Access to pre-hospital care among patients visiting emergency department of a tertiary hospital in Nepal: A Mixed Methods pilot study

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ABSTRACT

Introduction: Pre-hospital care covers assistance and immediate care to injured and seriously ill patients at the scene and during transfer to health facilities. Pre-hospital care demands skills and preparedness. Medical emergencies involve use of a range of transports other than ambulances in Nepal. The current pilot study aimed to explore the access to pre-hospital care and factors associated with it from both users and providers' perspective.

Method: Cross sectional concurrent parallel mixed method study was done in emergency department (ED) of Patan Hospital, Nepal. Semi-structured questionnaire and interview guides were used. Thirty patients and visitors arriving at ED and seven key informants participated. Permission was taken from ED and written informed consent was taken. Descriptive and inferential statistics was done using R software and thematic analysis was done using EZR package.

Result: Proportion of access to pre-hospital (PH) care was found to be 13.3% (4 out of 30). Concept of pre-hospital care itself is not popular among users. Limited PH care and service was found in the study site. Cost of transportation and distance between site and hospital were found to be associated with access. Further to it, barriers and facilitators were related with service delivery, workforce, financing, infrastructure, communication, coordination and information.

Conclusion: Access to pre-hospital services was found only in 4 out 30 patients. Awareness among the users' and integrated governance of ambulances is recommended for improvement of pre-hospital services.

Keywords: Ambulance, emergency medical services, pre-hospital care, tertiary hospital, Nepal

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INTRODUCTION

Medical emergencies are usually time sensitive. Timely provided emergency health care (EHC) saves lives. Development of robust EHC alone can address an estimated 45% of deaths and 35% of disability adjusted life years in low- and middle-income countries (LMICs).[1] Pre-hospital (PH) care incorporates immediate assistance and transfer to health facility.[2] Emergency medical service (EMS) providers at site are responsible for PH care and held responsible for deciding for dispatch.[3] Skill of EMS providers and preparedness of transfer vehicle with basic life-saving supplies are vital for PH care.[4] While in resource constrain setting like Nepal, preparedness for EHC focuses on health facility strengthening and PH care remains in shadow.[5] In LMICs, commercial drivers, volunteers, and other bystanders provided large proportion of pre-hospital transport and occasionally also provided first aid in many locations.[6] The situation is no different in Nepal; referral of cases from site is majorly driven by public, police and security personnel at site, and self-referral of patients. Thus involves a range of means of transport other than ambulances. [7] The current pilot study aimed to explore access to PH care and factors associated with it from both users and providers' perspective.

METHOD

This was a pilot study done in emergency department (ED) of Patan Hospital, Bagmati Province, Nepal. It was a cross sectional concurrent parallel mixed method. Study population included both users- patients and their visitors, and emergency service providers. The data was collected over during March, 2021 through face-to-face interviews.

A total of 30 purposively selected patients and their visitors arriving at the ED of Patan Hospital were recruited for quantitative interviews. Seven qualitative interviews were taken-four in depth interviews (IDIs) and three key informant interviews (KIIs). KIIs were conducted with medical practitioners of Patan Hospital and representative from National Ambulance Services (NAS).

For quantitative data collection, semi structured tool was used. It included socio-demographic information, socio-economic status,[8] patient related factors like- medical condition, triage category, frequency of emergency visit, information on PH care, means of transportation and reasons for preference, insurance coverage, service providers related factors like- availability of medical supplies, trained medical providers in ambulance, communication and coordination and access to ambulance service at the time of emergency. Qualitative interview guide for IDI with the patients and visitors attending ED included the open-ended questions like- information on PH care, means of transportation, reasons for preference, facilitators and barriers for accessing PH care and the qualitative interview guide for KII with service providers included open ended questions related to service delivery, health workforce, financing, governance, information system, facilitators, barriers and recommendation for PH care services. Probing was done as per need.

Permission was taken from the ED, Patan Hospital for having access to the patients for the pilot study. Purpose of the study was explained to the participants and written informed consent was taken. The aspects of voluntary nature of the participation and no direct benefit for participating in the study were explained. Confidentiality and anonymity of the participants was maintained throughout the study.

Quantitative data was entered in Microsoft Excel 2007, cleaned and imported into EZR package for further analysis. For descriptive analysis, frequency and percentage were calculated for categorical variables, mean, standard deviation (SD), median, minimum and maximum were calculated for the continuous variables. Inferential statistics including exploratory association between different variables was done using Fisher's exact test and odds ratio (OR) at 95% confidence interval (CI). For qualitative data, thematic analysis was done in six steps given by Braun and Clarke's[9] and analysis was done separately for users' and providers' perspectives. Themes identified were- service delivery, workforce, financing, facilities in ambulance, communication, coordination and information. Within these themes, the facilitators and barriers were analyzed. Triangulation of findings from quantitative and qualitative data was done.

RESULT

Socio-demographic and background characteristics of participants

Median age of participants was 51.5 years. Out of 30 patients, 20 (66.7%) were female, 18 (60%) lived in joint family. Socio-economic status showed that 20% were from upper middle status and 16.7% from lower middle status (Table 1). Out of 30 patients, 53.3% were with complains of vomiting, diarrhea, poisoning and dizziness, seven (23.3%) with self-reported pain, four (13.3%) with respiratory problem, two (6.7%) with obstetrics

and gynecological problems and one (3.3%) due to burn. Twenty-five participants (83.3%) were from red triage category. Out of 30, 13(43.3%) arrived to the emergency using taxi, 5 (16.7%) used motorbike, 4 (13.3%) each used private vehicles, ambulance and other means of transportation. (Table 1) During qualitative interviews we found, ambulance, bus, reserved vehicles were preferred to arrive at the hospital during emergencies depending upon the availability and patients' health condition.

Proportion of access to pre-hospital care

Proportion of access to PH care was found to be 13.3% (4 out of 30) during this pilot study. These four patients who used ambulance services contacted it through 102 number, hospitals and municipality. Reasons for using ambulance services were their belief that it was faster and had previous experience of using it. (Table 2) During IDI, one of them mentioned that they received information about ambulance services from health posts and thus they prefer to use ambulance.

Status of pre-hospital care

Key informants mentioned that PH care is provided to patients before reaching hospital which starts right from place of incident, stabilizing them and informing receiving hospital. It also includes training to service providers and services provided by ambulance. Concept of pre-hospital care itself is also not popular among users. Only 10% (3 out of 30) had heard about PH care services.

"… We don't know about it [prehospital care] *and we also didn't keep any interest in the subject that we haven't heard about." IDI 3*

This was also acknowledged by service providers that there is lack of awareness regarding PH care services among users.

"In my opinion awareness is the biggest challenge." KII 3

One of the key informants also mentioned that NAS was the major organization working on PH care in Nepal. Some private hospitals were mentioned to have provision of ambulance with paramedics and equipment. It has only been about a year and half that government has signed memorandum of understanding to expand and strengthen the PH care services.

"It is only recently that the concept of pre-hospital care started in Nepal. We can say that it is in its early stages." KII 1

The study site had limited PH care service. Key informant mentioned that the hospital doesn't have a system of providing PH care services. This was ironically mentioned in one of the key informant interviews, *"Basically, I would call it a taxi with oxygen supply. It has a driver and passenger seat like a taxi with only an additional oxygen cylinder." KII 2*

There was no communication between ambulances to this hospital, the study site, regarding arrival of patient in all four cases that came by ambulance.

Cost of transportation, distance and time taken to arrive emergency of hospital

Out of 30, 22 mentioned about cost of travelling to hospital in this visit. For ambulance users, median cost was NRs 1500 and for other transportation it was NRs 500 with minimum NRs 100 and maximum NRs 12,000. (Table 3) During qualitative interviews, there were different opinions of users related to cost of ambulance, some mentioned it to be cheaper and for others it was costly. And this payment is usually out of pocket expenditure which was also acknowledged during KIIs.

"Patient party is responsible for covering the user fees. It is charged based on per kilometers traveled." KII 1

Median distance between the site and hospital was nine Kilometers and median time to arrive to the hospital was half an hour. (Table 3)

Patients related factors associated with access to pre hospital care

During quantitative analysis, cost of transportation [p-value 0.02] and distance between site and hospital [p-value 0.03] were found to be associated with access to PH care (Table 4). During IDI, it was found that financial problems are faced by participants and one of them mentioned that they have to take loans to bring the patient to the hospital. This is one of the barriers for accessing PH care services.

"In the village, we don't have much work so during such times [medical emergencies] *we have to borrow money or take loans to bring the patient to the hospital. That is what I have been doing until now." IDI 1*

One of the participants mentioned that ambulance is easier and faster for taking the patients to the hospital and traffic jam was one of the factors to determine this

"They arrive on time… If there is no jam, then they will arrive on time only" IDI 4

Time was also considered as one of the factors for accessing PH care during KIIs.

The availability of contact number for ambulance was a facilitator. Absence of information along with the tendency to reach out to the readily available vehicle and unavailability of ambulance

during emergencies were pertinent barriers found in the study.

"So, whatever is available in front of us we have to use it [vehicle]*…." IDI 1*

In addition, the availability of medical personnel in ambulance was a facilitator and their absence was barrier.

"There were no experts available in the ambulance to give him first aid. Besides the driver it was only us who were present in the ambulance." IDI 2

"When we call them, the ambulance comes to pick up at our home only, so it is easy. The driver and the staff from the ambulance helps to take the patient inside the hospital as well." IDI 4

Providers' perspective of factors associated with access to pre hospital care

The quantitative analysis didn't show statistically significance for providers' presence in ambulance in terms of access to PH care (Table 4). The availability of trained medical personnel in NAS ambulances was identified as facilitator for pre-hospital service provision and saving lives while their lack was identified as a barrier during qualitative interviews.

"We have medical personnel in the dispatch who will suggest them regarding what can be done until the arrival of the ambulance. This makes it easier for the patients and helps in life saving." KII 3

Only ambulances with medical personnel and trauma cases referred by police, are communicating with referral centers about patient.

"…the paramedic from 102 is informed about the patient's details by the referring center. Then the paramedics convey the information and the provided intervention …to the receiving center." KII 1

There is hesitancy among providers because if any event happens during PH care, the entire blame and even physical attack can happen to medical personnel.

For cost of maintaining ambulance services and PH care, one of the major sources is revenue generated through users which can at times be barrier to access, though during COVID-19 pandemic, government supported cost. Further to it, National Dispatch Center requires a huge space and equipment which was also expressed as barrier for the pre-hospital care provision by one of the key informants.

"… National Dispatch Center requires huge space and equipment. It is not easy. If the government supports us in this aspect than it would be easier..." KII 3.

Table 1. Socio-demographic and background characteristics of participants

Variable	Frequency (%)
Sex (n=30)	
Female	10 (33.3)
Male	20 (66.7)
Socioeconomic status (n=30)	
Upper Middle	6 (20.0)
Lower Middle	5 (16.7)
Upper Lower	15 (50.0)
Lower	4 (13.3)
Medical condition for visiting ER	
Obstetrics and gynecological problem	2
Respiratory Problem	4
Self-Reported Pain	7
Burn	1
Others (vomiting, diarrhea, poisoning and dizziness)	16
Triage Category (n=30)	
Red	5 (16.7)
Yellow	16.7 (83.3)
Mode of transportation (n=30)	
Ambulance	4 (13.3)
Taxi	13 (43.3)
Private Vehicle	4 (13.3)
Motorbike	5 (16.7)
Others	4 (13.3)
Age (in years)- Median (First quartile (Q1), Third quartile(Q3)):	51.5 (28.5, 74.25)

Table 2. Access of pre-hospital care among the patients visiting ER department

Variable	Frequency (%)		Variable	Frequency (%)
Access of pre-hospital care (n=30)			**Contacted ambulance (n=4)**	
Yes	4 (13.3)		Through 102	1 (25.0)
No	26 (86.7)		Through hospital	1 (25.0)
Reason for choosing ambulance (N=4)			Others	2 (50.0)
Have used this service before	3 (75.0)			
Others	1 (25.0)			

Table 3. Cost of transportation, distance and time taken to arrive to emergency of hospital

Variable	Mean	SD	Minimum	Q1	Median	Q3	Maximum
Cost of Ambulance (N=4)	1375	250	1000	1375	1500	1500	1500
Cost of other transportation (N=18)	1882.3	3823.8	100	350	500	700	12000
Approximate Distance between site and hospital (N=30) in kilometers (KM)	44.1	81.5	1	5	9	28	350
Time taken to arrive to at the hospital in hrs (N=30) in hours	1.9	2.9	0.08	0.33	0.5	2	12

Table 4. Inferential Analysis of Access to pre-hospital care by mediating variables

Variable	Access to pre-hospital care		p-value	Odds Ratio(OR) 95% Confidence Interval (CI)
	Yes (%)	No (%)		
Medical Condition [a]				
OB/GYN	0.5(16.7)	2.5(83.3)	0.13	-
Respiratory Problem	2.5(50)	2.5(50)		
Self-Reported Pain	0.5(6.2)	7.5(93.8)		
Burn	0.5(25)	1.5(75)		
Others	2.5(14.7)	14.5(85.3)		
Triage Category				
Red	2(40.0)	3(60.0)	0.11	6.89[0.37-132.23]
Yellow	2(8.0)	23(9.0)		
Heard of Pre-hospital Care [a]				
Yes	0.5 (12.5)	3.5(87.5)	1	0.746[0.032-17.06]
No	4.5(14.8)	23.5(85.2)		
Cost of transportation [a]				
≤ 500	0.5	11.5(100)	0.02*	0.062[0.02-1.36]
> 500	4.5(40.0)	6.5(60.0)		
Distance between site and hospital (in kilometers)[a]				
≤ 9	0.5	15.5 (100.0)	0.03*	0.07[0.003-1.55]
>9	4.5(28.6)	10.5 (71.4)		
Time taken to arrive at hospital from site (in hours)				
≤ 0.5	2(10.5)	17(89.5)	0.61	0.54[0.03-8.6]
>0.5	2(18.2)	9(81.8)		
Insurance of the patients				
Yes	3(11.5)	23(88.5)	0.45	0.407[0.021-27.31]
No	1(25.0)	3(75.0)		
Reach of ambulance [a]				
Yes	4.5(13.8)	25.5(86.2)	1	0.52[0.018-15.4]
No	0.5(0)	1.5(75)		
Medical supplies and equipment in ambulance [a]				
Yes	1.5(7.5)	18.5(92.5)	0.12	-
No	3.5(38.9)	5.5(61.1)		
Don't Know	0.5(12.5)	3.5(87.5)		
Availability of medical personnel in ambulance [a]				
Yes	3.5(20.6)	13.5(79.4)	0.69	-
No	1.5(16.7)	7.5(83.3)		
Don't Know	0.5(7.1)	6.5(92.9)		
Availability of trained medical personnel in community [a]				
Yes	3.5(20.6)	13.5(79.4)	0.69	-
No	1.5(16.7)	7.5(83.3)		
Don't Know	0.5(7.1)	6.5(92.9)		

[a] Haldane Anscombe correction was used as one of the cell counts was less than 0 *Significant (p-value <0.05)

DISCUSSION

This pilot study shows access to PH care among 13.3% participants. Facilitators and barriers for access of PH care were found to be related to service delivery, workforce, financing, infrastructure and communication, coordination and information.

With regards to awareness of PH care, 90% participants had not even heard about PH care which was high than the findings of study done in India where only less than a quarter (23.8%) were unaware about the emergency medical services.[10] This difference may be due to small sample size in our study. This lack of awareness leads to the missed opportunity of accessing the existing PH care services. Thus, tailored messaging to the public [11] related to the need, importance and the services provided as part of the PH care is needed. Demand generation is also critical for quality improvement[12] and is equally applicable to pre-hospital services as well.

Time taken by the ambulances to reach the patient and then to the health facility shapes the preference of the public to access the services.[13] The rules on roads for giving way to ambulances aid in this part.[14]

Findings show that there was instance of need of loan for accessing EMS in users' side and there is dependence of ambulance on revenues on providers' side. Having declared emergency medical services as part of basic health services makes the government accountable for cost incurred during any medical emergency [15] and thus needs to be regulated.

Increment of the ambulance numbers alone is not sufficient; it incurs both medical supplies and workforce for provision of PH care services.[4] Timely addressing training needs, preparing emergency service providers and making them available for PH care is vital to make ambulances different from any commercial vehicle with oxygen.[16] Communication to referral hospital happened only from those ambulances had medical staffs. Such information is critical in assessing the right place for dispatch.[17] Integration of governance of ambulance services will also facilitate in quality improvement and opportunities for insurance coverage of the pre-hospital services.[4,18] Further to it a national dispatch center will aid in regulating integrated ambulance services and has potential to reduce hesitancy among emergency service providers for PH care.[19,20]

CONCLUSION

This pilot study showed that 4 out of 30 patients accessed ambulances and only one among them received PH care in it. Time taken by ambulance, availability of the medical supplies and service providers in ambulance, cost incurred and communication to referral site are pertinent factors that influence access and provision of the pre-hospital services. The irony that ambulances are like vehicles with drivers and an oxygen, needs to be addressed by respective stakeholders to improve the pre-hospital services being provided and at the same time awareness among users need to be instilled for creating demands and integrated governance of ambulance services is recommended for improvement of pre-hospital services. Scaling up this study will help understand these factors more explicitly.

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Conflict of Interest

We declare that we have no conflict of interest.

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