ORIGINAL ARTICLE

A qualitative assessment of stakeholder perspectives on barriers and facilitators to emergency care delays in Northern Tanzania through the Three Delays

Leah Hosaka [a], Anna Tupetz [b], Francis M. Sakita [c,d,e], Frida Shayo [d,e], Catherine Staton [b,c,f], Blandina T. Mmbaga [b,c,d,g], Anjni Patel Joiner [b,c,f,*]

[a] *University of Hawaii at Manoa School of Nursing, Honolulu, HI, United States*
[b] *Duke Global Health Institute, Duke University, Durham, NC, United States*
[c] *Global Emergency Medicine Innovation and Implementation (GEMINI) Research Center, Durham, NC, United States*
[d] *Kilimanjaro Christian Medical Centre, Moshi, Tanzania*
[e] *Kilimanjaro Christian Medical University College, Moshi, Tanzania*
[f] *Department of Emergency Medicine, Duke University Medical Center, Durham, NC, United States*
[g] *Kilimanjaro Clinical Research Institute, Moshi, Tanzania*

A B S T R A C T

Introduction: Emergency conditions cause a significant burden of death and disability, particularly in developing countries. Prehospital and Emergency Medical Services (EMS) are largely nonexistent throughout Tanzania and little is known about the community's barriers to accessing emergency care. The objective of this study was to better understand local community stakeholder perspectives on barriers, facilitators, and potential solutions surrounding emergency care in the Kilimanjaro region through the Three Delays Model framework.

Methods: A qualitative assessment of local stakeholders was conducted through semi-structured focus group discussions (FGDs) from February to June 2021 with five separate groups: hospital administrators, emergency hospital workers, police personnel, fire brigade personnel, and community health workers. FGDs were conducted in Kiswahili, audio recorded, and translated to English verbatim. Two research analysts separately coded the first two FGDs using both inductive and deductive thematic analysis. A final codebook was then created to analyze the remaining FGDs.

Results: A total of 24 participants were interviewed. Thematic analysis revealed that participants identified significant barriers within the Three Delays Model as well as identified an additional delay centered on community members and first aid provision. Perceived delays in the decision to seek care, the first delay, were financial constraints and the lack of community education on emergency conditions. Limited infrastructure and reduced transportation access were thought to contribute to the second delay. Potential barriers to receiving timely appropriate care, the third delay, included upfront payments required by hospitals and emergency department intake delays. Suggested solutions focused on increasing education and improving communication and infrastructure.

Conclusion: The findings outline barriers to accessing emergency care from a stakeholder perspective. These themes can support recommendations for further strengthening of the prehospital and emergency care system. Due to logistical constraints, emergency care workers interviewed were all from one hospital and patients were not included.

African relevance

- This study highlights the perspectives of five different emergency care stakeholder groups (police personnel, fire brigade personnel, hospital administrators, emergency hospital workers and com- munity health workers) on barriers to accessing emergency care treatment in the Kilimanjaro region. These public safety personnel are on scene for emergency conditions and therefore have unique perspectives on causes as well as solutions to improving access to care for these patients.

* Corresponding author.
  E-mail address: anjni.joiner@duke.edu (A.P. Joiner).

- In particular, the perspectives from police and fire personnel demonstrate an opportunity to incorporate other types of responders and fire-based systems which is currently not the process or underutilized in most African contexts.
- Insights gained about delays and barriers to emergency care have the potential to be applied to similar emergency care systems as well as provide key information towards developing prehospital systems in other LMICs, particularly in sub-Saharan Africa.

Introduction

In 2015, almost thirty million people died due to emergency conditions worldwide [1]. Of these, twenty-four million deaths occurred in low-to-middle-income countries (LMICs), displaying a disproportionate burden of deaths [2]. This accounts for an estimated 1023 million disability-adjusted life years (DALYs) and 932 million years of life lost in LMICs [2]. Similarly, it is estimated that 90% of emergency medical conditions occur in LMICs [3]. It is estimated that one-half of all deaths and one-third of disabilities worldwide could be reduced with the development and strengthening of emergency care systems [4]. In relation to injuries, the development of prehospital systems alone could potentially reduce mortality from injuries by 25% [5]. Despite the high incidence of clinical conditions that are emergent in nature, the majority of LMICs, particularly those in sub-Saharan Africa, lack robust prehospital and emergency care systems. Critical to strengthening emergency care systems is an understanding of where along the continuum of emergency care delays are occurring. Improvement and development of prehospital systems has been cited as a key component in improving mortality from emergency conditions in LMICs [5–9]. As such, the World Health Organization (WHO) has identified the need to improve access to care for time-dependent conditions, particularly through increasing the capacity of prehospital emergency care in these settings [10]. Additionally, emergency care interventions have been shown to be incredibly cost effective with the World Bank Disease Control Priorities Project citing the availability of prehospital services as the second most cost-effective public health intervention [4].

Thaddeus and Maine initially developed the Three Delays framework [11] in reference to maternal deaths in LMICs and described the first delay as the decision to seek care, or from the time of injury or the time of symptom onset to time of decision. The second delay is the time from when the decision to seek care is made to the time of arrival to the most appropriate facility, described as the delay in reaching care, while the third delay is in receiving care resulting from in-hospital or in-facility delays [11]. Applying lessons learned from addressing delays in access to emergency obstetric care in LMIC settings to emergency care conditions has been previously proposed [12]. The Three Delays framework was adopted by the Lancet Commission's Global Surgery evaluation of global access to surgical care and the World Health Organization for use in global emergency health [13]. The Three Delays model is a practical framework to understand barriers to emergency care as well as identifying areas to provide targeted interventions to improve access to care along the continuum for emergency conditions [12,14].

Important to the process of an individual seeking and receiving care after an emergency condition are the roles of stakeholders, such as Community Health Workers (CHWs), Hospital Administrators, Police and Fire Brigade, and Emergency Care Workers. To our knowledge, there have been no qualitative studies that evaluated the perspectives of emergency care stakeholders in Tanzania. With that, we conducted a qualitative evaluation to identify barriers and facilitators of emergency care provision using the Three Delays framework in the Kilimanjaro region of Tanzania. We hypothesize that by utilizing an open-ended approach to assessing barriers to emergency care access and delivery in conjunction with emergency care stakeholders, we will be able to provide potential recommendations for next steps towards development and strengthening of the region-wide emergency care system.

Methods

Research team and reflexivity

We followed the COnsolidated criteria for REporting Qualitative research (COREQ) [15]. The research team in Tanzania included six Tanzanian researchers, three males and three females. Two Tanzanian researchers are also emergency trained physician specialists. The team also included one American female nurse researcher located on site in Tanzania. The study team in the United States consisted of global health researchers and emergency care specialists. All members of the research team had previous experience in qualitative research studies.

Setting and participants

Our study focused on three of the seven districts in the Kilimanjaro region of Tanzania: Hai District Council, Moshi Municipal Council, and Moshi District Council. As of 2017, the three districts encompassed an approximate population of 940,000 persons [16]. In the Kilimanjaro region, the three districts share a total of 11 hospitals, with five in Moshi Municipal Council, four in Moshi District Council, and two in Hai District Council. All 11 hospitals provide 24 hours per day emergency services with a wide range of care capacity, resources, and triage [17]. For higher levels of care, Moshi Municipal District has a single mixed government and private tertiary care facility, Kilimanjaro Christian Medical Center (KCMC), which acts as a zonal referral hospital and a primary designated emergency trauma hospital [17], as well as Mawenzi Hospital which both have Emergency Departments staffed by Emergency Medicine Physicians. Across Northern Tanzania's Kilimanjaro region, there are currently no established prehospital or Emergency Medical Systems (EMS).

We conducted five focus group discussions (FGDs) consisting of emergency care stakeholders in the Kilimanjaro region: community health workers, fire brigade personnel, police officers, emergency care workers, and hospital administrators. All participants have witnessed and participated in current emergency care practices which provides important first hand stakeholder perspectives. Participants were identified via purposive sampling by the local research team (FS, FMS) in order to have a variety of perspectives within each stakeholder group. Additional participants were then identified via snowball sampling. Individuals were contacted via email or phone by the study team and invited to participate in focus group discussions.

Theoretical framework

A semi-structured focus group guide was developed using the Three Delays framework (see Supplemental Table 1). The semi-structured design provided opportunities for probing to help gain a better understanding of participant perspectives. The interview guide included 12 questions focused on barriers and facilitators of the Three Delays with respect to emergency care.

Interview procedure/data collection

The FGD guide was developed by AJP, AT and FS. The guide was developed in English and translated into Kiswahili by the bilingual Tanzanian research team. The focus group guide was piloted with a Tanzanian emergency medicine physician and the Tanzanian research team for feedback. The interview guide was iteratively revised based on feedback from the research team and the pilot (see Supplemental Table 1). The FGDs were conducted by the Tanzanian research team in person in Kiswahili in a private room on the KCMC hospital campus. FGD interviews lasted between 90 and 180 min in length. Participants were provided with subject numbers and referred to by subject number for the duration of the FGD. Before the FGD began, the Tanzanian research assistants explained the purpose and structure of the study and explained

the Three Delays framework. All interviews were audio recorded with consent. Audio files were transcribed to Kiswahili and subsequently translated into English by the Tanzanian research team verbatim. All transcripts were reviewed by study investigators for accuracy.

Focus groups were conducted between February and June of 2021 by three experienced Tanzanian full-time research assistants with prior qualitative research experience. Two research assistants were female, and one was male. The Tanzanian research assistants received additional qualitative interview skills training both prior to the study and after a FGD pilot interview by an expert qualitative researcher. This training included conducing mock qualitative interviews, receiving feedback on asking open-ended questions, and learning strategies in facilitating FGDs. The training helped the Tanzanian research assistants grow confident in their ability to manage FGDs.

Participants were informed of the researchers' names and roles prior to the research study, but no prior relationships were established and no further information regarding the interviewers or facilitators was provided prior to the FGD. A predetermined number of five FGDs were completed with a total of 24 participants. Field notes were taken by the research assistants during the interviews. Besides the research assistants, one US-based researcher (LH) was present in the room in an observer role during all five FGDs. There were no repeat interviews and transcripts were not returned to the participants for comment and/or correction given the number of participants in the study and challenges with following up with these participants. Data saturation was discussed with the research team after each transcription and translation was complete.

Ethical approval

This study was approved by the Duke University Institutional Review Board (IRB) (Pro000106116), the Kilimanjaro Christian Medical center IRB (#2486), the National Institute for Medical Research (Tanzania) (HQ/R.8a/Vol.IX, 3425), and also received regional approval (TAMISEMI AB.307/323/01/147). All participants provided verbal and written consent prior to participation. We followed the COnsolidated criteria for REporting Qualitative research (COREQ) guidelines [15].

Data analysis

Interviews were analyzed with Nvivo (released June 2021) using an inductive and deductive thematic content analysis. Two researchers (APJ and LH) independently coded the first two FGDs creating separate codebooks which were subsequently combined to create a single codebook that was used to code the remainder of the FGDs (see Supplemental Table 2 for codebook). The codebook consisted of predefined themes centered on the Three Delays framework as well as themes which emerged from the data. The codebook was modified in an iterative fashion after new themes emerged from subsequent FGDs and based on feedback from the research team. After coding and the thematic analysis was complete, to help strengthen cultural appropriateness and understanding, LH met separately with two FGD participants (both emergency care workers) to discuss the codebook and major emergent themes. FGD participants (both emergency care workers). This discussion provided an opportunity for participant confirmation of themes, an avenue for feedback on the accuracy of interpretations, and prompted minor adjustments in the creation of the final codebook.

Results

Demographics and characteristics of participants

All subjects agreed to participate in the study. In all five focus group discussions, participant ages ranged from 25 - 54 years old. Participants had been working in their roles between eight months to 20 years with the average length being approximately seven years. Male and female

participants were present in each FGD with 10 females and 14 males participating collectively. For the community health workers FGD, participants were invited from the three previously defined districts in the Kilimanjaro region. In the hospital administrators FGD, participants represented five different health facilities across the three districts. Both the police and fire brigade staff were recruited from their respective headquarters located in Moshi Municipal District. The police and fire brigade staff provide services to Hai District Council, Moshi Municipal Council, and Moshi District Council. The emergency care workers were selected from KCMC's Emergency Medicine department including a physician and nursing staff. No participants refused to participate, however one participant within the community health workers group was unable to attend the scheduled FGD due to unforeseen work responsibilities.

Emergency themes and related quotes

Major thematic codes were generated from FGD interviews which were organized within the Three Delays Model framework seen in Fig. 1's coding tree (Fig. 1).

Delay 1 - delayed decision to seek care

Financial constraints

The decision to seek care was impacted by a number of socio-contextual factors. One overarching reason for the delay to seek care was due to financial constraints. Financial barriers were perceived to affect if and when an individual decided to seek care. Participants indicated that the mere thought of the cost of hospital bills and transportation often prevented people from choosing to seek care and instead wait for their conditions to worsen. One participant stated, *"Those who experience emergency conditions may be delayed in reaching a facility due to poverty. Poverty contributes significantly to someone not getting to a health facility quickly. Someone may wait to see how the condition is the following day."* (Fire Brigade 4)

Limited community education on emergency conditions

Lack of education regarding emergency conditions was also cited as a delay in the decision to seek care. This failure to recognize emergency conditions was perceived as prevalent both among those experiencing emergency conditions as well as the surrounding community members. Specifically, participants indicated a poor knowledge of concerning signs and symptoms, resulting in the potential for emergency conditions to progress without immediate treatment. As one individual stated: *"Another individual delay is an educational issue. People don't know the possible complications of the problems they may experience… someone has difficulty breathing but they do not know the complications."* (Hospital Administrator 1)

Reliance on cultural and traditional remedies

Cultural factors, including consulting a village elder and the use of traditional remedies, were also thought to influence the decision to seek further care. Participants described frequent reliance on traditional remedies as initial first aid treatment as individuals began the process of seeking care. *"In their tradition they start with traditional herbs, if the situation becomes worse, they will start to seek medical treatment."* (Emergency Health Worker 4) They also noted that individuals often chose to forgo formal western health care and instead rely on local traditional treatments. *"Where I live, someone was bitten by a snake. Snake bites are considered a common problem, so he was given local anti-venom treatment. After the problem continued to worsen, the patient decided to come to the hospital."* (Fire Brigade 3)
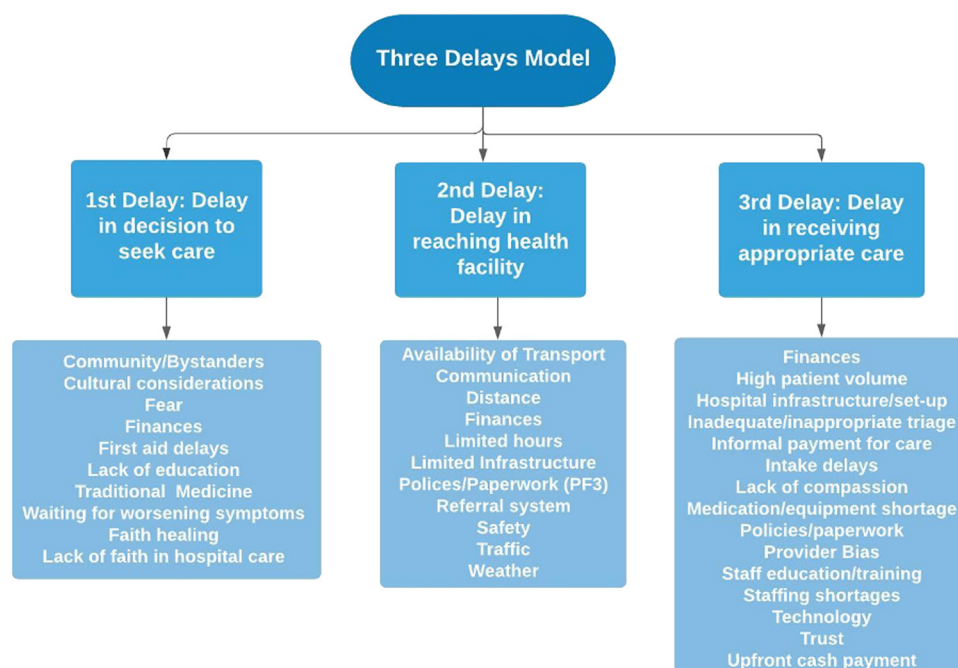
Delay 2 - Delayed arrival at health facility

Prehospital system infrastructure, reduced transportation access

A number of participants specifically discussed the infrastructure challenges that community members face when living in rural villages. Long distances from a health facility and challenging road conditions compounded by rainy weather were considered significant barriers for those in rural settings to arrive at health facilities in a timely manner. Additionally, it was noted that community members must often arrange their own transportation for both initial arrival at a health facility and pending transfer to a higher acuity facility, whether it be requesting a private vehicle or ambulance, using public transportation, or calling for a motorbike or taxi. For example, one participant stated, *"An emergency situation may occur 50 kms from a hospital. It is not easy to get a ride to the hospital. He will spend a lot of time trying to reach the hospital. The infrastructure does not allow those in emergency situations to bypass traffic, etc. There are no accommodations in place to quicken transportation. These transportation challenges sometimes can cause severe pain and further harm to the patient who suffered an emergency situation."* (Police 2)

Navigating emergency services

Some participants stated that patients lacked knowledge and awareness of where to seek care or how to navigate emergency services. *"Why do you think someone is too late to seek care when he already has an emergency problem?…The biggest problem is that people don't know where to find/seek emergency care."* (Fire Brigade 3) The hospital referral system also plays a role because those experiencing emergency conditions are expected to first reach a smaller, nearby health facility for evaluation and stabilization. From there, health staff determine whether a patient's needs can be met or if further management is needed. If a higher level of care is required, a patient receives a referral letter and he or she will then be transferred to a higher acuity facility. These aspects of emergency care require awareness and coordination which can pose challenges for emergency care patients and community members.

Police policies surrounding injuries/accidents

For those involved in vehicle crashes, accidental injuries, and other traumas that require investigation, a Police Form #3 (PF3) must be obtained by law. FGD participants debated whether this form was required

prior to receiving emergency care. Some FGD participants stated the PF3 was not required prior to treatment but could instead be retrieved while emergency care was being performed. *"The patient can continue with treatment while relatives can bring the PF3 or if no relatives the hospital may call the police and the police can then bring the PF3. Therefore, in my facility, all patients who need emergency care will receive it even if the PF3 is not yet present."* (Hospital Administrator 5) Others stated that before going to a hospital to seek care it was necessary to have a PF3 in hand which may add an additional stop at the police department during transportation to the hospital. Although opinions on the necessity of this form differed, the majority of participants agreed that it caused delays in reaching care. *"The procedure and the law can delay someone's access to care at the hospital until they have a police letter (PF3) so that they can receive care. For example, someone who is beaten and wants to go to a hospital but cannot be treated until he goes to the police to get a PF3 which allows him to go to the hospital and get treatment. That delays the patient getting care…"* (Community Health Worker 1)

First aid provision

The delay or lack of first aid provision immediately after an emergency condition was identified as an important theme falling within the first two delays of the Three Delays Framework. First aid as a separate form of treatment had the opportunity to both help and hinder one's pathway towards receiving appropriate emergency care. The absence of first aid provision highlighted the need for both community members as well as on-scene stakeholders such as CHWs, police officers and fire brigade to receive education in the management of emergency conditions. Limited education around first aid care as well as a need for further resources to provide initial care were cited as barriers for all involved. *"The training we need is how to provide first aid to patients in emergency situations. We currently have first aid boxes, but inside it is empty. If we have equipment and training, it will help us greatly in our work to save the lives of patients who experience emergency situations."* (Police 3)

Role of community members and bystanders

The role of the community and bystanders was noted to be an important factor in first aid provision and further mobilization of care (Delays 1, 2). Participants described the decision-making process among family members may be a source of delay. *"Also the decisions of the relatives of*

the person in need of care can delay him [the injured individual] reaching the service quickly. He has decided that he is going to get care but another one in the family will say that they understand how to help their family member. Then after that, the individual's condition may get worse and now the family has agreed the individual should go to the hospital, but now it is late and delayed."* (Hospital Administrator 2) Another aspect of community involvement was when the injured individual was unconscious, incapacitated, or lacked agency in making their own decisions. *"Communication in emergencies is not only for the person who has experienced the accident. It is important for witnesses and those surrounding to communicate on behalf of others. The whole community is responsible to inform others about emergencies."* (Police 4) Additionally, the role of community members was cited to influence an individual's ability to reach a health facility. Multiple participants stated that bystanders might be fearful in helping a stranger because of the possibility he or she would be considered a suspect in the investigation surrounding the incident. *"Someone may be afraid to witness emergencies because they don't want to be considered a suspect. For example, if the individual in the emergency dies, then the witness may be treated as a criminal."* (Fire Brigade 2) This causes further delays because actions are not swiftly taken to facilitate the transport of individuals to health facilities

Delay 3 - delayed provision of adequate care

Intake and triage delays

After reaching a health facility, participants discussed multiple barriers that patients and their families faced in receiving adequate and appropriate care. Some participants described time consuming intake and triage delays with patient registration and payment requirements to open a patient file. *"One factor that causes delays in receiving care is the procedure of bringing in a new patient. It takes time to register the patient with the receptionist. Even as the patient's condition worsens, no one has begun registering the patient, even in severe emergencies."* (Fire Brigade 1)

Upfront payments, financial strain

Financial costs were again cited as a challenge, especially in a population with a majority of people uninsured. Participants stated that even when patients were insured, the health insurance coverage would not always cover specific emergency care costs. *"If someone uses health insurance there is a disturbance to be told some services are not paid for by the health insurance the patient needs to use cash to pay for some services. If the patient does not have cash money to pay for the services that cannot be covered by the health insurance this may delay care for the patient after making a decision to seek care."* (Community Health Worker 2) It was also noted that individuals and family members are often expected to pay for more timely evaluation and treatment. In fewer instances, particularly at the largest facilities, the social services department has the ability to credit emergency bills which allows patients and their families to pay hospital bills at a later time. However, more often, this system favors those who can provide upfront payments and may cause those with a lower economic status to experience further delays, *"Someone who arrived early (to the health facility) may be the last to receive care because they don't have money for a bribe. This can cause frustration to patients who have waited all day."* (Police 3)

Some participants stated that basic first aid was provided while paperwork, payments, and registration were being completed. However, for most diagnostic and health services including imaging, blood work, and medication administration, it was necessary to provide proof of upfront payments. *"There is a delay in getting care quickly due to patient payments. When a patient arrives at the emergency room, the receptionist asks the patient's relatives for the payment method whether it is cash or insurance."* (Community Health Worker 5) Participants noted that family and community members may spend hours, days, and even weeks to gather the necessary funds to pay for higher cost diagnostics and treatment interventions like surgery. *"If you don't have money nowadays*

you will not access treatment until you receive money from relatives to pay for the hospital bill which will cause delays."* (Community Health Worker 4) During this time, participants stated patients would suffer short and long-term consequences and even death due to prolonged wait times in receiving appropriate emergency care. *"Disability may happen to the patient who needs emergency care due to delay of treatment."* (Emergency Health Worker 5)

Hospital infrastructure: shortages in equipment, medications, and staff

Hospital infrastructure was discussed with a particular focus on equipment, medication, and staffing shortages contributing to delays in emergency care treatment. *"There is also a problem in the structure of the emergency facility. For example, 5–6 people with emergency conditions may come in but only three beds are available. In addition to shortages of beds/supplies, there is a shortage of staff. Most emergency rooms are small and cannot treat more than a couple patients at a time. This causes delays in receiving care at the hospital."* (Hospital Administrator 2) Participants stated it was common for equipment to be broken and/or medications to be limited or out-of-stock. They stated that medications were given to patients based on availability, and in some circumstances family members of patients would search nearby pharmacies or hospitals to find the needed medications for their loved ones. *"In some places there is a shortage of equipment like cannulas [catheters] so patients must buy these supplies outside of the hospital. Until the relatives gather all these supplies, the patient will not receive treatment."* (Hospital Administrator 1)

Recommendations to improve emergency care

Empowering community members

Participants from all FGDs expressed the need for educating the wider community about recognizing symptoms that require emergency care. One participant stated that, *"Education to community members to understand what the emergency conditions are and how to take care immediately would lead community members to seek care sooner."* (Emergency Health Worker 1) The perspectives shared by FGD participants underscore the importance of improving knowledge on identifying emergent symptoms. Participants also believed it was important to educate the community on the impacts of delaying care seeking in lieu of alternative medicine treatments. *"Other people adhere to strong cultural beliefs like herbal and local medicine. People believe taking these medicines can cure them. For example, someone has a broken leg and believes there is a village elder who can help apply leaves (or herbal/local medicine) to help connect the broken bones together. Therefore, we need to educate the community about emergency matters."* (Hospital Administrator 1)

First responder/prehospital stakeholders

One recommendation provided from numerous participants was developing a clear, direct, and more robust communication system for first responders. Participants believed improved communication would lead to better teamwork, cooperation, and faster execution of prehospital and hospital emergency care. *"We need a number to expand our ways of communication about emergency cases. For others providing emergency services, they should have a phone number that's free like us at the fire brigade."* (Fire Brigade 2) Additionally, prehospital stakeholders emphasized a desire to better help those in emergency situations through education on first aid care and having the appropriate resources. *"Community health workers have a difficult time providing care to those in emergency situations. We do not have supplies like gloves and other protective equipment to be able to provide services quickly which contributes to patients delayed emergency care."* (Community Health Worker 3)

Hospital staff training and equipment

Health care providers and administrators also expressed a need for in-hospital staff to receive additional training to handle emergency conditions. They believed this education was particularly important for smaller, peripheral facilities which act as a community's first point of

care. *"Every staff member needs to have basic life support knowledge which will help them take care of the patients who reach their facility."* (Emergency Health Worker 4) Additionally, there were recommendations to ensure that hospitals and emergency facilities had adequate staffing, medical resources, and patient care space to meet the needs of incoming patients. FGD participants stated, *"The government needs to provide more workers and equipment"* and *"if the building is not enough, then a larger building is needed which can accommodate an abundance of emergency patients."* (Hospital Administrator 4, 3)

Discussion

In this study, we identified perspectives on emergency care delays in Northern Tanzania from key stakeholders using the Three Delays framework. These perspectives from a variety of stakeholders provided an understanding of perceived barriers within the emergency care pathway and also posed recommendations for improvement. Barriers within Delay 1 included financial constraints, limited education on emergency conditions, and reliance on cultural and traditional remedies as opposed to seeking western medical care. Challenges faced in Delay 2 included lack of a prehospital system infrastructure and transportation access, difficulty navigating emergency services, and police policies surrounding injuries and accidents. Lastly, perceived barriers for Delay 3 included hospital intake delays, need for upfront payments, and hospital infrastructure including shortages. First aid was identified as a unique contributor to Delays 1 and 2, but also as a needed skill for community members to be able to provide immediate care during an emergency. First aid treatment can be critical in temporizing or even resolving many emergency conditions. FGD participants provided recommendations for improvement through empowering community members and expanding emergency care training for first responders and hospital staff.

Prior findings from the emergency obstetric literature have identified a fourth delay, which is described as the collective responsibility of the community in reducing maternal mortality [18,19]. Similarly, we found a key theme that arose from our interviews was the role of the community throughout many aspects of the Three Delays framework, in particular, the provision of treatment. First aid occurs outside of the health facility and relies heavily on the knowledge, willingness, and proximity of community members and bystanders. A community's knowledge or lack thereof regarding symptoms of emergent conditions could either help or hinder mobilization of care. Incorrect knowledge of first aid practices could also prove harmful [20,21].

Many settings have evaluated training and utilizing community members as emergency first aid responders (EFAR) in order to respond to emergent conditions in areas where no emergency medical services exist. Training of lay persons across sub-Saharan Africa, such as commercial drivers, has been demonstrated to be a viable solution to address underdeveloped or non-existent prehospital services [22–28]. However, an evaluation of trauma patients presenting to Muhimbili National Hospital in Dar Es Salaam, Tanzania noted greater trust in close family members and neighbors to provide first aid and less trust in police or taxi drivers [29]. Sun and Wallis describe the successful implementation of a community-based EFAR program in a township in Cape Town, South Africa, as a cost effective solution to addressing an overwhelmed EMS system [30]. Developing an EFAR program would require significant buy-in and input from the community.

We also found the influence of the community was critical in many of the perceived reasons for the first delay, the delay in seeking care. A recent study applying the Three Delays framework within a rural Bangladeshi context found the decision to seek care was heavily influenced by sociocultural factors, with the male head of household or family elders making the primary decision [14]. Similarly, we found that family and community members heavily influenced the decision to seek care. Additionally, the community plays a significant role in an individual reaching a health facility due to the need for reliable and rapid transportation which is closely connected to barriers noted within De-

lay 2. A study conducted in rural Uganda focused on asking patients and their caregivers about their experiences in relation to Delays 1 and 2 which underscored the important role of community and family members in the decision to seek and reach care [21]. Community members are crucial in arranging for or directly providing transportation, or in some cases, physically carrying the patient [18,21].

Stakeholders within the public safety sector provided insight into understanding their unique roles. We found that overall Fire Brigade and Police officers were eager to expand their roles by learning first aid skills and providing care during emergency scenarios, but lack of specific first aid training and equipment hindered their ability to assist. These findings generally reflect those of other studies assessing police officer's roles during emergencies in Tanzania [31], however, this is the first study that we know of to assess the potential role of the Fire Brigade in these settings. Fire and Police brigade participants also noted underutilization of their specific emergency number which allows community members to contact their respective departments about emergencies.

Integration of both of these stakeholders has significant potential to impact emergency care provision in this setting. The Fire and Police departments have existing infrastructure with a dedicated emergency phone number, stations, and emergency response vehicles. Moreover, our findings demonstrate a sincere willingness to assist community members in need of emergency care. Other countries use Fire personnel as first responders and EMS transport services, however, this model has not gained traction in limited resource settings. Many training programs have been developed in low resource settings to promote the involvement of police officers in providing first aid to victims of motor vehicle collisions and overall, these programs have proven to be effective [23,32]. As this region of Tanzania continues to build emergency care capacity and consider development of a formal prehospital system, using and expanding the existing infrastructure of these services and personnel may prove a cost-effective and actionable solution.

Participants identified an additional potential solution particularly within the context of emergency health facilities. FGD participants were unified in their desire to see improvements made in supporting and educating emergency health workers. This intervention includes providing first aid and basic life support training as well as triage management and improved communication. Similarly, in 2019, the World Health Assembly (WHA) adopted resolutions to improve emergency and trauma care, with a particular focus on providing emergency care training for relevant health workers (Resolution 72.16) [33].

The Basic Emergency Care (BEC) course was developed by WHO and the International Committee of the Red Cross (ICRC) for emergency frontline healthcare providers with limited resources. A study conducted in Tanzania and Uganda implemented the WHO-ICRC BEC course which noted improvements in emergency care knowledge and confidence among locally trained providers [34]. Additionally, a Rwandan study evaluated a global emergency medicine course which benefited local emergency medicine trainees and proved to be logistically and financially feasible [35]. Furthermore, efforts have been made to empower nurses in LMICs through the development and implementation of emergency nursing curriculum [36,37].

Beyond emergency care training, FGD participants underscored the importance of improving communication and triage within the hospital setting. Several triage tools have been developed for LMIC and African-specific settings, including the Emergency Triage Assessment and Treatment Plus (ETAT+) for pediatrics and the South African Triage Scale (SATS). A country-wide implementation of the ETAT+ through a 5-day course and six-month long in-situ mentoring was associated with significant improvement in pediatric mortality and the quality of care [38]. This tool has been associated with a significant increase in various healthcare workers' knowledge and skills in treating pediatric and neonatal conditions in Rwanda [39]. A study completed in Nairobi, Kenya sought to evaluate the implementation of the SATS and found that health care worker triage decisions had improved with educational interventions [40]. Implementation of the SATS in Egypt was also asso-

ciated with improved mortality and decreased length-of-stay [41]. As efforts are made to reach the WHA's 2019 emergency global health goals, a dedicated approach to training emergency health workers is the foundation moving forward.

Limitations

Due to delays in receiving local medical research approval, all emergency care worker participants were from a single hospital emergency department at Kilimanjaro Christian Medical center. With that, there is a potential for future work to gather more perspectives of emergency hospital workers from other emergency departments at other hospitals. We also note that this study focuses primarily on the perceptions of various stakeholders on specific barriers to the Three Delays framework and as such, inherently excludes the patients. Further investigation into patient perspectives may be useful to compare with our findings.

Our setting may also be unique compared to other regions in Tanzania, as Kilimanjaro is home to one of five tertiary care centers in the country. Therefore, we understand that some of the perspectives, particularly with respect to Delay 3, may be different due to the presence of trained emergency medicine physicians and may yield different insights compared to other hospital systems.

Our FGDs were conducted during the heightened COVID-19 pandemic which may have altered emergency stakeholders perceptions about emergency care delays and lack of resources.

Conclusion

To our knowledge, this study is the first to assess the perceptions of stakeholders (fire brigade, police staff, community health workers, hospital administrators and emergency health care workers) on barriers within the Three Delays framework applied to an emergency care context. Our findings highlight the respective roles and unique perspectives of these stakeholders in the Kilimanjaro region of Tanzania. We found that the role of community members in providing first aid is an important aspect of Delays 1 and 2, and that although this can contribute to the overall delay to definitive care, first aid provision represents an opportunity to provide immediate and potentially life-saving treatment. Finding sustainable ways to reduce the delays requires the involvement of all stakeholders and the community. This includes the push to provide thorough education and training at all levels of care. Further research considering the expansion of fire brigade and police officer roles may provide avenues for the development of a sustainable and robust prehospital system.

Dissemination of results

This work will be shared with relevant stakeholders at the local and national level within Tanzania, including local hospitals.

Author's contribution

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: LH contributed 30%; APJ contributed 20%; FMS and AT contributed 15% each; FS contributed 10%; and BTM and CAS contributed 5% each. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of Competing Interest

The authors declare no conflicts of interest.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.afjem.2023.06.007.

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