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Original Research Article

Mortality trend in tertiary care hospital in a metropolitan city, India: a six years record based study

Vrushali Vishal Kulkarni, Amit Yadav*

Department of Community Medicine, Rajiv Gandhi Medical College, Kalwa, Thane, Maharashtra, India

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***Correspondence:**
Dr. Amit Yadav,
E-mail: amit1609yadav@gmail.com

ABSTRACT

Background: Mortality data from hospitalized patients reflect the causes of major illness and health care seeking behaviour of the community as well as standard of care being provided. Mortality data is helpful for early outbreak detection and control, identifying diseases of public health importance for resource allocation, assessing the success of national health programmes, and analysing socioeconomic, demographic, and environmental factors related to deaths.
Methods: This is a record based cross-sectional study conducted at the medical record department of a tertiary care hospital in a metropolitan city, Thane. Complete enumeration of data of deaths of patients in a tertiary care teaching hospital from 1 January 2018 to 31 December 2023 were considered for analysis. Related frequency and percentage were drawn for independent variable. Trend analysis and association between variable has been checked at 5% level of significance.
Results: There were 9,087 deaths recorded in the period of six years, with the highest mortality rate in 2020 and the lowest in 2019. Female deaths comprised 38.76% and males 61.24% of the total. Mortality patterns varied by age and 0-10 years group having the highest mortality rate ($p<0.05$). Most deaths occurred within 24 hours of admission (45.15%), primarily in the medicine department (67.71%).
Conclusions: The study noted a peak in 2020 mortality rates, potentially due to crises like COVID-19, highlighting gender disparities and high vulnerability in children aged 0-10. In order to successfully reduce mortality risks, it highlights the necessity of focused healthcare interventions catered to age- and gender-specific health issues.

Keywords: Mortality, Tertiary care hospital, COVID-19, Diseases

INTRODUCTION

Mortality is an index of the severity of a disease from both clinical and public health standpoints.[1] Mortality data from hospitalized patients reflect the causes of major illness and health care seeking behaviour of the community as well as standard of care being provided. It is an important aspect of health information system.[2] Most of the epidemiological studies begin with mortality data around the world. Many countries have routine systems for collecting such data. Each year, information on deaths is analysed and the resulting tabulations are made available by each government. [3] The annual reports on fatalities at the national level are not complete in terms of both the number of deaths and the causes of those deaths. Only 19% of anticipated deaths in 2019 had a medically certified cause of death (MCCD), despite the fact that 93% of estimated deaths were reported.[4,5]

An important use of mortality data is to compare two or more studies or one study in different time periods. Such studies may differ in regard to many characteristics that affect mortality of population. Age wise mortality distribution is the most important as it is the single most important predictor of mortality.[1] For epidemiological purposes, mortality information should ideally be made available at more frequent intervals in order to detect any unusual surge in deaths and investigate causes early on.[6]

Throughout human history, diseases have not altered greatly, but their patterns have. Every decade is considered to produce its unique pattern of sickness.[7] There has been an epidemiological transition from communicable diseases to non-communicable diseases with increase in the frequency of various health problems. Emerging picture is a mixture of the old and modern diseases. The rates of mortality vary greatly between different nations and areas which is a reflection of unequal access to food, clean water to drink, sanitary facilities, healthcare, and other necessities of life. They also represent variations in risk variables, behavioural choices, and social situations that influence people's chances of surviving. [8]

Medical records department in a teaching hospital has a structure for record collection and retention; nevertheless, useful statistics from these records for health care planning and review are absent. Data on hospitalised patients' mortality reflect the causes of major illnesses, community care-seeking habits, and the quality of treatment offered. Vital event records, such as death, are an essential component of the health information system. For improved documentation that will aid in the future for data collecting and simple analysis of the trends in disease and mortality, training of doctors and medical records department faculty about medical certificate for cause of death and international classification of disease (ICD) classification according to system wise must be done on a regular basis.

The availability of trustworthy data on death rates and cause-of-death patterns at local, district, state, and national levels will be helpful for early outbreak detection and control, identifying diseases of public health importance for resource allocation, assessing the success of national health programmes, and analysing socioeconomic, demographic, and environmental factors related to deaths. Hence, this study was conducted to know the various correlates and pattern of causes of death in tertiary care teaching hospital.

Objectives

The objective of this study is to study the pattern of deaths and associated variables at a tertiary care hospital in a metropolitan city, India

METHODS

A six-years record based cross-sectional study conducted at the medical record department of (a tertiary care hospital) Chhatrapati Shivaji Maharaj hospital and Rajiv Gandhi medical college, Thane, after clearance from institutional ethics committee. Complete enumeration of data of deaths of patients in a tertiary care teaching hospital from 1 January 2018 to 31 December 2023 were considered for analysis. Death was classified using a standard system of ICD-10. Data with incomplete records was excluded. Data was entered in excel and related frequency and percentage was drawn for independent variable and trend analysis has been observed over the six-year period.

RESULTS

From 2018 to 2023, the total numbers of deaths, were 9087 where total admission during these 6 years were 218186. The highest mortality rate recorded in 2020 and the lowest in 2019 as seen in Table 1 and Figure 1.

Out of a total 9,087 deaths, males accounted for 38.76% while females were accounted for 61.24%. The proportion of male deaths consistently remained higher each year, peaking at 62.96% in 2023 (Table 2).

Table 3 reveals the age group 0-10 years had the highest percentage of deaths at 18.34%, followed by the 61-70 years group at 16.04%. In the age-group of “more than 80 years”, lowest percentage of deaths has been seen which accounting for 3.32% of total. It was noticed that 0.1% deaths were found whose age could not get recorded.

Out of total deaths during 6 years, majority of deaths (45.15%) occurred within 24 hours of admission and 43% deaths were after 48 hours (Figure 1).

From 2018-2023, Figure 2 highlights that medicine department had highest proportion of deaths at 67.71%, followed by OBGY at 11.52% and paediatrics at 7.91%.

Association has been checked with the help of Chi-square test at the level of significance of 0.05. Significant association has been observed between age-group and annual mortality (Table 4).

Table 1: Distribution of year-wise mortality rate.

Years	No. of deaths	No. of admissions	Mortality rate per 1000 admissions
2018	1365	43365	31.48
2019	1510	48521	31.12
2020	1931	29733	64.94
2021	1186	26339	45.03
2022	1370	31529	43.45
2023	1725	38699	44.57
Total	9087	218186	41.65

Table 2: Gender wise distribution of mortality.

Years	2018	2019	2020	2021	2022	2023	Total
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Females	561 (41.10)	607 (40.20)	720 (37.29)	474 (39.97)	521 (38.03)	639 (37.04)	3522 (38.76)
Males	804 (58.90)	903 (59.80)	1211 (62.71)	712 (60.03)	849 (61.97)	1086 (62.96)	5565 (61.24)
Total	1365 (15.02)	1510 (16.62)	1931 (21.25)	1186 (13.05)	1370 (15.08)	1725 (18.98)	9087 (100)

Table 3: Age wise comparison of year wise mortality rate.

Age-group (in years)	2018	2019	2020	2021	2022	2023	Total
0 to 10	21.47	15.17	14.76	20.57	19.05	20.58	18.34
11 to 20	4.25	4.3	3.47	4.38	3.28	3.65	3.85
21 to 30	6.3	6.75	7.46	7	7.01	7.71	7.09
31 to 40	8.86	11.66	11.86	10.46	10.73	9.51	10.58
41 to 50	12.16	15.3	15.54	14.5	13.94	14.03	14.33
51 to 60	13.7	16.36	16.88	15.09	15.26	14.61	15.41
61 to 70	18.02	16.82	17.3	15.43	14.09	14.38	16.04
71 to 80	11.14	10.33	9.99	9.61	13.65	11.13	10.94
More than 80	4.1	3.18	2.74	2.87	2.92	4.12	3.32
Unknown age	0	0.13	0	0.08	0.07	0.29	0.1
Total	15.02	16.62	21.25	13.05	15.08	18.98	100

Table 4: Association between mortality and socio-demographic variables.

Socio-demographic variables		2018	2019	2020	2021	2022	2023	P value
Gender	Female	561	607	720	474	521	639	0.094
	Male	804	903	1211	712	849	1086	
Age (in years)	0-10	293	229	285	244	261	355	0.000
	11-20	58	65	67	52	45	63	
	21-30	86	102	144	83	96	133	
	31-40	121	176	229	124	147	164	
	41-50	166	231	300	172	191	242	
	51-60	187	247	326	179	209	252	
	61-70	246	254	334	183	193	248	
	71-80	152	156	193	114	187	192	
	>80	56	48	53	34	40	71	
	Unknown	0	2	0	1	1	5	
Duration between admission and death of cases	Below 24 h	605	701	841	524	637	605	0.075
	Between 24-48 h	167	185	271	122	151	167	
	Above 48 hours	593	624	819	540	582	593	

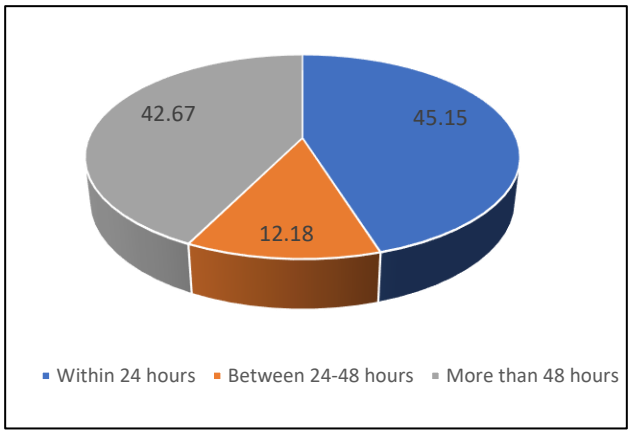

Figure 1: Duration of occurrence of deaths after admission.

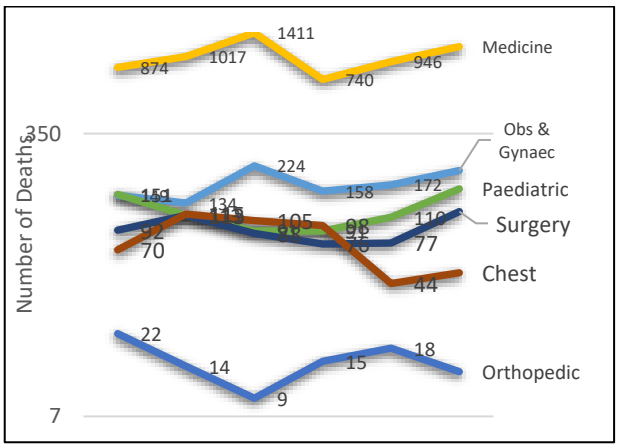

Figure 2: Department wise trend of mortality.

DISCUSSION

The study findings suggest that external health crises, potentially exacerbated by the COVID-19 pandemic in 2020, could have contributed to the highest recorded annual deaths consistent with the Lewnard et al study.[9] The subsequent decrease in 2021 may reflect improved healthcare responses or reduced pandemic impact. These fluctuations underscore the sensitivity of mortality rates to broader health and societal factors, necessitating ongoing monitoring and adaptive healthcare strategies to mitigate such impacts effectively.

The consistent higher proportion of male deaths (peaking at 62.96% in 2023) over the period 2018-2023 in our study suggests potential gender-specific health vulnerabilities or differences in healthcare-seeking behaviours, highlighting the need for gender-sensitive health interventions and research. Similar findings were seen in Chourasia et al study, Ashwathy et al study, Shankar et al study, and Das et al study.[10-13] This distribution of deaths by age underscores the vulnerability of children aged 0-10 years, who accounted for the highest percentage of deaths at 18.34% in our study which was consistent with findings of Das et al study.[13]

Older age groups, particularly those aged 61-70 years and 51-60 years also showed significant mortality rates similar to other studies, highlighting varied age-related health risks and the need for age-specific healthcare interventions.[10-12] Similar to the Chourasia et al study, the majority of deaths occurring within 24 hours of admission (45.15%) suggest critical challenges in immediate patient care and hospital protocols during the study period.[10]

In contrast, the Kulkarni et al study noticed mortality high after 2 days of admission which could be due to differences in patient demographics and underlying health conditions. The medicine department accounted for the highest proportion of deaths (67.71%) from 2018 to 2023 similar to Kulkarni et al study, indicating its central role in managing overall mortality and suggesting potential areas for healthcare improvement and resource allocation.[14]

Limitations

Being a single central study, the results of this study cannot be generalized and thus multiple such studies across different states need to be conducted.

CONCLUSION

The study identified fluctuating annual mortality rates, with a peak in 2020 possibly linked to external health crises like the COVID-19 pandemic. These findings emphasize the need for targeted healthcare interventions tailored to gender and age-specific health challenges to mitigate mortality risks effectively.

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