

Healthcare Access and Maternal Mortality: Transportation as a Critical Factor in Emergency Obstetric Care

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ABSTRACT

Maternal mortality: it is a very serious public health topic in geographically isolated and disadvantaged (GIDA) communities in the Philippines, where geographical isolation, a lack of infrastructure and transport severely delay emergency obstetric care. National maternal health programs notwithstanding, local and context-specific evidence is still necessary, as preventable maternal deaths are still occurring. The proposed study was based on the aim of investigating the issues facing emergency obstetric care during transport in Barangay Cagnipa, Garchitorena, Camarines Sur, and determining the community informed solutions on the barriers to timely access to emergency obstetric care. Data were gathered based on a phenomenologically informed qualitative case study design guided by the Three Delays Model and enacted through the in-depth-interviews, focus group discussions, key informant interviews, and field observations by collecting data using 30 purposely sampled participants. The four themes identified through thematic analysis consisted of: (1) extreme transportation factors such as geographic isolation, weather dependent sea travel and unavailable vehicles and high costs of transport; (2) cultural beliefs and mistrust in institutional care making care-seeking delayed; (3) the systemic limitations live up to healthcare such as poor quality in supplies, facility preparedness, and low referral systems, (4) the restrained emergency response at the community and municipal level. These results indicate that transportation barriers work alongside her socio-cultural and health system to increase delays and prevent avoidable maternal deaths. The research paper provides novel localized qualitative data of the experience of transport-related delays in a remote Philippine barangay and offers community-driven-based emergency transport, enhanced referral coordination, and culturally-sensitive maternal health literacy as community-oriented strategic interventions that may enhance maternal outcomes in remote, geographically isolated communities.

Keywords : Maternal Health, Transportation Barriers, Emergency Obstetric Care, Socioeconomic Factors, and Healthcare Access

INTRODUCTION

Another key, but preventable, form of public health challenge in the Philippines is in maternal mortality, especially among women in geographically isolated and disadvantaged areas (GIDAs) where access to skilled obstetric care is disadvantaged because of geographical factors. The Camarines Sur, Garchitorena, a mountainous area inhabited by island barangays, was considered to have weather-dependent travel so that during emergency situations, pregnant women might report dramatic delays when traveling to the facilities. In the case of barangay Cagnipa specifically, fatalities caused by the mother due to delayed arrival at proper care have been recorded, hence there are cases where continuous travel needs the combination of walking, tricycle ride and sea transportation, which is not always available during a storm or at night [1], [2], [3].

Transportation is always cited as a major obstacle to safe birth in rural and inaccessible locations. According to previously conducted studies, geographic distance, high transport cost, and untrustworthy mobility are some of factors that cause fatal delays even in situations where the women are trying to access care. The factors that exacerbate these barriers in an archipelagic and climate-vulnerable environment include terrain and weather conditions and are coupled with poverty and poor local infrastructure. Studies also underscore the fact that cultural practices and faith in traditional birth attendants disable timely access to facility-based care, whereas rural facility preparedness and referral logistics only fatten the emergency management [4], [5], [6], [7].

Maternal mortality is a long-standing societal issue in low and middle income countries, especially in geographically closed and underprivileged zones where access into the health system is limited due to the topography, infrastructure and poverty [14], [15]. The inequality in maternal outcomes within the rural and island municipality settings in the Philippine particularity is a systemic phenomenon that is evident in transportation, referral and access to skilled obstetric services [16], [17].

It has been shown in rural and archipelagic settings that the lack of adequate emergency transport networks plays a major role in Delay II, where ladies take protracted durations to accrue to the right care with the right obstetricians [18], [19]. The variability in climatic conditions, the reliance on using sea transport, and out-of-pocket high expenses of travelling compounds delays during obstetric emergencies [20].

Research studies conducted on rural Asian and Pacific have indicated that maternal decision making is a strong influence of cultural beliefs, previous negative experiences with health facilities, trust in traditional birth attendants, delaying health facilities in availing their services in regard to delivery [21], [22].

Even with customary approaches to encourage proficient birth attendance and emergency birth services, one issue of concern is settled: the functionality of constraints of transportation use in actual maternal crises in remote Philippine barangays, and the relationship between these constraints and cultural inclinations and constraints of the referral system to generate Delay 2 outcomes has yet to be resolved. The current literature tends to characterize transport as a broad obstacle but is not intricate enough to reflect the experienced, situation-specific dynamics of delay of families and frontline employees within such municipalities as Garchitorena. [1], [8], [9]

Recent reports indicate on a consistent basis that poor transportation systems in emergencies are a key cause of maternal mortality within rural and geographically isolated regions, especially in low- and middle-income nations [16], [17]. Poor road networks, the use of boats, weather fluctuations and high out of pocket transport expenses, in the usability of the area, add to the delays, which in turn contributes to the risk of fatality in case of obstetric emergencies, especially in archipelagic regions and areas that are hard to access [18], [19].

The rural and low-resource-based evidence suggests that cultural beliefs, prior adverse experiences with health facilities, and the trust in the traditional birth attendants are crucial factors in maternal decision-making and the postponement of obstetric care. With these socio-cultural determinants, there are structural barriers including transportation and cost, which also increase delays to access care and maternal death, which would otherwise be preventable.

To fill this gap, the research will examine the barriers to transportation and emergency obstetric access impacting on timely access to emergency care delivery in Barangay Cagnipa within a qualitative, phenomenologically informed case study based on 3 Delays Model, with the focus on the 2nd delay (reaching care). The synthesis of the views of medical staff, community leaders, relatives, and neighborhood residents informs the reader how the realities of transport, socio-cultural variables, and health-system limitations all meet in the face of obstetric emergency, and the study also creates area-specific solutions to enhance emergency response within GIDAs.

Recent literature has verified that transportation has been one of the biggest impediments to emergency obstetric services in low and middle-income nations. A rural ambulance service in Northern Togo showed that community based, well-organized, emergency transport systems can greatly reduce delays to the facilities and can make the difference between life and death among the women with obstetric complications, highlighting the fact that the availability of transport has a direct impact on maternal mortality [29]. A comparable result was obtained in multi center studies, in which the absence of vehicles, excessive distances, and inadequate road networks were strongly linked to the delayed emergency care and avoidable maternal deaths [31].

Transportation as a determinant of maternal health outcomes in low resource settings is widely reported in the existing literature. But the majority of the research is based on quantitative indicators or general regions of analysis. The study is valuable since it presents qualitative, in-depth, and community-level analysis of the transportation barriers experience within a geographically remote Philippine barangay. Focusing on the lived experiences on families, frontline health workers and local leaders, the study identifies contextually touched processes theoretic of delay including weather--dependent sea travel, inaccessibility of transport at night and informal community rescue mobilisation, which can hardly be found in national datasets. This evidence at a local

level can be used practically by developing culturally sensitive and community-based interventions that will help design emergency transport and referral interventions based on GIDAs.

The high rate of maternal mortality in geographically isolated and disadvantaged areas (GIDAs) in Philippines is intolerable even with the availability of a national maternal health program. In municipal towns like Garchitorena, Camarines Sur, physical isolation, reliance on sea transport, high cost of travel and poor road network make women have a long way to go to access emergency obstetric services. Although transportation has been recognized as a barrier in a broad manner by past studies, there is scant contextualized qualitative data on how transportation factors and socio cultural beliefs and local health systems constraints would interact and result in deadly delays in emergencies of the obstetric incidences. The lack of localized and experience-based evidence does not provide effective interventions on the community level. The proposed study will fill this gap by exploring transportation-based challenges to emergency obstetric care in Barangay Cagnipa through a phenomenologically informed case study based on the Three Delays Model.

This study aims to explore the transportation-related barriers affecting timely access to emergency obstetric care in Cagnipa, Garchitorena, Camarines Sur. It seeks to generate contextual insights into how these barriers operate and to identify community-informed strategies for improving maternal health outcomes in geographically isolated settings.

1. What transportation-related barriers do pregnant women in Cagnipa, Garchitorena, and experience when seeking emergency obstetric care?
2. How do geographic distance and the availability of transportation affect the timeliness of care during maternal health emergencies?
3. How do socio-economic conditions shape women’s access to transportation during obstetric emergencies?
4. What are the perceptions of healthcare providers and community members regarding existing transportation support systems for maternal health?
5. What context-specific strategies can be proposed to improve transportation and emergency response systems for pregnant women in the area?

Table 1: **CONCEPTUAL FRAMEWORK**

Input	Output	Process
<p>Availability and quality of roads, vehicles, and transport services. Resources and factors that influence healthcare access and maternal mortality. They include the physical infrastructure for transportation, the availability of healthcare facilities, trained personnel, community awareness, and supportive policies</p>	<p>Mechanisms for identifying and responding to obstetric emergencies. Actions and systems in place that facilitate access to emergency obstetric care. They include emergency response systems, referral protocols, community engagement efforts, and data collection mechanisms.</p>	<p>Increased Access to Emergency Care, more women receiving timely emergency obstetric care. Metrics help assess the impact of the study over time. They provide quantitative and qualitative data to evaluate changes in maternal mortality rates, transportation efficiency, healthcare utilization, community awareness, and healthcare provider readiness.</p>

The table above categorizes essential components into three sections—Inputs, Processes, and Outputs—in alignment with the Three Delays Model, which identifies critical intervention points to reduce maternal mortality. Inputs correspond to addressing Delay 1: the delay in deciding to seek care. This includes initiatives such as community education, awareness campaigns, and supportive policies that empower women and families to recognize maternal danger signs and make informed decisions promptly. It also encompasses the dissemination of accessible, culturally sensitive health information and outreach programs that build trust in formal healthcare systems. Processes relate primarily to Delay 2: the delay in reaching a healthcare facility. Key

interventions include the development of reliable transport infrastructure, the establishment of emergency transport systems, and the implementation of efficient referral pathways. These efforts ensure that once the decision to seek care is made, pregnant women can reach appropriate facilities in a timely manner. Additionally, community mobilization and local emergency preparedness further reduce transit delays. Outputs address Delay 3: the delay in receiving adequate care upon arrival at a health facility. This dimension highlights the importance of functional healthcare systems, including the presence of trained personnel, the availability of essential medical supplies, and the capacity to deliver emergency obstetric services. Integrated monitoring and data collection systems also support the evaluation and continuous improvement of maternal health interventions. By mapping these components to the Three Delays Model, the framework underscores the need for comprehensive, system-wide strategies that address maternal health challenges across all stages of care, particularly in geographically isolated and underserved communities.

Limitations

This study, while offering rich insights into maternal healthcare challenges in geographically isolated areas, is subject to several limitations. First, the research focused on a single municipality—Garchitorena, Camarines Sur—which limits the generalizability of findings to other regions in the Philippines. Second, although 30 participants were purposively selected to represent diverse perspectives, the sample size remains modest and may not capture the full variability of experiences in similar communities. Third, as with all qualitative research, there is a degree of subjectivity in data interpretation despite efforts to ensure rigor through member checking and thematic coding. Lastly, logistical constraints, such as weather conditions and access to remote barangays, posed challenges in conducting on-site observations and may have limited the scope of field data collection. Although the results do not allow exploring the potential of generalizability because of the qualitative case study design and the limited geographic and population area, they present transferable information that can be used to develop interventions aimed at promoting maternal health in other geographically isolated and disadvantaged communities with comparable contextual environments.

METHODOLOGY

This research paper hypothesizes a qualitative, community-based research of transportation obstacles of emergency obstetric care and incorporates the views of healthcare providers, community leaders, family members, and community residents. The research employs a phenomenologically informed case study design founded on the Three Delays Model to systematically record lived experiences of maternal emergencies to determine the lack of operations, socio-cultural barriers, and failure at the system-level. The research also seeks to develop locally based actionable interventions, like community based emergency transport systems, reinforced referral coordination and culturally sensitive maternal health education to enhance access to obstetric care

Study Design

The qualitative case study design guided by phenomenological concepts was used in this study to explore the factors that impede emergency obstetric care due to transportation issues in Barangay Cagnipa, Garchitorena, Camarines Sur. The qualitative approach was suitable as the study aimed at gaining insight into lived experiences, perceptions and contextual issues that determine maternal health outcomes as opposed to estimating prevalence or causality. Although the study initially used phenomenology to focus on subjective lives of participants, the particular maternal death case was investigated in the context of a broader social and health system; hence, case study design was the most efficient in the end that would enable conducting a comprehensive, context-specific investigation.

Research Site and Scope

This was done in the geographically isolated and disadvantaged area (GIDA) of Barangay Cagnipa where sea transport was relied upon, there was poor road network, and the area was in the form of island barangays. The latter geographic characteristics render the community especially susceptible to delays in reaching emergency obstetric services. The data was collected in the period between December 28 and 31, 2024, and the data collection was based on the transport-related maternal health experiences in the municipality.

Participants and Sampling

A total of 30 participants were selected through purposive sampling and they represented various views that are applicable to the access of maternal healthcare. Healthcare providers, barangay leaders, family members, and residents of the community with direct experience of maternal emergency were the participants. This sampling approach was selected because the research is intended to establish in-depth high-quality data that is relevant to the objective of the study, which is to get a return to transport-related delays under variable perspectives.

Data Collection Procedures

Primary data collection was done using key informant interviews, focus group discussions, reviews of documents, and observations made in the field. Semi-structured guides were used in the interviews and discussions so that there was consistency in response across the participants but left some flexibility so as to be able to delve into arising issues. There were field observations done to record transport routes, distances, environmental conditions that influence emergency mobility. Local documents and the relevant health records were reviewed to put participant narratives into context.

Data Analysis

Braun and Clarke (2006) determined six steps of thematic analysis of the data: (1) familiarization with data, (2) initial code generation, (3) theme search, (4) reviewing themes, (5) defining and naming themes, and (6) the final report production. It is a systematic process that helps to identify common patterns in the accounts of the participants. The Three Delays Model was used as an analytical framework in interpreting themes with special reference to Delay 2 (reaching care), which makes the study conceptual framework, research questions, and findings to be coherent.

Rigor and Trustworthiness

In order to strengthen rigor, the study made use of the member checking, inter-source triangulation, and the keen documentation of the analytic choices taken. These helped in enhancing credibility and reliability besides reducing the researcher bias that comes with qualitative research.

Type of Literature Review

The study adopted a thematic literature review approach. Rather than organizing the review chronologically or geographically, the literature was categorized into central themes such as transportation barriers, facility readiness, maternal education, cultural norms, and community-based interventions. This thematic organization enabled the identification of recurring issues across different studies and highlighted a significant gap in research specific to the second delay (transportation to health facilities) within geographically isolated areas of the Philippines. It also established a strong conceptual foundation for applying the "Three Delays" framework to the local case.

The maternal mortality remains due to the geographic inequities in access to emergency obstetric and newborn care. When particularly analyzed through large-scale spatial and health systems, it has been indicated that women within remote communities travel considerably far to visit the equipped locations thus exposing them to increased risks of complications and death [30]. The spatial model research also indicates that long and uncertain travel duration is also a good predictor of poor maternal outcomes and there is need to have transport-sensitive health planning in frail and geographically remote locations [39].

Research Site and Scope

The study was conducted in Barangay Cagnipa, Garchitorena, Camarines Sur, a geographically isolated and disadvantaged area (GIDA) in the Bicol Region of the Philippines. The community is characterized by island barangays, poor road access, and limited healthcare infrastructure, making it a critical setting for studying maternal healthcare access issues. Data collection took place from December 28 to 31, 2024, involving interviews, document reviews, and site observations.

Participants and Sampling

The study employed purposive sampling, a non-probability sampling technique commonly used in qualitative research, to identify participants with direct experience or substantial insight into the maternal death case and transportation-related challenges in Garchitorea, Camarines Sur. Participants were selected based on predefined inclusion criteria to ensure the relevance and richness of the data collected. Eligible participants met one or more of the following criteria:

- (1) healthcare professionals involved in antenatal, emergency, or referral care;
- (2) barangay and municipal officials familiar with health service delivery and transportation infrastructure;
- (3) immediate family members of the deceased woman who could provide context on healthcare-seeking behavior; and
- (4) community members from geographically isolated and disadvantaged areas (GIDAs) who had experienced difficulties in accessing maternal care.

A total of 30 participants were interviewed. This included:

10 healthcare providers, comprising nurses, midwives, and a municipal health officer from the Garchitorea

Medicare Community Hospital and the Municipal Health Office (ages 28–54);

5 barangay and municipal leaders, including barangay captains and health committee heads (ages 35–60); 4 immediate family members of the deceased woman (ages 25–60); and 11 community members, consisting of pregnant women, husbands, and caregivers (ages 20–45) from remote barangays such as Cagnipa and Binagasbasan.

This diverse participant pool allowed for a multifaceted understanding of the barriers to emergency obstetric care, ensuring that both institutional and personal experiences were captured across age, role, and location. This selection process contributed to the credibility and transferability of the study's findings.

Data Collection Methods and Tools

Data saturation was achieved through iterative and overlapping data collection from multiple sources until no new themes or insights emerged. During the in-depth interviews, focus group discussions, and key informant interviews, the researcher monitored when recurring patterns and codes began to stabilize across participant groups. After the 25th participant, few novel codes were identified, and by the 30th participant, the responses consistently reinforced existing themes without introducing new categories. This signaled that thematic saturation had been reached. Additionally, triangulation through document analysis and field observations supported the completeness of the data. Regular debriefings and memo-writing during data collection further helped confirm that saturation had been achieved, ensuring that the findings were both comprehensive and credible.

Data Analysis Procedure

The collected data were analyzed using thematic analysis, following Braun and Clarke's (2006) six-phase framework—a recognized and systematic approach suitable for identifying, organizing, and interpreting patterns of meaning in qualitative data. Audio-recorded interviews were transcribed verbatim to preserve the authenticity of participants' narratives.

The first phase involved data familiarization, during which the researcher repeatedly read the transcripts to gain an initial understanding. This was followed by generating initial codes through open coding, capturing both a priori codes aligned with the study objectives and emergent codes based on unanticipated but significant participant responses. A coding framework was developed and applied using qualitative data analysis software such as NVivo or ATLAS.ti, which enabled efficient data management and traceability.

In the third phase, themes were searched for by organizing related codes into conceptual categories such as "transportation barriers," "community-based responses," and "healthcare system constraints." During the theme review phase, axial and selective coding techniques were used to refine themes, remove redundancies, and establish interrelationships among concepts.

The fifth and sixth phases involved defining and naming final themes and producing the analytical narrative that links these themes to research objectives and literature. To enhance trustworthiness and credibility, member checking was conducted by presenting summary findings to selected participants for feedback and validation, ensuring that the interpretations authentically reflected their lived experiences.

This iterative, theory-informed, and participant-validated process ensured the rigor and alignment of the thematic findings with the study's research questions and philosophical orientation.

Ethical Considerations

This study adhered strictly to ethical research protocols to protect the rights, dignity, and well-being of all participants. Ethical approval was obtained from the relevant Institutional Review Board (IRB) prior to data collection. All participants were given detailed information about the research, including its purpose, procedures, risks, and benefits. Written informed consent was secured from each participant, and they were reminded of their right to withdraw at any point without penalty.

To ensure confidentiality, no personal identifiers were included in transcripts or reports. Pseudonyms and coded references were used to safeguard participant anonymity. All data — including transcripts, field notes, and recordings — were stored securely in password-protected files accessible only to the research team. The study also emphasized cultural sensitivity, acknowledging the local customs and values during interviews and community interactions. Community leaders were engaged as partners to facilitate acceptance of the research process and ensure respectful conduct.

At the conclusion of the study, research findings were shared with the community through summary reports and feedback sessions. This practice promoted transparency, accountability, and the potential application of results to local health planning and maternal mortality reduction initiatives.

RESULTS AND DISCUSSION

This section presents the results and discussion of the case study on Emergency Obstetric Care and Transport. The findings were structured thematically to explore the key factors influencing access to emergency obstetric care in Garchitorena, Camarines Sur. Through a structured thematic analysis, four primary themes emerged from the qualitative data: Transportation Challenges, Cultural Beliefs and Preferences, Healthcare Access and Systemic Barriers, and Emergency Response and Healthcare Provision. Each theme is discussed below, incorporating integrated participant quotations, interpretation, and connections to relevant literature. These results can be correlated to Sustainable Development Goal 3 within the Philippines and the objective of preventing preventable maternal morbidity by emphasizing the role of reinforced transportation systems in times of emergency and equal access to obstetric care in geographically remote and underprivileged localities. The same trend of maternal delays caused by transport in rural Indonesia, Nepal, and sub-Saharan Africa have been reported where geographic isolation and a poor referral network challenges effective emergency obstetric services despite national maternal health programs [23], [24]. Provision of trained staff, worked referral pathways, or necessary supplies is another key factor in reducing Delay III but these aspects are poorly practiced in remote health facilities [25], [26].

The paper found four interconnected themes explaining the role of transportation barrier in causing maternal deaths in Barangay Cagnipa: (1) extreme barriers to transportation in the form of geographical isolation, a shortage of vehicles or boats, high costs, and dependence on the weather; (2) cultural beliefs and distrust in institutional care that causes delays in care-seeking behavior; (3) systemic barriers to healthcare, such as supplies, likely related to the facility readiness level and weak referral systems; and (4), poor emergency response capacity at the community and municipal level. These results identify that transportation barriers do not affect the second and third delays independently but improve their impact in collaboration with sociocultural and institutional aspects and results in maternal deaths that could have been prevented.

Theme 1: Transportation Challenges

Transportation difficulties emerged as the most prominent barrier to accessing timely and effective emergency obstetric care. In geographically isolated areas like Barangay Cagnipa, the physical remoteness, difficult terrain, and reliance on sea travel significantly delayed maternal health responses. Participants shared how *"we couldn't go to the hospital that night because there were no boats, and the waves were strong. It was too risky"* and *"we had to carry her on foot to the coast before we could find a boat. It took hours."* This highlights how emergency transport is not only delayed but often physically exhausting and dangerous.

Further, the economic burden associated with emergency transport was made clear when a local official stated that *"the boat rental cost was Php 1,500. That's too expensive for most families here."* These accounts underscore the lack of affordable and reliable transport options, leading to the second delay in the Three Delays Model [1]. Studies [2], [3] affirm that transportation is a critical determinant of maternal health outcomes in rural areas, particularly where topography and poverty intersect. This theme primarily reflects Delay II (delay in reaching appropriate care) in the Three Delays Model. The findings illustrate how geographic isolation, lack of available transport, high travel costs, and weather-related constraints directly prevent pregnant women from reaching health facilities in a timely manner during obstetric emergencies.

Theme 2: Cultural Beliefs and Preferences

Cultural norms and childbirth practices played a significant role in influencing the deceased patient's healthcare decisions. A recurring sentiment was that *"she didn't want to give birth in the hospital. She said people died there before,"* reflecting deep-rooted mistrust in institutional care. Similarly, *"women here trust the hilot more than the midwife. It's tradition,"* expressed the continued preference for traditional birth attendants over trained medical personnel.

This theme intersects with Delay I (delay in deciding to seek care), as cultural beliefs, mistrust of institutional healthcare, and preference for traditional birth attendants influence women's and families' decisions regarding when and where to seek obstetric care.

This preference, shaped by historical and anecdotal accounts of negative hospital experiences, deters women from seeking facility-based care. A community health worker added, *"sometimes they think going to the hospital will just make things worse,"* pointing to perceived harm rather than help from formal health systems. This aligns with the Health Belief Model (Feldman et al., 2021), which illustrates how perceived risks and benefits drive health behaviors [4]. Studies conducted have shown that in rural Philippine communities, cultural familiarity and trust in traditional practices can override the appeal of formal medical interventions [6].

Theme 3: Healthcare Access and Systemic Barriers

Participants reported substantial gaps in maternal healthcare delivery, even when patients engaged in prenatal care. As one midwife explained, *"we advised her to stay at the halfway house, but she refused. She didn't like being far from her family."* This illustrates how patient choices, informed by personal and cultural values, can intersect with limited healthcare offerings.

Healthcare providers also acknowledged resource shortages. A municipal health officer stated, *"we ran out of Iron and Folic Acid that month. We didn't have enough to give to everyone,"* and a nurse noted, *"even if we check on them regularly, if the patient doesn't follow the advice, our efforts become limited."*

These responses demonstrate that despite regular engagement, both systemic limitations and individual choices can hinder effective care. This theme highlights the interaction between Delay II and Delay III, demonstrating how limitations in facility readiness, resource availability, and referral coordination further prolong access to effective care even after women attempt to seek assistance.

Studies [24], [25], observed that in under-resourced settings, even minimal lapses—like the absence of basic supplements—can have devastating outcomes. In the Philippines, study emphasized how lack of infrastructure, trained staff, and supplies continues to undermine rural maternal health services [26].

Theme 4: Emergency Response and Healthcare Provision

In emergency situations, the capacity to respond swiftly and adequately is vital. However, participants described the limited capabilities of local health institutions. One nurse at the Medicare Hospital said, *"we usually refer complicated cases to the Bicol Medical Center. We're not equipped for high-risk deliveries."* A municipal health officer added, *"we have an ambulance, but the challenge is getting the patient to us from their barangay. It can take hours."*

The role of local responders was also significant, as a Barangay Tanod shared, *"I've helped carry pregnant women across the mountains, but by the time we reach the boat, it's often too late."* These experiences underline the inefficiencies in referral systems and the consequences of infrastructure gaps. This theme primarily corresponds to Delay III (delay in receiving adequate care), reflecting gaps in emergency response capacity, staffing, supplies, and coordination that affect the quality and timeliness of obstetric care upon arrival at health facilities.

Studies described similar conditions in other rural areas, where delays in transport and communication impair emergency care [9]. This theme also ties into the third delay in the Three Delays Model, emphasizing the need for upgraded facilities and faster, more reliable transport solutions [1]

The present results support the current evidence that transportation plays a determining role in maternal survival with geographically isolated and disadvantaged perspectives, specifically in the second delay aspect of the Three Delays Model [1], [2]. This study, like the ones carried out in rural and archipelagic locations, validates the fact that distance, absence of reliable means of transportation and high cost of traveling takes a long time before emergency obstetric services can be accessed [2], [3]. But in contrast to other larger quantitative research that define transport as a general deterrent, the case study shows how transport delays occur in situ based on weather conditions and night emergencies and lack of boats or vehicles that are right at hand in Barangay Cagnipa.

However, the results compared with the previous studies also discovered transportation and poverty as the interacting factors that influence maternal mortality in rural areas [2], [3]. What this paper brings on board is a localized discussion of the interplay of these barriers with cultural beliefs and limitations in the local health systems. Although a national initiative like the BEmONC is designed to enhance the skilled birth attendance, outcomes indicate that the programs are still inadequate in regions with poor transport systems and referral systems, which is a common theme in Philippine and global literature [9], [14].

These findings have implications on the health planning of maternal health in GIDAs. To begin with, it is not probable that making facilities more prepared will actually lead to a decrease in maternal deaths unless the facility is supplemented with reliable and affordable emergency transportation. Second, the cultural mistrust of institutional care reflects that the enhancement of infrastructure should be accompanied by the active community interaction and health education. The findings imply that maternal health interventions are not to be considered separate aspects, but should be incorporated as one unit which includes transport, cultural acceptance and referral coordination.

Practically, the study can guide the local governments and health offices in the planning of community-based emergency transportations and the fortification of referrals, as well as westernization of the use of halfway houses to high risk pregnancies. To carry out a future study, the results indicate that the low-cost transportation interventions, including community-managed boats or transport vouchers, should be considered, and how the same ideas can be applied to other geographically isolated municipalities should be investigated. This study offers practical policy implications in the quest to reduce Delay 2 and enhance better maternal outcomes in underserved rural populations due to the grounding of policy recommendations on the lived experiences.

The study uncovered four interlinked themes—transportation challenges, cultural beliefs, systemic healthcare barriers, and emergency response limitations—that jointly contributed to a maternal death in Barangay Cagnipa. The participants' experiences, supported by existing literature and theoretical models, show how maternal mortality in geographically isolated areas is shaped by physical, cultural, and institutional obstacles. Addressing these requires a localized, multisectoral response that prioritizes infrastructure development, health education, and the empowerment of local health systems.

Transportation difficulty, weak referral systems and poor facility distribution have always been noted to be the main obstacles to having maternal healthcare by systematic reviews. The review done in East Africa and other low-resource settings showed that the gaps in emergency transportation and ineffective referrals routes were serious impediments in the provision of life-saving obstetric services [34], [38].

In these studies, it has been highlighted that the second delay in the Three Delays Model can be reduced through the enhancement of infrastructure and coordination of the referral. It is further demonstrated by the qualitative evidence that transport barriers are closely inter-connected with the limitation in the health systems.

Surveys in Ethiopia and Cameroon contained evidence that despite women trying to get care, lack of adequate ambulance services, lack of inter-facility communication, and insufficiency of emergency capacity sees them experience life-threatening delay and inadequate emergency responses [36], [37].

These results are also reflective of trends in isolated areas of the world where access to a proper facility is one of the key issues. The continuity of care and health workforce organization also determines maternal outcomes in remote locations.

Recent scoping review established that good community-based midwifery systems and referral integration have a strong association in facilitating better access to maternal care, especially in rural and underserved settings [32]. The gains of frontline health services are however minimally beneficial in the event of ineffectiveness of the transportation systems.

Leads into Future Research

This case study points to the need for further research on community-based interventions that integrate transport logistics with maternal care, particularly in geographically isolated and disadvantaged areas (GIDAs). Future studies should examine the feasibility, scalability, and cost-effectiveness of context-specific strategies such as halfway houses, mobile birthing units, and community-driven transport cooperatives designed to reduce second-delay outcomes in emergency obstetric care.

Specific policy suggestions include evaluating the impact of dedicated maternal transport vouchers, municipality-level transportation subsidies, and Barangay Emergency Transport Action Plans (BETAPs). These policies could incentivize both local governments and families to prioritize timely transport for expectant mothers.

Research should also explore policy integration between the Department of Health, Department of the Interior and Local Government, and Department of Transportation to institutionalize maternal transport as a component of rural healthcare systems. Community-based emergency transport programs, a transport voucher program and enhanced barangay-organized referral system have also proved effective in decreasing maternal delays in low-resource areas, and provide viable policy solutions to geographically remote Philippine populations [27], [28].

Pilot intervention ideas worth investigating include the deployment of mobile health vans offering prenatal and emergency care services in remote barangays, boat ambulances operated by trained local responders in coastal or island areas, and telemedicine-enabled birthing hubs staffed by midwives with remote physician support. Studies should assess community acceptance, response time efficiency, and maternal health outcomes linked to these innovations.

In terms of long-term infrastructure planning, research should explore models for integrated rural transport and health access corridors, ensuring that road, sea, and communication systems are co-developed to support healthcare access. Feasibility studies on solar-powered or amphibious transport solutions may also offer sustainable options for emergency response in climate-vulnerable regions. Additionally, spatial analysis tools such as geographic information systems (GIS) could be used to map healthcare access points and optimize future health infrastructure development.

Collectively, These Future Research Directions Can Provide Evidence-Based Recommendations For National Policy And Inform The Design Of Localized, Multisectoral Programs Aimed At Reducing Maternal Mortality In Remote Communities.

CONCLUSION

This paper has discussed transportation barriers affecting emergency obstetric care in Barangay Cagnipa, Garchitorena, Camarines Sur, based on qualitative case study design that follows the Three Delays Model. These results indicate that MOT in geographically remote areas is heavily influenced by the geographic isolation Delay II - difficulty in accessing suitable care - factor caused by insecure transportation, geographic remoteness, high price, and poor weather circumstances. The cultural beliefs, lack of trust to institutional healthcare and systemic constraints of referral coordination and facility preparedness compound these barriers.

This research highlights the importance of the fact that facility-based interventions will not be sufficient to enhance the maternal health outcomes in GIDAs. It is also important to strengthen the emergency transportation systems, timely referrals, and to overcome cultural barriers to seeking care. The practical implications encompass the necessity to have community-based emergency transportation strategies, better use of halfway houses in high-risk pregnancies, better coordination of the whole process between barangay health workers and other advanced facilities, and continued health education programs conducted by trusted local actors like the midwives and community health workers.

The findings indicate the significance of incorporating transportation planning in the maternal health strategies of local governments and health planners especially in the remote and island barangays. The policies should focus on investment in cheap and quality emergency transportation, referral guidelines, and mechanisms that help women to access care before the situation becomes complicated. The effectiveness of low-cost, context-specific transport interventions should be evaluated in future studies and their applicability to other geographically distant municipalities in the Philippines should be evaluated. This study will add to the evidence by focusing on community experiences in order to support specific, locally responsive interventions to reduce preventable maternal deaths. These results are consistent with world contributions to Sustainable Development Goal 3 to minimize preventable deaths of women by ensuring greater access to health services and capacity to refer to emergency services in underserved communities [29], [30].

RECOMMENDATIONS

Based on the findings of this study, several targeted recommendations are proposed to address the transportation-related barriers to emergency obstetric care in Garchitorena and similar geographically isolated areas:

1. Local government units, in partnership with the Department of Health and non-governmental organizations, should develop affordable and reliable community-based transport systems. These could include dedicated maternal health boats or land-based vehicles stationed in critical areas, subsidized by government funds or local health initiatives. This would reduce delays in reaching health facilities, especially in emergencies.
2. Functional halfway houses (lying-in facilities) should be improved and promoted as safe, accessible options for women in their third trimester who live far from hospitals. Increased community engagement and incentives could encourage expectant mothers to utilize these facilities in advance of labor onset.
3. Health education campaigns must be intensified to address cultural fears and mistrust toward institutional healthcare. Programs led by midwives, barangay health workers, and trained community volunteers can promote early care-seeking behavior, educate about the risks of high-risk pregnancies, and encourage facility-based deliveries.
4. Rural health facilities must be adequately equipped with essential supplies (e.g., Iron and Folic Acid, antihypertensives) and trained personnel capable of handling obstetric emergencies. This includes regular capacity-building programs for healthcare workers and ensuring the availability of ultrasound and basic diagnostic tools.
5. Clear, well-coordinated referral protocols between barangay-level health workers and tertiary hospitals should be established. This should include real-time communication tools, ambulance dispatch systems, and designated referral officers to facilitate rapid maternal transfers.

6. Future studies should evaluate the effectiveness of low-cost, scalable maternal transport interventions tailored to GIDAs. Pilot testing of innovations such as telemedicine-assisted birthing stations, mobile health clinics, or boat ambulances could inform broader policy implementation.

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