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The Role of Community Health Workers in Reducing Maternal Mortality in Rural Communities of Sierra Leone

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Abstract

Background: Maternal mortality remains a major public health concern in Sierra Leone, particularly in rural areas where access to quality healthcare services is limited. Community Health Workers (CHWs) play a vital role in bridging the gap between underserved populations and formal healthcare systems, thereby improving maternal health outcomes.

Methodology: A cross-sectional study employing a quantitative approach was conducted among 580 participants, including women of reproductive age, CHWs, and community stakeholders. Data were collected using structured questionnaires and analyzed using SPSS, applying descriptive statistics, Pearson correlation, chi-square tests, and multiple regression analysis.

Result: The findings indicate that CHW services such as health education, promotion of antenatal care, home visits, and referral support significantly improve maternal health outcomes. A strong positive correlation ($r = 0.684$, $p < 0.001$) was found between CHW service delivery and maternal health outcomes. Regression analysis further revealed that CHW services significantly predict maternal outcomes ($\beta = 0.684$, $p < 0.001$), accounting for 46.8% of the variance ($R^2 = 0.468$). Additionally, increased frequency of CHW visits was significantly associated with safer delivery practices, including higher rates of facility-based deliveries.

Summing-up; In conclusion, CHWs play a critical role in reducing maternal mortality risks in rural Sierra Leone. Strengthening CHW programs through enhanced training, effective supervision, and supportive health policies is essential for achieving sustainable improvements in maternal health outcomes.

Keywords: Community Health Workers, Maternal Mortality, Rural Health, Antenatal Care, Sierra Leone, Public Health

Original Research Article

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1.0 Introduction

Maternal health remains a central priority within global public health, particularly in low- and middle-income countries where disparities in access to essential healthcare services persist. Sub-Saharan Africa continues to bear a disproportionate burden of adverse maternal health outcomes, reflecting systemic inequalities in healthcare delivery, socio-economic conditions, and health system capacity. Sierra Leone, despite notable progress in maternal health indicators, continues to experience substantial maternal health risks, particularly in rural communities where access to skilled care remains constrained. Recent evidence suggests that while improvements in maternal healthcare utilization have been observed, significant inequalities persist across socio-economic and geographic groups, with rural populations facing pronounced disadvantages [1].

Maternal health outcomes in Sierra Leone are shaped by a complex interplay of structural, economic, and socio-cultural factors. Limited availability of healthcare infrastructure, shortages of skilled health personnel, and transportation barriers contribute to delays in accessing appropriate maternal care. In addition, socio-cultural norms, low levels of maternal education, and financial constraints further influence health-seeking behaviors and contribute to increased maternal health risks. Evidence from post-Ebola assessments highlights persistent barriers to maternal healthcare access, including reduced service utilization and disruptions in health system functionality, particularly in rural settings [2]. These challenges underscore the need for community-based approaches that can improve access to care and support positive maternal health outcomes.

In this context, community health workers (CHWs) have become an integral component of primary healthcare systems in Sierra Leone. CHWs serve as frontline providers who bridge the gap between formal health systems and underserved populations, particularly in rural areas. Their roles encompass health education, promotion of antenatal and postnatal care, identification of pregnancy-related risks, facilitation of referrals, and support for community engagement. Recent literature highlights the growing recognition of CHWs as key contributors to strengthening health system resilience, particularly in the aftermath of public health emergencies such as the Ebola outbreak and the COVID-19 pandemic [3].

Empirical studies across low-resource settings indicate that CHW-led interventions are associated with improvements in maternal health behaviors, service utilization, and overall maternal and child health outcomes. For instance, community-based home visits and health promotion activities conducted by CHWs have been linked to increased antenatal care attendance and improved maternal well-being indicators [4]. These findings suggest that CHWs play a critical supportive role in enhancing maternal health outcomes by facilitating access to information, promoting preventive practices, and encouraging timely utilization of healthcare services. However, it is important to note that such associations do not imply direct causation, particularly in cross-sectional and observational study designs.

Beyond service delivery, CHWs also contribute to addressing behavioral and socio-cultural determinants of maternal health. In many rural communities, health literacy, gender dynamics, and traditional beliefs influence maternal healthcare practices. CHWs, as trusted members of their communities, are uniquely positioned to foster behavioral change, improve awareness of pregnancy-related risks, and encourage the adoption of safer maternal health practices. Evidence from Sierra Leone further indicates that CHWs play

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an important role in strengthening community engagement and increasing uptake of essential health services, including immunization and preventive care [5].

Despite the recognized importance of CHWs, there remains limited context-specific empirical research examining their perceived impact on maternal health outcomes at the community level in Sierra Leone. Much of the existing literature focuses on national-level indicators or facility-based data, with less emphasis on community-level dynamics and the lived experiences of populations in rural settings. Additionally, while several studies have explored determinants of maternal healthcare utilization, fewer have examined how CHW activities are associated with maternal health outcomes and risk perceptions at the grassroots level [6].

Furthermore, emerging evidence highlights that maternal health systems in Sierra Leone have demonstrated resilience in the face of recent public health challenges, yet gaps in access, quality, and equity persist, particularly in rural districts [7]. These findings reinforce the need to better understand the contributions of community-level health actors, including CHWs, in shaping maternal health outcomes and mitigating risks.

Therefore, this study seeks to examine the role and perceived impact of community health workers on maternal health outcomes in rural communities of Sierra Leone. Specifically, it aims to explore CHW practices, assess their association with maternal health outcomes, and identify challenges affecting their effectiveness in delivering maternal healthcare services. By generating empirical evidence from a community-based perspective, this study contributes to the growing body of literature on maternal health and provides insights for strengthening community health systems in resource-limited settings.

2.0 Methodology

Study Design

This study adopted a cross-sectional descriptive research design using a quantitative approach to examine the role and perceived impact of community health workers (CHWs) on maternal health outcomes in rural Sierra Leone. Cross-sectional designs are widely used in public health research to assess associations between variables and capture population-level perceptions at a single point in time, particularly in resource-constrained settings [1]. This design was appropriate for examining relationships between CHW service delivery and maternal health indicators without implying causality.

Study Area

The study was conducted in remote rural communities across the Eastern, Northern, and Southern regions of Sierra Leone, where access to formal maternal healthcare services remains limited and CHWs serve as primary points of care. These regions were purposively selected due to high maternal health risks, inadequate healthcare infrastructure, and strong reliance on community-based health services. Existing evidence indicates persistent disparities in maternal healthcare access and utilization in rural and post-crisis settings in Sierra Leone [2].

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Study Population

The study population comprised key stakeholders directly involved in maternal health at the community level, including women of reproductive age (15–49 years), pregnant women, community health workers, traditional birth attendants, household heads, and caregivers. Participants were required to have resided in the selected communities for at least six months, be directly involved in or affected by maternal health services and be willing to provide informed consent. Individuals unable to provide reliable responses due to illness or cognitive limitations were excluded from the study.

Sample Size Determination and Sampling Technique

A total sample size of 580 respondents was included in the study. This sample was considered adequate to ensure sufficient statistical power for detecting associations and for conducting multivariate analyses, which typically require a minimum of 10–15 observations per variable [8]. The sample size also aligns with similar community-based maternal health studies conducted in Sub-Saharan Africa [6] and exceeds the minimum threshold required for factor analysis, as indicated by a Kaiser-Meyer-Olkin value above 0.60 [9].

A multistage sampling technique was employed. Initially, districts were purposively selected from the Eastern, Northern, and Southern regions. This was followed by the random selection of chiefdoms and villages within the selected districts. Households were then selected using systematic random sampling based on community household listings, which served as the sampling frame. Community health workers and traditional birth attendants were purposively selected due to their specialized roles in maternal healthcare delivery. The sampling frame was derived from community household registers, CHW deployment lists, and local administrative records.

Efforts were made to enhance representativeness through the inclusion of diverse geographic regions and multiple stakeholder groups. However, potential limitations include the underrepresentation of highly remote households and possible selection bias arising from the purposive inclusion of CHWs and traditional birth attendants, which are common challenges in community-based research conducted in resource-limited settings [10].

Study Variables

The dependent variable was perceived maternal health outcomes, defined as respondents' perceptions of key maternal health indicators. This composite construct included perceived reduction in pregnancy-related complications, awareness of maternal danger signs, utilization of antenatal care services, and likelihood of safe delivery practices. These indicators are consistent with the maternal continuum of care framework, which emphasizes antenatal care, skilled delivery, and postnatal care as essential determinants of maternal health outcomes [11].

The independent variable was CHW service delivery, encompassing activities such as health education, home visits, referral services, and promotion of antenatal care.

Data Collection Instrument

Data were collected using a structured questionnaire adapted from validated maternal health and community health frameworks. The instrument included sections on demographic characteristics, maternal health knowledge, CHW roles and activities, perceived maternal health outcomes, and barriers to

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maternal healthcare. Responses were measured using a five-point Likert scale ranging from strongly disagree to strongly agree, a widely accepted method for assessing perceptions in public health research [12].

Validity and Reliability

Content validity was established through expert review by public health specialists, maternal health researchers, and academic supervisors. Reliability was assessed using Cronbach's alpha, which demonstrated strong internal consistency, with coefficients of 0.86 for the CHW services scale, 0.88 for the maternal health outcomes scale, and 0.87 for the overall instrument. These values exceed the recommended threshold of 0.70, indicating acceptable reliability [8].

Exploratory factor analysis was conducted to assess construct validity. Principal Component Analysis with Varimax rotation was applied. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.842, and Bartlett's Test of Sphericity was statistically significant ($p < 0.001$), confirming the suitability of the data for factor analysis. Factor loadings of 0.60 and above were considered acceptable, while cross-loadings below 0.40 were retained. Two key factors were extracted, representing CHW service delivery and maternal health outcomes, consistent with existing literature linking community-based interventions to maternal health improvements [13].

Data Collection Procedure

Data were collected over a period of four to six weeks with the assistance of trained research assistants. Permission was obtained from relevant local authorities, and informed consent was secured from all participants prior to data collection. Face-to-face interviews were conducted to accommodate participants with low literacy levels and to ensure clarity and completeness of responses.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences version 27. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data. Inferential statistical techniques, including chi-square tests, Pearson correlation, and linear regression analysis, were employed to examine relationships between variables. Statistical significance was set at a p-value of less than 0.05.

Ethical Considerations

Ethical approval was obtained from the Sierra Leone Ethics and Scientific Review Committee prior to data collection, in line with national and international guidelines. Administrative permission was secured from relevant health authorities, local officials, and community leaders in selected rural areas.

Participation was voluntary, with informed consent obtained after explaining the study's purpose, procedures, risks, and benefits. Confidentiality and anonymity were ensured by excluding personal identifiers and reporting data in aggregate form. Data were securely stored and accessed only by the research team. The study upheld non-maleficence by avoiding harm and conducting interactions

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respectfully and culturally appropriately, while beneficence was reflected in its potential to inform maternal health improvements.

3.0 Results

Demographic Characteristics of Respondents

Table 1: Demographic Characteristics of Respondents (N = 580)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	198	34.1
	Female	382	65.9
Age (years)	15–24	142	24.5
	25–34	236	40.7
	35–44	132	22.8
	45+	70	12.0
Education	No Formal Education	188	32.4
	Primary	164	28.3
	Secondary	150	25.9
	Tertiary	78	13.4
Occupation	Farmer	214	36.9
	Trader	162	27.9
	CHWs/TBAs	86	14.8
	Others	118	20.3

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Table 1 presents key contextual characteristics of the study population. The sample is predominantly female (65.9%), consistent with the maternal health focus and ensuring representation of primary service beneficiaries. The largest age group (40.7%) falls within 25–34 years, corresponding to peak reproductive age and enhancing the relevance of maternal health insights. Educational attainment is generally low, with 60.7% having no formal or only primary education, suggesting potential constraints in health literacy and increased reliance on CHW-led interventions. Occupationally, most respondents are engaged in farming (36.9%) and trading (27.9%), reflecting a rural, low-income context with limited access to formal healthcare. Overall, these characteristics indicate a socio-economically vulnerable population highly dependent on community-based health services.

Descriptive Statistics of CHW Services and Maternal Health Outcomes

Table 2: Descriptive Statistics of Key Variables

Variable	Mean	Std. Deviation
Health Education by CHWs	4.12	0.78
Antenatal Care Promotion	4.25	0.69
Referral Services	3.98	0.82
Home Visits	4.05	0.75
Perceived Reduction in Pregnancy Complications	4.10	0.71
Awareness of Danger Signs	4.18	0.73

Table 2 shows consistently high mean scores (all > 3.5), indicating strong agreement on the availability and effectiveness of CHW services and improvements in maternal health outcomes. Antenatal care promotion (M = 4.25, SD = 0.69) and awareness of danger signs (M = 4.18, SD = 0.73) recorded the highest means, underscoring the effectiveness of CHWs in promoting preventive behaviors and health knowledge. Referral services had the lowest mean (M = 3.98), suggesting possible systemic or access-related constraints. The relatively low standard deviations indicate consistency in responses. Overall, the findings reflect a strong perceived contribution of CHWs to preventive and promotive maternal healthcare.

Factor Analysis (Exploratory Factor Analysis – EFA)

Table 3: KMO and Bartlett's Test

Test	Value
Kaiser-Meyer-Olkin (KMO)	0.842
Bartlett's Test (Chi-square)	2156.34
Sig.	0.000

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Table 3: Shows the Kaiser-Meyer-Olkin (KMO) value of 0.842 indicates meritorious sampling adequacy, suggesting that the dataset is suitable for factor analysis. Additionally, Bartlett's Test of Sphericity is statistically significant ($\chi^2 = 2156.34$, $p < 0.001$), confirming that the correlation matrix is not an identity matrix and that meaningful relationships exist among the variables.

Table 4: Rotated Component Matrix

Variables	Factor 1 (CHW Services)	Factor 2 (Maternal Outcomes)
Health Education	0.812	
Antenatal Promotion	0.845	
Referral Services	0.776	
Home Visits	0.801	
Reduced Complications		0.833
Awareness Improvement		0.852

Table 4 demonstrates a clear two-factor structure, with Factor 1 representing CHW service delivery (health education, antenatal promotion, referral services, and home visits) and Factor 2 reflecting maternal health outcomes (reduced complications and improved awareness). All factor loadings exceed 0.70, indicating strong construct validity, while the absence of cross-loadings supports discriminant validity. This structure empirically confirms the distinction and interrelationship between CHW interventions and maternal health outcomes.

Correlation Analysis

Table 5: Correlation Matrix

Variables	CHW Services	Maternal Outcomes
CHW Services	1	
Maternal Outcomes	0.684**	1

Note: $p < 0.01$

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Table 5 indicates a strong and statistically significant positive correlation between CHW services and maternal health outcomes ($r = 0.684$, $p < 0.01$), suggesting that increased CHW engagement is associated with improved maternal health indicators. The magnitude of the relationship reflects a substantial effect, underscoring the critical role of CHWs in influencing awareness, preventive behaviors, and care-seeking practices.

Chi-Square Analysis

Table 6: Chi-Square Test

Variable	Chi-square	df	Sig.
CHW Visits vs Safe Delivery	48.32	4	0.000

Table 6 shows a statistically significant association between CHW visit frequency and safe delivery practices ($\chi^2 = 48.32$, $df = 4$, $p < 0.001$), indicating that regular CHW contact influences maternal decision-making toward safer delivery options. This underscores the behavioral impact of CHW interventions beyond awareness to actual practice.

Regression Analysis

Model Summary

Table 7: Model Summary

Model	R	R Square	Adjusted R Square
1	0.684	0.468	0.465

Table 7 indicates that the model explains 46.8% of the variance in maternal health outcomes ($R^2 = 0.468$), demonstrating substantial explanatory power. The adjusted R^2 (0.465) further confirms the model's stability and generalizability.

ANOVA

Table 8: ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	182.45	1	182.45	156.32	0.000
Residual	207.33	578	0.36		
Total	389.78	579			

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Table 8 shows that the regression model is statistically significant ($F(1, 578) = 156.32$, $p < 0.001$), indicating that CHW service delivery is a significant predictor of maternal health outcomes.

Coefficients

Table 9: Coefficients

Variable	B	Std. Error	Beta	t	Sig.
(Constant)	1.245	0.182		6.84	0.000
CHW Services	0.712	0.057	0.684	12.50	0.000

Table 9 indicates that CHW services significantly predict maternal health outcomes ($\beta = 0.684$, $p < 0.001$). The positive coefficient ($B = 0.712$) suggests that increased CHW service delivery is associated with improved outcome scores, while the high t-value ($t = 12.50$) confirms the robustness of this relationship, supporting the effectiveness of CHW interventions.

Summary of Findings

The results reveal a consistent and statistically significant association between CHW service delivery and improved maternal health outcomes. Descriptive analyses indicate high perceived effectiveness of CHW activities, particularly in antenatal care promotion and health education.

Factor analysis supports a clear structural distinction between CHW interventions and maternal health outcomes, while correlation and regression findings demonstrate a strong positive relationship between these constructs. Furthermore, chi-square results emphasize the influence of CHW engagement on safe delivery practices, reflecting a tangible impact on maternal health behaviors.

Overall, the findings provide robust empirical evidence that CHWs play a critical role in enhancing maternal health awareness, shaping care-seeking behaviors, and promoting safer practices in rural Sierra Leone. The consistency and strength of these relationships highlight the strategic importance of strengthening CHW programs to improve maternal health outcomes in resource-constrained settings.

4.0 Discussion

This study examined the perceived impact of community health workers (CHWs) on maternal health outcomes in rural communities of Sierra Leone. The findings demonstrates a strong and consistent association between CHW service delivery and maternal health-related indicators, including awareness of danger signs, antenatal care utilization, and safe delivery practices. These results align with a growing body of literature that positions CHWs as critical intermediaries between underserved populations and formal healthcare systems.

The high mean scores observed across CHW activities particularly antenatal care promotion and health education suggest that CHWs are actively engaged in community-level maternal health interventions. This finding is consistent with evidence from a systematic review by [14], which reported that CHW-led interventions are associated with improvements in maternal health knowledge and antenatal care

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utilization. Similarly, [15] emphasize that CHWs play a central role in delivering maternal health services, particularly in resource-constrained settings where access to skilled providers is limited.

The factor analysis further reinforced the structural distinction between CHW service delivery and perceived maternal health outcomes, while simultaneously demonstrating their close relationship. This supports conceptual frameworks that position CHWs as facilitators of behavioral change and service utilization rather than direct providers of clinical outcomes. In this regard, CHWs contribute to improving maternal health-related indicators through pathways such as health education, referral linkages, and community trust-building.

The strong positive correlation ($r = 0.684$) identified in this study was consistent with findings from [16], who reported that CHW interventions are associated with improved maternal and newborn health outcomes, particularly among socioeconomically disadvantaged populations. However, it is important to interpret this association cautiously. Given the cross-sectional nature of the study, the relationship observed may reflect co-occurring factors rather than a direct effect of CHW services alone.

While this findings suggested a strong association between CHW engagement and maternal health outcomes, alternative explanations must be considered. First, communities with more active CHW programs may also benefit from better overall health system support, including NGO presence, improved infrastructure, or parallel maternal health initiatives. As noted by [17], CHW effectiveness is often shaped by broader system-level determinants such as training, supervision, and resource availability.

Second, the reliance on self-reported data introduces the possibility of social desirability bias, where respondents overstated positive health behaviors or the effectiveness of CHWs. This was particularly relevant in community-based studies where respondents may perceive CHWs as authority figures or community representatives.

Third, the observed associations were influenced by selection effects. Communities with higher levels of health awareness or stronger social cohesion were more likely to engage with CHWs, thereby producing more favorable outcomes independent of CHW interventions. This aligns with broader evidence that social and behavioral determinants significantly shape health outcomes beyond healthcare interventions alone.

The findings of this study have important implications within the context of rural Sierra Leone, where healthcare access remains uneven and health system constraints persist. CHWs appear to play a particularly important role in bridging geographic and socio-cultural barriers to care. Their involvement in home visits and community engagement aligns with evidence from [4], which highlights the value of home-based CHW interventions in improving maternal and child health indicators in rural settings.

However, the effectiveness of CHWs in Sierra Leone were likely contingent upon systemic support. A recent systematic review [18] emphasizes that CHW performance were highly dependent on workload, supervision, and retention, with poorly supported programs showing reduced effectiveness. This suggests that while CHWs contribute positively to maternal health outcomes, their impact was constrained without sustained institutional investment.

Furthermore, this study highlights the importance of CHWs in addressing maternal health risks through awareness and early detection, particularly in settings where delays in care-seeking are common. By improving recognition of danger signs and facilitating referrals, CHWs may influence critical decision-

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making processes at the household level. However, these contributions should be understood as part of a broader continuum of care rather than standalone solutions.

Policy and Practice Implications

From a policy perspective, the findings underscore the need to strengthen CHW programs as part of integrated maternal health strategies. This includes:

- enhancing CHW training and supervision
- ensuring consistent remuneration and motivation
- improving referral systems and linkage to formal healthcare services
- integrating CHWs into national health system frameworks

Contribution to Knowledge

This study contributes to the existing literature by providing community-level empirical evidence from Sierra Leone, a context that remains underrepresented in maternal health research. Unlike many facility-based studies, this research captures the perceptions and experiences of multiple stakeholders, offering a more nuanced understanding of how CHW services are experienced at the grassroots level.

Summing-up, this findings suggest that CHW service delivery strongly associated with improved maternal health-related indicators in rural Sierra Leone. However, this relationship influenced by broader health system, socio-economic, and behavioral factors. While CHWs play a critical supportive role in promoting maternal health, their effectiveness depends on the strength of the systems within which they operates.

5.0 Conclusion

This study provides empirical evidence on the perceived role of community health workers (CHWs) in shaping maternal health outcomes in rural Sierra Leone. The findings indicate a strong association between CHW service delivery such as health education, antenatal promotion, home visits, and referral support and improved maternal health-related indicators, including awareness of danger signs, care-seeking behaviors, and safe delivery practices.

These results align with existing literature highlighting the importance of CHWs in supporting maternal health service utilization and community-level health awareness in resource-constrained settings [15]; [14]; [11]. However, maternal health outcomes are also shaped by broader structural, socio-economic, and health system factors, which influence the effectiveness of CHW interventions [13].

Future research should incorporate longitudinal and mixed-method approaches to better understand causal pathways and to explore how CHW interventions interact with structural determinants of maternal health.

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Conflict of Interest

The authors declare that they have no competing interests or conflicts of interest related to this study.

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The opinions expressed in this article are those of the contributors alone and do not necessarily represent the views, policies, or position of any of the institutions and/or ethics review boards with which they are affiliated.

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