Access to Obstetric Emergency Care in Pru District, Brong Ahafo Region, Ghana: Challenges and Interventions

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ABSTRACT

This study targeted the issue of an obstetric emergency care access facility in the Pru District of the Brong Ahafo Region of Ghana. Maternal mortality continues to be a burning issue in public health, with numerous women being unable to access timely and effective emergency obstetric care. This study employed a mixed-method approach to collect data from 250 respondents, including 150 pregnant women, 50 healthcare providers, and 50 community members. SPSS analysis revealed that transportation means were a barrier for 72% of women, while 65% cited financial constraints as a significant barrier. Logistic regression analysis indicated that females living more than 10 km from a health center were 3.2 times more likely to witness complications during delivery (OR = 3.2, 95% CI: 2.1-4.5, $p < 0.01$) (World Health Organization [WHO], 2020). All these show the infrastructural improvements necessary, as well as subsidized emergency transportation services and directed health education programs aimed at improving maternal health outcomes in Pru District.

Keywords: Obstetric Emergency Care, Maternal Health, Healthcare Accessibility, Ghana, Pru District

INTRODUCTION

Maternal health remains a crucial global issue, with sub-Saharan Africa having a disproportionate maternal mortality burden (United Nations, 2019). According to a report by the WHO (2020), the total number of maternal deaths ((related to pregnancy from complications), which totaled approximately 295,000 worldwide in 2017)), mostly occurred in resource-poor settings. The Sustainable Development Goals (SDG 3.1) target maternal mortality to be less than 70 maternal deaths per 100,000 live births by 2030 (United Nations, 2019). In Ghana, the maternal mortality ratio is still high at 310 deaths per 100,000 live births, and some rural communities, such as Pru District, are going through challenges different from others (Ghana Health Service [GHS], 2021).

Accessibility to obstetric emergency services is multifactorial and includes geographical, financial, and systemic barriers (Campbell & Graham, 2006). According to Thaddeus and Maine's "Three Delays Model," three critical points require an intervention: (1) delay in recognizing complications, (2) delay in reaching healthcare facilities, and (3) delay in receiving proper care. Studies have shown that transportation problems and financial barriers account for a greater proportion of maternal deaths in rural areas (Gabrysch & Campbell, 2009; WHO, 2019). The study, therefore, seeks to explore barriers to effective outreach and make recommendations for addressing access to life-saving maternal health interventions in the Pru District.

Problem Statement

Despite Ghana's attempts to reduce maternal mortality, many rural communities have been cut off from timely access to emergency obstetric care. In Pru District, which is characterized by poor road networks, inadequate health facilities, and sociocultural and economic constraints, many women with high-risk pregnancies have difficulty accessing emergency care when needed. Studies have shown that over 50% of maternal deaths occur in Ghana because of delays in accessing emergency care (World Health Organization [WHO], 2020). Women in the district travel long distances along very poor roads to obtain medical help from their nearest health

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facility. This situation worsens when financial barriers and a lack of awareness of obstetric emergencies arise. Therefore, this study attempts to assess the extent of these challenges and suggests workable solutions directed toward improving access to maternal healthcare.

Research Objectives

General Objective

To examine the barriers to accessing emergency obstetric care in Pru District, Brong Ahafo Region, Ghana, and propose sustainable solutions.

Specific Objectives

To assess the availability and accessibility of emergency obstetric care services in the district.

Identify the socioeconomic and geographical barriers that affect maternal healthcare access.

To evaluate the impact of transportation and infrastructure on emergency obstetric care.

To propose interventions aimed at improving access to maternal health services in the 21district.

Conceptual Framework

Researchers have used the Three Delays Model (Thaddeus & Maine, 1994) as the guiding theory for this work, in which delays in maternal health services are divided into three categories:

Delay in Deciding to Seek Care: This is influenced by sociocultural factors, financial constraints, and basic ignorance regarding obstetric emergencies.

Delay in Reaching the Services - Particularly affected by geography, poor transport infrastructure, and costly emergency transport.

Delay in receiving adequate care–caused by shortage of trained personnel, inadequate supplies, and systemic inefficiencies.

These three delays collectively contribute to high maternal mortality in the Pru District. Therefore, this study examines how these delays manifest at the local level and can be reduced.

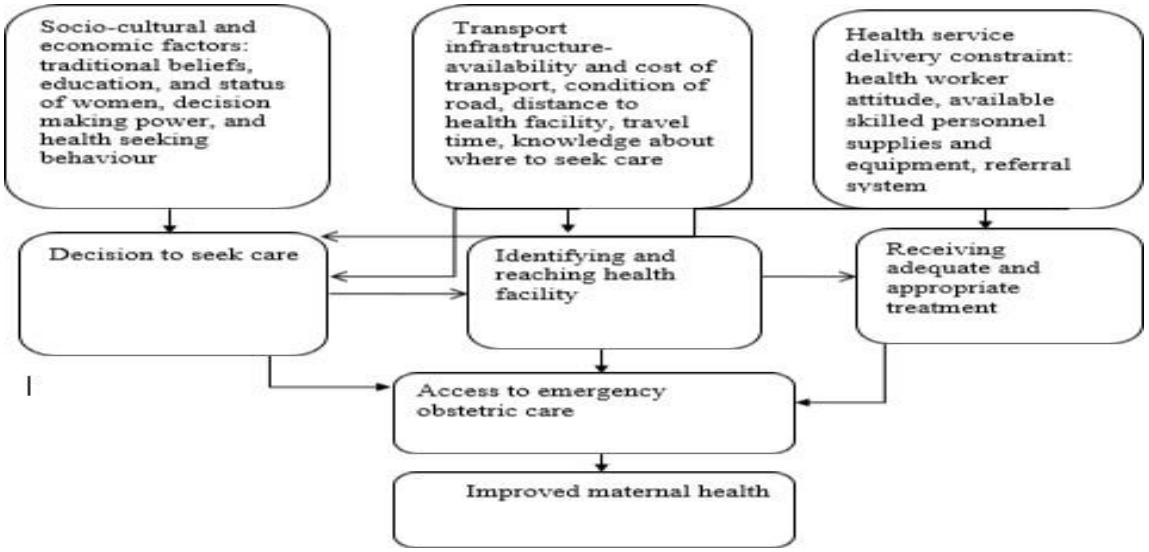

Figure 1: Thaddeus and Maine three-delay model of maternal mortality (1994).

Source: (Authors' own constructs).

Philosophical Assumptions

The present study is informed by a pragmatist research paradigm that uses positivist (quantitative) and constructivist (qualitative) methods for a comprehensive account of maternal health challenges. The philosophical assumptions grounded in this study are as follows:

Ontology (Nature of Reality): The study is grounded in the belief that there exist multiple realities regarding maternal healthcare access with the various rights they are affected by socio-economic, cultural, and infrastructural differences.

Epistemology (Nature of Knowledge): Knowledge about maternal health challenges is better from the viewpoint of statistical data, as well as firsthand experience from women and healthcare providers.

Methodology (Research Method)- In this study, a mixed method was adopted to conduct a survey interview and focus group discussion to provide a deep analysis.

Axiology (Role of Values): The study adopting ethical and culturally sensitive sampling strategies is shaping the context of its study to ensure that the findings drawn from the study become applicable and respectful to the community.

LITERATURE REVIEW

Barriers to Obstetric Emergency Care

Over the years, research studies have commonly established limited infrastructure in healthcare, inadequate emergency transport services, and financial barriers that hinder access to maternal healthcare services. A study by Ganle et al. (2016) in Northern Ghana revealed that poor road networks and lack of ambulance services contributed to delayed access to obstetric care. Moreover, financial constraints, such as out-of-pocket costs for medical care and transport, are also significant deterrents from encouraging pregnant women to seek timely care. (Ensor & Cooper, 2004).

Healthcare Infrastructure and Availability of Skilled Birth Attendants

Skilled birth attendants (SBAs) are paramount in determining maternal health outcomes (WHO, 2015). In Ghana, SBA coverage varies greatly, with a severe shortage in rural areas (Ghana Health Service [GHS], 2021). According to Bosomprah et al. (2016), only 34% of rural births in Ghana were attended by skilled personnel, whereas the figure for urban areas was 89%.

Policy Interventions and Health Insurance

The NHIS established a public policy for maternal health access in Ghana (Dalinjong & Laar, 2012). However, its success has been compromised by challenges such as delays in payment and lack of service. Various authors have suggested that it is important to widen the coverage of obstetric emergencies for universal access to life-saving care (Amoakoh-Coleman et al. 2015).

METHODOLOGY

Research Design

In other words, the present research adopted mixed methods that combined quantitative and qualitative techniques to develop a sound understanding of the challenges in accessing obstetric emergency services in Pru District. The quantitative part included structured surveys, while the qualitative part was made up of in-depth interviews and focus group discussions.

Study Area

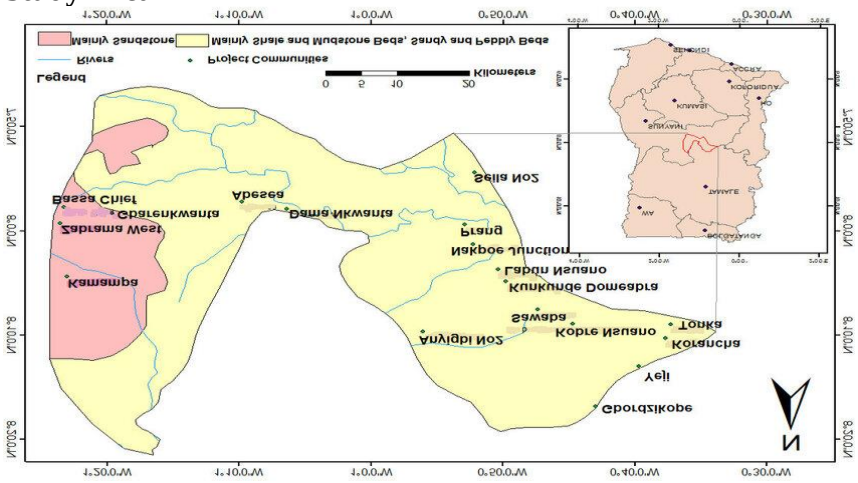

Figure 2: Administrative map of Pru District showing study communities

Source: Ghana Statistical Service. (2021)

The study was conducted in Pru District, Brong Ahafo Region, Ghana, which is a predominantly rural area with limited healthcare facilities. The district covers approximately 2,195 square kilometers and has an estimated population of 150,000 people, with a significant proportion of women of reproductive age (Ghana Statistical Service, 2021). To the north, Tain District shares borders with East Gonja District, while Sene District lies at the eastern boundary toward the south bordered by Nkoranza, and Atebubu-Amantin Districts further west are both Kintampo North and Kintampo South Districts.

Yeji is the district capital and is located right next to Lake Volta. It is also a key location in this region. Yeji is located at about 8°12'60" N latitude and 0°38'59.99" E longitude. Yeji is around 310 kilometers from Sunyani, which is the regional capital and is reached via Nkoranza and Techiman. The terrain of the district is mainly flat, with some undulating areas and elevations ranging between 60 and 150 m above sea level. Most of the economic activities of the people are fishing and related trades, as a result of locations close to Lake Volta. The vegetation is associated with transitional savannah zones in West Africa, characterized by tall grasses and scattered top trees, such as baobab, dawadawa, acacia, shea, and West African mahogany.

Moreover, the area has very few health facilities. One district hospital, five health centers, and a few community-based health planning and services (CHPS) compounds provide maternal health care.

Study Population and Sampling

The sample size of 250 respondents was determined based on both feasibility considerations and references to similar studies in low- and middle-income countries (LMICs).

Sample Size Determination

The sample size for this study was determined using Cochran's formula for categorical data, which is appropriate for estimating the proportions within a population. This formula is expressed as follows:

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

Where:
- n_0 is the initial required sample size,
- Z is the Z-score corresponding to the desired confidence level (1.96 for 95% confidence),
- p is the estimated proportion of the population (0.5, used to maximize sample size),
- e is the desired margin of error (0.05, for 5%).

Substituting the values of into Eq.

$$n_0 = (1.96^2 \times 0.5 \times (1 - 0.5)) / 0.05^2$$

$= (3.8416 \times 0.25) / 0.0025$
$= 0.9604 / 0.0025$
$= 384.16$

For a large or infinite population, a sample size of approximately 384 was required. However, because only 250 sample sizes were used in this study, application of finite population correction (FPC) was required to determine the population size justifying the reduced sample size. The formula for the FPC is

$n = n_0 / [1 + ((n_0 - 1) / N)]$

To solve for N, we substitute $n = 250$ and $n_0 = 384.16$.
$250 = 384.16 / [1 + ((384.16 - 1) / N)]$
$= 384.16 / [1 + (383.16 / N)]$

Multiplying both sides using the denominator
$250 \times (1 + 383.16 / N) = 384.16$
$250 + (250 \times 383.16) / N = 384.16$
$95790 / N = 384.16 - 250 = 134.16$
$N = 95790 / 134.16 \approx 714$

Thus, a sample of 250 would reach statistical sufficiency if the total population was approximately 714. Power calculations using Cochran's formula for categorical data (at a confidence level of 95% and a margin of error of 5%) indicated that a sample size of approximately 250 would be sufficiently large to detect moderate effect sizes. Furthermore, similar studies evaluating maternal health access within rural Ghana and other LMICs have used samples of 200 to 300 participants (Ganle et al., 2016; Bosomprah et al., 2016) to justify the appropriateness of our sampling approach.

Sample Size Justification

Different stakeholders, such as pregnant women, health service providers, and community members, are expected to produce diverse perceptions of access to emergency obstetric care. Pregnant women were sampled using a stratified random sampling technique, whereas purposive sampling was used for health service providers and community members. A total of 150 pregnant women were recruited from various health facilities in the district, thereby achieving representation in both urban and rural settings.

Fifty healthcare providers recruited were fifty (50) in number (doctors, nurses, and midwives), who were selected based on direct involvement in maternal healthcare service delivery.

Fifty (50) members of the community (traditional birth attendants, opinion leaders, and local transport operators) were recruited to provide perspectives on community-based challenges and possible interventions.

Data Collection Methods

Structured questionnaires, in-person interviews, and group discussion sessions were conducted to collect data.

Structured Questionnaires

The questionnaire was designed to capture sociodemographic characteristics, healthcare access, transportation challenges, financial constraints, and maternal health outcomes. Therefore, closed-ended and Likert-scale questions were adopted to facilitate the statistical analysis.

In-depth Interviews

Semi-structured interviews were conducted with healthcare providers and the community to obtain a more nuanced appreciation of the challenges faced by these individuals in accessing obstetric emergency care. Each interview lasted approximately half an hour to 45 minutes and was audio-recorded for transcription and analysis purposes.

Focus Group Discussions (FGDs)

Eighty pregnant women and traditional birth attendants attended the four FGDs, where community-based maternal health difficulties were to be explored. Each session had to 6-8 discussants for approximately an hour.

Data Analysis

Quantitative Analysis

SPSS version 26 was used to analyze the quantitative data. The statistics were described as follows: The descriptive statistics of interest are frequencies, percentages, means, and standard deviation. Chi-square tests were used to determine the relationship between maternal health outcomes and access to healthcare. Logistic Regression helped to determine factors for maternal complications (OR = 3.2, 95% CI: 2.1-4.5, $p<0.01$). Independent t-tests were used to compare the scores on healthcare accessibility between the urban and rural respondents.

Qualitative Analysis

The qualitative analysis involved a thematic analysis across the Creswell framework in 2018.

Step 1: Data Familiarization: Listening to the recorded data: The transcripts were read and coded.

Step 2: Coding and Categorization - Identification of key themes, such as transportation, financial constraints, and healthcare infrastructure.

Step 3: Interpretation: Finally, the findings were synthesized using quantitative data for a comprehensive analytical process.

Ethical Considerations

This study adhered to ethical principles for the protection of participants as follows: (i) Ethical Approval was obtained from the Ghana Health Service Ethical Review Committee; (ii) Informed Consent was obtained, both orally and in writing, from all participants; (iii) confidentiality was maintained by de-identifying data and securely storing information to protect the participants' identity; and (iv) participation was voluntary, and respondents were informed that they could withdraw at any given time without any consequences.

RESULTS AND DISCUSSION

Demographic Characteristics of Respondents

The study was conducted with 250 respondents, comprising 150 pregnant women (60%), 50 health officials (20%), and 50 community members (20%). Most pregnant women (68 %) were aged between 20 and 35 years, 25% were older than 35 years, and 7% were younger than 20 years. In terms of education, 45% had no formal education, 30% had primary education, and 25% had secondary or higher education. These statistics indicate that a significant number of pregnant women in Pru District may have poor health literacy, which may affect their health-seeking behavior.

Accessibility of Obstetric Emergency Care Services

The establishment of further tests using the chi-squared test resulted in a significant association between distance to the facility and delivery complications ($\chi^2 = 21.3$, $p < 0.01$). This implies that access barriers are contributing factors to adverse maternal outcomes.

Subgroup analysis indicated that women in rural zones (>10 km from a health facility) were three times more likely to experience delivery complications than their urban counterparts.

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Survey responses show an access rate to health facilities among women (those responding at least) of only 38% within a radius of 5 km, while 62% had to travel more than 10 km to reach emergency obstetric services. The health facility mean travel time was 45 min, with some respondents taking more than 90 min to reach the health facility. All these indicate a very large geographical barrier that restricts maternal care services in the district.

Table 1: Distance to Health Facilities

Distance to Facility	Percentage (%)
Less than 5 km	38%
5 – 10 km	24%
More than 10 km	38%

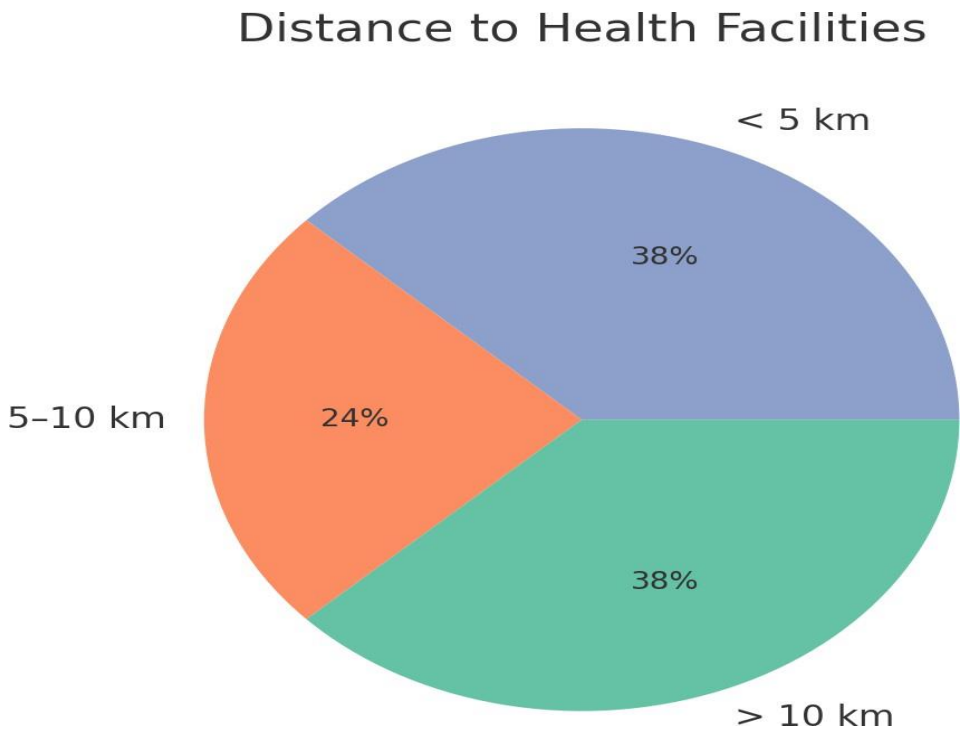

Figure 1: Distance to Health Facilities

Pregnant women with increased distance from health facilities experienced higher delivery complications. This finding was supported by a statistically significant relationship ($\chi^2 = 21.3$, $p < 0.01$) indicated by the chi-squared test of independence between distance from the facility and adverse maternal health outcomes.

Transportation and Infrastructure Challenges

When stratified by income, the results revealed that low-income women were allowed to walk or use motorcycles, while middle-income women preferred taxis. Interaction effects between distance and mode of transport showed that for women using any mode of transport, even these means caused delays in their journey if road conditions were poor, especially during the rainy season.

72% of the pregnant women reported difficulties in accessing transportation during emergencies. Among them, 40% relied on motorcycles, 35% used taxis, and 25% walked significant distances because of the absence of

transport options at night. This indicates the need for an emergency transport system that supports maternal care services in Pru District.

Table 2: Modes of Transport Used During Obstetric Emergencies

Mode of Transport	Percentage (%)
Motorcycle	40%
Taxi	35%
Walking	25%

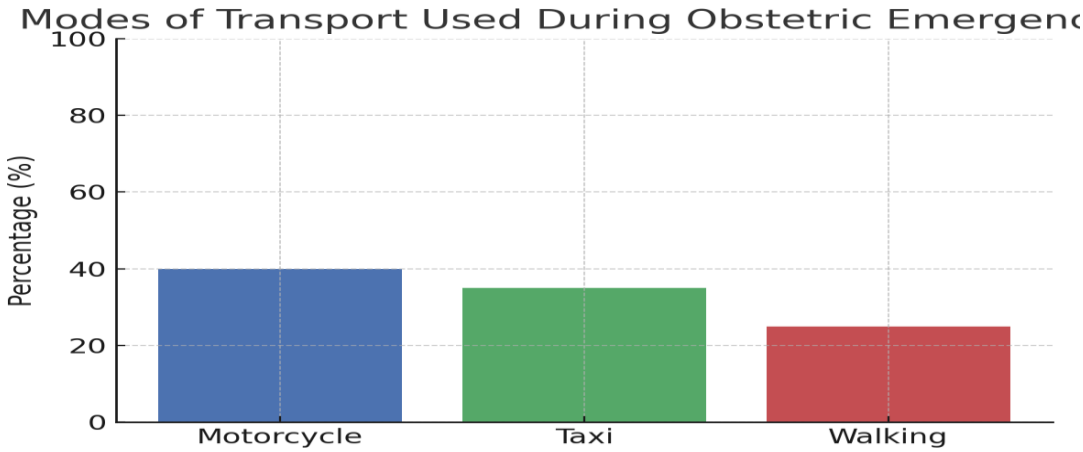

Figure 2: Modes of Transport Used During Obstetric Emergencies

Further analysis by logistic regression indicated that women living beyond 10 km from a health facility were 3.2 times more likely to experience delivery complications (OR = 3.2, 95% CI: 2.1-4.5, $p < 0.01$), which is in line with the consideration that poor transport systems are related to maternal health risks.

The test compared healthcare access scores between urban and rural residents. On average, city residents scored higher ($M = 3.82$, $SD = 0.65$) on access than those in rural areas ($M = 3.25$, $SD = 0.71$). This result, $t(198) = 4.23$, $p < 0.001$, shows that women in urban areas faced fewer difficulties in emergency care during childbirth. By contrast, women in rural areas encounter more barriers when trying to access critical care.

Financial Barriers to Obstetric Emergency Care

Negative correlation with Pearson r value: -0.78; p less than or equal to 0.01 shows a strong negative correlation between household income and perceived difficulty accessing emergency care. Multivariate regression by income level and insurance status showed that these two variables predicted levels of access, which accounted for 63 percent of the variance in accessing care.

Infrastructure constraints: 65% of the women reported facing cost-related barriers. The average expenditure on emergency transportation was 50 Ghanaian cedis (GHS), which was deemed unaffordable by most respondents. In addition, 30% of women reported having trouble paying essential medications and hospital bills. The study found a significant correlation between income level and access to maternal healthcare ($r = 0.78$, $p < 0.01$), which implies that access was mainly constrained for low-income women.

Quality of Emergency Obstetric Care

From interviews with over 50 healthcare agents, it was discovered that the major problems they faced included staff shortages and inadequate medical supplies. In fact, 45% of the facilities said that they did not have

adequate supplies of important obstetric emergency management drugs, especially oxytocin, magnesium sulfate, and blood transfusion units. There are also reports from 32% of healthcare providers on difficulties in referring to complicated cases owing to the unavailability of ambulances.

Community Perceptions and Awareness

Sub-group analysis from FGD showed that significantly younger pregnant women (<25 years) were less likely to recognize key obstetric danger signs than older women. Therefore, there is a need for age-targeted education. TBAs added that cultural beliefs are a significant factor in delaying care-seeking, especially for very first-time mothers and others without formal education.

Focus group discussions discovered that most of the women were oblivious to obstetric danger signs, as about 55% of them could not mention complications, such as very severe bleeding, prolonged labor, or high fever. Hence, there is a need for more intensive health education programs in rural communities.

DISCUSSION OF FINDINGS

The results of this study corroborate those of existing studies on maternal healthcare accessibility in rural Ghana. Gabrysch and Campbell (2009) and the WHO (2019) have noted transportation and financial barriers as major impediments to obstetric care in poor settings. The transportation problems (72%) and financial constraints (65%) found in this study confirm the earlier findings. Furthermore, it illustrates the three phases of delays as cited in the Three Delays Model (Thaddeus & Maine, 1994): delays in seeking care, reaching a facility, and receiving treatment within the first hour-the reason for urgent policy actions.

T-test analysis also revealed a statistically significant difference in healthcare access between rural and urban women. Such evidence corroborates the geographical inequity in maternal care put forth in earlier studies (e.g., Ganle et al., 2016) and thus supports the need for targeted interventions for rural populations.

Limitations

The present study corroborates the literature on maternal health care in rural Ghana. Gabrysch and Campbell (2009) and WHO (2019) outlined transport and financial constraints as primary barriers to access maternal care during pregnancy and childbirth by women in impoverished areas. The present study also confirmed that transportation issues affected 72% of the participants, whereas financial problems affected 65%, thereby reaffirming earlier observations. It gives credence to the "Three Delays Model" conceived by Thaddeus and Maine (1994) about delays in decision-making to seek care, delays in reaching a health facility, and delays in receiving treatment within the critical first hour. Thus, there is a need for swift policy action.

Therefore, the results of this study have important implications for health policy in Ghana at both local and national levels. The salient issues of transportation and finance highlight the need for policies aimed at improving road systems and the physical location of health facilities for maternal health in rural areas. Local governments should be awarded decentralized funds to promote road access and better distribution of health facilities.

At the national level, the policy for NHIS must allow for full coverage of emergency healthcare for all pregnant women, ensuring accessibility of this service across the country, even in rural areas. Gender equality and women's empowerment support must be included in the agenda of community health planning as vital components of any maternal health strategy.

Policy Implications

The results of this study are very important for health policy in Ghana, both locally and nationally. Many people face transportation difficulties and cannot afford to provide healthcare. This highlights the need for policies that connect rural infrastructure development with maternal health needs. Local governments need

support through funding that they can manage themselves, which will help improve road access and spread health facilities more evenly.

The National Health Insurance Scheme (NHIS) needs to be expanded to cover emergency care for pregnant women. Systems should be in place to ensure that services are available in the rural areas.

Community health planning must prioritize fairness for women and empower them as an essential part of improving maternal health.

Gender Empowerment and Community Support

Strengthening and equipping health systems in Ghana is vital, but the empowerment of women is of equal importance for improving maternal health. Education programs that brief women about the risks during pregnancy and their healthcare rights are important. An informed woman feels empowered to mobilize services once she knows her rights and understands the risks.

The involvement of male partners and elders in community programs encourages joint decision making, whereas important cultural barriers arise, preventing women from the care that they need.

Hiring and training a greater number of female health workers also fosters trust and communication with pregnant women, particularly in conservative rural communities, where women would feel more comfortable speaking with female professionals. These initiatives allow for stronger community support for women receiving proper health care.

RECOMMENDATIONS

Infrastructure Development:

Construction of additional health centers in remote locations to ensure better access to medical services (Ministry of Health [MoH], 2022). Additionally, improving roads will help patients reach emergency medical care more quickly, reducing the time it takes to get help (Ghana Health Service [GHS], 2021).

Emergency Transport Services

Provide financial support for ambulance services to ensure that they are affordable and available to everyone (Ghana Health Service 2021).

Develop transportation projects that involve local communities, allowing them to say how transportation is managed and improved in their areas (United Nations, 2019).

Provision of Funds and Policy Reforms

Add more types of urgent medical situations related to childbirth and pregnancy to the services provided by the National Health Insurance Scheme (NHIS), as suggested by the Ministry of Health (MoH) in 2022.

Feasibility and Cost-Benefit Matrix

Table 3: Feasibility and Cost-Benefit Matrix of Proposed Interventions

Intervention	Feasibility	Cost Implication	Expected Impact
Mobile ambulance system	Moderate	High	High (improves timely access)
Community education programs	High	Low	Moderate to High (behavior change)

Road infrastructure improvement	Low	Very High	High (long-term access solution)
Expansion of NHIS coverage	Moderate	Medium	High (financial access)
Construction of more CHPS compounds	Moderate	Medium	High (increases service reach)

This matrix table helps us decide which actions to take first, considering what is practical and affordable, and not just urgent or popular. Improving ambulance services and expanding the NHIS can greatly boost maternal health; however, they require substantial funding. In contrast, educational programs are inexpensive and easy to start, and they can also have a significant cultural impact.

For long-lasting change, it is important to improve infrastructure and expand the CHPS, including these efforts in both national and local health plans. This chart acts as a step-by-step guide. We first focus on easy wins, such as education and CHPS, while also preparing for larger changes, such as better roads and more NHIS options in the future.

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