

Mortality Patterns among Patients admitted at a Tertiary Care Facility in Nepal: A Descriptive Cross-sectional Analysis

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Article History

Received: May 28th, 2026

Acceptance: June 24th, 2026



Abstract

Introduction: Analyzing mortality trends offers important insights into the existing healthcare measures and for this our study outlines mortality patterns of patients admitted at a tertiary care hospital in Nepal. This involves analyzing primary cause of death among inpatients, distribution of death according to patients age and gender, distribution of deaths within the hospital by departments and categorizing deaths as natural and unnatural and observing patterns of death based on date and time of admission and death.

Methods: Mortality from November 2025 to May 2026 were analyzed. Deceased age, sex, date and time of arrival, date and time of death, diagnosis, or cause of death, department or unit where death happened and manner of death as natural and unnatural, were recorded. The data was analyzed in the Statistical Package for Social Sciences (SPSS) software, version 27. Descriptive statistics were used to present the data in terms of frequencies and percentages. The statistical association between the variables were analyzed using Chi-Square test and the p-value of <0.05 was considered significant.

Results: This study explored that mortality was predominant among males (62.77%). Maximum number of deaths were seen in elderly people of 60-80 years. Majority of death happened after 1 day to a week, after arrival to the hospital, with highest rate in medicine department as stroke, the leading cause of death and Chitwan district accounting for highest mortality.

Conclusions: The study demonstrates that natural manner of death is higher than unnatural manner and mortality is male predominance and stroke as the leading cause of death. Further studies are required in other parts of our nation to understand pattern of mortality at national level.

Keywords: Hospital, Mortality, Patients.

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Introduction

World Health Organization (WHO) introduced the International Classification of Diseases (ICD) to identify worldwide health trends and statistics.¹ 50-60 million individuals die globally each year.² According to the Burden of Disease 2019 report, Nepal has a greater mortality rate from chronic respiratory disease than any other nation in the region, despite cardiovascular disease being the country's top cause of death.³ The burden of disease in Nepal changed from communicable, maternal, neonatal, and nutritional (CMNN) disorders to non-communicable diseases between 1990 and 2017.⁴

Analyzing mortality trends would offer important insights into the existing healthcare measures and for this our study outlines mortality patterns of patients admitted at a tertiary care hospital in Nepal. This involves analyzing primary cause of death among inpatients, distribution of death based on patients age and gender, department wise distribution of deaths within the hospital, categorizing deaths as natural and unnatural and observing patterns of death based on date and time of admission and death

Methods

A quantitative descriptive, prospective, cross-sectional

How to Cite this Article in Vancouver Style:

Shah DK, Baral MP, Shrestha K, Karki A, Khadka A. Mortality Patterns among Patients admitted at a Tertiary Care Facility in Nepal: A Descriptive Cross-sectional Analysis. Med. J. Pokhara A. Health Sci. 2026;9(1):64-69.

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observational study was conducted at College of Medical Sciences, Bharatpur, after receiving permission from the Administrative director of college and ethical approval from the institutional review committee with approval letter reference no: COMTH-IRC/2025-063.

Census sampling method including all inpatient deaths occurring during the study period from November 2025 to May 2026 was employed. Mortality in the emergency department, different intensive care units, and different wards in the hospital were included in the study. However, brought dead cases, intrauterine foetal death, and cases with incomplete, partial or missing information were included in the overall mortality count but were excluded from the analysis requiring a confirmed cause of death.

After retrieving the mortality record from record section of each department, a self-designed, structured proforma was used.

Name of the deceased were not documented in the proforma for the purpose of maintaining confidentiality of the deceased. Deceased age, sex, date and time of arrival, date and time of death, diagnosis, cause of death, department or unit where death happened and manner of death were recorded. The data was entered using MS Excel and later analyzed in the Statistical Package for Social Sciences (SPSS) software, version 27. Descriptive Statistics were used to show the distribution pattern of mortality and were expressed in terms of frequency and percentage and for inferential statistics. Chi Square test was used to assess the correlation between distribution of mortality

patterns and demographic variables.

Results

A total of 180 deaths were analyzed during the study period where majority of the mortality was seen among males accounting for 113 (62.77%) cases and females accounted for 67 (37%) deaths. The patients aged between 60-80 years, showed the highest frequency of mortality (74 cases, 41.11%) which was also the highest in both sexes of the same age group (female vs male: 48.52% vs 37.16%). The lowest frequency of mortality was observed between 0-20 years (9 cases, 5%). Table 1.

Table 1: Age and gender wise distribution of mortality.

Age group (years)	Female (%)	Male (%)	Total (%)
0-20	5 (7.35%)	4 (3.35)	9 (5%)
21-40	6 (8.82%)	20 (17.69%)	26 (14.44%)
41-60	16 (23.52%)	30 (26.54%)	46 (25.55%)
61-80	32 (48.52%)	42 (37.16%)	74 (41.11%)
> 81	8 (11.76%)	17 (15.04%)	25 (13.88%)
Total	67 (100%)	113 (100%)	180 (100%)

Highest number of mortalities was seen in Chitwan district 87 (48.33%), followed by Nawalpur 28 (15.55%) and Makwanpur 19 (10.55%) both of which are neighboring district to Chitwan. Figure 1.

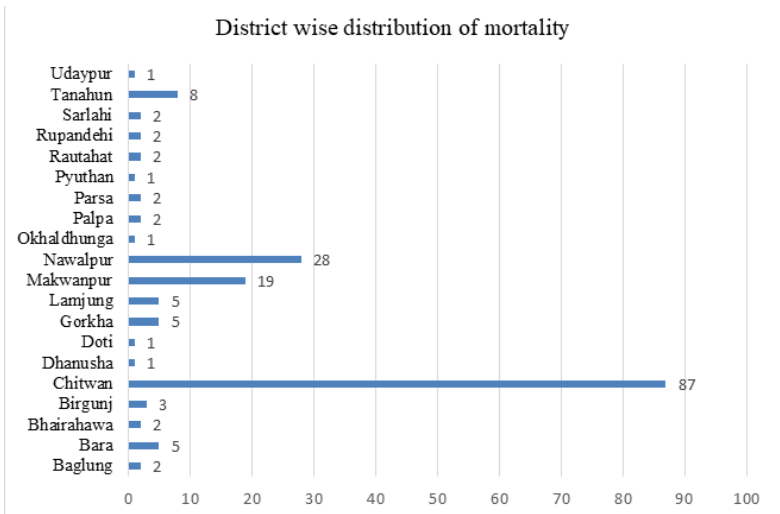


Fig 1: Mortality pattern by district.

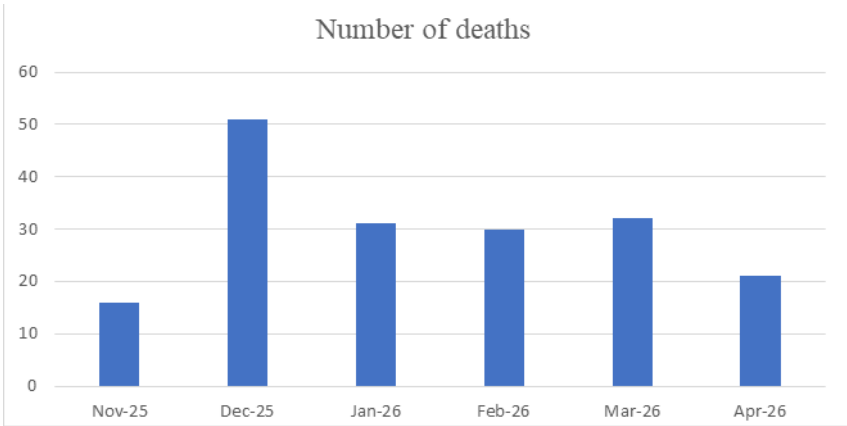


Fig 2: Distribution of mortality by month.

The mortality was highest 51(28.33%) in December 2025, remains steady from January to March 2026 and slightly decreased in April 2026. November 2025 showed the lowest recorded deaths 16 (8.88%). Figure 2.

Out of 180 deaths, 42 was brought dead and one intrauterine fetal death cases which were excluded in analysis portion as the exact cause of death was not identified. So, 137 hospital deaths where cause of death was known were analyzed. Among those 137 deaths, 82 (59.86%) were males and 55 (40.14%) were females. Traumatic head injury accounted for maximum deaths 17 (12.4%) followed by stroke (10.9%), pneumonia (9.5%) and sepsis (8.8%). Conditions like valvular heart disease, traumatic

splenic injury, systemic lupus erythematosus, right bundle branch block, pulmonary edema, pulmonary tuberculosis, metabolic encephalopathy, meningoencephalitis acute liver failure accounted for less than 1% of the death.

The number of mortalities among males were higher in most of the causes, especially in stroke (14 males vs 1 female), Chronic liver disease (10 males vs 2 females) and head injury (11 males vs 6 females). Contrary to this, females had higher mortality due to myocardial infarction (4 females vs 1 male) and poisoning (2 females vs 0 male). There was no statistically significant association between sex and underlying cause of death (p-value 0.098). Table 2.

Table 2: Distribution of cause of death according to sex (n=137).

Cause of death	Sex		Frequency (%)	P-value
	Female	Male		
Abdominal injury	1	2	3 (2.2%)	0.098
Acute liver failure	0	1	1 (0.70%)	
Acute Pancreatitis	2	2	4 (2.9%)	
Bowel perforation	0	2	2 (1.5%)	
Chronic kidney disease	4	7	11 (8.0%)	
Chronic liver disease	2	10	12 (8.8%)	
Chronic obstructive pulmonary disease	4	6	10 (7.3%)	
Dilated cardiomyopathy	5	4	9 (6.6%)	
Head Injury	6	11	17 (12.4%)	
Malignancy	7	6	13 (9.5%)	
Meningoencephalitis	0	1	1 (0.7%)	
Metabolic encephalopathy	0	1	1 (0.7%)	
Myocardial infarction	4	1	5 (3.6%)	
Pneumonia	7	6	13 (9.5%)	
Poisoning	2	0	2 (1.5%)	
Pulmonary tuberculosis	0	1	1 (0.7%)	
Pulmonary edema	1	0	1 (0.7%)	
Right bundle branch block	1	0	1 (0.7%)	
Sepsis	5	7	12 (8.8%)	
Systemic lupus erythematosus	1	0	1 (0.7%)	
Splenic injury	1	0	1 (0.7%)	
Stroke	1	14	15 (10.9%)	
Valvular heart disease	1	0	1 (0.7%)	
Total	55 (40.14%)	82 (59.86%)	137 (100%)	

The highest number of deaths, 61 (44.52%) occurred in the 60-80 years followed by 31 (22.62%) in 40-60 years and least number of deaths i.e., 2 (1.45%) was recorded in the 0-20 years individual. Among the young people of age 20-40 years, head injury was the leading cause of death accounting for 6 (31.57%) cases, followed by acute pancreatitis with 3 deaths (15.78%). Chronic liver disease caused maximum mortality among 40-60

years individual responsible for 7 (2.58%) deaths. Malignancy was predominant in 60-80 years causing 9 deaths (14.75%). In more than 80 years population, pneumonia was the leading cause responsible for 6 (25%) deaths. A statistically significant association was derived between age and cause of death (p-value <0.001) as summarized in the table 3.

Table 3: Age-wise distribution of mortality (n=137).

Cause of death	Age group					P-value
	0-20 years	21-40 years	41-60 years	61-80 years	>81 years	
Abdominal injury	0	0	1	2	0	<0.001*
Acute liver failure	0	0	1	0	0	
Acute pancreatitis	0	3	1	0	0	
Bowel perforation	0	0	1	1	0	
Chronic kidney disease	0	0	4	4	3	
Chronic liver disease	0	2	7	3	0	
Chronic obstructive pulmonary disease	0	0	0	6	4	
Dilated cardiomyopathy	0	0	2	6	1	
Head Injury	1	6	4	6	0	
Malignancy	0	1	1	9	2	
Meningoencephalitis	0	0	0	0	1	
Metabolic encephalopathy	0	0	0	0	1	
Myocardial infarction	0	0	1	3	1	
Pneumonia	0	1	3	3	6	
Poisoning	0	1	1	0	0	
Pulmonary tuberculosis	0	0	0	1	0	
Pulmonary edema	0	0	0	1	0	
Right bundle branch block	0	0	0	1	0	
Sepsis	0	2	1	5	4	
Systemic lupus erythematosus	1	0	0	0	0	
Splenic injury	0	1	0	0	0	
Stroke	0	2	3	9	1	
Valvular heart disease	0	0	0	1	0	
Total	2	19	31	61	24	

Cerebrovascular system disease accounted for maximum death (27.7%), followed by Gastrointestinal system (19.7%), Respiratory system (19.0%) and Cardiovascular system (11.7%). Blood and Reticuloendothelial system, Endocrine system and Immune system accounted for least number of death (0.7%).

Out of 137 cases, majority of the deaths were due to natural causes (112, 81.75%) and 25 (18.24%) cases were due to

unnatural causes. Highest number of natural deaths (52, 46.42%) were observed in 61-80 years and unnatural (9.36%) in 20-40 years individual. The number of males were predominant across most age groups. Natural deaths were almost equally frequent in both sexes whereas unnatural deaths were relatively higher in middle aged males of 21-40 years age. There was no statistically significant association between sex and manner of death across all age groups. Table 4.

Table 4: Mortality distribution by manner of death.

Age group	Sex	Manner of Death		Total	P-value
		Natural	Unnatural		
0-20 years	Female	1	1	2	NC
	Male	0	0	0	
21-40 years	Female	3	2	5	0.701
	Male	7	7	14	
41-60 years	Female	9	2	11	0.902
	Male	16	4	20	
61-80 years	Female	25	4	29	0.840
	Male	27	5	32	
>81 years	Female	8	0	8	NC
	Male	16	0	16	
Total		112 (81.75%)	25 (18.24%)	137 (100%)	0.640

Table 5, depicts the duration of survival since the time of hospital admission for various disease conditions. Majority of the death occurred within a week of hospital admission (90, 65.69%) followed by deaths occurring within a day of admission (30, 21.89%), >1-2 weeks (10, 7.29%) and >2 weeks survival (7, 5.10%). Head injury was the most common among the patients dying within a week (13, 14.44%) whereas 4 of the cases died within 24 hours of admission. Between the two of the poisoning cases, duration of survival was <24 hours with Zinc phosphide

Table 5: Mortality distribution by duration after arrival to hospital.

Cause of death	Duration between arrival and death				P-value
	<1 day	1 week	>1-2 weeks	> 2 weeks	
Abdominal injury	0	2	0	1	0.023*
Acute liver failure	1	0	0	0	
Acute pancreatitis	1	2	1	0	
Bowel perforation	0	2	0	0	
Chronic kidney disease	1	7	3	0	
Chronic liver disease	3	9	0	0	
Chronic obstructive pulmonary disease	4	6	0	0	
Dilated cardiomyopathy	1	8	0	0	
Head Injury	4	13	0	0	
Malignancy	1	10	0	2	
Meningoencephalitis	0	0	1	0	
Metabolic encephalopathy	1	0	0	0	
Myocardial infarction	4	1	0	0	
Pneumonia	0	9	3	1	
Poisoning	1	1	0	0	
Pulmonary tuberculosis	0	1	0	0	
Pulmonary edema	0	1	0	0	
Right bundle branch block	0	0	1	0	
Sepsis	3	8	0	1	
Systemic lupus erythematosus	0	1	0	0	
Splenic injury	0	1	0	0	
Stroke	4	8	1	2	
Valvular heart disease	1	0	0	0	
Total	30	90	10	7	

The highest number of mortalities was seen in medicine department 89 (65.0%), followed by surgery department 32 (23.3%) and emergency department 16 (11.7%). No mortality was seen in any other department during this study period.

and upto a week with paraquat. Other conditions which showed duration of survival less than 24 hour since hospital admission were valvular heart diseases, right bundle branch block, traumatic splenic injury, systemic lupus erythematosus, pulmonary edema, pulmonary tuberculosis, pneumonia, metabolic encephalopathy, meningoencephalitis, acute liver failure. There was a statistically significant association between cause of death and duration of survival since hospital admission (p-value 0.023). Table 5.

Discussion

This study evaluated pattern of mortality at a tertiary care center in Nepal and demonstrated significant variations according to age group, gender, underlying disease and duration of the hospital stay. Our study explored that mortality was predominant among males (62.77%) in overall dataset. Among the hospital deaths, the maximum number of deaths were seen in elderly people of 61-80 years. The findings are similar with study by other authors. Kulkarni et al. found mortality among male as 61.24%. Adhikari MC et al. in similar Nepalese setting found male: female ratio of 1.2:1.^{5,6} This may be attributed to higher prevalence of risk factors such as smoking, drinking, workplace exposure among males. Also, some study has reported delayed medical attention seeking behavior among males which worsens the disease status resulting in the poor prognosis.⁷ Further, due to ageing process an individual naturally becomes vulnerable to various chronic disease conditions, comorbidities and diminished immune response. The higher number of deaths in elderly population indicates towards the need for proper management and prevention of non-communicable diseases. Contrary to this, mortality among adult population was mainly due to head injuries sustained due to blunt force trauma resulting due to road traffic mishaps.

The present study showed majority of death happening after 1 day to a week, after arrival to the hospital, with highest rate occurring in medicine department as stroke, the leading cause of death, and out of total number of deaths, 62.22% were male and 37.77% were female whereas, Kulkarni et al. in 2023, discovered that the majority of deaths happened within 24 hours of admission.⁵ Contrary to our study, Hadiza et al. in 2015 also found majority of deaths happened within 24 hours after admission, however cerebrovascular disease (34.4%) was the leading cause, alike our study.⁸ This variation in the duration of survival could be due to accessibility of health care services, severity of the illness at the time of hospital admission and multi-disciplinary approach in patient management at tertiary levels. The significant rise in cerebrovascular disease reflects the epidemiological transition that is contributing to the highest number of premature and preventable deaths.

Shakya et al. in 2014-2017, identified stroke, making up 14.5% of fatalities as a leading cause, similar to our finding.⁹ This study discovered, cerebrovascular system disease accounting, maximum death (27.94%), contrary to a study done by Adhikari in 2024 and Karki in 2012-2013, where maximum cause of death was attributed to respiratory diseases.^{6,10}

Abedin et al. in 2014 and Tarafder et al. in 2015 in different medical colleges in Bangladesh also discovered that cerebrovascular disease was the leading cause of mortality.^{11,12} Ibadan et al. in 1973 gave a contrary result where, majority of the deaths were due to cardiovascular conditions particularly

hypertension, with heart failure accounting for 43.5%.¹³

Arodiwe et al. in 2014 discovered, infections (20.2%) to be the most common cause of death. Nonetheless, the single most entity causing mortality (12.3%) was chronic renal disease and Cerebrovascular accident accounted for 10.5% of death.¹⁴ Garko et al. in 2003 Chijioke et al. in 2009 discovered infections as major cause of death.^{15,16}

Conclusions

The study demonstrates that natural manner of death is higher than unnatural manner and mortality is male predominance and stroke the leading cause of death. Further studies are essential in other parts of our nation to understand pattern of mortality at national level.

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