

“Dying due to poverty and lack of easy transport”: A qualitative study on access and availability of pre-hospital emergency medical services in Kampala, Uganda

Amber Mehmood

Johns Hopkins University Bloomberg School of Public Health

Shirin Wadhvaniya

Johns Hopkins University Bloomberg School of Public Health

Esther Bayiga Zziwa

Makerere University College of Health Sciences

Olive C Kobusingye (✉ okobusingye@musph.ac.ug)

Makerere University College of Health Sciences <https://orcid.org/0000-0003-2413-599X>

Research article

Keywords: Emergency medical services, pre-hospital care, emergency care system, access, quality of care, patient-centred

Posted Date: August 16th, 2019

DOI: <https://doi.org/10.21203/rs.2.13056/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background Emergency care services in low-and middle-income countries (LMICs) have traditionally received less attention in the dominant culture favouring vertical health programs. The unmet needs of pre-hospital and hospital-based emergency services are high but the barriers to accessing safe and quality emergency medical services (EMS) remain largely unaddressed. Few studies in Sub-Saharan Africa have qualitatively investigated barriers to EMS use, and quality of pre-hospital services from the providers and community perspective. We conducted a qualitative study to describe the patient-centred approach to emergency care in Kampala, Uganda, with specific attention to access to EMS. Methods The data collection was comprised of Key Informant Interviews (KII) and Focus Group Discussions (FGDs) with the community members. KII participants were selected using maximum purposive sampling based on expert knowledge of emergency care systems, and service delivery. FGDs were conducted to understand perceptions and experiences towards access to pre-hospital care, and to explore barriers to utilization of EMS. The respondents of ten KII and seven FGDs included pre-hospital EMS (PEMS) administrators, policy makers, police, health workers and community members. We conducted a directed content analysis to identify key themes and triangulate findings across different informant groups. Results Key themes emerged across interviews and discussions concerning: (1) lack of funds, (2) lack of standards, (3) need for upfront payments for emergency transport and care, 4) corruption, 5) poor quality pre-hospital emergency service, 6) poor quality hospital emergency care, and 7) delay in seeking treatment. Conclusions Patient-centred emergency care should be an integral part of comprehensive health care services. As Uganda and other LMICs continue to strive for universal health coverage, it is critical to prioritize and integrate emergency care within health systems owing to its cross-cutting nature. Community perceptions around access and quality of PEMS should be addressed in national policies covering affordable and safe EMS.

Background

Emergency care systems in low-and middle- income countries (LMICs) have historically received less than desired attention.[1, 2] Low-income countries and poor people in individual countries are particularly at the risk of an inequitable distribution of the burden and adverse outcomes of injuries and other emergencies.[3] Currently 90% of all deaths from road traffic injuries (RTIs) occur in LMICs, with majority of early deaths as a result of pre-hospital delays, unavailability of transport, or inadequate care.[4, 5] In many LMICs, pre-hospital care, which is an essential component in the continuum of Emergency Medical Services (EMS) are often overlooked and under-developed.[6, 7] In an environment of competing priorities for the triple burden of diseases, one of the biggest challenges is to draw the attention of health systems planners, policy makers, and donors to strengthen pre-hospital EMS (PEMS) and hospital-based emergency care systems.[8, 9] As a results, in many low-income settings where availability of, and access to PEMS is inadequate, there are reports of variable capabilities and disparities between urban and rural utilization of formal EMS.[10]

Despite a rapidly growing burden of unintentional injuries, non-communicable diseases and acute complications of infectious diseases, there is no formal pre-hospital emergency care system in Uganda. [11–13] Patients and caregivers often have to organize transport and pay upfront for the pre-hospital emergency services, and later face unprecedented challenges in hospital based emergency care.[11, 13, 14] Lack of formal EMS also undermines response to mass casualties; most road traffic victims are transferred to the nearest health facilities, despite an apparent lack of the surge capacity to deal with mass casualty incidents.[15] Emergency obstetric care is frequently compromised by the lack of emergency transport and communication systems in Uganda.[16] Despite these reported challenges the access and availability of these services has not been studied from the perspective of community members and providers. With this background, we conducted a study using a health system framework to understand the gaps in the system and allow insights into potential areas of EMS improvement in Uganda. The framework detailing pre-hospital emergency system and its multi-pronged assessment methodology is described elsewhere.[17] In this paper, we are reporting the results of the qualitative section of our study, which describes the current PEMS in Kampala with specific attention to patient-centered access to formal and informal emergency care system. These interviews and discussions were designed to probe gaps in PEMS as well as explore the community's perceptions and experiences about access and quality of emergency care and overall status of emergency care in Uganda.

Methods

Setting:

This was a cross sectional study, conducted in the city of Kampala, which has a night-time population of 1.5 million. The city was served by five major hospitals, several health centres, and private clinics. The five acute care, tertiary hospitals are Mulago, Nsambya, Rubaga, Mengo, and Kibuli, most of them also serve as trauma referral centres.[13] Reports suggested that most ambulances were owned by the police or hospitals and were used as transport vehicles between the hospitals.[11] A number of players, including the police, private-for-profit, and private-not-for-profit, as well as local humanitarian agencies, provided care in fragmented fashion, with little or no coordination.[11, 13]

Data Collection:

The data collection was comprised of key informant interviews (KIIs) and focused group discussions (FGDs) conducted between November 2015–April 2016. Key informants were individuals who, because of their position or experience, had expert knowledge of pre-hospital and hospital-based emergency care system, policies, and planning of services in Uganda. Thus, KIIs took place with PEMS providers, policy makers, and administrators. Participants were selected from the following organizations including Ministry of Health, Kampala Capital City Authority, representatives of PEMS services/ambulance providers in Kampala metropolitan area, and Police department. Respondents were selected using maximum variation purposive sampling. The inclusion criteria for KII was that the respondent's job was

connected to pre-hospital/ emergency care and that they had at least 1-year of work experience in that position.

KIIs were conducted using a semi structured questionnaire that lasted 30–35 minutes. KIIs were aimed to elicit information regarding policy and implementation of pre-hospital services, financial support for PEMS operations, access and coverage of PEMS services, internal and inter-agency coordination, communication procedures, and knowledge and practices of the care providers. FGDs were conducted with emergency care providers and community representatives to understand their perceptions, opinions, beliefs, and attitudes towards access to pre-hospital care and barriers. The questions with community members aimed to acquire insight into the experience of patients and their families, their willingness to use ambulances, satisfaction with the care provided en-route and in the emergency rooms, and out-of-pocket expenditure. Participants for the focus group discussion were selected if they had used any EMS service either for themselves or for a family member within the preceding 12 months or had provided the emergency care to the patients. All participants were over 18 years of age and could communicate in English or Luganda. The study plan and procedures were approved by the Johns Hopkins Bloomberg School of Public Health, Makerere University School of Public Health, and Mulago Hospital Institutional Review Boards.

Data Analysis:

All the transcripts from the FGDs and KIIs were recorded, transcribed, translated into English where indicated, and exported into Atlas-ti 6.2© for electronic coding and analysis. The JH-IIRU research team read through and coded all transcripts to develop lists of preliminary themes using participants' own words. Identifying information was omitted during data analysis to protect participant confidentiality. The research team met regularly to discuss emerging themes and to develop a formal codebook, which linked each content area with specific thematic codes. During the process, extra codes were identified from text, defined and added to the codebook while other predetermined codes and or their definitions were changed to reflect what the text indicated in the data. Any discrepancies in code definitions and in the application of codes, were resolved through discussion, thus ensuring the reliability of coded data and consistency of emerging themes. Multiple levels of descriptive, interpretive, and explanatory coding allowed for an in-depth understanding current state of EMS and attitudes towards pre-hospital care.

Results

We included detailed transcripts of ten KII and all seven FGDs. Some KIIs (n = 8) were deemed too brief to be included in the qualitative thematic analysis due to targeted nature of the questions, however they served to corroborate findings across informant groups. The respondents (n = 65) included PEMS administrators, policy makers, police, PEMS personnel, health workers and community members. The male to female ratio among participants was 3:1 and the mean age of the participant was 38 5.5 years. Findings from KII and FGD are presented under the following themes: (1) lack of dedicated funds, (2) lack

of standards, protocols and training for PEMS, (3) need for upfront payments for emergency transport and care, (4) corruption and bribes, (5) poor quality pre-hospital emergency service, (6) poor quality hospital health service, (7) delay in seeking treatment.

- Lack of dedicated funds

Unsecured funding for ambulance and pre-hospital care emerged as a significant issue. PEMS in Uganda are partly funded by government, international development agencies, non-government organizations, and charities. Procurement of ambulances, their maintenance, and personnel training are supported through grants. It was stated that once funding discontinued, provision of free transportation, maintenance of ambulances and equipment, availability and training of EMS personnel was jeopardized. As described by a PEMS administrator:

'We always replace when they (equipment/vehicles) are damaged but it also highly depends on the availability of funding like the XX (donor) has been here for the last four years so they take care of the program and makes sure that things are in place. But in case there is change over, there could be situations when there is no equipment and it's a bit of a challenge to maintain some of the equipment.'

- Lack of standards, protocols and training

In Uganda, PEMS are administered by multiple provider organizations—public, for profit and not for profit. Different kinds of ambulances have a variety of personnel—driver, nurse, doctor, paramedic, health worker, volunteers from *'diverse professional backgrounds'* with variable training and skill set. Despite recent establishment of Uganda National Ambulance Services, there is ambiguity in the legal framework, governance and EMS policies. Poor implementation of protocols for EMS services, lack of clinical guidelines, and ambulance standards were mentioned frequently. As mentioned by an EMS administrator:

'yes, within the training for the standard first aiders and the trainer of trainers these clinical indicators are clearly laid out; however, the challenge is we have not yet put in place this standard operating procedure to bring out these kinds of things and bring out explicit indicators.'

There were no standard indicators for pre-hospital or hospital-based data collection and data were mostly collected for reporting requirements to donors and only seldom used to improve quality of care.

There was lack of formal training and accreditation of the EMS providers. Police personnel were trained in rescue and fire-fighting skills but many of them were not aware of safe transport procedures from the scene to the hospital. Very few boda-boda (motorcycle taxi) drivers and community members were trained in first aid. The training of pre-hospital providers was not standardized, and the duration of this training was reported to be variable. A health care worker while recognizing EMS related training needs said:

'Even in some hospitals you know we are not well equipped. First of all, we lack equipment, we lack the training, so sometimes we can receive an emergency and we don't know what to do, someone doesn't know where to start. So, there is need for training much as we are medical personnel there's need for training people who handle emergencies. You know it needs continuous training and particularly in how to handle emergencies because not every medical personnel can handle emergencies.'

Lack of single national toll-free phone number for emergency medical services and ambulances was raised in the study. Different ambulance providers have different phone numbers and the community members find it difficult to arrange for an ambulance in the absence of central dispatch system. They either call police or use other modes of transportation as described by a community member:

'... but it is very difficult to call for an ambulance because we don't have their contacts, so we run to the nearby health facilities and we use special hires.'

- Need for upfront payments for emergency transport and care

A major challenge in receiving emergency care was money. While some ambulance services were apparently free, in most cases patients or their relatives had to pay for transportation, the cost ranging for 500,000 to 750,000 Ugandan Shillings (UGX) i.e. about 135–202 USD. Distance to the health facility, condition of the patient and vehicle type dictated the transportation cost. As mentioned by a health worker:

'... and also if the government has provided those ambulances, let the fuel and the drivers be there in those ambulances all the time because you find that there is an ambulance and there is no fuel so when you contact them they first ask for fuel money yet you are poor and can't manage to use boda-boda; you thought it would be free but they ask for fuel money.'

It was common for patients to be expected to pay upfront for investigations, medicines and treatment even for those who were in critical condition, resulting in devastating consequences. Some recounted that even during emergencies, services are denied unless the patient or relatives pay the required amount as described by a health worker:

'I have a scenario of my cousin brother who died of tetanus recently. He was pierced by a nail and when he went to get a tetanus toxoid they asked for 10,000 (UGX) yet he had 2,000 so he said "can I give you 2,000 because I don't have the 10,000?" The man in the clinic said no (...) so he went back home and put tea leaves and salt thinking he had immunized himself yet the thing was maturing... Now when it reached the brain he was taken to XX hospital but when they reached there, ..., they asked for UGX 300,000 but he was in a critical condition with locked jaws. So, the brothers went back home to sell the cow... They sold two cows but didn't get 300,000 since it was done hurriedly but the patient had not received any treatment. They first took 150,000 and the health workers said we said 300,000 so they went back to get

the balance and when they took the UGX 200,000 he died that same day. The man was 32-yrs old with six children and a wife. He died of a preventable disease....'

- Corruption and bribes

Corruption was reported to be rampant in the healthcare system, including in emergency medical services. Community members reported that the transporters and health care providers took advantage of their situation by demanding money. A major barrier of getting to health facilities was lack of money to pay bribes. Community members believed that they would not receive health services until they had money and hence many avoided going to health facilities. Even after arriving at the health facility, they had faced other challenges. Some government doctors had their private practice and they would have their brokers in the government health care facility as described by a community member:

'So when patients get to hospital they are denied prompt health care so that this broker comes to talk to the caretaker of this very ill patient; "you see you are being delayed yet I know of a very good and cheap doctor in Bwaise who treated my patient one time" the caretaker will say it's okay let's go. And if you are keen it is the same doctor who was at this hospital that you will find in the other clinic.'

Money is demanded at different points in health care delivery until the patient is discharged. While systems are developed to avoid corruption in public health facilities, such as close circuit TV and cameras but most bribes are exchanged in places such as toilets.

- Poor quality pre-hospital emergency service

Due to the lack of EMS, it takes some effort to arrange for transportation and there are delays in reaching the health facility. During emergencies, the community use a range of vehicles including ambulances, private vehicles, bicycle, boda-boda, taxis, and police pick-ups. Some patients go to the hospitals by foot. Participants reported using boda-boda because they were readily available and cheaper so that they could save money for treatment costs at the hospital. One community member recalled the ordeal of her colleague:

'...she had labour pains and was supposed to deliver at hospital since she was on ARVs (antiretroviral treatment) but due to lack of transport she delivered on the way. We were so confused but when we called XX hospital, we were advised to take them there as quickly as we could because the treatment to the baby has to be administered within a given period of time. The baby was wrapped very fast and taken on a boda-boda as the mother came on a taxi (wagon bus).'

They also found boda-boda as the quickest mode of transport to the hospital as these could easily navigate through traffic while some other prefer using ambulance as mentioned by a community member:

'ambulances are respected and not affected by traffic jam, drivers give them way, so they are faster.'

In most cases the patient does not receive medical care at the scene or at home and during transport. Also, ambulances are not always available and at times they are also misused for other purposes as described by a participant:

'hospital administrators should monitor ambulance drivers to ensure that they don't misuse ambulances because one time we took a woman in labour and needed an ambulance, but it was not available and when it came it had loaded matoke (bananas).'

Another major challenge in delivering pre-hospital care was lack of equipment and supply of other medical products, mostly due to inadequate funds. This was expressed by both the providers and community members. For instance, the ambulances are not equipped with equipment such as oxygen, lifesaving medicines are mostly not available or are expired and at times even basic supplies such as gloves are not available. Many times, communities do not have a first aid kit that could be used in case of emergency, as described by a health worker:

'for example, you may get a lady delivering on the way, but you don't have gloves because we cannot go out with them... they will say we are stealing so when you find a mother delivering you won't help because you cannot touch blood using bare hands.'

Most ambulances would only drop the patient at the hospital and would leave without any communication between the EMS team and hospital team. A major reason for this was to avoid getting patient trolleys held up at the hospital.

- Poor quality hospital health service

Even after arriving at a health facility, there may be delays in receiving treatment. Some of the reasons for this delay are related to improper communication, limited human resources or lack of medical supplies. The hospital emergency staff would continue triage and treatment on ambulance trolley because of insufficient number of hospital beds. Sometimes ambulances inform private hospitals about patient transfer. Although few community members reported that their patients received prompt care in case of emergency, several human resources related issues were highlighted by the respondents. Providers were either not available or were absent or were rude, non-responsive or demotivated as described by a community member:

'... then health workers especially in government health facilities don't have care for people who need emergency care, you may get there but they don't care so some people die while in hospital but have not received any prompt medical care.'

Participants also recognized low salary and heavy workload as reasons for their lack of motivation. Lack of life-saving medications were also identified as barriers for treatment. In some other cases the patient is

either asked to purchase the required medicines or are referred to some other facility. As described by one community member:

'... most government hospitals have no care because one time I took a patient who had a very deep wound on the head which needed to be stitched but this was not possible due to lack of supplies, can you imagine a government hospital not having these supplies for stitching! I took this patient to XX where he received services.'

- Delays in treatment seeking

Lack of protection of good Samaritans was a reason why community members were hesitant to help someone in emergency. As explained by a community member:

'the other issue is that if one is involved in an accident and a good Samaritan in any vehicle would like to help this person to hospital they fear because when they get there this person is asked so many questions even before giving care to the patient to the extent of retaining his vehicle, at times they are incriminated.'

Lack of knowledge and use of home remedies were identified as reasons for delay in treatment seeking. Community members would seek treatment at a health facility only if the health condition worsened as described by a health worker:

'... others prefer traditional medicine/herbal, so they take time taking that. People deceive them that you take this and that so they take long. Others think they are bewitched. Or they may say the other time so and so died so they go for some rituals and waste time and by the time they come they are very ill.'

Participants reported that during emergency they had to travel to multiple facilities before they could get health services. There was general dissatisfaction with emergency health services and as one participant put it, *'I regret why I came here'*. Because of the poor service and rude treatment at public health facility, patients prefer to seek treatment either at private facilities if they could afford or preferred to stay home.

One community member elaborated the challenges due to the lack of integrated emergency services:

'yes it is a problem due to lack of transport, secondly health facilities are far and the nearby one has limited services because in most cases this HC-III (health centre) has stock outs so they refer patients to XX and the patient has no money, has no transport, the available boda-boda transport is not convenient so we are scared of using them so you find that people end up dying due to poverty and lack of easy transport, so many people have died because of that yet they would have been saved'

Discussion

This study highlighted several barriers in the access and delivery of pre-hospital and hospital-based emergency care services. Community members described the need for timely and effective emergency

care for all types of acute illnesses including trauma, communicable diseases and obstetric emergencies but also highlighted a number of challenges. While policy makers and administrators pointed out the lack of a lead agency that must lay out the framework for integrated services and provide inter and intra-agency coordination, health workers were concerned about lack of guidelines and standards, equipment and medical products, as well as training opportunities. The participants' perception and experience about the emergency care services is best described using the conceptual framework presented by Levesque et al, in which the accessibility to health care and in this case, emergency care are discussed in terms of 1) Approachability; 2) Acceptability; 3) Availability; 4) Affordability; and 5) Appropriateness.[18] We will discuss patient-centred emergency care services according to the various dimensions of accessibility framework as described in figure 1, and propose some recommendations targeted at the health systems strengthening to overcome some of these barriers.

The ability to perceive the need and seeking emergency care services are in part dependent upon the community's health literacy, beliefs and trust in the system. Looking closely at the respondents' perception of approachability of EMS, it is evident that lack of trust in the system and low expectations from available services prevented them to approach even when they felt the need and urgency to seek care. This was often times complicated by poor health literacy and belief in traditional remedies that caused more harm and further delayed treatment.

Challenges in arranging pre-hospital transport such as lack of toll-free number, phone ownership and upfront payments might be additional inhibitory factors for patients who need emergency care, or good Samaritans attending to the victims of violence or trauma. Poor quality of services both in pre-hospital and hospital phases resulted in lower acceptability. Lack of universal access number for emergency medical services poses a significant barrier to the approachability and utilization of EMS. Similarly, with limited number of functional ambulances, people end up employing alternative methods such as private vehicles and boda-bodas, risking their safety, receiving wrong triage, as well as making out-of-pocket payments.

Limited availability of pre-hospital emergency services, geographical distribution of secondary and tertiary care hospitals with sufficient capacity to produce services in a timely manner, was found to be a limiting factor in access and utilization of emergency care. Sometimes, when patients managed to reach a facility using informal emergency transport, their needs could not be met due to dysfunctional system, lack of trained health providers, lack of supplies and equipment to deal with emergencies.

Affordability of EMS emerged as one of the major barriers. The direct costs of emergency services, indirect costs in the form of bribes as well as opportunity cost of arranging pre-hospital transport adds up to out-of-pocket expenditure, which was sometimes described in catastrophic proportions. Unlike other chronic diseases where the assessment and treatment may be spread over months and years and thus community may have more time to mobilize financial resources, patients might forego expensive radiological tests and surgical treatment in an emergency event, thus further compromising the chances of full recovery.

Finally, there is a significant mismatch between available emergency care services and patient needs. Timeliness, which is the essence of EMS was compromised in most situations by the lack of pre-hospital triage, safe transport and limited options for hospital-based emergency care. Lack of standards, treatment guidelines, and protocols for safe transport add to the inadequacy of the technical and interpersonal quality of the services provided. Differences in types of providers and variations in provider practices may adversely affect the utilization of services as well as outcome of emergency illnesses.

Recommendations

Responding to these complex challenges require a health systems approach especially because of cross cutting nature of the EMS.[17] A strong EMS is the common safety net that provides lifesaving interventions to all patient populations, in all geographical locations, and for all time-sensitive illnesses. The World Health Assembly Resolution 60.22 indeed provides a policy tool to strengthen emergency care. [19] Recent efforts of the Ugandan Ministry of Health by constituting a National EMS Taskforce to spearhead the development of a national EMS policy, financing model, as well as accompanying guidelines, and standards for the emergency medical care, is commendable.[11] Health systems research for emergency medical systems and pre-hospital care has been frequently centred around governance, policy making and human resource development, however community and provider experiences of service delivery are relatively understudied.[1, 2, 20–22] Therefore, a top-down approach to policy making and planning of services is more common than a patient-centred approach.

In the light of the study findings, integration of different emergency services and coordination between services and provider organizations might be necessary to make the services more approachable and available. Similarly, opportunities for training and accreditation of providers and institutions, tool to standardize care and oversight for provider performance, must be incorporated in the governance structure thereby setting standards for the accountability and transparency. Barriers such as transport costs, distribution of emergency care facilities and quality of in-hospital emergency care are more responsive to specific policies than the broader social and economic characteristics of the population. Since human resource development may take a while; task shifting might be one strategy to address acute shortage of emergency care personnel and has been tried previously in South Africa.[23] Innovative models of prehospital care such Motorcycle Response Units are an efficient way to augment traditional EMS response, currently operational in different countries.[24] This could be another venue to explore the acceptability and appropriateness of such services and whether this approach has positive impact on health outcomes in Uganda.

The biggest challenge is lack of dedicated funds for EMS in low-middle-income countries including Uganda. Without earmarking in the budgetary allocations, it is difficult to provide affordable and sustainable emergency services. The situation is not different in the rest of Sub-Saharan Africa, where most EMS services and government operated, provide limited coverage and operates with fee-for-service. [25] The most frequently cited barrier to development of prehospital care in LMICs is inadequate funding. While EMS may receive supplemental funds in the form of taxes and mandatory motor vehicle insurance,

governments need to include provision of emergency services as a component of universal health coverage as they are more effectively provided through public programs.[10][26] Although private providers have a limited role in overall PEMS it could be expanded by including them in the service delivery framework and providing appropriate incentives.[27]

Limitations

This study was conducted in Kampala city and metropolitan area and included interviews and FGDs of about sixty-five participants. Despite these limitations, findings and recommendations from the study may be relevant not only in Ugandan context but also in other countries with similar socio-demographic characteristics.

Conclusions

As Uganda and other LMICs continue to strive for universal health coverage, it is critical to prioritize and improve services directed at emergency care that not only cater to injuries and obstetric care, but all time-sensitive illnesses. Access to PEMS should be an integral part of equitable health care services available for all socioeconomic strata. A patient-centred approach for equitable access to emergency services must be adopted in implementing national policies for timely and safe emergency care.

Abbreviations

EMS: Emergency Medical Services

FGDs: Focus Group Discussions

KII: Key Informant Interviews

LMIC: Low- and middle- income countries

RTIs: Road traffic injuries

UGX: Ugandan Shillings

Declarations

Ethics approval and consent to participate: Ethical approval was obtained from the Institutional Review Board at the Johns Hopkins Bloomberg School of Public Health, Makerere University, School of Public

Health. Written consent was taken from all interview and discussion participants in English or Luganda. No personal identifiers were recorded during the interviews.

Consent for publication: Obtained.

***Availability of data and materials:* All data generated or analysed during this study are included in this published article [and its supplementary information files]**

Competing interests: The Authors declare that there is no conflict of interest

Funding: We thank the Johns Hopkins Center for Global Health for funding this research through the CGH Faculty Pilot Grant award. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Center for Global Health or Johns Hopkins Bloomberg School of Public Health.

Authors' Contributions: AM conceptualized the study and developed the first manuscript drafts. SW analyzed the data and prepared results; EBZ and OK led the data collection in Uganda and preparation of interview transcripts. All authors participated in manuscript preparation and read and approved the final draft.

Acknowledgements: We acknowledge the support of the Ministry of Health, Ms. Resty Nakayima and representatives of community and various organizations who participated in the interviews and discussion.

Authors' information:

Amber Mehmood, MBBS, MPH, FCPS,

Johns Hopkins International Injury Research Unit,

Health Systems Program, Department of International Health,

Johns Hopkins Bloomberg School of Public Health, 615 N Wolfe St, Baltimore, MD 21205, USA

E-mail: amehmoo2@jhu.edu

Shirin Wadhvaniya, MHA, MPH

Johns Hopkins International Injury Research Unit,

Health Systems Program, Department of International Health,

Johns Hopkins Bloomberg School of Public Health, 615 N Wolfe St, Baltimore, MD 21205, USA

E-mail: swadhwa2@jhu.edu

Esther Bayiga Zziwa, MPH

Makerere University School of Public Health,

Kampala, Uganda

E-mail: estherbayiga@gmail.com

Olive Kobusingye, MBChB, MSc., MMed, MPH

Senior Research Fellow

PI, Trauma, Injury, & Disability

Makerere University School of Public Health

E-mail: okobusingye@musph.ac.ug

References

1. Sriram V, Gururaj G, Razzak J, Naseer R, Hyder A: *Comparative analysis of three prehospital emergency medical services organizations in India and Pakistan. Public Health* 2016, *137*:169–175.
2. Razzak JA, Hyder AA, Akhtar T, Khan M, Khan UR: *Assessing emergency medical care in low income countries: a pilot study from Pakistan. BMC Emergency Medicine* 2008, *8*(1):8.
3. Nantulya VM, Reich MR: *Equity dimensions of road traffic injuries in low-and middle-income countries. Injury control and safety promotion* 2003, *10*(1–2):13–20.
4. Yeboah D, Mock C, Karikari P, Agyei-Baffour P, Donkor P, Ebel B: *Minimizing preventable trauma deaths in a limited-resource setting: a test-case of a multidisciplinary panel review approach at the Komfo Anokye Teaching Hospital in Ghana. World journal of surgery* 2014, *38*(7):1707–1712.
5. Jat AA, Khan MR, Zafar H, Raja AJ, Hoda Q, Rehmani R, Lakdawala RH, Bashir S: *Peer review audit of trauma deaths in a developing country. Asian journal of surgery* 2004, *27*(1):58–64.
6. Kobusingye OC, Hyder AA, Bishai D, Joshipura M, Hicks ER, Mock C: *Emergency medical services. In: Disease Control Priorities in Developing Countries. 2nd edn. Edited by Jamison DT, BJ, Measham AR et al. Washington DC.: World Bank; 2006.*
7. Razzak JA, Kellermann AL: *Emergency medical care in developing countries: is it worthwhile? Bulletin of the World Health Organization* 2002, *80*:900–905.

8. Sheikh K, Gilson L, Agyepong IA, Hanson K, Ssengooba F, Bennett S: *Building the field of health policy and systems research: framing the questions. PLoS medicine* 2011, 8(8):e1001073.
9. Frenk J, Gomez-Dantes O: *The triple burden: disease in developing nations. Harvard International Review* 2011, 33(3):36.
10. Nielsen K, Mock C, Joshipura M, Rubiano AM, Zakariah A, Rivara F: *Assessment of the status of prehospital care in 13 low-and middle-income countries. Prehospital Emergency Care* 2012, 16(3):381–389.
11. Kobusingye O: *A National Survey on the State of Emergency Medical Services in Uganda*. In. Kampala, Uganda: Makerere University School of Public Health; 2018.
12. Lett RR, Kobusingye OC, Ekwaru P: *Burden of injury during the complex political emergency in northern Uganda. Canadian Journal of surgery* 2006, 49(1):51.
13. Kobusingye OC, Guwatudde D, Owor G, Lett RR: *Citywide trauma experience in Kampala, Uganda: a call for intervention. Injury Prevention* 2002, 8(2):133–136.
14. Hsia RY, Mbembati NA, Macfarlane S, Kruk ME: *Access to emergency and surgical care in sub-Saharan Africa: the infrastructure gap. Health policy and planning* 2011, 27(3):234–244.
15. Onyachi NW, Maniple E, Santini S: *Preparedness For Mass Casualties Of Road Traffic Crashes In Uganda: Assessing The Surge Capacity Of Highway General Hospitals. Health Policy and Development* 2011, 9(1):17–26.
16. Krasovec K: *Auxiliary technologies related to transport and communication for obstetric emergencies. International Journal of Gynecology & Obstetrics* 2004, 85 (S1):S14-S23.
17. Mehmood A, Rowther AA, Kobusingye O, Hyder AA: *Assessment of pre-hospital emergency medical services in low-income settings using a health systems approach. International Journal of Emergency Medicine* 2018, 11(1):53.
18. Levesque J-F, Harris MF, Russell GJ, Ijfehli: *Patient-centred access to health care: conceptualising access at the interface of health systems and populations. 2013, 12(1):18.*
19. Anderson PD, Suter RE, Mulligan T, Bodiwala G, Razzak JA, Mock C, on Access TF, Medicine IFfE: *World Health Assembly Resolution 60.22 and its importance as a health care policy tool for improving emergency care access and availability globally. Annals of emergency medicine* 2012, 60(1):35–44. e33.
20. Razzak JA, Cone DC, Rehmani R: *Emergency Medical Services and cultural determinants of a emergency in Karachi, Pakistan Prehospital Emergency Care* 2001, 5(3):312–316.

- 21.Roy N, Murlidhar V, Chowdhury R, Patil SB, Supe PA, Vaishnav PD, Vatkar A: *Where there are no emergency medical services—prehospital care for the injured in Mumbai, India. Prehospital and Disaster Medicine* 2010, 25(02):145–151.
- 22.Subhan I, Jain A: *Emergency care in India: the building blocks. International journal of emergency medicine* 2010, 3(4):207–211.
- 23.Terry B, Bisanzo M, McNamara M, Dreifuss B, Chamberlain S, Nelson SW, Tiemeier K, Waters T, Hammerstedt H: *Task shifting: meeting the human resources needs for acute and emergency care in Africa. African Journal of Emergency Medicine* 2012, 2(4):182–187.
- 24.Lausch P: *Motorcycle Response Units in EMS. In: Journal of Emergency Medical Services. Tulsa, OK: PennWell Corporation, Tulsa, OK; 2018.*
- 25.Mould-Millman N-K, Dixon JM, Sefa N, Yancey A, Hollong BG, Hagahmed M, Ginde AA, Wallis LAJP, medicine d: *The state of emergency medical services (EMS) systems in Africa. Prehospital and disaster medicine* 2017, 32(3):273–283.
- 26.Sachs JD: *Achieving universal health coverage in low-income settings. The Lancet* 2012, 380(9845):944–947.
- 27.Brown HA, Douglass KA, Ejas S, Poovathumparambil V: *Development and implementation of a novel prehospital care system in the State of Kerala, India. Prehospital and disaster medicine* 2016, 31(6):663–666.

Figures

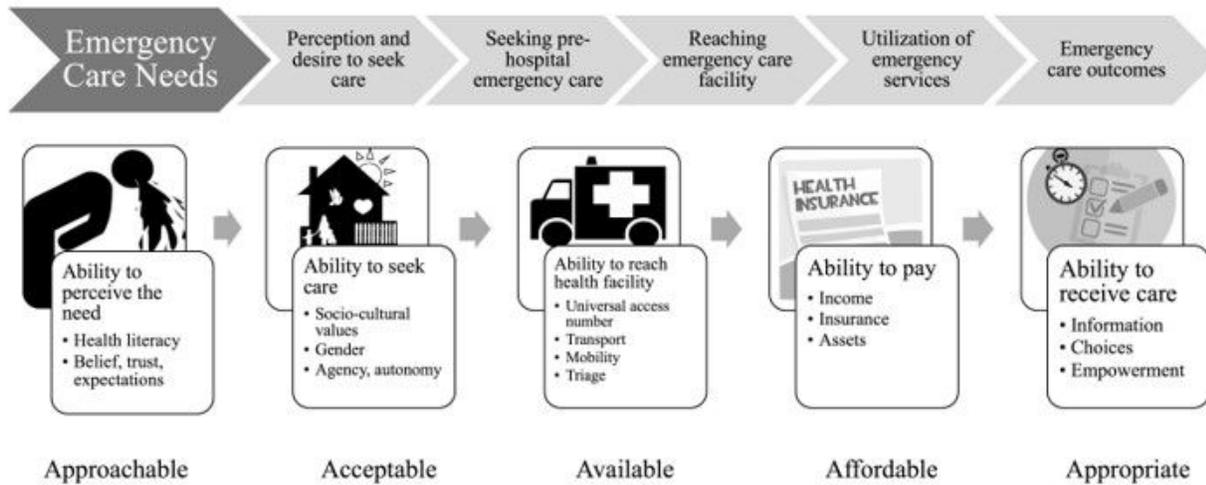


Figure 1

Patient-centered access to emergency care at the interface of health systems and populations (Adopted from Levesque, Harris and Russel, 2013, with permission)18

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementaryfileAllcodesEMSqualitative.pdf](#)