

Mortality in Emergency Department of Nepal Medical College Teaching Hospital, a tertiary care centre in Kathmandu, Nepal

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Abstract

Introduction: There are limited literatures regarding mortality studies in emergency department of different hospitals of Nepal. The objectives of this study were to review and highlight the demographic patterns of mortality and to determine the frequency and causes of accident and emergency deaths.

Methods: This was a retrospective study carried out in emergency department of Nepal Medical College Teaching Hospital, Kathmandu for a period of 3 years from April 2013 to 14th April 2016. The study variables were analyzed with descriptive statistics using software SPSS 16.

Results: A total of 35,734 cases attended the emergency department during this period with mortality rates of 0.19%, 0.21% to 0.35% on consecutive 1st, 2nd, and 3rd year of study. There were 51(56%) males and 40(44%) females. The age of the cases ranged from 1month 23days to 86years old. Highest number of mortality (30.8%) was seen in the age group of more than 70 years old. Medical causes for death was far more common than surgical causes (83.5% versus 16.5%), Cardiac arrest being the commonest (n=19, 20.9%). Maximum number of cases (n=44, 48.4%) died within 1 to 6 hours of arrival to the emergency department.

Conclusions: This study on mortality patterns highlights the causes of common mortalities in one of the emergency department of tertiary care centre in Nepal. This study will provide a basic data to develop competent manpower and good infrastructure with latest equipments in order to optimize positive outcome and to strengthen the emergency setting.

Key words: Emergency, Mortality, Patterns

Introduction

The emergency department(ED) of a hospital is an important entry point of critically ill patients. It is often challenging to save valuable lives as it calls for prompt and appropriate initial management. Thus mortality in emergency department depends upon the infrastructure of the department and the manpower, in addition to certain pre- hospital factors.¹ The quality of care in the emergency room is considered to be an indirect indicator of the standard of healthcare delivery that is given in a health institution.¹

There are limited literatures regarding the mortality studies in the emergency department. The mortality rates in these studies varied from 1.9% to 6%.^{2,3,4,5} It has been reported that 15-60% of all the mortalities in a hospital occur in ED.⁶ Available literatures have shown cardiovascular conditions, sepsis, traffic accidents, traumas and cancers to be the most important etiology of mortalities in ED.^{2,3,4,5,6} However, the data from our country is very limited.^{7,8}

It is necessary to find out the causes of common mortalities in emergency department in order to develop competent manpower and good infrastructure with

latest equipments to optimize positive outcome and to strengthen the emergency setting. The objectives of this study were to review and highlight the demographic patterns of mortality and to determine the frequency and causes of deaths in Emergency department of Nepal Medical College Teaching Hospital (NMCTH), Kathmandu, Nepal.

Methods

This was a retrospective study carried out in emergency department of NMCTH, Kathmandu. Data were collected retrospectively from records of mortality and death certificates from 1st Baisakh 2070B.S (15th April 2013) to 30th Chaitra 2072(14th April 2016) . The study was approved by ethics committee of Institutional review board of NMCTH. Information on age, gender, causes of death, contributing factors, co- morbidities, and time of arrival to death were extracted from the records. All the patients who died after registration into emergency department were included in the study while those who had incomplete registration and brought-dead were excluded .The study variables were analyzed with descriptive statistics using software SPSS 16.

Results

A total of 35,734 cases attended the emergency department of NMCTH from 1st Baisakh 2070 B.S (15th April 2013) to 30th Chaitra 2073 (14th April 2016). There were 91 mortalities (0.25%) during this period. The mortality rate increased each year from 0.19%, 0.21% to 0.35% on consecutive 1st, 2nd, and 3rd year of study. There were 51(56%) males and 40(44%) females. Table 1 shows total number cases in each year and mortality in that year along with the gender distribution.

Table 1: Mortality in both sexes in each year

Year	Total cases	Sex		Total Mortality (n,%)
		Males	Females	
2070	11279	13	9	22(0.19%)
2071	12915	16	12	28(0.21%)
2072	11540	22	19	41(0.35%)
Total	35734	51(56%)	40(44%)	91

The age of the cases ranged from 1month 23days to 86years old. Highest number of mortality(30.8%) was seen in the age group of more than 70 years old followed by 15.4% each in the age groups of 31-40 years and 61-70 years. A medical cause for death was far more

common than surgical causes (83.5% vs 16.5%). (Table 2,3)

Table 2: Mortality and its causes in various age groups

Age group (years)	Cause		Total (n/%)
	Medical	Surgical	
<10	3	1	4 (4.4%)
10-20	2	2	4 (4.4%)
21-30	4	3	7 (7.7%)
31-40	12	2	14 (15.4%)
41-50	4	3	7 (7.7%)
51-60	12	1	13 (14.3%)
61-70	13	1	14 (15.4%)
>70	26	2	28 (30.8%)
Total	76(83.5%)	15(16.5%)	91 (100%)

Table 3: Year wise mortality patterns in different age groups

Age group (years)	Year			Total(n)
	2070	2071	2072	
<10	0	3	1	4
10-20	2	0	2	4
21-30	2	3	2	7
31-40	3	4	7	14
41-50	0	2	5	7
51-60	5	3	5	13
61-70	6	2	6	14
>70	4	11	13	28
Total	22	28	41	91

Cardiac arrest was the cause for highest number of deaths (n=19, 20.9%) followed by sepsis, myocardial infarction (MI) and chronic obstructive pulmonary disease (COPD) in 8 cases(8.8%) each. Other common causes of death were head injury (n=6, 6.6%) and hypovolemic shock (n=6, 6.6%). Upper gastrointestinal (UGI) bleeding, poisoning and cerebro vascular accident (CVA) accounted for 4(4.4%) deaths each. (Figure 1)

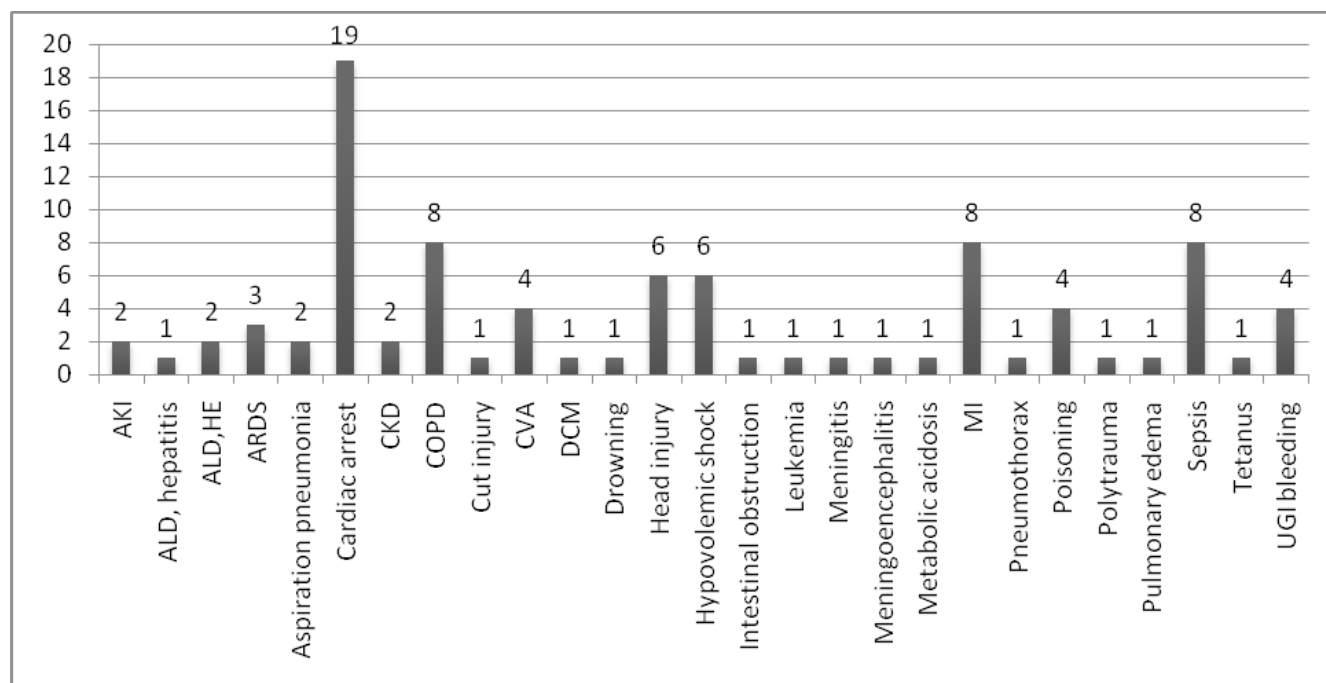


Figure 1: Causes of death. [AKI- Acute kidney injury, ALD- Alcoholic liver disease, HE- Hepatic encephalopathy, ARDS- Acute respiratory distress syndrome, CKD- chronic kidney disease, COPD-chronic obstructive pulmonary disease, CVA- cerebrovascular accident, DCM- dilated cardiomyopathy, MI- myocardial infarction, UGI- upper gastro intestinal]

Common associations with death due to cardiac arrest were COPD, COPD with cor -pulmonale, hypertension (HTN), diabetes mellitus(DM), ischemic heart disease(IHD), valvular heart disease, dyselectrolytemia, chronic kidney disease(CKD), Bronchogenic carcinoma and congestive cardiac failure(CCF).

Only 5 mortalities due to road traffic accidents (RTA) were seen in our study. Two cases of head injury were due to RTA and 4 cases due to fall from height. Out of 6 cases of hypovolemic shock, three cases were RTA, 2 were fall from height and one was physical assault. Out of four cases of UGI bleeding, no cause could be identified in two cases, however, other two cases had oesophageal varices. There were 4 mortalities from poisoning, two each from organophosphorus(OP) and aluminium phosphide.

Maximum number of cases (n=44, 48.4%) died within 1 to 6 hours of arrival to the emergency department followed by 29(31.9%) cases who died within one hour of arrival. (Table 4)

Table 4: Duration before death

Time	Causes		Number (n)	Percentage (%)
	Medical	Surgical		
<1hour	25	4	29	31.9
1-6hours	37	7	44	48.4
6-12hours	12	3	15	16.5
12-24hours	2	1	3	3.3
Total	76	15	91	100.0

Discussion

In this study 35,734 cases attended the emergency department in 3years study period, during which there were 91 mortalities. The crude mortality rate was 0.25%. The mortality rates in literatures are higher than that of our study. It has been reported that 15-60% of all the mortalities in hospital occur in ED.⁶ The ED mortality rate in Ethiopia was found to be 1.9 %.² A mortality rate of 2% was reported in urban hospital of Nigeria³ whereas it was 3.9% in ED of rural area of Nigeria.⁴ A very high ED mortality of 6% was reported

by Rukewe *et al.*⁵ We observed a gradual increase in the mortality rates in 3 years. This may be an alarm that this rate may still increase if proper interventions are not implemented in the emergency department.

In our study, ED mortality was more in males; this followed the pattern reported by other studies.^{3,4,5} Highest number of mortality was seen in cases more than 70 years of age (30.8%), this contributed to 60.5% cases above 50 years of age. In most of the studies, majority of emergency department deaths were seen in young cases.^{1,3,4,5} The peak age in trauma deaths was 20-29 year, while that in non-traumatic deaths was 40-49 years as reported by Ekere *et al.*³ Chukuezi *et al.* in their study found that almost 60% of cases were less than 50 years of age.⁹ However, Beckett *et al.* reported that 66% cases who died in ED were more than 60 years of age.¹⁰

Medical causes accounted for majority of mortality; 83.5% in contrast to surgical mortality of 16.5%. Our finding was consistent with the findings of other studies. However, the cause of death may differ in various geographical locations. Medical causes of death was 75.4% in a study done by Ogunmola *et al.*⁴ whereas it was 56% and 66.8% in other studies.^{5,11} In contrast to this finding Chukuezi *et al.* reported that trauma related deaths constituted the most common cause of mortality with road traffic accidents being most common.⁹ Among the medical causes of death, cardiac arrest was the cause for highest number of deaths (20.9%) followed by sepsis, myocardial infarction and chronic obstructive pulmonary disease, 8.8% each. Beckett *et al.*¹⁰ in their study showed that Myocardial infarction/Ischaemic heart disease were the commonest cause of death (55.56%). Khan *et al.* reported that the leading causes of death in their study were sepsis (23%), myocardial infarction (19.7%), cerebrovascular accident (10.7%) and pneumonia (8.2%).¹² Head injury and sepsis were the most common causes of death among ED patients in an Ethiopian study.² Few studies reported stroke to be common cause of medical deaths.^{11,13} In our study as well, we found 4.4% cases of CVA. The frequency of stroke mortality may be due to poor state of hypertension control and hypertension may be an important and independent risk factor for patient mortality. Unlike other studies, we found only 5 mortalities due to RTA. The reason behind this may

be low velocity injuries because of roads and the traffic in our setting.

Ekere *et al.*³ found that 70.9% cases died within six hours of arrival in the emergency department whereas Rukewe *et al.*⁵ reported it to be 43.4% within 5 hours of arrival.⁵ In a Nigerian study, most deaths occurred within 10 to 26 hours of arrival at ED.¹ The number of early death was more in our study. Maximum number of cases (48.4%) died within 1 to 6 hours of arrival to emergency department followed by 31.9% cases who died within one hour and 16.5% within 6 to 12 hours of arrival. Together this resulted in 80.3% deaths within six hours and 96.7% within 12 hours of arrival in the ED. Medical causes were the most common reason for deaths in this time period. The cause for this high number of early mortality in emergency may be delay in presentation, poor infrastructure and inadequate equipments as well as lack of expertise in manpower working in the ED. Competent provision of emergency medical and trauma care has been shown to decrease patient mortality around the world.²

Conclusions

The study showed the crude mortality rate of 0.25% in ED of NMCTH with high mortality among elderly age group with male predominance. Cardiac cause was the most common cause of death and most death occurred within 1-6 hours after arriving in the Emergency. Though this study may not reflect the real national scenario about mortality in the emergency department, it will definitely call for an appraisal of the present system to promote an efficient pre-hospital care, well-organized ambulance service and specialized standard of care required in ED. Furthermore, this study emphasizes training of accident and emergency health care professionals for the best management of patients in the department of emergency based on scenario of local patterns of mortality which will ultimately help reduce the preventable deaths.

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Conflict of interest: None declared

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