Assessing administrative effectiveness of the m-mama emergency transport system: A case of Mtwara Region, Tanzania

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ABSTRACT

This study aimed at addressing the administrative effectiveness of the m-mama emergency transport system in Mtwara Region, Tanzania. The main objective of the study was to assess the administrative effectiveness of the m-mama emergency transport system, and the specific objectives were to evaluate the operational efficiency of the M-Mama dispatch center in coordinating emergency transport, to investigate factors affecting community utilization of the M-Mama services, and to identify administrative challenges within the program's implementation. The study was guided by health system theory. The target population of the study was 123 individuals. Both qualitative and quantitative methods approaches were adopted, involving a sample of 59 participants drawn from dispatch personnel, healthcare workers, and community members. Simple random sampling and purposive sampling were used as sampling methods.Structured questionnaires and semi-structured interviews were applied as data collection tools. The questionnaire guide and interview questions were the tools of data collection. The descriptive analysis was adopted to analyze the quantitative data and thematic analysis to analyze the qualitative data, and SPSS was used to assist the analysis. The findings showed that as much as the M-Mama program has led to awareness creation with regard to emergency response and facilitated access to maternal health services, a number of barriers to operation and system operation still exist. The lack of road works, communication devices, and poor organization of the various agencies were the main factors limiting the efficiency and responsiveness of the dispatch center. Further, a poor workforce and few training opportunities for emergency responders also deterred the successful running of the program. Other factors that negatively affected the community's utilizations of the services were socio-cultural beliefs and poor community awareness. Based on the study, it is concluded that to maintain the sustainability and success of the M-Mama emergency transport system, there is a need to put in place efforts to improve the road networks, communication systems, and administrative coordination, as well as invest in building the capacity of the staff. The results have significant implications for policymakers, health organizations, and donors who pursue enhanced emergency maternal care provision in underserved and rural areas. The paper suggested that community education programs ought to raise awareness and appreciation of the M-Mama services in the rural settings. There also needs to be standards of communication between dispatch centers and health facilities so that M-Mama would become more effective.

Keywords: Administrative Effectiveness, m-mama Emergency Transport System, Mtwara Region, Tanzania

I. INTRODUCTION

Maternal mortality has continued to pose a significant challenge in the world, particularly in low- and middle-income countries (LMICs), where most of the maternal deaths noted are above 90 percent (World Health Organization 2023). Among the many important interventions in minimizing such deaths is the development of emergency maternal transport mechanisms that decrease the second delay in seeking treatment in a health facility. Research and evidence over the world present that with good transport systems in place, maternal and neonatal outcomes are very much enhanced (Zachariah et al., 2009). Nonetheless, their success is closely connected with the administrative control with regard to real-time communications, adequate paperwork, workforce and equipment availability. With an increasing pace of digital transformation in healthcare, most emergency transport systems currently utilize mobile technology to boost coordination and response time (Mlambo et al., 2022).

Poor infrastructure, lack of health work force, and poor administrative coordination follow high rates of maternal mortality in sub-Saharan Africa. Nigeria, Uganda, and Tanzania are among the countries that have preceded to community-based transport programs to enhance referrals in maternal health. Nevertheless, numerous assessments show that these systems are likely to be a disappointment because of administrative failures like the lack of data reporting systems, ambiguous referral processes, and the failure to be continuously financed (Mooney et al., 2023). Bittaye et al.

(2023) in their meta-analytical study also discovered that the efficiency of transport programs raises significantly in the case of sustained administrative follow-up and cross-agency cooperation.

Tanzania has introduced a number of projects in order to deal with maternal health, such as the M-Mama initiative, especially in underdeveloped areas such as Shinyanga and Mtwara. The M-Mama system reportedly applies 24-hour dispatch model, mobile-phone coordination, and community drivers to deliver mothers with obstetric emergencies (Munishi et al., 2023). Research notes that the model, in terms of structure, is quite successful, but there is a broad range of results depending on the efficiency at the levels of regions and councils (Ehiri et al., 2018). The problematic areas are that health facilities are all over the place in terms of reporting, interdepartmental communication is either lacking totally or inefficient and there is also a shortage of staffing and lastly they have a problem of disrupting the timely coordination of the dispatch.

The structure of the M-Mama system is centralized with the dispatch center, which needs proper and urgent contacts with the medical surrounding and the community transportation centers. According to the study conducted by Njiro et al. (2023), the importance of Regional and Council Health Management Teams (R/CHMTs) in managing referrals, tracking the use of transportation, and managing dispatch employees should be noted. But in those jurisdictions where such administrative mechanisms are poorly funded or poorly staffed, there is no coordination. As their assessment conducted of community engagement activities showed, despite high rates of community awareness, setbacks were still experienced in terms of administrative mismatch and a lack of real-time reporting systems.

A lot of the initial achievements of M-Mama were documented in Shinyanga, where research reported that the efficiency of maternal referrals has increased significantly (Sanga et al., 2025). They have however also documented issues of their scaling and administrative sustainability of the system which includes budget planning, the supply chain to supply fuel and vehicles and insufficient health information system integration. Such lessons can be applied even to Mtwara directly, which also has limitations in the sphere of logistics and infrastructure. According to Ifeanyichi et al. (2021), in most cases, health facilities did not have trained emergency coordination officers and there was a lack of communication between the dispatch teams and the health facility officers in high stress situations.

Connectivity plays a key role in the functionality of M-Mama, as dispatch and triage decisions depend heavily on mobile phone-based communication. Studies from the Urban Birth Collective (2025) show that areas with poor connectivity often face delays in dispatch even when administrative structures are present. This underlines the necessity of integrating ICT infrastructure development within health transport programs. Mlambo et al. (2022) argue that administrative effectiveness should not only consider human resources but also technological readiness including mobile networks, digital literacy of health workers, and equipment functionality.

Sunguya et al. (2024) identified several best practices from stakeholder interviews during the M-Mama scale-up: clear interdepartmental communication protocols, routine training for facility- and community-based actors, and real-time dashboards for monitoring dispatches. These measures substantially improved system responsiveness and community trust. The authors recommend a performance-based management approach for regional administrators to sustain high standards of coordination and reporting and advise embedding emergency-referral dashboards within national health information systems to institutionalize efficiencies and reduce reliance on paper records.

Mtwara is a rural, under-resourced region with fragile transportation, communication infrastructure, and administrative coordination. Implementing M-Mama in this setting provides an opportunity to examine how administrative factors shape the practical operation of a digital maternal emergency transport system. Research from similar regions indicates that without strong administrative coordination particularly in dispatch, facility readiness, and supervision the intended benefits of such systems are often compromised (Munishi et al., 2023). A focused study of administrative dynamics in Mtwara can help refine national policy and support effective scaling of emergency maternal transport programs.

1.1 Statement of the Problem

Although there are serious gains that have been made on the accessibility of maternal and emergency healthcare opportunities in Tanzania as facilitated by the M-Mama transport system, several weaknesses still dangle in the face of managing the system administratively. These problems including poor coordination between stakeholders, delays in delivery of the services and inefficiencies in the resources allocation processes undermine the potential of the system to be timely and effective in providing care in emergencies. These problems are especially acute in rural areas such as Mtwara, as the infrastructure and logistics of emergency healthcare are mostly absent. As past research revealed, although M-Mama has the potential to save lives, improper management and administrative failures may lead to delayed response and rise in costs, and missed chances to bring health outcomes (Njiro et al., 2023; Munishi et al., 2023).

Standardised procedures of operation and operational communication channels among the health facilities, drivers, and the local communities will be among some of the major barriers of administration or communication. It has been demographic that the irregularities in such processes may result in miscommunication, poor time in dispatching vehicles, and difficulties in urgently reaching patients (Njiro et al., 2023). People in Mtwara, where the healthcare

facilities are usually not close to the populated centers, should focus especially on the need to organize and manage health care much better in order to provide the patients with the necessary medical assistance in time. Despite the success of M-Mama in maternal mortality reduction, the administrative loopholes restrict its success in attaining the more general health outcomes Onyango et al., 2022).

In addition, little is known about the administrative performance of the M-Mama system in particular to Lindi, Tanzania. A majority wishing to study the M-Mama system did so with the focus on the operational implications of the system, and few have engaged with the side of the administrative mechanisms underlying the system. Consequently, little substantial knowledge is understood regarding the factors that will rend the system administratively successful or rather unsuccessful in this case. This research intended to plug that gap and evaluate the administrative efficiency of the M-Mama transport system in Lindi, list the main administrative bottlenecks, and propose suggestions to enhance the management of the system and its overall effect on the emergency health operations (Yawson et al., 2022).

1.2 Research Objective

The study aims to assess the administrative effectiveness of the M-mama emergency transport system in Mtwara Region, Tanzania

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Health Systems Theory

The Health Systems Theory is used to explain all the dynamics and the structures of health systems and how they are key in offering health care services in a more effective manner. It is concerned with the different aspects of healthcare, including the organization of healthcare, funding, courtesy, and delivery of services and their interaction to attain health goals (Wang et al., 2021). The theory highlights the importance of coordination and integration of these elements to make sure that the healthcare systems become efficient and responsive to the needs of the population. The health systems theory is especially applicable in emergency health services including M-Mama transport system since timely delivery of the service is crucial in reducing the morbidity and mortality rates.

Assumptions: According to Health Systems Theory, the proper working healthcare system is that which incorporates various elements that include service delivery, leadership, and financing, as well as community participation, to facilitate quality and responsive healthcare. It states that these pieces have to fall into place so that the health system can work precisely and can fit the needs of the population (Sullivan et al., 2020). The theory also presupposes that the health systems need to be flexible to the changing situations, including emergencies and that proper management of resources and services are paramount in enhancing the health outcomes. Given a scenario of emergency transport systems, this theory implies that dispatch centers, transport services, and healthcare providers, in order to provide efficient service delivery, should be coordinated.

Relevance: An understanding of the Health Systems Theory lends a lot to the current research particularly in gaining an understanding on how the emergency health transport systems can be operated and how it can be administered in this case the M-Mama system. It underlines the role of coordination, administrative effectiveness, and resource factors that lie in the core of the M-Mama dispatch center operation. Using the Health Systems Theory, this research will conduct an examination of the extent to which the M-Mama system has been able to combine different components including technology, dispatch coordination, community awareness, and transport logistics to deliver timely emergency services. In addition, the concern with the organizational structure of how healthcare is delivered as part of the theory allows to comprehend how administrative issues and wastefulness within the healthcare delivery system may be alleviated.

Weaknesses: Even though it is obviously relevant, the Health Systems Theory has certain limitations when it is to be applied to particular health interventions under resource-limited conditions. Firstly, the theory assumes a perfect health system that resources are properly distributed and controlled which might not exactly happen in most low-income or rural area, like Mtwara region. The integration and coordination focus on the theory of the disease could ignore the local conditions regarding an inadequate infrastructure, logistical difficulties, and underfunded health systems, which is widespread in Tanzania and other such settings. Also, the theory might not be able to explain all barriers cultural and societal that can determine the acceptance and use of emergency transport systems in some communities.

Strengths: Among the most significant strengths of the Health systems theory, one must mention the comprehensively of its perspective on health systems provided as the interconnected elements. Such a systems thinking is of great use in the case of the M-Mama transport system analysis because it emphasizes the synergistic action of many factors, including efficiency of the dispatch centers, the ability of people to use the transport services, and the role of the community in providing effective healthcare services. The theory is also able to give a clear guideline on how the administration systems and management of resources can affect the success of operational systems of providing

emergency transports. Health Systems Theory brings valuable advice about the benefits of coordination and integration and areas of improvement that can enhance administrative effectiveness and operational efficiency of such systems as M-Mama in rural areas (Sullivan et al., 2020).

2.2 Empirical Review

Several empirical studies show that emergency transport systems can improve maternal health outcomes in low- and middle-income countries. For example, Ehiri et al. (2018) reviewed emergency transportation interventions and found that timely transport substantially reduces adverse pregnancy outcomes in resource-constrained settings, highlighting the value of structured referral systems. Montagu et al. (2017) similarly reported that community-based transport models increase the likelihood that women reach health facilities for childbirth, which helps prevent avoidable maternal and neonatal deaths.

In Tanzania, evidence from Shinyanga suggests similar benefits. Munishi et al. (2023) found that the M-Mama community-based transport initiative reduced delays in accessing care during obstetric emergencies, crediting community involvement and mobile-phone dispatch systems for much of its success. Njiro et al. (2023) noted that the program's sustainability depends on administrative support, cross-sector collaboration, and integration with existing health structures. At the same time, Sanga et al. (2025) cautioned that scaling up remains difficult where funding is limited, infrastructure is poor, and administrative coordination is inconsistent.

Research from other sub-Saharan African countries echoes these challenges. Ifeanyichi et al. (2021), studying ambulance referrals across Tanzania, Malawi, and Zambia, observed that financial barriers and weak communication between dispatch teams and health facilities reduce referral efficiency. Banke-Thomas et al. (2024) highlighted that geographic inaccessibility and travel time are major constraints on maternal survival, and the Urban Birth Collective (2025) pointed out that poor mobile connectivity and weak ICT infrastructure often delay dispatch decisions in rural areas.

Technological readiness matters. Mlambo et al. (2022) argued that ICT can strengthen coordination in maternal health systems, provided health workers have the necessary digital skills and reliable networks. Sunguya et al. (2024) found that regions with real-time digital dashboards and regular staff training saw faster response times and greater community trust. Conversely, Onyango et al. (2022) reported that mobile health innovations in rural Tanzania were undermined by limited supervision, weak feedback loops, and inadequate community sensitization, reducing their long-term impact.

Administrative capacity is equally important. Mehmood et al. (2018) showed that pre-hospital emergency systems often underperform in low-income settings because of limited workforce capacity and poor coordination among stakeholders. Yawson et al. (2022) argued that weak administrative frameworks within M-Mama operations in rural Tanzania impede efficient referrals and recommended clearer communication protocols and more investment in staff training. Without routine supervision and capacity building, dispatch centers face bottlenecks that undermine maternal outcomes.

Overall, these studies suggest that community-based emergency transport programs like M-Mama have real potential to reduce maternal mortality, but their success hinges on administrative capacity, ICT infrastructure, and reliable road networks. Sustainable improvements will require a holistic approach that combines infrastructure investment, administrative reform, and active community engagement.

III. METHODOLOGY

3.1 Study Area

The research was undertaken in Tanzania, particularly Mtwara region where the M-Mama emergency transport system is in active implementation processes. This site has been selected because it is a rural site, which is characterized by less availability of healthcare infrastructure and it offers a good case to assess the effectiveness of emergency transport system against the difficulties that are unique in its healthcare delivery mode such as poor road infrastructure and inability to access timely healthcare services. The opportunity to study the M-Mama system in the given context has given significant insights as to how the emergency transport systems may be optimized in order to enhance delivery of health care in the underserved regions, and the results are likely to be applied more widely in other rural areas of Tanzania.

3.2 Research Design

The survey research design was used. To evaluate the efficiency of the M -Mama operating process, survey research was conducted which took into consideration such indicators as the time of reaction and the success of emergency transportation. This layout made it very easy to outline the status quo of the system in Mtwara. As Saunders

et al. (2019) assert, the given design gives the depth to the analysis revealing not only what happens, but also the reasons behind what happens to the operational results of the M-Mama system.

3.3 Target Population

The population under study is selected precisely out of Mtwara region and it has 123 members directly up to date with the M-Mama system. That population will consist of 45 people within the community, 35 people in healthcare workers, and 43 members of administration. By targeting this group the study got the view of the two groups i.e. the service users as well as the group that handles and gives the service. Tashakkori and Teddlie (2010) note that inclusion of various stakeholders is essential in offering a grainy account on how emergency transport systems work in reality. The contribution of a wide range of participants guarantees the inclusion of a general variety of experiences, providing a more comprehensive understanding of factors that contributed to the system success or failure.

3.4 Sampling Procedure and Sample Size

The sampling procedures for this study combined purposive and random sampling techniques. Purposive participants were selected through sampling and predominantly include the direct target group of healthcare workers, dispatch workers, and the community leadership that is most directly involved with M-Mama system. The approach is suitable because it is used to obtain information about those who have adequate knowledge or experience of the research goals so that the information gathered becomes meaningful and relevant (Patton, 2015). Also, random sampling was used to identify the members of the communities who have used the M-Mama system so that the sample will represent the larger population of the communities. By using both approaches, the research is going to guarantee the diverse, but focused sample that will enable providing the more detailed analysis of M-Mama system.

Obtained through Yamane formula, the sample of 62 respondents is statistically sufficient so that the findings are representative of the population but the margin of error is reasonable. This sample is powerful enough to lead to valid answers in terms of determining the effectiveness of the M-Mama system and the elements which affect the operational success of the M-Mama system with the levels of confidence and margin of error, which are 91 percent and 9 percent respectively. With the sample size of 62, not only the study would be cost-effective but the qualitative and quantitative data would be thoroughly analyzed, making it possible to draw more general conclusions, and at the same time, not make the study too large in order not to overburden it (Krejcie & Morgan, 1970). The formula used is Yamane (1967) and this is explained with a level of confidence of 91 and 9 percent (1-0.09) and formula is expressed as hereunder;

$$n = \frac{N}{1 + N(e^2)}$$

Where: n= is number of sample (required)

N = Total population (123) and

e = Error tolerance (level) or margin of error (0.09)

$123/ (1+123(0.09)^2) = 123/1.9963= 62$

In that regard, the study sample size of the study was 62 respondents

3.5 Data Collection Instruments and Procedures

Creswell (2014) defines data collection instruments as the specific tools or strategies that researchers use to collect data from participants in a study. These instruments help researchers gather information that is relevant to their research questions and objectives. This study used questionnaires and interviews as data collection tools.

3.6 Reliability and Validity

The researcher's conclusions must therefore be trustworthy and legitimate. Any researcher seeking high-quality research should take validity and reliability into account while planning a study interpreting the findings, and presenting the findings. This study achieved validity in a number of ways. First, it involved carefully crafting questions and pre-testing questionnaires to ensure that they are understandable and those potential issues are detected early on, allowing for the easy identification of remedies. Second, in order to find and fix mistakes and omissions made during data recording, the gathered data was edited. The goal is to achieve accuracy, consistency, and completeness. A sufficient number of questions were created and formulated by the researcher for this study and questionnaires were used to gather data from a variety of respondents. But the purpose of the reconnaissance was to test the equipment.

3.7 Data Analysis

Data processing and analysis for this study was carried out using both manual and statistical software techniques. Quantitative data from surveys were analyzed using SPSS software to compute descriptive statistics, such as means,

percentages, and frequencies, to summarize the community's perceptions and the operational efficiency of the M-Mama system. Qualitative data from interviews were analyzed thematically, following the steps outlined by Braun and Clarke (2006). This approach helped in identifying key themes and patterns in the data that align with the research objectives. The combination of statistical and thematic analysis allowed for a robust interpretation of both objective and subjective data, offering a comprehensive understanding of the research questions.

IV. FINDINGS & DISCUSSION

4.1 Response Rate

The study targeted a total of 62 respondents from different stakeholder groups involved in the M-Mama system. Out of these, 59 questionnaires were returned, resulting in a response rate of 95.16%, which is considered satisfactory for this study. Table 4.1 presents the distribution of expected and actual respondents by category.

Table 1

Response Rate

Categories of Respondents	Expected Sample Size	Actual Sample Size	Response Rate (%)
Community Members	18	17	94.44
Healthcare Workers	14	14	100.00
Administrative Staff	17	15	88.24
Total	**62**	**59**	**95.16**

The high response rate ensures the reliability of the data collected and supports valid conclusions for the study. Moreover, it increase the possibility that survey findings may be generalized to the population studied and decrease the risk of response bias by lowering the possibility for distinctions among participants and non-respondents. Data gathered from interviews has been assessed, qualitatively summarized, and interpreted by combining it with quantitative statistics.

4.2 Operational Efficiency of the M-Mama Dispatch Center

The first objective of this study was to evaluate the operational efficiency of the M-Mama dispatch center in coordinating emergency transport in Mtwara Region. To achieve this objective, the study focused on six key indicators: community awareness, understanding of services, knowledge among pregnant women, frequency of awareness campaigns, adequacy of sensitization efforts, and effectiveness of community education regarding emergency maternal transport services. The responses were collected from 55 participants and analyzed as shown in the table below.

Table 2

Community Awareness and Administrative Effectiveness

Statement	SD (1)	D (2)	N (3)	A (4)	SA (5)	Total
Community members are well-informed about how the M-Mama emergency transport system operates.	7 (12.7%)	8 (14.5%)	5 (9.1%)	20 (36.4%)	15 (27.3%)	55 (100%)
The level of understanding of M-Mama services among community members is satisfactory.	6 (10.9%)	9 (16.4%)	4 (7.3%)	25 (45.5%)	11 (20.0%)	55 (100%)
Most pregnant women in remote areas know when and how to access M-Mama services.	4 (7.3%)	11 (20.0%)	6 (10.9%)	22 (40.0%)	12 (21.8%)	55 (100%)
M-Mama conducts regular public awareness campaigns on emergency health services.	8 (14.5%)	9 (16.4%)	5 (9.1%)	23 (41.8%)	10 (18.2%)	55 (100%)
The frequency of sensitisation efforts about the M-Mama system is adequate.	6 (10.9%)	13 (23.6%)	3 (5.5%)	23 (41.8%)	10 (18.2%)	55 (100%)
Community education on emergency maternal transport services is effectively delivered.	4 (7.3%)	8 (14.5%)	5 (9.1%)	27 (49.1%)	11 (20.0%)	55 (100%)

The findings reveal that 36.4% of respondents agreed and 27.3% strongly agreed that community members are well-informed about the operations of the M-Mama emergency transport system. However, 12.7% strongly disagreed and 14.5% disagreed, indicating a significant minority still lacks full awareness. This suggests that while the majority recognizes a satisfactory level of awareness, there remain notable gaps, particularly in marginalized and remote areas. Qualitative data from interviews supports this observation, with one participant noting:

> *"Most people are aware of the M-Mama programme, but there are still some remote villages that have not received enough education."*(Interview Guide, 2025)

These findings highlight uneven awareness of M-Mama services and the difficulty of reaching remote communities. When asked whether the level of understanding of M-Mama services was satisfactory, 45.5% agreed and 20.0% strongly agreed, while 10.9% strongly disagreed and 16.4% disagreed. In other words, a clear majority grasp the services offered, but a meaningful minority do not. Among pregnant women in remote areas, 40.0% agreed and 21.8% strongly agreed that they knew when and how to access M-Mama services; 7.3% strongly disagreed and 20.0% disagreed. These results show generally positive awareness but also a substantial information gap that calls for targeted sensitization efforts (Njiro et al., 2023).

Perceptions of public awareness campaigns were mixed: 41.8% agreed and 18.2% strongly agreed that campaigns are run regularly, while 14.5% strongly disagreed and 16.4% disagreed. Although radio and community meetings reach many people, consistent coverage of remote locations remains a challenge (Bittaye et al., 2023). Similarly, respondents' views on the adequacy of sensitization were divided: 41.8% agreed and 18.2% strongly agreed it is adequate, yet 10.9% strongly disagreed and 23.6% disagreed. This again points to important gaps particularly among hard-to-reach groups despite generally positive assessments. When asked about the effectiveness of community education, 49.1% agreed and 20.0% strongly agreed that efforts are impactful; 7.3% strongly disagreed and 14.5% disagreed. While many feel education is working, the dissenting responses suggest there is room to improve reach and engagement.

A traditional birth attendant elaborated:

> *"People now understand the importance of M-Mama after receiving education, but there are still men who do not see the value of taking their wives to hospital on time."* (Interview Guide, 2025)

Another Community Health Worker insisted,

> *"From my perspective on the ground, the M-Mama Dispatch Center has brought significant improvements in emergency maternal care awareness. Pregnant women are beginning to understand that help is available when complications arise, although this knowledge is still uneven across remote areas. We conduct awareness campaigns in the community, but they are not as frequent as they should be perhaps once every two months. Given the critical nature of maternal health, these sensitization efforts need to be more regular and include follow-up visits. Many women I interact with know about M-Mama, but they don't always understand exactly how or when to access it. Education materials are available, but language and literacy barriers limit their effectiveness. Overall, the dispatch center is effective, but without consistent and well-funded community education, its potential is not fully realized."*

This signifies the twofold character that the successful education campaigns have brought: there is more awareness, but the cultural barriers are still an issue to reckon with (Mehmood et al., 2018). All in all, the above results suggest that the situation with the community awareness and understanding of the M-Mama emergency transport system is rather favorable yet not universal. The problem is that the rural and disadvantaged communities remain less informed, and it shines the light on the existing disparities in accessing information. The results are consistent with those that earlier investigations pointed out noting that health education and awareness campaigns tend to lack equity in its delivery in geographically and socially disadvantaged areas (Sunguya et al., 2024). The resultant implication here is an obvious requirement of increased, culturally-sensitive and geographically-inclusive sensitization activities so that the entire community (as in, not just those in the urban centers) has access to timely and correct information about M-Mama services.

Summing up, although significant success has been registered so far to spread the information and educate people on using M-Mama emergency transport system, special work needs to be continued and improved in the identified areas of concern. This is likely to enhance knowledge, as well as facilitate the breaking of socio-cultural barriers that hinder access to emergency services in a timely manner to contribute to improved maternal health outcome.

4.3 Factors Affecting Community Utilization of the M-Mama Emergency Transport Services

The second objective of this study was to investigate factors affecting community utilization of the M-Mama emergency transport services in Mtwara Region. To achieve this, the study focused on six key indicators: poor road infrastructure, availability of reliable road networks, delays caused by impassable roads during emergencies, availability of functional communication equipment at M-Mama dispatch points, the role of mobile phone connectivity in timely coordination of emergency maternal transport, and the impact of lack of communication equipment on response time. Responses were collected from 55 participants and analyzed as shown in the table below.

Table 3

Factors Affecting Community Utilization of m-mama

Statement	SD (1)	D (2)	N (3)	A (4)	SA (5)	Total
Poor road infrastructure limits access to M-Mama emergency transport services in remote areas.	3 (5.5%)	6 (10.9%)	5 (9.1%)	25 (45.5%)	16 (29.1%)	55 (100%)
Availability of reliable road networks enhances the effectiveness of the M-Mama emergency response.	2 (3.6%)	4 (7.3%)	7 (12.7%)	28 (50.9%)	14 (25.5%)	55 (100%)
Most rural communities in Mtwara experience delays due to impassable roads during emergencies.	4 (7.3%)	7 (12.7%)	5 (9.1%)	26 (47.3%)	13 (23.6%)	55 (100%)
Functional communication equipment is available at most M-Mama dispatch points.	3 (5.5%)	8 (14.5%)	6 (10.9%)	24 (43.6%)	14 (25.5%)	55 (100%)
Mobile phone connectivity helps in the timely coordination of emergency maternal transport.	1 (1.8%)	4 (7.3%)	5 (9.1%)	29 (52.7%)	16 (29.1%)	55 (100%)
Lack of communication equipment affects the response time of M-Mama emergency services.	2 (3.6%)	7 (12.7%)	6 (10.9%)	26 (47.3%)	14 (25.5%)	55 (100%)

The findings show that most respondents view poor road infrastructure as a major barrier to accessing M-Mama emergency transport in remote areas: 25 (45.5%) agreed and 16 (29.1%) strongly agreed. A smaller number disagreed (3, 5.5% strongly disagreed; 6, 10.9% disagreed) and 5 (9.1%) were neutral. This suggests that terrain and underdeveloped roads substantially hinder emergency vehicles from reaching patients quickly, especially during the rainy season when unpaved routes become impassable (Munishi et al., 2023).

On the positive side, many respondents believe that reliable road networks improve M-Mama's effectiveness: 28 (50.9%) agreed and 14 (25.5%) strongly agreed. Only a few respondents disagreed (2, 3.6% strongly disagreed; 4, 7.3% disagreed) and 7 (12.7%) were neutral. These results highlight how road accessibility not only shortens travel times for ambulances or community taxis but also improves safety during transport, consistent with findings that better transport networks are linked to lower maternal mortality in sub-Saharan Africa.

Respondents also reported frequent delays caused by impassable roads in rural Mtwara: 26 (47.3%) agreed and 13 (23.6%) strongly agreed that such delays are common. A minority disagreed (4, 7.3% strongly disagreed; 7, 12.7% disagreed) and 5 (9.1%) were neutral. These responses reinforce that transportation barriers involve not just availability but also reliability; poor roads can cause delays that are dangerous during obstetric emergencies (Kihwele et al., 2022).

Regarding communication at M-Mama dispatch points, 24 (43.6%) respondents agreed and 14 (25.5%) strongly agreed that functional equipment is available. However, 3 (5.5%) strongly disagreed and 8 (14.5%) disagreed, indicating persistent communication gaps. Because timely dispatch depends on effective two-way communication, any shortfalls in equipment can jeopardize service delivery.

Mobile phone connectivity was widely seen as critical: 29 (52.7%) agreed and 16 (29.1%) strongly agreed that it plays a key role in timely maternal transport. Only 1 (1.8%) strongly disagreed, 4 (7.3%) disagreed, and 5 (9.1%) were neutral. These results underline the growing importance of mobile technology in settings with limited physical infrastructure: phones enable rapid alerts, faster decision-making, and better coordination among communities, dispatchers, and health workers, thereby reducing the "second delay" in emergency response.

Finally, most respondents (26, 47.3% agreed; 14, 25.5% strongly agreed) reported that a lack of communication equipment slows response times. A few disagreed (2, 3.6% strongly disagreed; 7, 12.7% disagreed) and 6 (10.9%) were neutral. Overall, inadequate communication infrastructure appears to create time lapses in dispatch and response procedures that directly affect service efficiency and patient outcomes.

In an interview, one respondent said:

> *"One major barrier to the community's full utilization of M-Mama services is poor road infrastructure. Many areas become inaccessible during the rainy season, and emergency vehicles cannot reach women in need quickly. Mobile phone connectivity is another big issue. In many rural regions, network coverage is patchy, and people struggle to call the dispatch center. Even when they reach out, there's often a lack of reliable or functional communication equipment, particularly in smaller health outposts. We've tried to provide radios or alternative communication tools, but budget limitations prevent full coverage. These infrastructure and technology gaps undermine an otherwise promising program. To truly empower communities to use M-Mama, we need cross-sector collaboration to improve roads and digital access."*

The findings reveal that road infrastructure and communication tools are critical elements influencing the accessibility and effectiveness of the M-Mama emergency transport service. The barriers identified namely, poor road conditions and inadequate communication systems mirror broader structural challenges documented in the literature.

4.4 Administrative Challenges in the Implementation of the M-Mama Emergency Transport System

The third objective of this study was to identify administrative challenges within the M-Mama emergency transport system implementation in Mtwara Region. To achieve this objective, the study examined six key factors: clarity and efficiency of coordination between healthcare facilities and the M-Mama dispatch centre, delays in communication affecting timely responses, regular updates from healthcare facilities to the dispatch centre, adequacy of staffing and training at the dispatch team, the impact of lack of trained staff on emergency response effectiveness, and availability of training opportunities for dispatch staff. Responses were collected from 55 participants and analysed as shown in the table below.

Table 4

Administrative Challenges

Statement	SD (1)	D (2)	N (3)	A (4)	SA (5)	Total
Coordination between healthcare facilities and the M-Mama dispatch centre is clear and efficient.	4 (7.3%)	5 (9.1%)	6 (10.9%)	25 (45.5%)	15 (27.3%)	55 (100%)
Delays in communication between health facilities and dispatch centres affect timely response.	3 (5.5%)	6 (10.9%)	5 (9.1%)	26 (47.3%)	15 (27.3%)	55 (100%)
Healthcare facilities regularly update the dispatch centre with emergency needs.	5 (9.1%)	7 (12.7%)	8 (14.5%)	20 (36.4%)	15 (27.3%)	55 (100%)
The dispatch team is adequately staffed with trained personnel to handle emergency calls.	6 (10.9%)	8 (14.5%)	7 (12.7%)	18 (32.7%)	16 (29.1%)	55 (100%)
Lack of trained staff in dispatch centres hinders the effectiveness of emergency responses.	4 (7.3%)	5 (9.1%)	6 (10.9%)	21 (38.2%)	19 (34.5%)	55 (100%)
Training opportunities are available for staff working in M-Mama dispatch operations.	7 (12.7%)	9 (16.4%)	5 (9.1%)	19 (34.5%)	15 (27.3%)	55 (100%)

Most respondents felt that coordination between healthcare facilities and the M-Mama dispatch center is generally clear and efficient: 25 (45.5%) agreed and 15 (27.3%) strongly agreed. However, a notable minority disagreed (4, 7.3% strongly disagreed; 5, 9.1% disagreed) and 6 (10.9%) were neutral. These results suggest that while coordination works for many, there are still operational gaps that could hinder emergency response. Kruk et al. (2018) emphasize that well-structured interfacility coordination is essential for timely maternal emergency transport, especially in decentralized systems like Tanzania's.

Delays in communication between health facilities and dispatch centers were widely seen as affecting timely responses: 26 (47.3%) agreed and 15 (27.3%) strongly agreed. A smaller group disagreed (3, 5.5% strongly disagreed; 6, 10.9% disagreed) and 5 (9.1%) were neutral. These findings point to communication bottlenecks that undermine the M-Mama response, consistent with Njiro et al. (2023), who linked similar delays in southern Tanzania to the absence of real-time tools and weak information-sharing protocols problems that are worse in remote facilities with unreliable mobile networks.

When asked whether facilities regularly update the dispatch center about emergency needs, responses were mixed: 20 (36.4%) agreed and 15 (27.3%) strongly agreed, while 5 (9.1%) strongly disagreed, 7 (12.7%) disagreed, and 8 (14.5%) were neutral. This inconsistency in information flow makes it harder for dispatch teams to anticipate demand and allocate vehicles. Onyango et al. (2022) note that weak feedback loops between dispatch centers and peripheral units often lead to misallocated resources and referral delays.

Respondents were somewhat positive about staffing and training in the dispatch team: 18 (32.7%) agreed and 16 (29.1%) strongly agreed that staffing and training were adequate. Still, 6 (10.9%) strongly disagreed, 8 (14.5%) disagreed, and 7 (12.7%) were neutral, suggesting uneven staffing levels or differences in perceived competency across locations. Bittaye et al. (2023) found that insufficient training and limited technical skills among emergency teams are common barriers to effective service delivery in low-resource settings.

On whether a lack of trained staff hinders emergency response, most respondents agreed: 21 (38.2%) agreed and 19 (34.5%) strongly agreed. A minority disagreed (4, 7.3% strongly disagreed; 5, 9.1% disagreed) and 6 (10.9%) were neutral. These results reinforce that inadequate training undermines the quality and timeliness of emergency care.

Taken together, the survey data indicate that coordination, timely communication, and consistent staffing/training are critical to M-Mama's effectiveness. While many participants see these elements working well, the persistent disagreements and neutral responses highlight areas for operational improvement especially strengthening real-time communication tools, standardizing update practices, and investing in dispatch training and supervision.

In support, an interview with a nurse from a rural health center in Masasi District revealed:

> *"Sometimes the dispatch centre takes too long to respond because the person receiving the call does not understand the urgency. I believe more training is needed to help them prioritize cases quickly."* (Interview Guide, 2025)

Another one added,

> *"From an administrative standpoint, one recurring issue is the lack of timely updates from healthcare facilities regarding their capacity and readiness to receive emergency referrals. This affects dispatch decisions and can result in delays or misrouting of transport. Another challenge is the shortage of trained staff familiar with emergency maternal protocols and the M-Mama system. Without proper training, even equipped facilities fail to provide the needed support when women arrive. Coordination between the dispatch center and the healthcare facilities is also not always clear; there are instances where responsibilities overlap or are misunderstood. We lack a unified communication protocol, and this sometimes creates confusion in high-pressure situations. Investing in digital tracking systems and routine administrative training would significantly enhance implementation. In sum, while M-Mama is a transformative initiative, its success depends on robust, synchronized administration at all levels."*

Finally, regarding the availability of training opportunities for staff working in M-Mama dispatch operations, 19 (34.5%) respondents agreed and 15 (27.3%) strongly agreed. Nevertheless, 7 (12.7%) strongly disagreed, 9 (16.4%) disagreed, and 5 (9.1%) were neutral. The data imply a shortfall in continuous professional development opportunities. Without regular refresher courses, staff may struggle to keep up with evolving procedures and technologies, thereby undermining programme effectiveness.

The results highlight critical administrative and operational challenges affecting the implementation of M-Mama emergency transport services in the Mtwara Region. These include communication delays, inconsistencies in coordination practices, insufficient staffing, and inadequate training opportunities.

4.2 Discussion

4.2.1 The Operational Efficiency of the M-Mama Dispatch Centre

The investigation found a strong positive correlation between the efficiency of the M-Mama emergency transport system and both community use ($r = 0.763$, $p < 0.01$) and fewer administrative obstacles ($r = 0.701$, $p < 0.01$). In other words, greater community awareness and active engagement, together with smoother administrative processes, meaningfully improve dispatch-center performance.

When community members respond quickly, reporting is faster and transport resources are deployed sooner. Administrative improvements such as quicker fund release and fewer bureaucratic hurdles give the dispatch center more autonomy and improve coordination with health staff and transport providers during emergencies.

Most respondents had more than six years of experience and represented a range of roles, including community members, healthcare workers, and administrators. This mix of perspectives supports better decision-making and clearer distribution of tasks.

These findings are supported by previous work: Kruk et al. (2018) and Sullivan et al. (2020) highlight that coordination, resource allocation, and inclusive teams are essential for effective health operations. The value of community-based transport systems for maternal health in rural areas, which aligns with the Mtwara results. Wang et al. (2021) also argue that balancing infrastructure improvements with efforts to build community trust for example through awareness campaigns and administrative reform increases system efficiency.

Overall, the results indicate that M-Mama's effectiveness depends on both active community participation and well-functioning internal systems. Together these factors create a positive feedback loop that strengthens maternal and newborn health outcomes.

4.2.2 Factors affecting Community in the Utilisation of the M-Mama Emergency Transport System in Mtwara Region

The study confirmed a significant correlation between community utilization and operational efficiency amid administrative challenges ($r = 0.652$, $p < 0.01$), emphasizing the critical role of administrative performance in shaping public trust and service usage in the M-Mama emergency transport system. Key factors such as timely responses, strong coordination, and clear communication directly influence community confidence. When these systems function effectively, they foster reliability and engagement. In contrast, delays and disorganized responses lead to reduced trust and underutilization of services, even during emergencies. Administrative functionality is therefore not merely supportive but central to the effectiveness and perceived dependability of M-Mama.

Beyond technical availability, the paper shows that the operational configuration how calls are responded to, how quickly help arrives, and how well transport and health services coordinate determines system impact. Effective communication within and outside the system builds awareness, offers feedback channels, and enhances community cooperation. Additionally, administrative capacity-building through staff training, evaluation, and technology adoption is essential in making the system transparent, fast, and adaptable. Findings from Mlambo et al. (2022) reinforce that issues like low awareness, poor dispatch coordination, and resource shortages, rather than educational barriers, are the primary limitations in low-resource settings like Mtwara.

Demographic insights reveal that while the community respondents (28.8%) highlighted grassroots challenges like lack of awareness and slow responses, 89% of participants had at least a diploma, suggesting operational not educational barriers. Literature from Sunguya et al. (2024) consistently highlights that administrative responsiveness, transparency, and follow-up mechanisms are vital for public confidence in emergency transport systems. Overall, this study underscores a two-pronged approach: improving internal administrative systems and simultaneously engaging the community through education and outreach. Together, these efforts enhance both service utilization and the broader maternal health outcomes in the region.

4.2.3 The Administrative Challenges within the M-Mama Emergency Transport System Implementation in Mtwara Region

The results show a strong positive correlation between administrative challenges and both community utilization ($r = 0.652$, $p < 0.01$) and operational efficiency ($r = 0.701$, $p < 0.01$). This suggests that system-level inefficiencies are a major barrier to the performance of the M-Mama emergency transport service. Administrative delays, rigid procedures, and limited local decision-making authority slow emergency responses delays that can be life-threatening in maternal emergencies. Poor coordination among health workers, transport providers, and local authorities also contributes to dispatch delays, undermining the M-Mama model's reliance on smooth collaboration.

These findings are consistent with Larson et al. (2019), who reported that decentralized emergency systems in Tanzania often face bureaucratic and logistical hurdles. In our study, 22% of managerial respondents highlighted poor supervision, communication gaps, and resource mismanagement. Experienced staff—39% of respondents had more than 11 years of service echoed these concerns and pointed to entrenched structural problems. Supporting literature from Njiro et al. (2023) similarly identifies weak administrative frameworks and fragmented leadership as key obstacles to timely, reliable emergency responses.

Other regional studies reinforce these themes. Mlambo et al. (2022) and several analyses of East African emergency health systems note that inadequate administrative planning, limited stakeholder engagement, and logistical disorganization regularly disrupt service delivery. The relatively high correlation values reported here underscore the need for administrative reforms to improve maternal and newborn outcomes.

To address these gaps, the evidence suggests prioritizing clearer communication channels, stronger accountability mechanisms, and targeted capacity building. Practical steps include standardizing rapid-response procedures, delegating decision authority where appropriate, and improving supervision and resource tracking. Strengthening coordination protocols among dispatch centers, health facilities, and transport providers paired with routine training and performance monitoring can reduce response times and improve care quality.

Ultimately, improving the administrative backbone of the M-Mama system is essential for translating community engagement into effective, timely emergency transport. By combining operational reforms with better stakeholder coordination, the M-Mama program can become more reliable and more effective at saving maternal and newborn lives in Mtwara.

V. CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

On the basis of the findings, the study deduces that a number of interrelated elements greatly undermine the successful implementation and application of the M-Mama emergency transport system in Mtwara Region. Inefficient road networks especially in villages that are not easily accessible causes an extreme shortage of effective transportation to emergency maternal care, and it causes its share of critical delays and in many instances, poor maternal and neonatal wellbeing. Also, the existence and operability of communications systems, such as mobile network access and radio devices, were deemed crucial in supporting the coordination and responsiveness of emergency services. Nonetheless, in the study, it was found that there are poor coordination mechanisms between healthcare facilities and the M-Mama dispatch centre that, along with delay of message exchange and an insufficiency of information flow, hinders the effectiveness of emergency response activities. In addition to that, the lack of available educated personnel and the lack of ongoing capacity-building programs with dispatchers became the major obstacles, interfering with the sustainability and the reliability of the functioning of the system. The findings support the criticality of multi-sectorial interventions that include infrastructural developments, technology, investment and strengthening of human resource to enhance the outcomes of maternal health by delivering the emergency transportation services in a more effective way.

5.2 Recommendations

To start with, it is of utmost importance to enhance the development of the road infrastructure in the remote and underserved regions. Poor and unadjusted roads are a major bridge in responding to the situation in time, in most cases, the reaching of health facilities is delayed during the obstetric emergencies. Funding into construction and development of rural road network would help to save time of transport and minimize the travel issues and eventually lead to the

better maternal and neonatal outcomes.

Secondly, all the M-Mama dispatch centres and other related rural health facilities must be provided with working and dependable communication equipment. Emergency response can be fatally jeopardized by the communication errors between dispatchers, drivers, and the medical staff. Delivery of mobile communication gadgets, radios, and a stable source of internet to the centres will facilitate real-time coordination and curtail time lag when it comes to delivery of service.

Third, creating a uniform system of communication between the dispatch centres and the healthcare facilities is a prerequisite to efficient work. Information exchange, triage and case management are examples of uniform processes that can reduce errors, achieve consistency when delivering services and facilitate monitoring and evaluation of service outcome. Evidence-based protocols should be maintained on a regular basis to echo new best-practices.

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