

Effectiveness of Integrated Strategies in Reducing Socioeconomic Inequalities to Improve Healthcare-Seeking Behavior Among Pregnant Women and Newborn Mothers: Evidence from Sierra Leone

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ABSTRACT

Background: Maternal health inequities continue to be a major problem in Sierra Leone, where socioeconomic and geographic disparities continue to impede women's access to health care services during pregnancy and at the newborn stage. Community-based health education, financial protection mechanisms and telemedicine are among the integrated approaches that have shown promise for improving outcomes, but there is limited evidence from a local setting.

Objective: This study evaluated the perceived effectiveness of integrated strategies in reducing health inequalities and improving health care seeking behaviour of pregnant women and mothers of newborns in Bo District, Sierra Leone.

Methods: The study was a descriptive cross-sectional one involving 500 participants drawn from an urban tertiary facility (Bo Government Hospital) and a rural primary facility (Tikonko Maternity Home). Data were collected by using structured interviews and analyzed using SPSS Version 26. Descriptive analysis, χ^2 , Spearman correlation and exploratory factor analysis were used.

Results: The participants' top priorities were public funding (19.27%), comprehensive health insurance (13.51%) and community-based programs (12.27%). There was a significant relationship between geographic location and service utilization ($\chi^2 = 64.48$, $p < 0.001$). The preference for effective interventions correlated positively with education ($r = 0.80$, $p = 0.20$). Factor analysis showed financial and access-based strategies to be most contributory.

Conclusion: Mixed methods strategies that address financial and geographical barriers must be used to improve maternal health equity in Sierra Leone. Policymakers need to invest in scalable and community-led interventions and help close awareness gaps on culturally inclusive and supportive care practices

KEYWORDS: Maternal health, health equity, integrated strategies, health care access, Sierra Leone

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INTRODUCTION

The outcomes of maternal health are also the foremost global issue, as the number of maternal deaths was estimated at 260,000 in the world in 2023, of which 92% are in low- and lower-middle-income countries [1]. Sub-Saharan Africa has remained to carry disproportional burden of these deaths, with 70 percent of these deaths, mostly through systemic predicaments, including poor health infrastructure, inadequate trained hands, and endemic socioeconomic disparities [2]. Although the rate of maternal mortality in the world has decreased by 34 percent since the year 2000 to 2020, it has not been uniform, with some countries such as Sierra Leone still registering some of the highest ratios of maternal mortality in the world [3].

As of 2020, the maternal mortality ratio in Sierra Leone was 443 deaths per 100,000 live births, which is an improvement over the decades, nevertheless alarmingly high in comparison with the rest of the world, where the maternal mortality rate is 211 per 100,000 [4]. These issues are compounded by strong disparities in healthcare access especially among low-income women, rural populations and less educated women. These inequalities lead to inadequate access to antenatal, delivery, and postnatal care, which results into poor maternal and infant health outcomes [5]. Financial limitations and cultural practices in Bo District, in particular, where healthcare facilities differ between the city and the countryside, tend to postpone or even block the process of care-seeking among pregnant women and new mothers [6].

Combination of strategies has become an essential instrument in solving these inequalities and increasing the behavior of seeking

healthcare. They are community-based health education campaigns, mobile outreach services, financed healthcare, and digital health interventions, such as telemedicine and appointment reminders. Care Groups and participatory models of health education, which are community-based programs, have been shown to be effective in raising attendance of antenatal care and deliveries at facilities [7]. Equally, the geographic and financial barriers to maternal treatment in the rural setting have been greatly decreased through mobile clinics and transportation subsidies [8].

Telehealth service has also been very useful in linking women in remote societies with qualified professionals. The authors find that during the COVID-19 pandemic, digital tools maintained the provision of antenatal services under restrictions of physical movement, which underscores their increased applicability in resource-covered environments [9]. Nevertheless, these combined strategies do not always work effectively in socio-demographic settings and require much local awareness, policy encouragement, and system preparedness [10].

On this background, this study assesses the perceived efficacy of holistic measures in reducing health disparities and improving the healthcare-seeking behaviour of pregnant women and newborn mothers in Bo District, Sierra Leone. The study will provide evidence to inform policy and specific maternal health programs since it will capture the views of the community and the priority they place on different interventions.

MATERIALS AND METHODS

Study Design

The effectiveness of integrated strategies in the reduction of socioeconomic inequalities that affect healthcare-seeking behavior among pregnant women and newborn mothers in the Bo District, Sierra Leone, was investigated using a descriptive cross-sectional design. The design permitted one point collection of quantitative data of a heterogeneous population.

Setting and Population of the study.

The research was done in Bo Government Hospital (urban, tertiary-level) and Tikonko Maternity Home (rural, primary-level). These locations are urban and rural healthcare settings. The target population includes pregnant women and mothers of children under the age of five that had received antenatal, postnatal or child health services within the study time.

Eligibility and Sampling

Pregnant women and mothers of children below the age of five were included in the study, assuming that they had stayed in the Bo District of at least six months and received healthcare services through any of the chosen facilities. Women which failed to satisfy these conditions or could not give an informed consent were excluded. The sample was selected at random as a participant was selected based on the registration of daily service attendance.

Sample Size Determination

The number of people sampled was determined by Cochran formula of cross-sectional studies:

$$n_0 = (Z^2 \times p(1-p)) / e^2$$

where:

Z = 1.96 (represents a 95 percent confidence level),

- p = 0.5 (presumption prevalence to maximise the sample size),

- e = 0.05 (margin of error).

Cochran formula resulted in 370 samples. To address the non-responses, a 26 percent buffer was included and the final sample size was 500, 294 pregnant women and 206 mothers with young children.

Data Collection

The collected data was based on the structured face-to-face interviews completed with the help of the digital questionnaire implemented by the ONA platform. The interviews were carried out in English or the local languages by the trained research assistants, which guaranteed the privacy and confidentiality of the participants in accordance with the set of ethical standards.

Ethical Approval

Njala University Ethics Review Board gave ethical consent to this study. Every action was in line with the provisions of the ethical principles in the Declaration of Helsinki. The study subjects all signed informed consent in writing before taking part in the study and were assured of confidentiality and at no cost may opt out of the study.

The paper is an original work that is not under review in another institution and does not deal with animals. The authors do not mention any financial or non-financial conflicts of interest.

Data Analysis

The analysis of data was performed using SPSS 26.0. Participant characteristics were described by descriptive statistics. Chi-square tests were used to test the association between the categorical variables. Spearman correlations were used to determine the relationships between ordinal and continuous. The clusters of high-impact interventions were revealed through factor analysis. The set level of statistical significance was $p < 0.05$.

RESULTS

There were 500 women who took part in the study. Most of them (74.8) were in urban (Bo Government Hospital) and 25.2 were in rural (Tikonko Maternity Home). Mean age of pregnant women and young child mothers was 24.83 and 24.07 years

respectively. More than fifty-three percent (53.6) of the respondents had secondary education and almost half (46.6) were married. Majority of them were found to be Muslim (52.4) or Christian (47.4) and resided in monogamous families. The family-size was 5.3 and the average monthly income was 335.03 NLE. The average number of pregnancies among the respondents was 1.83 (Table 1).

Table 1: Respondents' Socio-Demographic Characteristics

Category	Sub-Category	Frequency	Percent	Statistical Summary
Residency (n=500)	Urban (Bo Government Hospital)	374	74.80	
	Rural (Tikonko Maternity Home)	126	25.20	
Age of Pregnant Women (n=294)	Mean			Mean = 24.83 (SE = 0.28, SD = 4.74, Range: 16–45, 95% CI = ±0.54)
	Median			25
	Mode			25
Age of Newborn Women (n=206)	Mean			Mean = 24.07 (SE = 0.30, SD = 4.34, Range: 17–45, 95% CI = ±0.60)
	Median			23
	Mode			20
Education Level (n=500)	No Formal Education	50	10.00	
	Primary Education	142	28.40	
	Secondary Education	268	53.60	
	Tertiary Education	40	8.00	
Marital Status (n=500)	Married	233	46.60	
	Cohabitation	82	16.40	
	Single	158	31.60	
Religion (n=500)	Islam	262	52.40	
	Christianity	237	47.40	
	Indigenous/Traditional Religions	1	0.20	
Household Size (n=500)	Mean			Mean = 5.30 (SE = 0.18, SD = 4.07, Range: 2–52, 95% CI = ±0.36)
Monthly Income (NLE) (n=500)	Mean			Mean = 335.03 (SE = 29.90, SD = 668.49, Range: 0–10,000, 95% CI = ±58.74)
Pregnancies Experienced (n=500)	Mean			Mean = 1.83 (SE = 0.05, SD = 1.05, Range: 1–7+, 95% CI = ±0.09)
Family Type (n=500)	Polygamous	66	13.2	
	Monogamous	434	86.2	

Table 2 shows the most desirable interventions that respondents suggest can be used to overcome the healthcare access barriers faced by pregnant women and mothers living in socio-demographic inequalities. The maternal responses were subcategorized as the top-level maternal responses, the mid-level maternal responses, and lower maternal responses.

Top-Level Maternal Responses.

Increased public financing of maternal health services was the top priority with 19.27% and the second priority was comprehensive health insurance (13.51%), community-based health interventions (12.27%), and better access to transportation (12.01%).

Middle Level Maternal Responsiveness.

The prenatal education support (9.75%), telehealth services (6.07%), awareness campaigns (6.07%), and maternity leave policies (5.76%), were the mid-level priorities.

Lower Maternal Responses

The interventions of lower priority were partnering with community organizations (5.41%), mental health assistance (4.74%), workplace accommodation (2.88%), and translation services (2.26%).

Table 2: Interventions to Address Healthcare Access Challenges for Pregnant Women and Mothers Facing Socio-Demographic Inequalities

Response Category	Multiple Response Frequency (n=2257)	Percent
Increase public funding for prenatal and maternity healthcare services	435	19.27%
Implement comprehensive health insurance coverage	305	13.51%
Establish community-based healthcare programs	277	12.27%
Enhance transportation services to healthcare facilities	271	12.01%
Provide free or subsidized prenatal education and support programs	220	9.75%
Increase access to telehealth services for prenatal care	137	6.07%
Create awareness campaigns to educate communities about prenatal care	137	6.07%
Develop policies that ensure paid maternity leave	130	5.76%
Strengthen partnerships between healthcare providers and community organizations	122	5.41%
Implement programs providing mental health support and counseling	107	4.74%
Enhance workplace policies for pregnant employees	65	2.88%
Offer language and translation services in healthcare settings	51	2.26%
Total	2257	100%

Table 3 shows the perception of participants regarding the best health policy interventions to achieve positive healthcare-seeking behavior among pregnant women, mothers, and children who have different socio-demographic backgrounds.

Top-Level Maternal Responses.

Universal access to maternal healthcare (14.8%), extended maternity leave (12.3%), and community-based health education (10.7%), were the policy preferences in the category of enhancing healthcare-seeking behavior.

Mid-Level Mama Behaviors.

Subsidized maternity care (9.81%), telehealth promotion (9.64%), and anti-discrimination laws were other policies that had moderate support (9.08%).

Lower Maternal Responses

Less-priority interventions were culturally competent healthcare services (6.32%), flexible work (6.00%), the increase of health insurance coverage (5.59%), and the public awareness (4.62%). Such policies were less endorsed than the universal access and the reform of the maternity leave.

Other interventions like community health worker programs (2.19%), mobile clinics and outreach programs (1.86%), and incorporating technology to make appointment (1.05) were least emphasized. Only 0.16% of respondents mentioned holistic maternal health policies, and this implies poor awareness or perceived inconsistency with larger programs.

Table 3: Changes to Enhance Healthcare-Seeking Behavior among Pregnant Women, Mothers, and Children with Different Status Across Socio-Demographic Inequalities

Response Category	Multiple Response Frequency (n=1234)	Percent (%)
Universal Access to Maternal Healthcare	183	14.83
Expansion of Maternity Leave Policies	152	12.32
Community-Based Health Education Programs	132	10.70
Subsidized or Free Maternity Care	121	9.81
Promotion of Telehealth Services	119	9.64
Anti-Discrimination Laws	112	9.08
Culturally Competent Healthcare Services	78	6.32
Flexible Work Arrangements	74	6.00
Health Insurance Coverage Expansion	69	5.59

Public Awareness Campaigns	57	4.62
Community Health Worker Programs	27	2.19
Incentives for Healthcare Providers	25	2.03
Peer Support Programs	24	1.94
Mobile Clinics and Outreach Programs	23	1.86
Integration of Mental Health Services	23	1.86
Integration of Technology for Appointment Reminders	13	1.05
Holistic Maternal Health Policies	2	0.16
Total	1234	100.00

Figure 1. Heat map of perceived effectiveness of combined strategies in minimizing socioeconomic inequalities that affect healthcare-seeking behavior among pregnant women and newborn mothers.

It can be seen that the most heavily supported strategies in demographic subgroups include increased public funding (19%), comprehensive health insurance (14%), and community-based healthcare programs (12), with greater preference sharing among the urban respondents and those who have secondary or higher education (Spearman $r = 0.80$, $p = 0.20$). Conversely, translation services (2.3%), and workplace accommodation (2.9%) among the strategies demonstrate weaker associations and they appear with negative factor loadings (-1.23 and -1.10) indicating that they are not perceived to be very relevant. These graphic correlations highlight the disparate support of interventions on the basis of geography and education level, which is used to make specific policy.

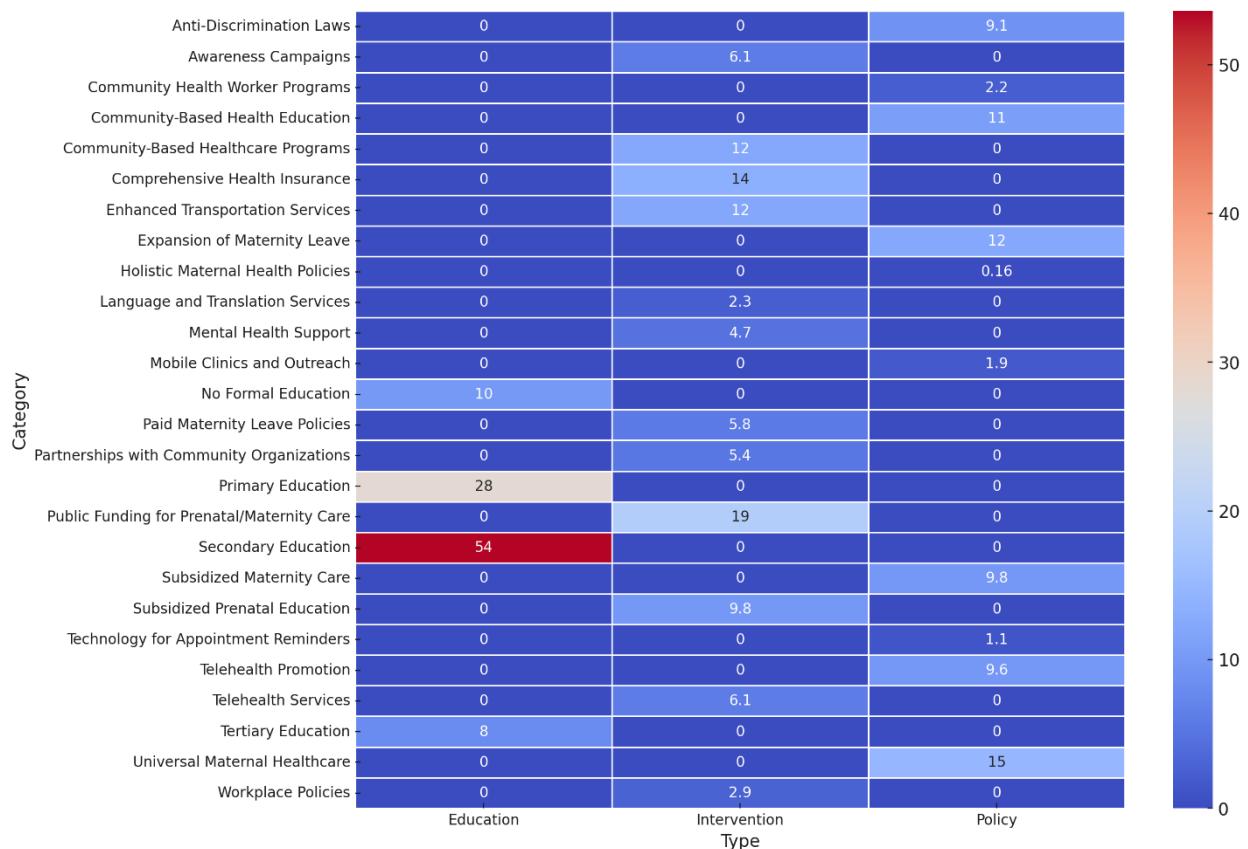


Figure 1: Integrated strategies that reduce socioeconomic inequalities affecting healthcare-seeking behavior among pregnant women and newborn mothers

DISCUSSION

This paper brings to light the many diverse processes of how inequality in health, especially the socioeconomic and geographical factors, influence healthcare-seeking behavior of pregnant women and newborn mothers in Bo District, Sierra Leone.

Financial Obstacles and Systems Problems.

This research reiterates the overwhelming nature of socioeconomic disparities on healthcare-seeking behavior among pregnant women and mothers of newborns in the Bo District, Sierra Leone. The majority of the respondents knew that the top priority should be to have more public funding (19.27%), and wide coverage with health insurance (13.51) because it is one of the main ways to overcome the financial barriers. These results are in agreement with cross-sectional study in Sierra Leone that found out that even after Free Healthcare Initiative had been implemented, indirect costs, which include transportation, informal payments, and absence of insurance, still act as major deterrents to accessing services [11].

A comparable cross-sectional study based in Nigeria revealed that households that had low economic security were much less likely to receive maternal services, and it is important to note how health financing systems can be used to close equity gaps [12].

Geographic Inequality and Locally-Based Access.

The geographic inequalities are depicted by the statistical relationship between residency and healthcare facility use ($\chi^2(1, N = 500) = 64.48, p < 0.001$). Rural women especially those who took care at Tikonko Maternity Home were more inclined to recommend community-based healthcare programs (12.27) and transportation support (12.01). Ghanaian mixed-methods research indicated that the decentralized services such as maternity waiting homes increased facility-based deliveries in underserved communities [13]. Similarly, a longitudinal assessment of Ethiopian mobile clinics showed a higher coverage of antenatal care in isolated locations [14].

Such studies point out that the localization of care delivery is the evidence-based and practical response to the structural impediments in rural and peri-urban regions.

Education and Sociocultural Motivators of Health Behavior.

The fact that the level of education is positively related to preference of effective interventions ($r = 0.80, p = 0.20$) highlights the importance of health literacy in the decision-making by the mothers. The mid-tier priorities that were advocated by respondents included prenatal education programs (9.75%) and community awareness campaigns (6.07%). The cluster-randomized trial conducted in Kenya affirmed that educational interventions had significant impacts of enhancing the timely attendance during antenatal services among low-income mothers [15]. Likewise, a population-based survey conducted in Liberia indicated that women who had secondary education were almost three times as likely as those who did not to access care at formal health facilities [16].

These findings support the idea that maternal health outcomes can be improved only through physical infrastructures as well as with strategic behavioral and educational modification.

Moderate Priority Interventions: Technological and Work Support.

Even though telehealth services and maternity leave policies were endorsed in the middle (6.07% and 5.76%, respectively), the evidence of its applicability is worldwide. Recently, a quasi-experimental study in a rural region of Nigeria determined that establishing telehealth systems to provide follow-up care during the antenatal stage enhanced compliance (30 percent) and minimized avoidable referrals [17]. In addition, a cohort study conducted in South Africa associated paid maternity leave with increased levels of postnatal care attendance and reduced levels of maternal stress [18].

These results indicate that these interventions cannot be a priority in this context, but they can be used in addition to financial and geographic changes to promote holistic access to care.

Whole person Maternal Health Models and Cultural assimilation.

Other strategies that were considered as having less impact were mental health counseling (4.74%), workplace accommodation (2.88%), and translation services (2.26%). Nonetheless, a mixed-methods study of Uganda revealed that mental health screening as an element of antenatal care decreased undiagnosed postpartum depression by 42 percent [19]. Similarly, culturally inclusive care models in Malawi, assessed using participatory action research design increased trust and early healthcare uptake of indigenous people [20].

Therefore, even though underestimated by the respondents, these interventions are essential to the long-term resilience of the maternal health system and equity.

Policy Preferences at a Community level and Alignment at a Global level.

The policy reforms that were identified by the respondents, such as universal access to maternal health care (14.83%), extended maternity leaves (12.32%), and health education in the community (10.70%), appear as global targets of maternal health in the WHO Ending Preventable Maternal Mortality (EPMM) framework [21]. Nevertheless, low adoption of mobile clinics (1.86%) and digital appointment reminders (1.05) indicates that there can be digital literacy, awareness, or access disparities that should be bridged via specific community-based and capacity-enhancing measures.

Statistical Discoveries and Intervention Clustering.

Exploratory factor analysis found that the most effective interventions were found to be public funding (factor loading = 2.21) and insurance coverage (1.04). In the meantime, translation services (-1.23) and flexible workplace policies (-1.10) had the least impact. These rankings demonstrate a burning concern with both affordability and access, which has been in tune with a recent West African survey, which discovered income-driven inequities explain more than 60 percent of the maternal health service disparities in the area [22].

It can be seen that interventions based on education levels and cultural setting can produce the most significant effect as correlation heatmaps show the correspondence between education, policy preferences, and health-seeking behavior.

CONCLUSION

Addressing the maternal health disparities would go beyond defining the gaps and requires one to take decisive action that would

put the reality of women at the center of health care reform. The idea of integrated approaches is not only effective but it is a tool that is critical in the formulation of systems that are inclusive, resilient, and responsive to all women without regard to geography or income. With policymakers and practitioners setting the path ahead, the call is deafening: invest in equity-centered strategies that do not just make access better but also restore dignity, confidence, and trust in the health system. It is only then that we can have a sustainable development and safe motherhood to all women everywhere.

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