

Perception of the healthcare professionals towards the current trauma and emergency care system in Kabul, Afghanistan: A mixed method study

Umerdad Khudadad (✉ umerhaideri47@gmail.com)

Aga Khan University <https://orcid.org/0000-0002-3364-4844>

Wafa Aftab

Aga Khan University

Asrar Ali

Aga Khan University

Nadeem Ullah Khan

Aga Khan University

Junaid Razzak

Johns Hopkins University School of Medicine

Sameen Siddiqi

Aga Khan University

Research article

Keywords: Trauma care system, Afghanistan, Emergency care system, Perceptions, Mixed method

Posted Date: August 25th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-26649/v2>

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

[Read Full License](#)

Version of Record: A version of this preprint was published on October 29th, 2020. See the published version at <https://doi.org/10.1186/s12913-020-05845-8>.

Abstract

Background: Trauma and injury contribute to 11% of the all-cause mortality in Afghanistan. We aimed to explore the perceptions of the healthcare providers (pre and in-hospital), hospital managers and policy makers of the public and private health sectors to identify the challenges in the provision of an effective trauma care in Kabul, Afghanistan.

Methods: A concurrent mixed method design was used, including key-informant interviews (healthcare providers, hospital managers and policy makers) of the trauma care system (N=18) and simultaneous structured emergency care system assessment questionnaire (N = 35) from July 15 to September 25, 2019. Interviews were analyzed using thematic analysis and structured questionnaire data were descriptively analyzed.

Results: Four themes were identified that describe the challenges: 1) pre-hospital care, 2) cohesive trauma management system, 3) physical and human resources and 4) stewardship. We found some key challenges related to scene and transportation care, in-hospital care and emergency preparedness within the wider trauma care system. Less than 25% of the population is covered by the pre-hospital ambulance system (n=23, 65.7%) and there is no communication process between health care facilities to facilitate transfer (n=28, 80%). Less than 25% of patients with an injury requiring emergent surgery have access to surgical care in a staffed operating theatre within two hours of injury (n=19, 54.2%) and there is no regular assessment of the ability of the emergency care system to mobilize resources (human and physical) to respond to disasters, and other large-scale emergencies (n=28, 80%).

Conclusion: This study highlighted major challenges in the delivery of trauma care services across Kabul, Afghanistan. Systematic improvement in the workforce training, structural organization of the trauma system and implementing externally validated clinical guidelines for trauma management could possibly enhance the functions of the existing trauma care services. However, an integrated state-run trauma care system will address the current burden of traumatic injury more effectively within the wider healthcare system of Afghanistan.

Background

Trauma is a time-dependent health issue that requires an immediate healthcare intervention to reduce the chances of mortality and disability[1]. The major focus of the trauma care is the rapid transportation to the facility where appropriate trauma care should be available and definitive treatment can be delivered within the first hour of the injury [2]. The trauma care system is well institutionalized with the given major operational components: prevention activities, communication structure, medical direction, training of the trauma workforce, pre-hospital care, transportation care, triage, in-hospital care, rehabilitation, public education and evaluation of trauma capacity [3]. Trauma care system encompassing a comprehensive pre-hospital and in-hospital service delivery model has been proved to reduce mortality, morbidity and revamp functional outcomes [4-6].

The system of trauma care in low- and middle-income countries (LMIC's) come across number of challenges that include accessibility, limited resources and lack of infrastructure [7, 8]. In many settings of the LMICs, the recognition of the impact of trauma on public health is very limited [9] and there is negligible emphasis on public education regarding the prevention of trauma and injury [10, 11]. In addition, rapid urbanization and industrialization in LMICs have shifted the emphasis of the disease burden towards trauma [12]. Evidence shows that 90% of mortality related to trauma turn up in LMICs [13]. This burden demands a public health attention and a well-functioning trauma care system. However, implementation of the trauma care system tends to be highly resource demanding which could be a deterrent factor to implement it in the low resource countries [11].

Afghanistan is a noncoastal country with a population of 37.2 million in 2018 [14]. Afghanistan has been affected by conflicts for three and half decades which has incapacitated the health infrastructures [15]. All over Afghanistan, there are 3,135 health facilities including basic health centers, district hospitals, provincial hospitals and specialty hospitals that ensure access to 87% of the population within two hours distance [16]. In Kabul, there are 31 hospitals including two trauma centers which provide secondary and tertiary healthcare services. In addition, there is only one public ambulance service that provide services as part of the pre-hospital care in Kabul [17]. This public operated ambulance service has fifteen stations across Kabul from where they are operating the ambulances in case of emergencies. There is no fee for services of this publicly owned ambulance provider and its services are widely available to entire population of Kabul on toll-free number. There are 29 ambulances in total to cater the needs of 4.6 million population in Kabul during emergency situations. It is also noteworthy that Afghanistan's health system is largely dependent on foreign aid and a large portion of health services provisions are contracted out to Non-governmental organizations [18].

Trauma and injury contribute to 11% of the all-cause mortality in Afghanistan[19-21]. Man-made and natural disasters have also contributed to the large pool of trauma-related morbidity and mortality. Evidence indicates that, trauma and injury is the principal cause for people living with disabilities in Afghanistan [14]. Less than 11% of the seriously injured people from the road traffic crashes are transferred to emergency health care centers by ambulances in Afghanistan [22]. Given the long history of conflict in Afghanistan, the system of trauma care is arguably even more important in this context. There is a very little context-relevant guidance available to help the planners of the healthcare system in developing a well-functioned trauma care system. A perception-based assessment of the pertinent key-informants can buy-in for the effective implementation of the trauma care system in Afghanistan.

Aim of the study

This study aimed to explore the perceptions of the healthcare providers (pre and in-hospital), hospital managers and policy makers of the public and private health sectors to identify the challenges in the provision of an effective trauma and emergency care in Kabul, Afghanistan.

Methods

Design

A concurrent mixed-method approach was utilized to capture the contextual information based on the perceptions of the healthcare providers (pre and in-hospital), hospital managers and policy makers. . Qualitative and quantitative data were collected and analyzed at the same time in a single phase. This study was conducted in Kabul, Afghanistan from July 15 to September 25, 2020.

Study Setting

Healthcare system in Afghanistan is managed by the Ministry of Public Health (MoPH) and has provincial departments all over 34 provinces. Formulation of health policies, mobilization of resources and regulation of health sector is centrally governed. Healthcare including acute trauma care is provided by a mix of public and private providers.

Kabul is the capital and the largest province of Afghanistan with a population of 4.63 million. Administratively, Kabul is divided into 17 districts. In Kabul, there are 31 hospitals providing secondary and tertiary healthcare services. There is only one public ambulance service namely, the Kabul Ambulance Service that provide services as part of the pre-hospital care in Kabul. There is also a private ambulance system which is based on fee for service.

Sampling and Recruitment of Key Informants

The sample pool comprised of distinctive key-informants, including pre-hospital administrator, specialist cadres, emergency doctors and nurses. Potential key informants were recruited with the help of consultation with the General Directorate of Curative Medicine at MoPH. The selection of respondents was ensured by including a wide range of participants from both hospital settings and ministry of public health. Purposive sampling technique was used in which all the key informants have become the part of the study after meeting the enrollment criteria; minimum two years of experience in provision of trauma care for being enough acquainted with system of trauma care in Kabul.

Interviews and Data Collection

The interview guide was developed with the help of a literature review [23] and discussion with subject experts. The interview guide focused on three main areas: 1) assessing broad understanding of trauma care system, 2) challenges present in the current trauma care pathway and 3) recommendations to improve the current trauma care system. For quantitative component, we adapted a perception-based structured questionnaire; WHO emergency care system assessment (ECSA) tool by narrowing its focus to scene and transportation care, in-hospital care and emergency preparedness.

The data was collected from July 15 to August 26, 2020 through face to face interview which was conducted individually with each key informant to lessen the probability of acquiescence and habituation bias. The duration of interview ranged from 25 to 40 minutes. The first author (UK) interviewed the key

informants at their respective workplaces. The qualitative data were collected from the key-informant until redundancy occurred in their responses and saturation was achieved.

Data Analysis

For qualitative analysis a research assistant transcribed all the interviews in local language (Persian) which were then translated to English language by another research assistant (Fig. 1). These translated transcriptions were then re-translated to Persian language to reduce the effect of lost in translation and interpretation bias. The inconsistencies in the translation were tidied up to avoid the misleading analysis. Nvivo version 11 (QSR International) was used for qualitative analysis. A content analysis approach was applied to identify the emerging themes and sub-themes [24]. Rigor and trustworthiness in the study was established through following Lincoln and Guba's criteria [25]. Credibility of the study was enhanced by emphasizing the aim to learn from respondents through an open and non-judgmental attitude of the interviewer during the key-informant interviews. The content of the transcripts was interpreted by two authors (UK & AA) independently that further contributed to the credibility of the study. In addition, data gathered from the ECSA tool were entered in the SPSS Version 25.0 (SPSS Inc., Chicago, Ill., USA). Descriptive frequencies were computed for the variable of interests.

Ethical Considerations

The study was approved by the institutional review board (IRB) of the Afghanistan National Institute of Public Health (reference number: NS.0619.0032) and the ethical review committee of the Aga Khan University in Karachi, Pakistan (reference number: 2019-1452-4210). Informed consent was obtained from all the participants at the beginning of an interview and permission was sought for recording the interview. The confidentiality of the respondents was maintained throughout the study and anonymity was ensured by using unique identification numbers for each participant.

Results

Demographic Characteristics of the Interviewees

We conducted 18 key-informant interviews with the diverse participants ranging from ministry of health, public and private health facilities to pre-hospital providers. Characteristics of the interviewees are summarized in table 1. Of the 18 interviewees, most of them were male (n=15, 83.4%) and majority of the participants (n=8, 44.4%) had 8-10 year of experience dealing with trauma and emergency care in Kabul, Afghanistan.

Table 1. Characteristics of the interviewees (N=18)

Characteristics	n (%)
Age	
30-35 years	3 (16.6)
36-40 years	10 (55.5)
41-45 years	2 (11.1)
46-50 years	3 (16.6)
Gender	
Male	15 (83.4)
Female	3 (16.6)
Respondent's Type of Institution	
Public	11(61.2)
Private	7(38.8)
Years of Experience	
2-4 years	2 (11.1)
5-7 years	5 (27.8)
8-10 years	8 (44.4)
11-13 years	3 (16.6)
Primary role of the Respondents	
Managers in the Ministry of Public Health	2 (11.1)
Hospital Managers	4 (22.2)
Physicians	4 (22.2)
Nurses	4 (22.2)
Ambulance Staff	3 (16.6)
Ambulance Administrator	1 (5.5)

Demographic Characteristics of the ECSA respondents

A total of 35 respondents completed the structured questionnaire. Most of the respondents were male (n=26, 74.2%) and had been involved for in managing trauma and emergency care for 5-7 years. The characteristics of the respondents are given in Table 2. Majority of the respondents identified themselves as clinical provider (n=20, 57.1%).

Table 2. Characteristics of the ECSA respondents (N=35)

Characteristics	n (%)
Age	
30-35 years	4(11.4)
36-40 years	7 (20)
41-45 years	19 (54.2)
46-50 years	5 (14.4)
Gender	
Male	26 (74.2)
Female	9 (25.8)
Respondent's Type of Institution	
Public	21(60)
Private	14(40)
Years of Experience	
2-4 years	13 (37.5)
5-7 years	16 (45.4)
8-10 years	4 (11.4)
11-13 years	2 (5.7)
Primary role of the Respondents	
Policy maker	2 (5.7)
Pre-hospital Administrator	3 (8.6)
Head of surgery, trauma or emergency unit	9 (25.7)
Researcher or epidemiologist	1 (2.9)
Clinical provider	20 (57.1)

We developed an analytical thematic framework by identifying the emerging themes from the transcribed interviews. We synthesized four key themes: 1) pre-hospital care, 2) cohesive trauma management system, 3) physical and human resources and 4) stewardship. These themes are further categorized into sub-themes which were ascertained by grouping the related phrases from the interview transcripts. Table 3 shows the themes and sub-themes in the form of thematic analytical framework.

Table 3. Analytical themes and sub-themes based on participant's perceptions

Themes	Sub-themes
Pre-hospital care	Ambulances Layman involvement Transportation care Road infrastructure Universal access number
Cohesive trauma management system	Multidisciplinary approach Implementing trauma care guidelines
Physical and human resources	Trauma care workforce Physical equipment/supplies Technical capacity
Stewardship	Accountability Quality improvement approaches

Pre-hospital Care

The participants expressed disquieting concerns related to the provision of trauma care at the pre-hospital level. Among the many factors involved in hindering the delivery of effective pre-hospital trauma care; inadequate ambulances, layman involvement, poor road infrastructure and lack of universal access number were highly emphasized.

Many participants talked about the challenges related to the availability, functions and transportation mechanism of the ambulances. The number of ambulances to cater the needs of trauma victims in Kabul is inadequate. This situation becomes more alarming when these ambulances lack adherence to appropriate medical direction protocols for transportation and transfer. Furthermore, perpetuating environmental factors, sub-standard road infrastructures and untrained bystander involvement in medical care complicates the management of trauma care at the pre-hospital level.

“These ambulances are meant to transport the patients from the scene to the hospital...there is no medical care available during transportation”. (Participant 9)

“Just because there are no protocols to manage the transportation care and transfer... there have been many instances in the past when critical patients have been taken to the low-resourced hospitals... and the management of the critically injured patients have been affected” (Participant 11)

Other challenge related to the optimal pre-hospital care was sub-standard road infrastructure. It causes delay in response time for ambulances.

“Nearly 30% of the roads in Kabul are not constructed for example interior Qargha (place in north of Kabul) ...now if there is an emergency case in this area...it is very difficult for ambulance to reach there in less time” (Participant 4)

The participants also expressed that majority of the injured patients are transported either by family members, community residents or bystanders. These individuals are untrained and may increase the complications. However, in the absence of immediate pre-hospital care, these individuals can be a good source in transporting the patients to the healthcare facility.

“In most of the cases...such as road traffic injuries and mass casualties, the injured victims are transported by the taxi drivers, and bystanders...they are unskilled and try to help with inappropriate interventions.” (Participant 7)

“Most of the time, taxi drivers, community residents, and family members take most of the injured patients to the hospital in Kabul.” (Participant 9)

Cohesive trauma management system

The participants described that systems for trauma management in Kabul needs multidimensional functions. The current trauma care approach is uncoordinated and complicated in terms of navigating the appropriate trauma services. Few participants expressed that trauma care becomes challenging when there is a gap in implementing guidelines and protocols both at the pre-hospital and in-hospital level. In addition, the receiving hospitals needs to be well-resourced with the essential supplies and workforce to provide the optimal level of care to the trauma patients.

“There is no well-articulated communication system that should respond in the emergency conditions and notify all the hospitals to be prepared to deal with the mass casualties.” (Percipient 5)

“There are number of hospitals with well-established emergency rooms...however, they are not adhering to some standard protocols for the management of trauma.” (Participant 9)

Participants also talked about poor interagency coordination at the pre-hospital level, specifically in the course of large-scale emergencies that hinders the rapid evacuation and optimal trauma care.

“Some of the major challenges that we face is coordinating with the police when they put the cordon at the site of blast and do not allow our ambulances to get into the site of explosion which obviously cause delay in the care of those who have got massive bleeding and need immediate care” (Participant 9)

Participants described some other challenges regarding the management of trauma patients in the emergency rooms of the hospitals including unclear roles of the healthcare professionals that often creates confusion and chaotic situation. There is a need of a trauma team in the hospitals with pre-defined roles and responsibilities.

“We need a team of trauma care...that should have competent doctors, nurses and paramedics to deal with the emergency situations” (Participant 2)

“We have people working in the emergency unit with undefined roles...the situation of managing critical trauma care often creates confusion and anxiety...with this kind of disorganized care...I believe we would rather endanger the patient’s life”. (Participant 17)

Physical and Human Resources

Participants mentioned inaccessibility to appropriate physical and human resources an important factor for ineffective trauma care. Most of the hospitals in Kabul designated for trauma care lack trauma workforce. Furthermore, participants expressed that these hospitals are also deficient in physical resources such as resuscitation equipment to manage critical emergencies.

“The administration in most of the hospitals is such...that patient’s families have to bring the supplementary supplies when there is some surgery planned” (Participant 17)

“Most of the emergency departments don’t even have the crash cart for emergency situations” (Participant 5)

Some participants mentioned the need for diagnostic equipment such as radiological investigating machines to initiate the appropriate treatment. Additionally, some participants reported that hospitals lack technical professionals to fix the diagnostic machines.

"We do not have CT-Scan and MRI machines in many hospitals...I believe they are very important in some cases" (Participant 13)

"We don't have technical people who can fix the machines used in hospital like biomedical engineers" (Participant 11)

Some other challenges were inappropriate staffing in the hospitals and lack of trauma care training as described by the participants

"It is very surprising to tell you...that midwives are deployed in the burn ward" (Participant 3)

"The healthcare providers in the emergency room are not trained enough to deal with the critical trauma patients." (Participant 1)

Stewardship

According to the participants, the health authorities lack a unified vision to deal with trauma emergencies. There is a gap in the current trauma care system of Afghanistan in terms of having interagency strategic plan, quality improvement approaches and appropriate assignment of trauma related tasks.

"The emergency department of the public hospitals are funded by an external agency that functions completely independent of the hospital structure." (Participant 4)

"No one asks about the quality of care...ministry of health should have some mechanism to assess the quality of care." (Participant 16)

Lack of accountability and unresponsive to the monetary motivation of the trauma care workforce were some other challenges mentioned by the participants that affect the quality of trauma care.

"Many nurses who are employed in these hospitals have dual job...because they are not paid enough to run their livelihoods." (Participant 10)

WHO Trauma and Emergency Care System Assessment Outcomes

A total of 35 mixed healthcare professionals responded to the WHO ECSA survey instrument. The primary role of these respondents ranged from pre-hospital provider, head of surgery or emergency unit, clinical provider, epidemiologist to policy managers. The following sections summarizes the perspectives of these respondents in response to emergency and trauma care system functionality.

Scene Care and Transportation

Respondents reported that population of Kabul is partially covered through emergency care access number (Kabul ambulance services-102). Less than 25% of the population is covered through this ambulance system. In addition, the coverage in rural areas is extremely low. Table 2 shows the view of respondents regarding scene care and transportation. Currently, the pre-hospital care is not governed through any kind of system-wide protocols. Participants also deemed the need for communication system to provide on-scene clinical guidance.

Table 4. Respondents views regarding scene care, transport and transfer

Indicators	N=35	
	n	%
There are one or more emergency care access number with partial Kabul coverage.	27	77.1
Pre-hospital care is not governed by any system-wide protocols. However, an advisory service (e.g. staffed telephone) may be available for advice regarding pre-hospital care on ad-hoc basis	28	80
There is no communication system that allows on-scene clinical advising from facilities or dispatch centers	26	74.3
Less than 25% of the population is covered by the pre-hospital ambulance system	23	65.7
The number of ambulances is grossly inadequate for the needs of the population	26	74.3
There is no policy to ensure that pre-hospital providers have adequate equipment to care for patients at the scene and during transport	29	83
There is no communication process between health care facilities to facilitate transfer	28	80.0

Respondents felt that existing number of ambulances is inadequate to cater the needs of population. Furthermore, there is no policy to ensure that ambulance service providers have adequate equipment in ambulances to manage patients. Additionally, there is no systematic process of communication for healthcare facilities to assist them with transfer information.

In-hospital Trauma Care and Emergency Preparedness

Respondents reported that less than 25% of the population have access to a well-equipped 24 hours facility-based emergency care. Table 3 shows respondents view regarding facility-based trauma care. Condition-specific protocols for emergency conditions are not consistent and their use is also not assured. Moreover, less than 25% of the patients who require immediate surgical intervention have access to surgical care in a staffed operating theatre within two hours. Approximately 25-50% of the facilities dealing with trauma emergencies have triage protocol. The emergency severity index (ESI) algorithm is widely by many hospitals for triaging.

Table 5. Respondents view regarding In-hospital trauma care and emergency preparedness

Indicators	N=35	
	n	%
Less than 25% of the population have access to 24-hour facility-based emergency care	28	80
Some emergency units have protocols to govern key emergency conditions, but these are not consistently used	25	71.4
Less than 25% of patients with an injury requiring emergent surgery have access to surgical care in a staffed operating theatre within two hours of injury	19	54.2
25-50% of the trauma facilities have triage protocol with designated triage personnel	30	85.7
There is no regular assessment of the ability of the emergency care system to mobilize resources (human and physical) to respond to disasters, and other large-scale emergencies	28	80
There is emergency response plan, but it was created only by one agency, and not in conjunction with other necessary agencies.	26	74.3
There is no system-level plan in place for extraordinary events that specifically identifies a source for additional human resource and alternate transportation mechanism	29	83

Emergency preparedness across Afghanistan is coordinated by National Command Control Center for Emergency. There is an emergency response plan, but it lacks interagency coordination. Table 4 shows respondents view regarding emergency preparedness. The capacity of emergency care system to respond to large scale emergencies is seldom assessed and disaster drills are reasonably infrequent.

Discussion

This study identifies several challenges and strength in the current trauma care system of Kabul, Afghanistan and gives a comprehensive understanding of the overall trauma and emergency care service delivery. We identified four key themes: 1) pre-hospital care, 2) cohesive trauma management system, 3) human and physical resources and 4) stewardship. We reported some of the key obstacles related to scene and transportation care, in-hospital care and emergency preparedness within the wider trauma care system. Despite this, there were some strengthening factors; such as an Italian non-governmental hospital designed for trauma services exclusively to the victims of war. This hospital receives patients from Kabul as well as remote areas of Afghanistan. Its services are free of charge. Moreover, the emergency departments of the few public hospitals are functioning under the “ICU project” funded by external donor agencies. The essential equipment is available in the emergency rooms of these hospitals but the utilization of these equipment is not ensured widely.

The emergency care system assessment (ECSA) tool can be useful in providing a comprehensive picture of the emergency care services in developing countries. It is designed to assess the various components of the emergency care system including governance, financing, emergency care data, pre-hospital care, in-hospital care, emergency preparedness, quality improvement and rehabilitation. However, this tool demands the perceptions of wide range of professionals including policymakers dealing with the emergency care system to present the average situation across the country.

There is only one pre-hospital provider in Kabul to cater the emergency needs of the 4.6 million population which is governed by the Ministry of Public Health. This public owned pre-hospital provider has fifteen stations in different regions of the Kabul. The total number of ambulances are 29 which is inadequate to meet the population's emergency needs. Shortage of ambulances is one of the barriers for ineffective pre-hospital trauma care [26] [27]. Conversely, there are private ambulances linked with private hospitals in Kabul, but they are not widely standardized and regulated. Their services are limited to transportation from one facility to another facility in case of referral and transporting patient to home on patient's preferences.

The current pre-hospital care system in Kabul lacks protocol for triage of the acutely injured patients that impacts the outcome of care negatively. Triage to a non-trauma center increases the mortality rate up to 30% in the initial two days for acutely injured patients [28]. Similarly, the communication system between ambulance crew and receiving hospital is also crumbled. The communication regarding transfer of the injured patients occurs in an uncoordinated manner and mostly based on the individual decisions. The exchange of information between ambulance and hospital staff on the situation of injured patient such as mechanism of injury, prehospital intervention and estimated time of arrival initiates preparation at the facility for optimal trauma care [29-31]. There is no medical direction (clinical advising) from dispatch center or trauma facilities to support the trauma care at the scene level and transportation. The outcome of the trauma care at the level of scene and transportation is widely based on the knowledge and skills of the pre-hospital ambulance staff. In addition, inadequate equipment in the ambulances is another barrier to ineffective pre-hospital care. A study conducted in Pakistan, showed that availability of the equipment in ambulances increases the chance of survival for trauma patients [32]. However, the availability of the equipment in the ambulance does not exclusively decide the chance of survival but skills of the pre-hospital care provider plays an equal role where most of the ambulance staffs in Kabul were found not having the necessary training.

The study also found that bystanders are involved in aiding the injured victims at the point of injury and transportation that exacerbates the problem because they lack first aid training. Since bystanders witness many pre-hospital emergencies; a trauma care training that is context appropriate may improve the initial care at the site of injury until emergency medical service is arrived [33]. Poor terrains and narrow roads were found to be some of the barriers for the ambulance providers for transporting the patients timely. A study conducted in Iran to identify the barriers of the pre-hospital trauma care also found that sub-standard road infrastructure impedes the transportation care [34]. Furthermore, there is a poor interagency coordination while responding to the large-scale emergency crisis such as bomb explosion or earthquake etc. The lack of interagency coordination leads to inappropriate mobilization of resources and delayed evacuations. Most of the pre-hospital services in LMIC's require coordination among the existing pre-hospital agencies for ensuring comprehensive input [35].

The in-hospital trauma care provided is not adequately integrated that negatively impacts the management of trauma patients. A basic training to widely accepted and systematic approach (Airway,

Breathing, Circulation, Disability, Exposure) can help health care professionals of emergency and trauma care focus on the most life-threatening conditions effectively [36]. The roles of the different health cadres involved in trauma management are not clear and that creates confusion. The optimal trauma care needs coordination of multispecialty services in the hospital with well-defined roles that collectively makes up a trauma team. This multispecialty approach to trauma care ensures the effective integration of resources and knowledge across the continuum of care has been shown to improve outcomes. [4, 37-40]. However, training of the healthcare workforce designated for the management of trauma patients is also a major concern since most of the health care providers are not certified in any trauma related courses such as advanced trauma life support (ATLS). A study conducted in Iran showed a remarkable improvement in the trauma management of the injured patients after providing training to the existing cadres of the trauma care [41]. Training is a critical component of a continuous performance improvement cycle, ensuring that advances in knowledge are translated into practice in a timely manner. Successful training requires the development of and adherence to training standards. The healthcare personnel of the trauma and emergency management in Kabul, Afghanistan can be trained through numerous courses designed to address the burden of trauma comprehensively including Basic Endovascular Skills for Trauma (BEST) and Advanced Trauma Operative Management (ATOM) courses [42]. Furthermore, the lack of clinical protocols in most of the hospitals added another perplexity in trauma management of the injured patients. Implementation of the standardized protocol for trauma care in most of the LMIC's is an area of concern [43-46]. Moreover, the equipment to manage resuscitation followed by the lack of physical resources such as imaging technologies are some of the barriers to providing effective trauma care. Similar challenges were reported in other studies from LMIC's [44, 47, 48]. Subsequently, the assessment of the hospital capabilities for trauma care is infrequent which is supported by the qualitative analysis that ministry of health lacks technical capacity. Many studies have emphasized the assessment of the trauma care capacities by adding quality improvement programs to strengthen the in-hospital trauma care [49, 50]. This study determined these challenges in the provision of trauma care services in Kabul which is the most developed province of Afghanistan and by inferencing; this situation is likely to be more worse in other provinces of Afghanistan.

Within the current structure of the trauma care system, the accountability and ownership to combat the trauma casualty are widely fragmented and this fragmentation can seriously compromise care of the wounded. Key decision makers in the line of command lack the knowledge, skills, clarity of responsibility, and perspective to address problems in the trauma care system. Stewardship has a strategic role in creating a well-functioned and effective trauma care system that addresses the need of injured at all tiers of the care [51]. Provided the substantial burden of the injury, it is in the best interest of the trauma care leaders to implement a national trauma care system to ensure that preventable deaths due to injury are significantly reduced. Furthermore, the trauma care system functions under the overall healthcare delivery system, thus it should be well-integrated. This integration will improve both; the transitions of care for trauma patients as well as create a halo effect for other emergent and time-sensitive conditions. However, trauma care is additionally particular in that it continues beyond healthcare system to interface with

emergency management and public security. Subsequently, a state-run approach to trauma care correspondingly prepares the emergency response system for mass casualty events and disasters [4].

We recommend some strategies to address the challenges of the trauma care system in Kabul, Afghanistan based on our discussion and analysis of findings. Table 7 gives a description of these strategies.

Table 7. Strategies to address the challenges of trauma care system in Kabul

Description of strategies
1. First aid training of the lay responders including taxi drivers and law enforcing agents
2. Training of the emergency medical technicians in ambulances
3. Increase the number of well-equipped ambulances up to 430 ambulances to meet the population demand
4. Incorporate system-wide coordination mechanisms to promote complementary services
5. Contracting out the ambulance services to private service providers to improve accessibility and quality of services
6. Mandating trauma care certification for the emergency care providers
7. Arranging quarterly mock drills of the emergency preparedness plan
8. Developing trauma care registry to improve medical care for trauma patients

Limitations

This study has some limitations, the most important being selection bias, as with many studies of this type [52]. Respondents who agreed to participate in the study may have negative discernment against existing trauma care system. We mitigated this issue by recruiting wide range of participants from multiple segments of the healthcare system (MoPH, pre-hospital service provider, emergency response center, public and private hospitals). In addition, we couldn't explore the perceptions of the healthcare professionals from an NGO based trauma facility and this may disproportionate our findings on the capacity of trauma care. Furthermore, we did not conduct focus group discussions that may have added richness to qualitative responses. However, responses were clustered around the themes presented and no response was omitted from being presented in the results. Despite these limitations, this study provided contextual knowledge regarding the existing status of trauma and emergency care in Kabul, Afghanistan. The qualitative research helped examining the situation in depth which were not previously known and identified number of challenges that impedes the delivery of trauma care effectively. Additionally, we used a quantitative structured tool to estimate the view of respondents and triangulated both; qualitative and quantitative responses to ensure validity.

Conclusions

This study highlighted major challenges in the delivery of trauma care services across Kabul, Afghanistan. These are inevitable issues to overcome; such as pre-hospital care, multidisciplinary

approach, accountability of health authorities and human and physical resource at pre-hospital and in-hospital settings. Systematic improvement in the workforce training, structural organization of the trauma system and implementing externally validated clinical guidelines for trauma management could possibly enhance the functions of the existing trauma care services. However, an integrated state-run trauma care system will address the current burden of traumatic injury more effectively within the wider healthcare system of Afghanistan.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the ethical review committee of the Aga Khan University (Ref: 2019-1452-4210) and institutional review board from the National Institute of Public Health, Afghanistan (Ref: NS.0619.0032). The informed consent was obtained from all the participants before participating in the study.

Consent for publication

Not Applicable

Availability of data and materials

The data is stored in the repository of the Aga Khan University. The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This research study was supported by Johns Hopkins-Afghanistan Pakistan International Collaborative Trauma and Injury Research Training program (grant number D43- TW007292) from the Fogarty International Center of the United States National Institutes of Health. The content is solely the responsibility of the authors and do not represent the views of Fogarty or NIH.

Authors' contributions

UK, SS, WA and NK directly contributed in research paper planning and proposal development. AA analyzed and interpreted data. JR provided expert review. All authors have read and approved the final manuscript.

Acknowledgements

The authors courteously acknowledge the support of Dr. Attaullah Saeedzai, Director of the health management information system, ministry of public health – Afghanistan and wish to thank all the participants who took part in the study. The authors would also like to thank Dr. Uzma Khan, Dr. Naveed and Ms. Shumaila Rupani for the facilitation that they provided during data collection in Kabul, Afghanistan

Authors' information

Authors	Authorship	Position& affiliation	Email
Mr. Umerdad Khudadad	Primary investigator	Research Fellow, Department of Emergency Medicine, Aga Khan University, Pakistan	umerhaideri47@ gmail.com
Dr. Wafa Aftab	Co-investigator	Senior Instructor, Department of Community Health Sciences, Aga Khan University, Karachi, Pakistan	wafa.aftab@aku.edu
Mr. Asrar Ali	Co-investigator	Research Fellow, Department of Emergency Medicine, Aga Khan University, Pakistan	asrarali007@gmail.com
Dr. Nadeem Ullah Khan	Co-investigator	Associate Professor, Department of Emergency Medicine, Aga Khan University, Pakistan	nadeemullah.khan@aku.edu
Dr. Junaid Razzak	Co-investigator	Professor, Department of Emergency Medicine, Johns Hopkins School of Medicine, Baltimore, USA	junaid.razzak@jhu.edu
Dr. Sameen Siddiqi	Supervisor	Chair, Department of Community Health Sciences, Aga Khan University, Karachi, Pakistan	sameen.siddiqi@aku.edu

References

1. Committee on Military Trauma Care's Learning Health, S., et al., in *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury*, D. Berwick, A. Downey, and E. Cornett, Editors. 2016, National Academies Press (US) Copyright 2016 by the National Academy of Sciences. All rights reserved.: Washington (DC).
2. McNicholl, B., *The golden hour and prehospital trauma care*. Injury, 1994. **25**(4): p. 251-254.
3. Rasmussen, T.E., *A national trauma care system: From call to action*. Journal of Trauma and Acute Care Surgery, 2016. **81**(5): p. 813-815.
4. National Academies of Sciences, E. and Medicine, *A national trauma care system: integrating military and civilian trauma systems to achieve zero preventable deaths after injury*. 2016: National Academies Press.
5. Nathens, A.B., et al., *Effectiveness of state trauma systems in reducing injury-related mortality: a national evaluation*. Journal of Trauma and Acute Care Surgery, 2000. **48**(1): p. 25.
6. Celso, B., et al., *A systematic review and meta-analysis comparing outcome of severely injured patients treated in trauma centers following the establishment of trauma systems*. Journal of

- Trauma and Acute Care Surgery, 2006. **60**(2): p. 371-378.
7. Callese, T.E., et al., *Trauma system development in low-and middle-income countries: a review*. journal of surgical research, 2015. **193**(1): p. 300-307.
 8. Sethi, D., et al., *Injury care in low-and middle-income countries: identifying potential for change*. Injury Control and Safety Promotion, 2000. **7**(3): p. 153-164.
 9. Higashi, H., et al., *Burden of injuries avertable by a basic surgical package in low-and middle-income regions: a systematic analysis from the Global Burden of Disease 2010 Study*. World journal of surgery, 2015. **39**(1): p. 1-9.
 10. Davies, G. and A. Chesters, *Transport of the trauma patient*. Br J Anaesth, 2015. **115**(1): p. 33-7.
 11. Joshipura, M., et al., *Trauma care systems in India*. Injury, 2003. **34**(9): p. 686-692.
 12. Mathers, C.D. and D. Loncar, *Projections of global mortality and burden of disease from 2002 to 2030*. PLoS Med, 2006. **3**(11): p. e442.
 13. Krug, E.G., G.K. Sharma, and R. Lozano, *The global burden of injuries*. Am J Public Health, 2000. **90**(4): p. 523-6.
 14. . 2017, World Bank, Afghanistan.
 15. Lucchi, E., *Between war and peace: humanitarian assistance in violent urban settings*. Disasters, 2010. **34**(4): p. 973-95.
 16. Organization, W.H., *Afghanistan Health System*. 2018, World Health Organization.
 17. Aljazeera, *Afghan lives under threat as ambulance services overstretched*. 2019: Kabul.
 18. Acerra, J.R., et al., *Rebuilding the health care system in Afghanistan: an overview of primary care and emergency services*. International journal of emergency medicine, 2009. **2**(2): p. 77-82.
 19. Saeed, K.M.I., *Prevalence of risk factors for non-communicable diseases in the adult population of urban areas in Kabul City, Afghanistan*. Central Asian journal of global health, 2013. **2**(2).
 20. Zarocostas, J., *Deaths from non-communicable diseases are highest in Afghanistan, lowest in Sweden*. 2011, British Medical Journal Publishing Group.
 21. Massahikhaleghi, P., et al., *Burden of Diseases and Injuries in Afghanistan, 1990-2016: Findings From the Global Burden of Disease 2016 Study*. Arch Iran Med, 2018. **21**(8): p. 324-334.
 22. The, L., *Out-of-hospital cardiac arrest: a unique medical emergency*. Lancet (London, England), 2018. **391**(10124): p. 911.
 23. Mock, C., et al., *Evaluation of trauma care capabilities in four countries using the WHO-IATSIIC Guidelines for Essential Trauma Care*. World journal of surgery, 2006. **30**(6): p. 946-956.
 24. Hsieh, H.-F. and S.E. Shannon, *Three approaches to qualitative content analysis*. Qualitative health research, 2005. **15**(9): p. 1277-1288.
 25. Lincoln, Y.S. and E.G. Guba, *But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation*. New directions for program evaluation, 1986. **1986**(30): p. 73-84.
 26. Haghparast-Bidgoli, H., et al., *Barriers and facilitators to provide effective pre-hospital trauma care for road traffic injury victims in Iran: a grounded theory approach*. BMC Emerg Med, 2010. **10**: p. 20.

27. Jamshidi, H., et al., *Challenges of Cooperation between the Pre-hospital and In-hospital Emergency services in the handover of victims of road traffic accidents: A Qualitative Study*. Invest Educ Enferm, 2019. **37**(1).
28. Haas, B., et al., *The mortality benefit of direct trauma center transport in a regional trauma system: a population-based analysis*. J Trauma Acute Care Surg, 2012. **72**(6): p. 1510-5; discussion 1515-7.
29. Zhang, Z., A. Sarcevic, and R.S. Burd, *Supporting information use and retention of pre-hospital information during trauma resuscitation: a qualitative study of pre-hospital communications and information needs*. AMIA ... Annual Symposium proceedings. AMIA Symposium, 2013. **2013**: p. 1579-1588.
30. Zhang, Z., A. Sarcevic, and R.S. Burd, *Supporting information use and retention of pre-hospital information during trauma resuscitation: a qualitative study of pre-hospital communications and information needs*. AMIA Annu Symp Proc, 2013. **2013**: p. 1579-88.
31. Khor, M.X., et al., *Pre-hospital notification is associated with improved stroke thrombolysis timing*. J R Coll Physicians Edinb, 2015. **45**(3): p. 190-5.
32. Mahmood, K., et al., *Management of the patient from the site of accident to the hospital/pre-hospital care*. Journal of Pharmaceutical Sciences and Research, 2010. **2**(12): p. 804.
33. Jayaraman, S., et al., *Current Patterns of Prehospital Trauma Care in Kampala, Uganda and the Feasibility of a Lay-First-Responder Training Program*. World Journal of Surgery, 2009. **33**(12): p. 2512-2521.
34. Haghparast-Bidgoli, H., et al., *Barriers and facilitators to provide effective pre-hospital trauma care for road traffic injury victims in Iran: a grounded theory approach*. BMC emergency medicine, 2010. **10**: p. 20-20.
35. Nielsen, K., et al., *Assessment of the status of prehospital care in 13 low- and middle-income countries*. Prehospital emergency care : official journal of the National Association of EMS Physicians and the National Association of State EMS Directors, 2012. **16**(3): p. 381-389.
36. Thim, T., et al., *Initial assessment and treatment with the Airway, Breathing, Circulation, Disability, Exposure (ABCDE) approach*. International journal of general medicine, 2012. **5**: p. 117-121.
37. Gururaj, G., *Injuries in India: A national perspective*. Background Papers: Burden of Disease in India Equitable Development-Healthy Future. New Delhi: National Commission on Macroeconomics and Health, Ministry of Health & Family Welfare, Government of India, 2005: p. 325-347.
38. Hsiao, M., et al., *Road traffic injury mortality and its mechanisms in India: nationally representative mortality survey of 1.1 million homes*. BMJ open, 2013. **3**(8): p. e002621.
39. Khademian, Z., et al., *Teamwork improvement in emergency trauma departments*. Iranian journal of nursing and midwifery research, 2013. **18**(4): p. 333-339.
40. MacKenzie, E.J., et al., *A national evaluation of the effect of trauma-center care on mortality*. N Engl J Med, 2006. **354**(4): p. 366-78.
41. Nafissi, N., M. Saghafinia, and K. Balochi, *Improving trauma care in rural Iran by training existing treatment chains*. Rural & Remote Health, 2008. **8**(4).

42. Sidwell, R., M.M. Matar, and J.V. Sakran, *Trauma education and prevention*. Surgical Clinics, 2017. **97**(5): p. 1185-1197.
43. Japiong, K.B., et al., *Availability of resources for emergency care at a second-level hospital in Ghana: a mixed methods assessment*. African Journal of Emergency Medicine, 2016. **6**(1): p. 30-37.
44. Payal, P., et al., *Management of polytrauma patients in emergency department: An experience of a tertiary care health institution of northern India*. World journal of emergency medicine, 2013. **4**(1): p. 15.
45. Wesson, H.K., et al., *Assessing trauma care at the district and provincial hospital levels: a case study of hospitals in Kenya*. Injury, 2013. **44**: p. S75-S80.
46. Lombardo, S., et al., *Trauma Care in Mongolia: INTACT Evaluation and Recommendations for Improvement*. World J Surg, 2018. **42**(8): p. 2285-2292.
47. Levine, A.C., et al., *Understanding barriers to emergency care in low-income countries: view from the front line*. Prehospital and Disaster Medicine, 2007. **22**(5): p. 467-470.
48. Nakahara, S., et al., *Evaluation of trauma care resources in health centers and referral hospitals in Cambodia*. World journal of surgery, 2009. **33**(4): p. 874-885.
49. Kesinger, M.R., et al., *A standardized trauma care protocol decreased in-hospital mortality of patients with severe traumatic brain injury at a teaching hospital in a middle-income country*. Injury, 2014. **45**(9): p. 1350-1354.
50. Stelfox, H.T., et al., *Trauma quality improvement in low and middle income countries of the Asia–Pacific region: a mixed methods study*. World journal of surgery, 2012. **36**(8): p. 1978-1992.
51. Hjortdahl, M., et al., *Leadership is the essential non-technical skill in the trauma team-results of a qualitative study*. Scandinavian journal of trauma, resuscitation and emergency medicine, 2009. **17**(1): p. 48.
52. Collier, D. and J. Mahoney, *Insights and pitfalls: Selection bias in qualitative research*. World Politics, 1996. **49**(1): p. 56-91.

Figures

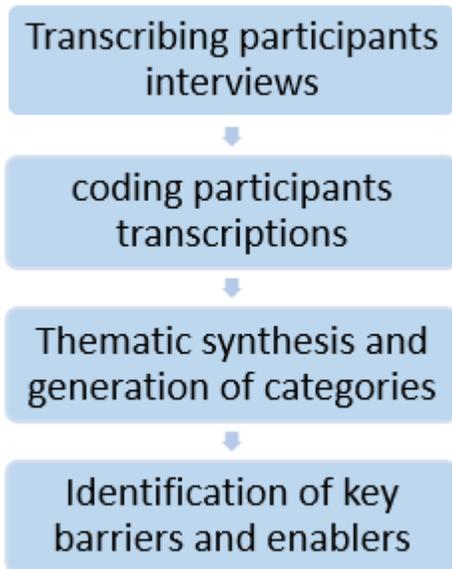


Figure 1

Qualitative data collection and analysis sequence.