

Transport and Pre-hospital Care Prior to Arrival in Tertiary Care Emergency Department of Eastern Nepal: a Cross sectional Study

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Abstract

Introduction: Nepal has diverse terrain and the length of time taken by the patients to get medical help is often too long. Road linkage transport may not exist, inadequate or are unreliable and irregular.

Materials and Methods: After ethical clearance, this prospective observational study was done by convenient sampling, among 2211 patients arriving in the emergency ward of B. P. Koirala Institute of health science over a period of one month. A pre-tested validated questionnaire consisting of questions related to study objectives (i.e. demography, preferred mode of transport, reasons for choosing the transport, facilities available in ambulance, cost and time taken through ambulance service and any pre-hospital care received) was handed over to the patient or their relatives and their responses were collected. Descriptive analysis was done in SPSS software version 11.2.

Result: Out of the 2211 patients presented in emergency ward, 43.2% (955) came in an ambulance. Patients with ATS 2 (very sick) arriving in ambulance were 27.6%. The median time taken by ambulance is 2 hours (IQR 1-3hrs). The median distance covered is 55km ((IQR 38km- 80km). The median cost paid was USD 31.25 or NRs. 3500 (IQR NRs 2000- NRs 6000, USD 17.86- 53.57). Their main reason expressed for not choosing ambulance service was high cost, i.e. expensive (26%). About one third subjects (29.4%) had used some sort of pre-hospital care.

Conclusion: Patients preferred private vehicles to arrive in emergency ward of this hospital with high acuity triage score (ATS 2). Awareness needs to be raised among Nepalese population to enhance the practice of using ambulance service for patient transport.

Key words- Ambulance, Emergency, Pre-hospital care

Introduction

Nepal is unique in its mountainous and terrain (Terai) regions. Deaths due to trauma, cardiac arrest or cerebrovascular accidents, occur within the first hour. Many do not reach hospital or a primary health centre here due to geographical diversities of Nepal. The length of time taken by the patients to reach to a medical help is often too long. To add to the woes of the general

population, many villages of Nepal do not have road linkages to the hospitals. Transport may not exist or even when present, it is unreliable and irregular.¹ The Government of Nepal has established primary health care facility at each of the 3913 village development committees of and District hospital in each of the 77 districts of the country for the health facility to its population.²

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Ambulance services started in Nepal from an unknown period. Bir hospital (the oldest hospital of the country) and a number of social organisations like Nepal Red cross society and

Rotary club have been operating the ambulance service in various regions of the country. With the introduction of health service in private sector in 1990s, the number of ambulance has increased but the current number of plying vehicles is not sufficient to meet the country's needs.^{1,2}

The Nepal Red cross society, the country's largest NGO, has 140 ambulance plying from 127 stations all over Nepal with First aid training standardization (FATS) in 30 districts since 2003.² In developed countries, the debate is about the pre-hospital care belonging to paramedics but evidence shows better results in rural setting of developed countries, where a trained General Practitioner is often called upon.³ Arguments, however, continue about the best early responders and the safe transport of patients with minimal financial burden on them.

Pre-hospital care in context of Nepal refers to the medical care given by paramedics or physicians from the location from which the patient is referred to a hospital. This service is provided by the nearest private or government health facility from where the patient is referred to a tertiary care centre.⁴

According to a study conducted in Patan hospital by Gongol et al, only 10% of the patients arrive in emergency rooms via ambulance, and 54% arrive by a taxi.⁵ The consequences may be adverse, at times serious, with delivery of patients by taxis or by make shift ambulance.

According to study by Merkin et al in Kathmandu about the emergency medical service system in three principal emergency departments, injury is present in 30% of all

visits and remains the single greatest threat to public health.⁶ It is estimated from the Nepal Community Emergency Preparedness Group that Nepal loses about 530,000 Disability Adjusted Life Years (DALYs) per year to injury. With the current trends, injuries are estimated to be the third most common cause of DALY loss in Nepal by 2020 as compared to the current ninth position as the common cause.⁷ Hence, the consequences of not having Emergency Medical service in Nepal can increase the economic burden of the country. According to World Bank data, average percentage of Nepalese population remaining below the poverty line is 25%. On average, the total cost of treatment at a government health facility is slightly higher than that of a private health institution; NRs. 1167 at government hospital and NRs. 1010 at private institution. The urban areas have expensive consultation costs in comparison to their rural counterpart (NRs. 2069 versus NRs. 1040) in a government facility.⁸ In eastern development region, 53.8% of the households are within 30 minutes of reach to the nearest health post or sub health post.⁹

This study was conducted with an objective of looking into: current state of Nepalese population's preference on the mode of transport to hospital, reasons for choosing the same, the charges and distance covered by them to reach the tertiary care hospital. This study also reviewed the pre-hospital management given to these patients in their referral centre.

Method and Materials

A descriptive cross sectional study was done in the emergency ward of B. P. Koirala Institute of Health Sciences, Dharan Nepal which had emergency admissions of 37,800 clients in the

fiscal year 2014-2015.¹⁰ A semi-structured questionnaire was distributed by convenient sampling among 2211 patients arriving in emergency ward with an Australasian triage score (ATS) of two or more, on all 6 working days of the week, from 15 September 2015-15 October 2015. Australian Triage Score is used in the emergency ward of B. P. Koirala institute of Health Sciences for categorizing the patients arriving in the ward. It has 5 levels of acuity scores (ATS 1- Immediately life threatening, ATS 2- Imminently life threatening, ATS 3- Potentially life threatening or important time-critical treatment or severe pain, ATS 4- Potentially life-serious or situational urgency or significant complexity, ATS 5- Less urgent.¹¹

The questionnaire was developed to describe the objectives which included the following variables- a. Demographic profile- age, sex, occupation and religion, b. Socioeconomic status- the economic status was estimated by approximate annual family income, c. Transportation details- type of transport used by the patient, cost, distance and time taken by the ambulance only, reason for their preference for not choosing ambulance, medical facilities available in the ambulance, d. Training received by the ambulance driver if any and duration since the training taken by them, e. Details on pre-hospital care, including treatment prior to arrival in our hospital.

This study was conducted after ethical clearance from the IERB, BPKIHS. An information sheet was provided with confidentiality and detail explanation was made by the researcher during the questionnaire interview. Pretest was done in 10% of the sample size. Validity and reliability of the questionnaire were assessed using expert

recommendation and reliability was calculated using Cronbach's alpha (0.70).

The collected data were entered in Microsoft excel 2007 and converted it into SPSS 12 for descriptive statistical analysis.

Results:

Out of 2211 patients presenting in emergency ward, more subjects were females (51.7%) and dependant (56%) in occupation (Figure 1). Patients arriving in ambulance to the emergency were 43.2% (n= 955) and other modes are described in Figure 2.

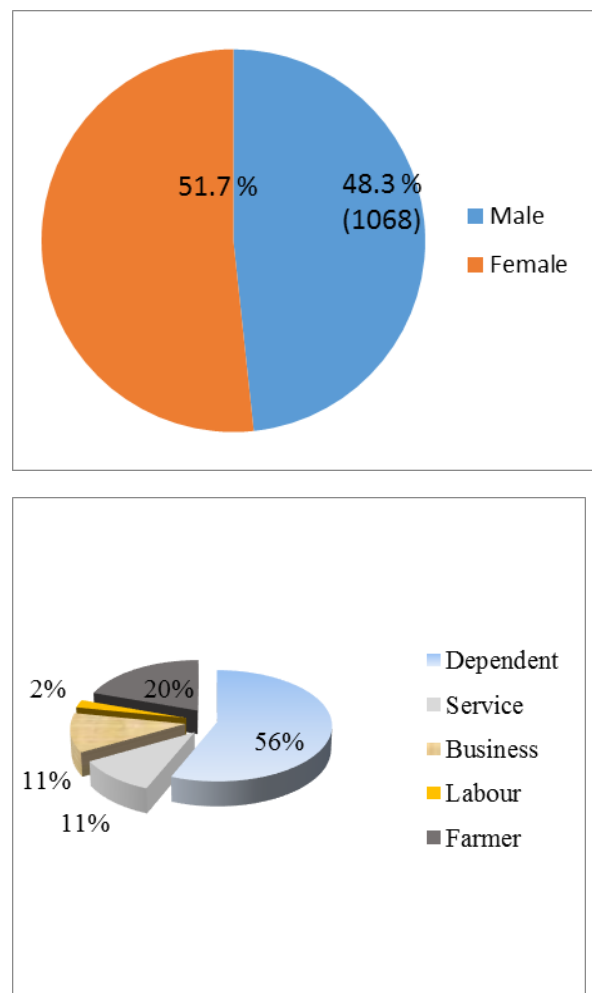
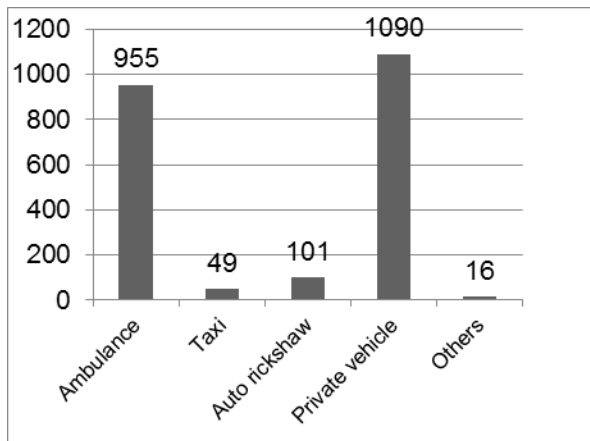


Figure 1: Sex distribution and Occupation

Patients with an Australasian Triage Score (ATS) of 2 and 3 attending the emergency ward were 59.4% and 23.4%, irrespective of their mode of travel. Patients with ATS 2 arriving in ambulance were 27.6 % only. The description of the mode of transport with ATS scores have been illustrated in Table 1. Maximum of 344 patients arrived in ambulance in our emergency ward during 12PM- 6PM. Patient arrival in other modes of transport with their arrival time is described in Table 2.

Figure 2: Preferred Mode of Transport



Only 2.8% of the ambulance drivers driving the patient to the emergency service had some training which they had received one year back in average. 76% of the ambulance services had oxygen cylinders but lacked Automated external defibrillators. During the transport to our hospital, 68.9% of the patients had used oxygen and 95% did not receive any medications. There was no witnessed death during their transport to the hospital.

The median time taken by ambulance was 120 minutes (IQR 60min -180 min) to reach our hospital. The median distance covered was 55km (IQR 38km - 80km). The median cost paid by them was NRs. 3500 (IQR NRs. 2000 - NRs 6000), i.e. USD 31.25 (USD 17.86- 53.57).

Patients, who arrived by other means of transport, used private vehicles including motorbikes and cars (49.3%), auto rickshaw (4.3%) and taxi (2.2%). Their reasons for the preferred modes were: ambulance being more expensive (26%), other means of transport easily available (13.8%), having private vehicle at home (14.7%) and home near to hospital (2.4%).

Table 1: Mode of transport with ATS score on arrival

ATS	Modes of Transport				
	Ambulance	Taxi	Auto rickshaw	Private vehicle	Others
1	16 (1.7%)	1 (2.0%)	0 (0%)	8 (0.7%)	0 (0%)
2	264 (27.6%)	15 (30.6%)	19 (18.8%)	214 (19.6%)	5 (31.3%)
3	541 (56.6%)	24 (49.0%)	56 (55.4%)	686 (62.9%)	7 (43.8%)
4	109 (11.4%)	7 (14.3%)	21 (20.8%)	151 (13.9%)	4 (25.0%)
5	25 (2.6%)	2 (4.1%)	5 (5.0%)	31 (2.8%)	0 (0%)
Total	955	49	101	1090	16

Table 2: Arrival Time and Mode of Transport of ED patients

Time of Arrival	Ambulance N= 955	Others N= 1256
6AM - 12PM	262	397
12PM - 6PM	344	469
6PM - 12AM	230	271
12AM - 6AM	119	119

Referrals from other centre were from Private hospitals (20%) and Zonal hospitals (3.4%), and the other referral centers are illustrated in Figure 3. Only 29.4% of all the patients arriving in the emergency ward had received some treatment from their referral centre as a part of pre-hospital care. Patients had received definitive treatment which included analgesics, antibiotics, antidotes and other specific drug administrations and had supportive treatments which included only oxygen administration, intra venous canulation and intra venous fluids.

Table 3: Mode of transport from referral centre with treatment obtained

Mode of Transport	Treatment Received	Treatment Received
	YES	NO
Ambulance	484	471
Others	165	1091

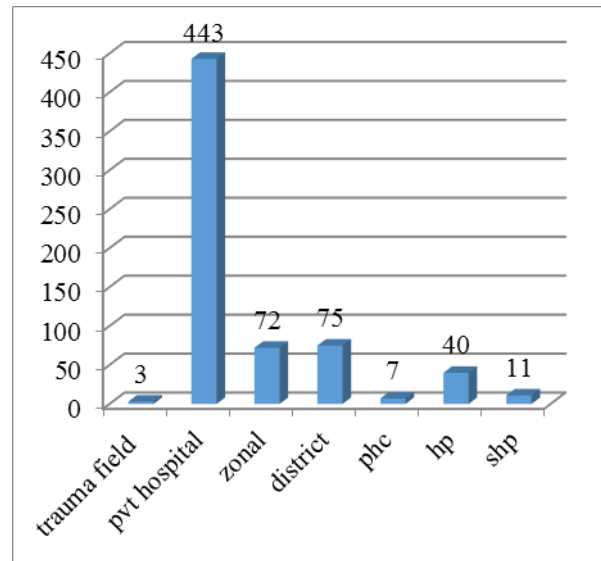


Figure 3: Description of Referral centre

Discussion

Ambulance services availed by patients in eastern Nepal were still unreliable and not preferred even after a decade of previous studies done in Nepal.^{4,10} Preference towards private vehicles to reach hospital is also prevalent. The EMS service is currently available in Kathmandu valley by Nepal ambulance services but yet to be expanded outside the valley.¹¹

Our study showed 43.2% patients arriving in ambulance which is slightly higher than the services availed by patients (13.4% and 9.4%) in previous studies done in Nepal.^{4,12} Patients who arrived in ambulance with a triage score of 2 (sick patients) was 27.6% which have improved from 15.4% by Gongol et al. Improvement in the proportion of using ambulance service is observed among the Nepalese population in the last decade. This study also showed an increased use of ambulance service in the eastern part of Nepal in comparison to studies done in Kathmandu. Transport of sick patients still remains uncertain and dependent on private

vehicles (49.3%) or public transport (7.5%) which was similar to previous studies.^{4,12.}

There is no particular development in the presence of equipments in the ambulances in the last decade. Oxygen cylinders was present in 76% of ambulances which has significantly improved but absence of AED is still persisting.⁴ Trainings among the ambulance drivers had been provided by some private organizations like Nepal Red Cross and NADEM (Nepal disaster and emergency medicine) but are very limited. Currently, no government regulations for attainment of license with trainings or education are required by the ambulance drivers of Nepal.

Hjalte et al have shown that all patients arriving in hospital does not require pre-hospital care and ambulance services. Patients with less emergency conditions can choose other modes of transport.¹³ Patients with high acuity triage score needs well equipped ambulance and trained paramedics for reduction in morbidity and mortality. Our study revealed no such preference in modes of arrival to the hospital with the severity of the disease presentation. Their preference of choosing other modes of transport was mostly due to financial constraints. This enforces the government and healthcare facilities to provide affordable accessibility of ambulances to public to reduce the disability and morbidity among them.

According to the Central bureau of statistics of Nepal (2015), mean time taken to reach urban and rural hospitals was 26 to 135 minutes but our study showed a median time of 120 minutes to reach the hospital in ambulance. The appalling road condition of the eastern Nepal is

one of the major factors in this delay. The median cost being NRs. 3500 is also high in comparison to the reports of the government due to absence of fixed rates made by the government on ambulance drivers of various organizations of the country.⁷ These expenses are covered solely by the economically deprived patients which is similar scenario as in other developing countries like Sudan.¹⁴

Conclusion

Our study evaluated the patient's preference to arrive in emergency ward of B. P. Koirala Institute of Health Sciences which found that the clients preferred other means of transport than ambulances. Contributing reasons were expensive ambulance services and easy availability of other vehicles for transportation to hospital. This increases the risks of high morbidity and disability among the Nepalese population. Government and Non government organizations can implement policies to make ambulance services with trained paramedics and basic facilities, be more affordable to common Nepalese population who mostly are from a low socioeconomic background. However, with rising education, the population has improved knowledge about patient care and ideal transportation of patients for better outcome.

Limitation of Study

The limitations of our study were: 1. The patients arriving with a triage score of 1 were not included due to the urgency to get treated and emotionally traumatic patient relatives to go through the questionnaire. 2. This study was done in a single hospital setting .There are other medical institutes in Eastern Nepal where many patient visit for the service. Their perspectives were missing in our study.

Recommendations

1. Government policies should implement compulsory paramedic trainings with knowledge to use AED and BLS before providing license to ambulance drivers.
2. Basic emergency care trainings along with BLS to existing current ambulance drivers of Nepal.
3. Collaboration with Government of Nepal and various Zonal Hospitals to provide the trainings.
4. Introduction of affordable ambulance services to Nepalese population by our Government of Nepal.

Abbreviations

DALYs – Disability adjustment life years
EMS – Emergency medical services
HP – Health post
NRs. – Nepalese Rupees
PHC – Primary health centre
SH- Sub health post
USD- U S dollars (exchange rate – 1\$= 112.08)

Ethics approval

The ethical approval was taken from Institutional Ethical Review Board (BPKIHS). Doc No.- Acd 254/2070/07.

Competing Interest

There is no financial or non financial competing interest among the author or the co-authors.

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