ornaments, and the refreshed of office spaces. These enhancements also encompass the maintenance of facilities to create a better, more beautiful, and comfortable campus environment. Development is implemented in stages, with various rules in place. Improvements are made to boost work enthusiasm and public service.

Unila maintains external relationships and collaborations. External communication is consistently conducted, particularly with stakeholders, encompassing the provincial, city, and district governments, as well as the private sector. Unila has obtained a land grant of 150 hectares in the Kota Baru area. The rector's main resource for conducting out activities and planning initiatives is communication. Any obstacles are communicated through purposeful messages, both internally and externally. The rector's emotional competence is demonstrated through his decisiveness in removing one of the vice rectors who was deemed to have committed a fundamental violation, as well as a personal failure in understanding the nature of their leadership role as a lecturer with supplementary duties.

In internal communication, it has been underscored from the beginning that when dealing with campus issues or agenda, there should be no miscommunication or failure in delivering necessary information. A sincere effort must be made to communicate essential information. Likewise, communication is not limited to verbal discussions alone. All methods of communication must

be implemented, including encompassing correspondence and the use of media, all of which must be carried out proportionally. The fundamental nature of communication is essential, therefore every organizational structure should foster communication to ensure effectiveness.

Messages must be delivered to their intended recipients. To prevent any obstacles. To create consensus, everyone must position themselves within the appropriate communication framework. A professional attitude is reflected through proportional communication. Proportionality does not mean identical treatment for everyone, but rather an approach that is appropriate and meets mutual agreement. Thus, individuals should avoid excessive or insufficient behavior, striving for a balanced approach. Similarly, external communication tends to follow the same principle. The rector invariably represents Unila in maintaining communication, particularly with stakeholders, and the public, which typically becomes an arena for public opinion. Advocacy, education, and other related sectors are handled with the utmost professionalism. Universities or faculties have many relationships, and numerous require communication, leading to collaboration. Collaboration must be facilitated through communication. The rector's principle is to sustain a continuous upward trend in performance, focusing on ongoing improvement rather than merely aiming focusing for higher rankings for the university.

Both internal and external communication, are essential. Prioritizing only internal communication would hinder the institution's ability strengthen itself. Hence, internal communication is crucial because it optimizes the internal environment, unifies the vision, and outlines how the next steps will be developed, such as how the faculties will be formatted. To support internal communication, external communication is also significant. Neither aspect should be neglected and both are essential to communication. Hence, the slogan "Be Strong" can be defined as synergy and collaboration toward outstanding innovation. Synergy within and collaboration outside. Synergy facilities communication within the campus, while collaboration focusses on communication and cooperation with external parties. Hence, synergy and collaboration cannot be separated.

Symbols are necessary to strengthen the institution. "Be Strong" is an acronym that represents academic performance. While the points of value are not meant to be memorized, the spirit behind them is felt and can be developed into solutions to attain the institution's great ambitious only about strength. Hence, the slogan is not only about strength, but also a symbol that is applied to make Unila better than before. The values contained in it are very remarkably if they are translated into actions at lower levels, becoming activities that integrate into the academic community, encompassing students, in maintaining the academic culture.

The values of "Be Strong" have already been ingrained in campus life, but they have not been clearly defined. It contains new things, primarily in terms of emerging terminology. The values contained in the Tridharma have been practiced before. Its governance starts with regulations derived from laws, government regulations, presidential regulations, ministerial regulations, and finally rector regulations. Campus life grows and develops in line with the basic assumptions and the values of "Be Strong."

Currently, there are innovations. First, there are more opportunities to actualize oneself. This does not mean that there were none before, but now numerous young generations are beginning to take leadership positions in faculties, institutions, and work units. Second, the international atmosphere that has been dreamed of is being actively realized. The leadership has initiated international collaborations, creating an atmosphere of international cooperation. Student mobility activities have been realized. There are opportunities for both faculty and students to go abroad and study the dynamics of education. The leadership has actively participated in several international forums, encompassing faculties and institutions, so that the international atmosphere continues to grow. International accreditation certificates are attained through the synchronization of local values. Building renovations have not eliminated ethnic touches. Facilities are built with international acceptability. Faculty buildings, such as classrooms, are now on par with those in foreign universities, yet local ethnic ornaments are still displayed.

Communication between the dean and rector is progressing well. This is because the dean's programs are a translation of the programs developed by the university, and their alignment has been significant. Several forms of communication are conducted, such as university leadership meetings attended by the dean and vice deans. Additionally, there are coordination meetings and reports that are periodically requested by the university, both from the rectorate and from institutions. Thus, the communication is felt, even though not everything is optimal yet. Nonetheless, the communication is meaningful and beneficial, and it already meets the necessary standards. It continuous to evolve and improve over time.

Unila is a large university, a large organization, and as such a coordinating activities can be challenging. Coordination is focused on key points that help solve problems effectively. For instance, if an issue must be resolved at the faculty level, it is concretely solved at the faculty level. If there are issues that should be coordinated at the university level, they will definitely be addressed. Policies to be implemented by the university leadership: including the rector and vice rectors, are guided by an established chain of command. This structure flows from the rector to the dean, from the dean to the vice dean, and from the vice rector to the vice dean. Furthermore, internal communication is intended to build organizational solidarity. External communication must be conducted for institutional development, as the institution cannot develop on its own. At the city level, coordination with the city government is required and at the provincial level, communication with the provincial government is essential, as well as communication with other institutions. Internal consolidation is significant, as is external communication. After the internal organizational development is completed, communication with external parties is developed, highlighting the message that Unila wants to become a world-class campus. Thus, things that cannot be implemented alone will gain support from external parties.

Over the past year, the "Be Strong" campaign has been attempted to reinforce these values. Whenever activities are held, it is invariably expressed, mentioned, and exhibited so the faculty and work unit staff understand it. Likewise, from the leadership's perspective, these values are not something new. It is just that now the scope must be applied more broadly. The rector's leadership pattern as a female leader has its own strengths, with more attention to detail. In terms of values, there is more sensitivity and the campus infrastructure is also more vibrant. At the next level, positions are also filled by women, such as the vice rector, deans, and other institutions.

Internal communication has become more intensive. This is intended to build togetherness, in addition to communication through technological applications. Direct meetings are more frequently conducted through meetings. External communication by the rector is already running, particularly in building closer relations with provincial and local governments. Unila is always invariably invited to attend provincial or city events and Unila has obtained land grants from the provincial government. Several grants have also been provided to faculties from both the city and provincial governments.

Organizational management has been enhanced previously, there was no term such as integrity zone or corruption-free area. Now, this is being promoted. Previously, only one faculty was given responsibility now, all faculties are involved. This is a significant improvement in governance. Additionally, services have also been optimized. Higher education services are not only academic services but also services related to promotions or promotions for lecturers, which have also become better. In terms of communication patterns, it is now much better. In addition to direct communication, through meetings or invitations to meetings, technology is also employed. Quick coordination is facilitated utilizing applications between the university leadership and faculties. Moreover, it can employed for broader purposes, such as socialization activities.

At the leadership level, the dominant communication pattern is not dominated by one person but is collective and collegial. When something must to be decided, the leadership and the relevant work units are involved. Decisions are not made by one person alone, but through collegiality. The consequence is that all members of the organization or institution must also participate in providing their opinions and understanding. All resources must understand must to be done or decided. The strength lies in collegiality and togetherness. When the collective collegial culture runs well, everyone has an understanding based on agreement. If only one person makes the decision, while others do not fully comprehend the issues, then the internalization of that decision's understanding will not reach the lowest levels.

As the leader of the university, the rector, has demonstrated strong communication skills. While the rector holds the highest position in the structure, she not only acts as a leader but also as a lecturer who fosters communication the academic staff. The rector has practiced building relationships and communication. Furthermore, as a lecturer, she is diligent in responding to invitations from anyone, not only from the leadership but also from other lecturers or anyone else who extends an invitation. The rector also takes the time to attend meetings and forums, truly dedicating time to creating communication and togetherness. This is one way to convey messages, particularly encouraging everyone to work together to build the institution. The rector typically attends meetings because she understands that communication and the frequency of interactions are key to the success of the work. If there is no face-to-face meeting, discussion, or sharing of thoughts, then misunderstandings or miscommunication could arise.

The rector's leadership style encompasses the entire leadership team, officials, lecturers, and staff in the activities and daily operations. While the process is implemented out in stages within the organizational structure, particularly in decision-making, communication is conducted by encouraging feedback. The rector maintains a balanced relationship and ensures that her presence is felt. Her activities are arranged in such a way that she is invariably occupied with external events, hence communication with subordinates is preserved.

Leadership meetings have become one of the key intensive rituals practiced by the rector at Unila. These meetings also include coordination meetings. In a hierarchical manner, the rector and the vice rectors coordinate with institutions and technical implementing units. Consequently, structured communication flows within the hierarchy. Overall, leadership meetings are an essential ritual that is regularly conducted every month. If any urgent matters arise that need coordination or resolution, a leadership meeting will be held immediately. The involvement of lecturers in then leadership meetings emerges not only in forums but also through internet technology applications. Thus, both formal and informal communication are practiced consistently. The leadership meetings follow patterns: limited and expanded. Nonetheless, the expanded leadership meeting, encompassing departments, deans, vice deans, institutions, and technical units, is the employed model. This pattern is like how corporate failures and scandals in the UK are addressed using compassionate leadership by developing a dynamic meeting culture in large companies (Villiers, 2019: 253–278).

The rector's leadership style does not favor particular individuals. Anyone with an interest, whether for discussion, conversation, or share their thoughts, is always invariably weel-supported. The rector is willing to listen, although the final decision remains at her discretion. Nonetheless, it is understood that decisions should be made collectively with other leaders, so hence the decision-making process, the rector is open to listening and considering other's perspectives. This is a pattern of open communication demonstrated as a leader. This communication style is evident in the relationship between the rector and the lecturers. In her relationship with the administrative staff, the rector is typically seen on Fridays, touring the campus, observing the situation and environment, and visiting places that need enhancement, such as gardens or walkways. Thus, she is not confined to her desk but actively engages in the field, assessing the need to elevate the campus environment. Furthermore, the rector's communication lies in her willingness to get directly involved, engage in conversation, and listen firsthand, rather than merely accepting information based on reports and trusting them. The rector verifies the accuracy of the information in reports by checking things in the field herself. If there are certain issues, the makes tries to personally observe and ensure everything is functioning properly. If negative issues arise, then she investigates the truth behind them, searching for and identifying the root causes. This approach prevents misunderstandings and quickly leads to solutions.

The description of ritual activities during the one-year leadership of the rector of Unila further strengthens the truth of the resilience theory of leaders who are shown to be different from previous university leaders. Resilience is interpreted as the ability to rise from setbacks, adapt well to change, and keep moving in difficult situations (Gusfa, 2023). Studies on resilience theory are based on communication activities that test the adaptive capacity of nonprofit networks, showing the results that formal structures create conditions for organizing informal activities that are adaptive (Doerfel et al., 2022). In this case, unlike the previous rectors who tended to use masculine power through rhetoric, speeches, and words; the existence of the rector as a female leader emphasizes her "presence" in various ritual activities, both in official and unofficial meeting forums.

Leadership meetings are expanded to solve daily problems openly and run objectively, as it is.

Unila Rector, after being inaugurated (January 18, 2023), the first activity carried out was a friendly meeting with retirees, namely lecturers and employees who had served at the university. Shortly thereafter, a friendly meeting was held with journalists of the Unila network. The Rector made official and unofficial visits to all faculties in Unila, as well as institutions and technical implementation units. Every flag ceremony requires all participants to wear traditional clothes. Every commemoration of Indonesia's independence on August 17, a long red and white flag parade is held around the campus area. In the holy month of Ramadan, a joint breakfasting is held in each faculty. The rector develops leadership meetings not limited to the rectorate leadership, but expanded with deans, heads of institutions, and technical implementation units. The rector often visits Unila campuses outside the city. The Rector collaborates to make Unila a University of Nationality in instilling national values and the unitary state. It has been two years running that in January an awarding event was held for all academicians, employees, and parties who have contributed to developing Unila. And, the rector is always present when a member of the Unila family dies or is hit by a disaster. And, important university agendas always present former rectors and old rectors who are familiar with the nickname "senior rectors."

Communication in achieving vision

Unila's vision for 2025 is "to be one of the top 10 best universities in Indonesia." In this context, the rectors leadership over the period 1998–2019 (last revision) are prioritizing internationalization, where international accreditation becomes a crucial measure for achieving the "top 10" vision. Internationalization encompasses collaborations with foreign institutions and the achievement of globally recognized quality standards. The focus on international accreditation reflects the university's efforts to align with ever-evolving global educational standards. It also signifies that the university has reached world-class standards, allowing its graduates to be more competitive in the international job market. In comparison, in Russia, the effort to elevate universities to world-class status is part of a national program (Pusbnykh et al., 2021).

The objective in the "top 10" has been declared at both the university and faculty levels. This demonstrates that, at the very least, attaining the vision requires maximum performance. To attain such remarkable achievements, collaboration is key. Each unit and faculty is committed to realizing the collaboration necessary to achieve the institution's vision. There is a belief that the vision can be achieved. While the realization of collaboration and expectations has not been fully met, it is at least moving closer to the "top 10" vision. Currently, there have been many accomplishments, and international recognition programs have already taken place, such as students participating in competitions held by universities in the United States and winning first place. Achievements and progress toward the "top 10" ranking continue to be made and enhanced.

To achieve the "top 10" status, there must be an awareness of performance gaps. Solutions must be found to address shortcomings or boost the components of the organization that are still weak. The primary business of higher education institutions is academic activity or building an academic culture. Thus, academic achievements and culture must stand out. Students must maintain their intellectual attitudes and thinking. When participating in competitions, it should be in line with strengthening intellectual capacity and academic performance. International programs should prioritize intellectual activities. Unlike other organizations, the academic community—comprising students, faculty, or the campus—should have intellectual excellence that can be a source of pride. This kind of optimism is certainly achievable.

In terms of academic culture, positive practices have already emerged. The rector actively provides motivation while also attaining key performance indicators. Achieving these indicators represents a new practice and simultaneously implements the "Be Strong" values related to accreditation assessments. Thus, accreditation, as a new practice, will offer appreciation and success for institutions that achieve outstanding accreditation. International competitions attended by faculty and students are valuable recognition for the university and faculties. Likewise, student mobility programs and various international activities encompassing faculty and students are part of this new cultural practice. In this regard, the university and faculties allocate budgets to participate in international activities. Unila continues to race toward achieving national and international rankings.

As a public university, Unila operates under the Ministry of Education, Culture, Research, Technology, and Higher Education, which sets performance targets through performance contracts. These targets primarily prioritize key performance indicators (KPIs), which guide the work of structural leadership. A specific additional target that has been set is the international accreditation. To maintain the performance required to reach this goal, supplementary time and effort are required, although the process is carefully planned and managed. Achieving the KPIs and attaining excellent international accreditation require extra work hours or overtime.

The vision of being in the "top 10" ranking stimulates all elements—students, academic staff, faculty, and structural leaders—to highlight efforts to achieve this goal. When examining rankings like Web of Science and Webometrics, Unila's position has declined. This is due to various variables that must be enhanced to reach a higher rank. Despite this, in other rankings, Unila has performed well, although it has not yet reached the "top ten" ranking. Regionally, in Sumatra, it ranks as the third-best university, with excellent governance ratings, which is a significant achievement.

At the national level, in the Ministry's rankings, Unila has not yet broken into the top10 ranking. Nevertheless, when considering various factors, the top 10 can be seen differently. While Unila has not made the national top 10 overall, it is already in the top 10 among state universities with public service agency status. Universities are categorized into clusters, with those being independent legal entities at the highest level, followed by public service agencies and working units. In its strategic plan, Unila aims at achieving the "top 10" status by 2025. Several indicators are employed to measure progress toward this goal. While some indicators have already been met, others will be realized by 2025. The global ranking may have declined, but specific KPIs are already in the "top 10," which indicates success. Unila has obtained recognition as a "National University" alongside five other public universities. Nevertheless, some indicators are still being worked on to meet the full target, and these areas will require continued effort to strengthen and improve.

A new indicator has emerged—the maturity index, which measures the level of maturity of a university. Unila has earned positive points in several key areas, such as human resources, information and communication technology, and planning. These factors collectively demonstrate the university's maturity. Unila is now recognized as a mature university. Additionally, its maturity index has significantly increased, with its capabilities in information technology and communication standing out, as well as its service delivery. Unila has a comprehensive data center that stores all the necessary indicators for attaining recognition both nationally and internationally. All activities within the university are mature, beginning from planning documents, through implementation, control, and evaluation. According to these criteria, Unila deserves the label of maturity, as all aspects necessary for assessment have been implemented. Nationally, it is fair to consider Unila as a "mature" institution.

In terms of communication, the successful programs that have been built must be maintained and further enhanced. Their achievements should be disseminated to the public. Furthermore, a culture of good communication has been established through routine meetings and coordination sessions, where success stories are shared. Faculty forums are also employed to continue this dialog. Additionally, programs aimed at optimizing human resources and competencies for the academic community are regularly developed. This ensures that the successful points, encompassing excellent performance, are communicated to the entire academic community, thereby boosting the university's reputation and taking it to the next level of maturity. In reality, Unila has already achieved "top ten" status in certain areas. Nevertheless, there are still aspects that need enhancement. Hence, it is essential to collectively identify the root causes of the issues and find solutions to strengthen the areas that are lagging behind, so that Unila can continue advancing toward the full realization of its vision.

According to the results of previous research on Unila's academic culture during the three leadership of the rector 1998–2019 which has been published under the title "Leaders in Communicating and Maintaining Sustainable Academic Culture towards the Top Ten Universities in Indonesia," *Journal of Ecohumanism* Vol. 3 No. 4 (2024), pp. 695–708, found leadership legacy in the formation of academic culture, namely Unila as a university of research and university of teaching (Trenggono, et al., 2024). These two main values can encourage an increase in Unila's ranking among universities in Indonesia. Thus, the structures in the university have stored provisions in carrying out the maintenance and care activities of academic culture.

In practice, for one year 2023–2024, the rector, vice rectors, deans, heads or heads of institutions, and technical implementation units have carried out daily activities, namely the learning and teaching process, research activities, and community service. In addition, increasing international accreditation for departments and study programs in Unila. International cooperation in the exchange of lecturers and students between universities with various countries. In fact, the rector built a leadership meeting mechanism that included university-wide structures to boost the university's performance index and achievements in global rankings. However, compared to the previous rectors, the rector's priority in achieving rankings as an institutional achievement can be seen from the diction chosen when delivering messages in speeches, meetings and conversations, namely the rector prefers "we must have the spirit to always work better." Almost never the discourse "Unila becomes the top ten universities in Indonesia (top 10)." The rector tends to emphasize togetherness, communication must be honest and productive, in solving problems, among each other remind and help each other. In this case, the rector aims to create a new balance with new processes, leadership styles, and policies that are all done together (Seeger et al., 2024). The latest Webometrics ranking data in January 2025 places Unila in 15th position among the best universities in Indonesia and ranked 1,588 universities on a world scale.

Conclusion

According to the results of the analysis and discussion that have been presented, four conclusions can be formulated from this research. First, the rector as a female leader openly faces problems as a continued impact of the Covid-19 virus pandemic that lasted for two years, followed by an organizational shock as a consequence of corruption committed by the old rector and other university leaders, as well as other problems, namely the organizational climate dominated by old leaders who became senior officials at the university. The dominance of seniority faced by the new rector is characterized by the call "senior rector" to the former rectors in daily life, in university meeting forums, or social media conversations. This "senior rector" nickname is applied to both those who have retired and those who are still actively working in the university environment.

Second, the communication strategy carried out by the rector as a female leader becomes a communication pattern in her leadership, different from her predecessor leaders. The rector does not emphasize the power of speech communication, rhetoric, speeches, and words. However, the rector chose to carry out activities directly, through the approach of presence and attention to solving daily problems. This is done either symbolically, rituals, activities to achieve the organization's vision, or informal activities that create balance and new energy for the continuous organizing process. The slogan "Be Strong" was initially presented as a symbol of "passion" for recovery, revival, and optimism in the campus environment, after a long time it became a communication performance both personally, socially, and organizationally. "Be Strong" became specialized vocabulary (jargon), growing into sociality to thicken the new identity.

Third, the process of achieving organizational vision, especially in order to achieve superior rankings among universities in Indonesia and enter world-class universities, is not done through accelerated messages, attitudes, actions, and policies. However, the rector as a female leader consistently continues to maintain a balance between the achievement of university achievements in education, research, and community service through forms of maintaining academic culture and maintaining patterns of adaptation symbolically and collectively, as well as various rituals both formal and informal. Over time, the process of meaning formation runs at the individual, group and community levels. Collective understanding is built, so that the continuity of the organization is graphically stable and the leadership of the rector is accepted, and gains public trust.

Fourth, the rector's leadership displayed through giving unique meaning to positions in the university, symbol communication, ritual activities, and maintenance of academic culture, is not done through planning but is carried out through ignorance that publishes insight, mistakes that are corrected on the way, and continuous learning. Communication patterns that are carried out in dense intersections with adaptation patterns have had multiple impacts, namely academic

culture is maintained, organizational sustainability is stable, and leadership resilience bloom continuously. This unique pattern of communication and adaptation of women leaders can be an alternative model in co-creating future social services.

The recommendations from this research are as follows: first, a program of activities should be designed with clear scheduling and adequate intensity to instill the values of "Be Strong." Second, in line with the first recommendation, a branding effort for "Be Strong" should be established, comprising values that become the university's identity. Third, there should be a transformation of the Tri Dharma activities, particularly in research and community services, that are truly concrete and help maintain the balance between government and community interests and social services.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found in the article/supplementary material.

Ethics statement

The studies involving humans were approved by the University of Lampung Institutional Review Board. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

NT: Conceptualization, Methodology, Supervision, Writing – original draft, Writing – review & editing. AW: Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. AA: Data curation, Formal analysis, Methodology, Writing – review & editing. NA: Investigation, Methodology, Validation, Writing – original draft. TK: Formal analysis, Funding acquisition, Project administration, Resources, Validation, Writing – review & editing.

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

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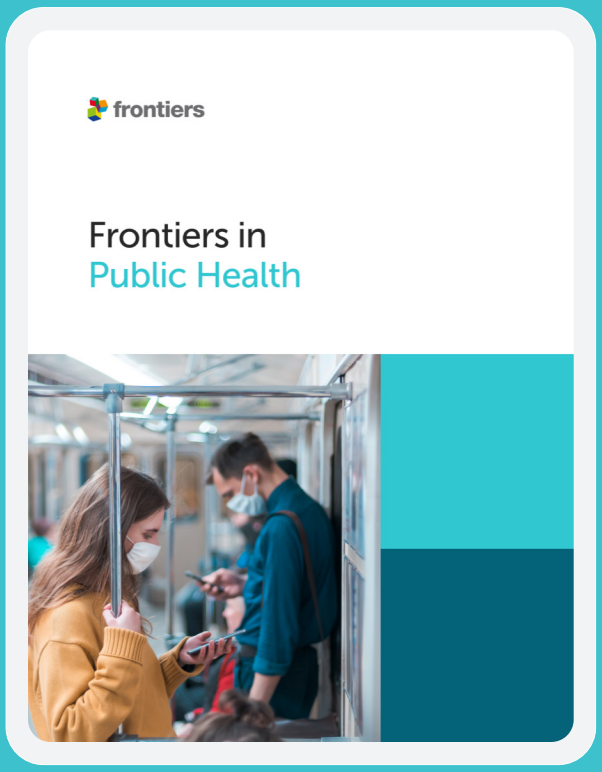

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