Reasons for Summoning Ambulance Services in the Hilly Region of Nepal

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ABSTRACT

Background

Nepal lacks a unified and countrywide emergency medical services system as other developing countries. However, the emergence of ambulance service initiatives in the past decade shows a promising future for pre-hospital care. Nepal Ambulance Service (Est. 2011) and Dhulikhel Emergency Medical Services (Est. 2013) are the existing emergency medical services initiatives in Nepal.

Objective

To describe the reason for summoning ambulance services and demographics of the patients who were transported by Dhulikhel Emergency Medical Services at Dhulikhel hospital, hilly region of Nepal.

Method

One thousand three hundred and ninety three patient records at Dhulikhel hospital transported by Dhulikhel Emergency Medical Services during the five-year period (2013 - 2018) were included in the study. Chief complaints and demographic data were collected and categorized into overarching systemic categories.

Result

Among 1393 patients, majority were female (60.4%) and the most common age group was 20-29 years. The most common reason for calling ambulances was gastrointestinal problem (22.6%). Similarly, respiratory (17%), obstetric and gynecological (15.2%), trauma (12.7%) and neurological (9.6%) problems were other common reasons. The number of respiratory problem was increased during the winter season. The overall percentage of patients arriving at hospital with trauma problems was increased steadily, but it was not statistically significant.

Conclusion

Gastrointestinal problem was the most common reason, followed by respiratory and obstetric and gynecological problems for summoning ambulances services in the hilly regions of Nepal. The incidence of respiratory problem significantly increased during the winter season.

KEY WORDS

Ambulance services, Dhulikhel hospital, Emergency medical services, Pre-hospital care

INTRODUCTION

Nepal has undergone many recent advances in the healthcare sector, which includes services provided by different institutions.[1] An emerging vital sector is the field of Emergency Medical Services (EMS) and pre-hospital care.[2] EMS plays a prominent role in triage, transport decisions, and initial management of patients during emergency medical situation.[3]

The emergence of ambulance service initiatives in the past decade shows a promising future for pre-hospital care. Nepal Ambulance Service (NAS) {estd. 2011} and Dhulikhel Emergency Medical Services (DEMS) {estd. 2013} are the existing EMS initiatives in Nepal.[2] DEMS is the only paramedics facilitated pre-hospital ambulance service provider in Kavrepalanchowk district.[4]

At Dhulikhel hospital, 31% patients used ambulance services for the transportation of the patients to emergency department.[4] Neurological, pulmonary, cardiovascular, gastrointestinal and trauma were the most common problems found in patients transported by EMS in India.[5] Shortness of breath was the reason in 1.3% patients for ambulance call.[6] An increase in the cases of dyspnea patients were found in other studies.[7,8]

The objective of this study was to describe the reason for summoning ambulance services and demographics of the patients who were transported by DEMS at Dhulikhel hospital. Due to recency of EMS patient data, the burden of disease, patient demographics and utilization of EMS in Nepal has not been fully described before. A better understanding of the burden of the diseases could help hospital and EMS providers to be better prepared in terms of equipment and pre-hospital care skills. This also lays the groundwork for developing a coordinated and evidence-based EMS in Nepal.

METHODS

This retrospective study was conducted in the Department of General Practice and Emergency Medicine at Dhulikhel Hospital. Ethical approval was received from the Institutional Review Committee (IRC) of Kathmandu University School of Medical Sciences (KUSMS) to conduct the study. Data was collected from all patients' record who were received by DEMS and brought to Emergency Department (ED) during five year period from May 2013 to February 2018 by Dhulikhel hospital paramedics who were involved in pre-hospital care.

Data was collected on a predesigned questionnaire form regarding demographic details, the reasons for summoning the ambulance services and burden of diseases. Chief complaints from the patients' record were manually classified into the broad categories such as gastrointestinal, respiratory, obstetrics and gynecology, trauma, neurological, fever (unspecified), cardiovascular, urinary or others. Data were then entered into a Microsoft Excel spreadsheet and analyzed through both descriptive statistics and quadratic/linear regression models using R Programming Language and R Studio Software. P value less than 0.05 was considered significant.

RESULTS

Out of total 1393 patients who were enrolled in the study, 552 (39.6%) were male and 841 (60.4%) were female (Table 1). Similarly, the age of the patients ranged from newborns to 96 years old. The highest number of ambulance patients was between 20 and 29 years old (fig. 1). Additionally, in this 20 to 29-year-old age group category, the percent of chief complaints with obstetric and gynecology problem was 44.8%, which is almost three times higher than the overall sample of ambulance patients for all ages.

Table 1. Distribution of the patients according to the gender (N=1393)

Gender	Number of Patients	Percentage
Male	552	39.6
Female	841	60.4
Total	1393	100

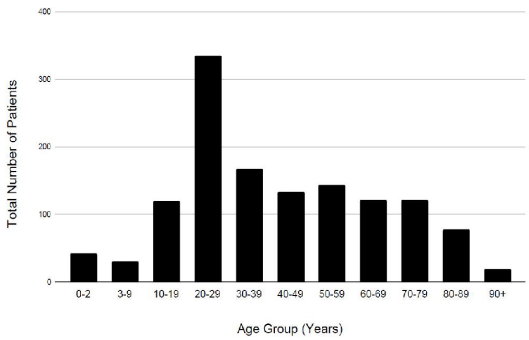

Figure 1. Distribution of the patients according to the age demographics (N=1393)

Out of 1393 ambulance patient records, 1,373 had identifiable chief complaints and 20 were either left blank or were illegible for various reasons. Hence, only 1,373 of the 1,393 ambulance records were included in the analysis of patient chief complaints. The most common reason for summoning ambulance services among patients was gastrointestinal problems (310, 22.6%). Respiratory complaint was the second highest (233, 17.0%). Obstetrics and gynecology problem (209, 15.2%), trauma (132, 12.7%) and neurological (122, 9.6%) were the other common reasons (Table 2).

Respiratory chief complaint was found a parabolic pattern for the January to December monthly cycle. The sample size was 168 patients, and patient data from the 2013 and 2018 was excluded from this sub-analysis, as they did not contain data for all 12 months of the year. The results of this analysis showed an increase in respiratory chief complaints

Table 2. Distribution of the patients according to the chief complaints (N=1373)

Chief Complaint Category	Number of patients	Percentage
Gastrointestinal	310	22.6
Respiratory	233	17.0
Obstetrics and Gynecology	209	15.2
Trauma	174	12.7
Neurological	132	9.6
Fever (Unspecified)	123	9.0
Cardiovascular	53	3.9
Urinary	33	2.4
Others	106	7.7
Total	1373	100

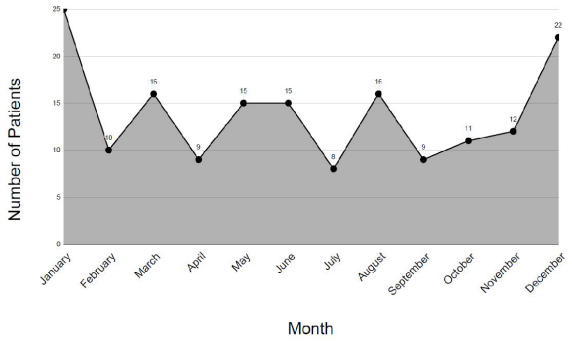

Figure 2. Distribution of the patients regarding respiratory related chief complaints according to the month from 2014-2017.

during the winter season of December and January (fig. 2). Quadratic regression model showed parabolic relationship between month of year and the number of patients with respiratory chief complaints and found a statistically significant (p=0.046).

There was an overall steady increase in the patients with trauma related chief complains (between 10-20% every year) from 2013-2018 (fig. 3); however, this trend was not found to be statistically significant in the linear regression model (p=0.10).

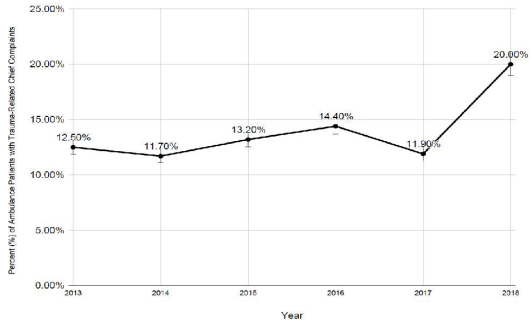

Figure 3. Distribution of the patients regarding traumarelated chief complaints according to the year from 2013 to 2018.

DISCUSSION

An Emergency Medical Service (EMS) can be defined as "a comprehensive system which provides the arrangements of personnel, facilities and equipment for the effective, coordinated and timely delivery of health and safety services to victims of sudden illness or injury".[3] The burden of disease, patient demographics, and utilization of EMS in Nepal has never been fully described before. The most common chief complaints of patients who request ambulances in this study were gastrointestinal, respiratory, obstetrics and gynecology, trauma, and neurological problems. These findings were comparable to the results of a study by Wijesekera et al. conducted in four emergency departments in India, that reported top five most common chief complaints of patients in the pre-hospital setting were neurological, pulmonary, cardiovascular, gastrointestinal and trauma.[5] The overall results of this study showed that while the burden of disease in EMS patients in the hilly region of Nepal is similar to that of India except Nepal's hilly region has a far higher incidence of obstetrics and gynecology problems. Additionally, the burden of gastrointestinal chief complaints in this study was at the highest category whereas it was on the fifth category in the study conducted in India.[5]

Respiratory chief complaints were the second most common in patients received by DEMS and the incidence of respiratory problem significantly increased during the winter season. This finding was similar to the study in Ontario conducted by Moineddin et al.[9] Similarly a study conducted in India examined pre-hospital care and outcomes of EMS patients with respiratory chief complaints in Andra Pradesh, India and reported high mortality rates due to underutilization of prehospital care.[6] Hence, the results suggested that EMS utilization for patients with respiratory chief complaints is critical in order to improve patient outcomes. Furthermore, these results suggest that EMS and ED staff training resources should focus on the management and treatment of respiratory chief complaints and that the staff should be prepared for a higher number of respiratory patients during the winter season.

The majority of patients were women and that the highest portion of patients was between the ages of 20 and 29-years-old in this study. Among this age group patients, the percent of patients with obstetric and gynecology problems was three-fold higher than in overall patient. This finding suggests the EMS attendants must have high-quality training in these issues, especially to manage the labour and delivery complications in order to improve patient outcomes in this demographic group. Studies conducted in resource-limited areas such as Sub-Saharan Africa also have reported that patient outcomes in obstetrical emergencies can be improved by higher utilization of ambulances services with EMS.[10]

The burden of disease due to trauma is increasing worldwide, including Nepal. A review by Karkee et al.

showed increasing road traffic accidents in Nepal.[11] Results from this study echoed these known trends by showing a steady increase in the percentage of DEMS with trauma-related chief complaints. It already has been established that EMS systems reduce the morbidity and mortality in trauma victims.[12] Results of this study suggest putting on further emphasis on trauma-care focused EMS curriculums and effective time management for the transportation of the patient from the scene to the hospital.

Further studies should be conducted once pre-hospital systems exist in other geographical regions of Nepal, as the burden of disease is likely to be different due to topographical and other factors. It is also important to continue such studies in order to continually assess the changes in patient demographics and chief complaints to best guide EMS curriculum development and overall emergency preparedness.

It was not possible to gain additional insight about patients for whom the chief complaint was difficult to categorize in many records, as the study was retrospective. Additionally, as the ambulance records were hand-written on the hard-copy forms, which were sometimes difficult to understand due to handwriting or spelling issues.

CONCLUSION

Gastrointestinal problem was the most common reason, followed by respiratory, obstetric and gynecology, trauma and neurological problems for summoning ambulances services in the hilly regions of Nepal. The incidence of respiratory problem significantly increased during the winter season and a trend of steadily increasing percentage of trauma-related chief complaints. A better understanding of the burden of the diseases could help hospital and EMS providers to be better prepared in terms of equipment and pre-hospital care skills and could improve patient outcomes and increase the efficiency of EMS. Results of this study suggested putting on further emphasis on trauma-care focused EMS curriculums and effective time management for the transportation of the patient from the scene to the hospital.

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