Mortality pattern in a trust hospital: a hospital based study in Karachi

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Abstract

Objectives: To determine the frequency and causes of inpatient mortality in a trust hospital in a lower middle class community of Karachi.

Methods: The retrospective analysis was conducted with the audit records of patients who died at the Chiniot General Hospital, Karachi, during five calendar years, from 2006 to 2010. SPSS 11 was used for statistical analysis.

Results: There were 36446 admissions during the study period and 584 (1.6%) of them died in hospital. Males accounted for 54% (n=316) deaths, while the collective mean and median age was 37.9±20.6 years and 45 years respectively. The average length of stay was 4±3.8 days (median 2 days). Mortality increased slightly from 1.4% to 1.9% during the first four years, but decreased in 2010. The majority of deaths were in Medicine (n=348; 3.5%) followed by paediatrics (n=195; 2.2%). Mortality in Surgery (n=35; 0.06%) and Obstetrics was (n=6; 0.05%). Majority of deaths were in extremes of life: less than one year (n=177; 30.2%) and over 60 (n=216; 37%). The primary cause of death was infections 161 (27.6%), followed by respiratory disorders 126 (21.6%), and cardiovascular 81 (13.9%).

Conclusions: Infections leading to septicaemia and pneumonia were the leading causes of hospital mortality in the study setting, followed by cardiovascular causes. Priorities and strategies for improving the standards of care should be defined.

Keywords: Mortality, Infections, Septicaemia, Chronic liver disease, Myocardial infarction. (JPMA 63: 1031; 2013)

Introduction

Governments and international health agencies need accurate information on the leading causes of death in different populations to help them develop and monitor effective health policies and programmes. Initiatives to measure healthcare quality are an important focus for policymakers who believe that such measurements can drive quality improvement programmes.[1] Evaluation of inhospital mortality makes appropriate assessment of healthcare performance to some extent.[2] Mortality data from hospitalised patients reflect the causes of major illnesses and standard of care being provided. Records of vital events like death constitute an important component of the Health Information System.[3]

In Pakistan the quality of care provided in different settings varies from hospital to hospital and is also dependent whether it is a teaching, private, commercial or not-for-profit trust hospital. The causes of mortality are often poorly documented in developing countries. The medical records department at the Chiniot General Hospital (CGH) has a system of compilation and retention of records, yet the acquisition of meaningful statistics from these records is lacking.

Unfortunately in many developing countries, national data are incomplete and unreliable and the studies based on hospitals are of limited value because most deaths occur elsewhere.[4,5] Health planning requires reliable information about rates, ages and causes of mortality in different sections of society. Precise and reliable information of this nature is lacking in our country because of under-reporting of births and deaths, poor recall of data and age at death and inability in determining the exact cause of death.[6]

There is very little reliable published data on cause-specific mortality rates in secondary and tertiary care. The present study was planned to determine the frequency and causes of inpatient mortality in a trust hospital in a lower middle class community of Karachi.

Materials and Methods

Chiniot General Hospital Karachi is a trust hospital where patients are treated at subsidised rates and no patient is refused admission for whatever reason. It has a comprehensive system of compilation and retention of records. The study analysed all deaths in Medicine and allied specialties from January 2006 to December 2010 to see the frequency and cause of death from medical records. Different variables such as age, gender, mode of admission and cause of death, etc. were worked out after the study

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was approved by the institutional review committee.

SPSS 11.0 was used for data feeding and analysis. Mean±SD, and median values are reported for quantitative variables, while frequency percentage were reported for qualitative variables. Statistical comparison was performed by using Chi-square/Fisher exact test for qualitative variables and student t-test and analysis of variance (ANOVA) for quantitative variables. In all statistical analysis, p <0.05 was considered significant.

Results

Of a total 36446 admissions over the 5-year study period, 584 (1.6%) died in hospital. Deaths increased slightly

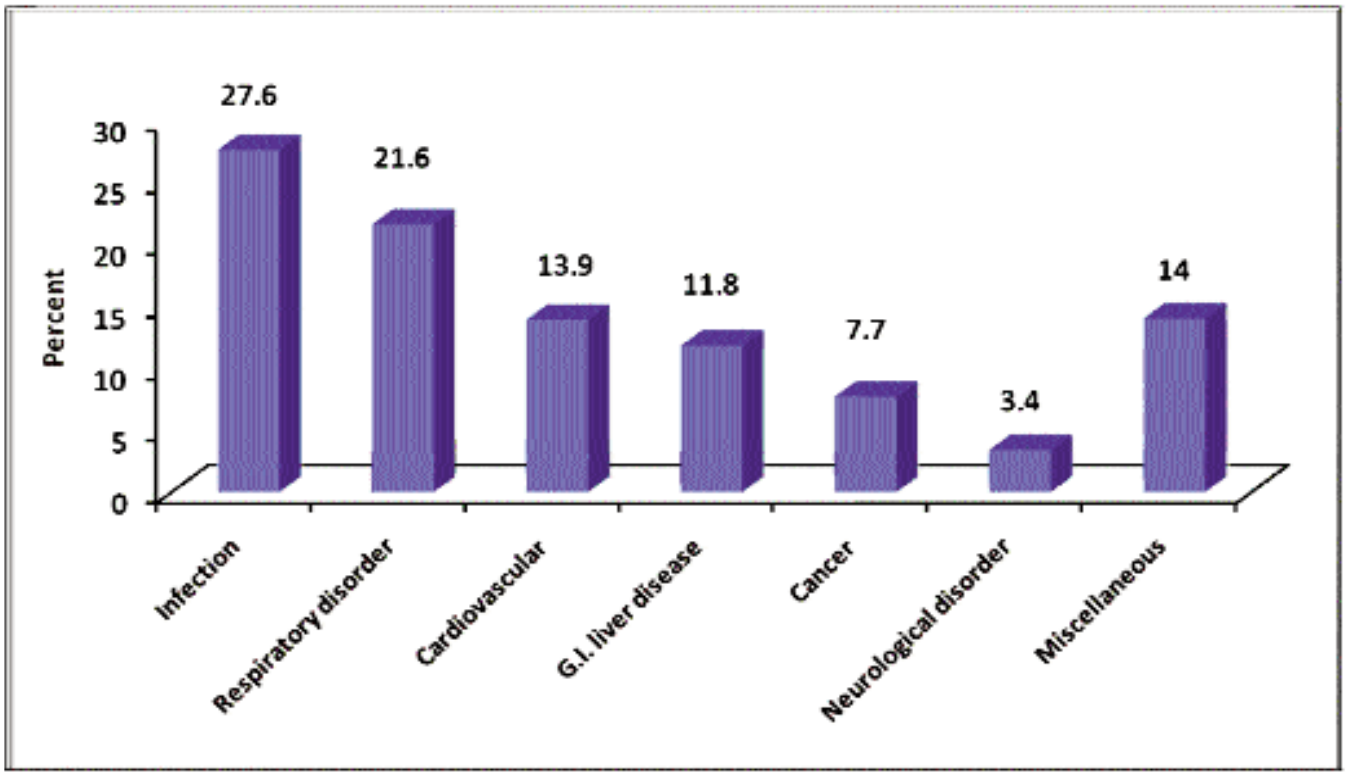

Figure: Primary cause of death.

Table-1: Confirmed hospital admission and mortality rates.

Year	2006	2007	2008	2009	2010	Overall
Total admission	6300	6952	7208	7918	8068	36446
Mortality	86 (1.36%)	111 (1.60%)	116 (1.61%)	150 (1.89%)	121 (1.49%)	584 (1.60%)
Department-wise admission and mortality						
Medicine						
Admission	1500	1843	1938	2392	2313	9986
Mortality	53 (3.5%)	70 (3.8%)	76 (3.9%)	85 (3.6%)	64 (2.8%)	348 (3.5%)*
Surgical						
Admission	1054	1295	1110	1096	1116	5671
Mortality	12 (1.1%)	5 (0.4%)	3 (0.3%)	11 (1.0%)	4 (0.4%)	35 (0.6%)
Paeds						
Admission	1603	1602	1771	1989	1855	8820
Mortality	17 (1.1%)	35 (2.2%)	36 (2.0%)	54 (2.7%)	53 (2.9%)	195 (2.2%)
Gyn. & Obs.						
Admission	2143	2212	2389	2440	2784	11968
Mortality	4 (0.19%)	1 (0.05%)	1 (0.04%)	-	-	6 (0.05%)

*Mortality were significantly more in medicine department (3.5%) as compared to other department p<0.05.

Table-2: Mortality distribution according to gender, age, mode of admission, hospital stay, time of admission and death.

Year Mortality	2006 n = 86	2007 n = 111	2008 n = 116	2009 n = 150	2010 n = 121	Overall n = 584
Gender						
Male	40 (46.5%)	57 (51.4%)	69 (59.4%)	79 (52.7%)	71 (58.7%)	316 (54.1%)
Female	46 (53.5%)	54 (48.6%)	47 (40.6%)	71 (47.3%)	50 (41.3%)	268 (45.9%)
Age (year)						
Neonates	15(17.4%)	28 (25.2%)	26 (22.4%)	43 (28.7%)	45 (37.2%)	157 (26.8%)
Under 1	2 (2.3%)	4 (3.6%)	5 (4.3%)	4 (2.7%)	5 (4.1%)	20 (3.4%)
1 - <5	1 (1.2%)	6 (5.4%)	5 (4.3%)	8 (5.3%)	4 (3.3%)	24 (4.1%)
5 - 29	5 (5.8%)	12 (10.8%)	2 (1.7%)	7 (4.7%)	11 (9.1%)	37 (6.4%)
30 - 59	22 (25.6%)	21 (18.9%)	27 (23.3%)	38 (25.3%)	22 (18.2%)	130 (22.3%)
60 & above	41 (47.7%)	40 (36.0%)	51 (44.0%)	50 (33.3%)	34 (28.1%)	216 (37.0%)
Mode of admission						
Emergency	61 (70.9%)	74 (66.7%)	92 (79.3%)	112 (74.7%)	80 (66.1%)	419 (71.8%)
Outpatient	7 (8.1%)	12 (10.8%)	11 (9.5%)	13 (8.7%)	12 (9.9%)	55 (9.4%)
Labour room	9 (10.5%)	12 (10.8%)	3 (2.6%)	15 (10.0%)	9 (7.4%)	48 (8.2%)
Operation theater	5 (5.8%)	8 (7.2%)	9 (7.8%)	6 (4.0%)	18 (14.9%)	46 (7.9%)
Other	4 (4.7%)	5 (4.5%)	1 (11.1%)	4 (2.7%)	2 (1.7%)	16 (2.7%)
Time of admission (24 hrs)						
Known (n=540)	n = 85	n = 101	n =112	n = 122	n = 120	n = 540
1.00 to 6.00	9 (10.6%)	8 (7.9%)	18 (16.0%)	13 (10.7%)	11 (9.2%)	59 (10.9%)
6.01 to 12.00	13 (15.3%)	20 (19.8%)	19 (17.0%)	18 (14.8%)	17 (14.2%)	87 (16.1%)
12.01 to 18.00	42 (49.4%)	47 (46.5%)	45 (40.2%)	59 (48.4%)	52 (43.3%)	245 (45.4%)
18.01 to 24.00	21 (24.7%)	26 (25.7%)	30 (26.8%)	32 (26.2%)	40 (33.3%)	149 (27.6%)
Time of death (24 hrs)						
Known (n=576)	n = 86	n = 111	n =114	n = 146	n = 119	n = 576
1.00 to 6.00	16 (18.6%)	16 (14.4%)	28 (24.6%)	19 (13.0%)	12 (10.1%)	91 (15.8%)
6.01 to 12.00	24 (27.9%)	27 (24.3%)	22 (19.3%)	47 (32.2%)	40 (33.6%)	160 (27.8%)
12.01 to 18.00	21 (24.4%)	36 (32.4%)	37 (32.4%)	36 (24.7%)	34 (28.6%)	164 (28.5%)
18.01 to 24.00	25 (29.1%)	32 (28.8%)	27 (23.7%)	44 (30.1%)	33 (27.7%)	161 (27.9%)
Hospital Stay (days)						
Mean ± S.D, (median)	4.5±3.7(3)	3.7±3.6 (2)	4.4±3.8 (2)	4.2±3.9 (2)	3.2±3.0 (2)	4.0±3.8 (2)
Primary Cause of Death						
Infection	19 (22.1%)	30 (27.0%)	37 (31.9%)	40 (26.7%)	35 (28.9%)	161 (27.6%)
Respiratory disorder	15 (17.4%)	18 (16.2%)	22 (19.0%)	43 (28.7%)	28 (23.1%)	126 (21.6%)
Cardiovascular	18 (20.9%)	20 (18.0%)	17 (14.7%)	13 (8.7%)	13 (10.7%)	81 (13.9%)
Neurological disorder	2 (2.3%)	6 (5.4%)	4 (3.4%)	7 (4.7%)	1 (0.8%)	20 (3.4%)
G.I. & liver disease	8 (9.3%)	12 (10.8%)	10 (8.6%)	25 (16.7%)	14 (11.6%)	69 (11.8%)
Cancer	5 (5.8%)	7 (6.3%)	14 (12.1%)	10 (6.7%)	10 (7.4%)	45 (7.7%)
Miscellaneous	19 (22.1%)	18 (16.2%)	12 (10.3%)	12 (8.0%)	21 (17.4%)	82 (14.0%)

from 1.4% to 1.9% during the first four years but decreased in 2010. Majority admission were in Gynaecology and Obstetrics (n=11968; 32.83%) followed by Medicine (n=9986; 27.39%), Paediatrics (n=8820; 24.20%) and Surgery (n=5671; 15.56%). Mortality was significantly more in Medicine (n=348; 3.5%) and Paediatrics (n=195; 2.2%) as compared to Surgery (n=35; 0.06%), and Gy-Obs (n=6; 0.05%) ($p<0.05$) (Table-1). Of the total, 316 (54.1%) were males while 268 (45.9%) were females. Majority of deaths 177 (30%) were under one year, and 216 (37%) of the deceased were 60 years and above. The collective mean and median age was 37.9±20.6 years and 45 years respectively. Besides, 419 (72%) patients had been admitted through Emergency Room, and only 55 (9.4%) from the out-patient departments (OPDs); 245 (45%) patients were admitted during 1201 to 1800 hours; 149 (28%) were between 1801 to 2400 hours, and rest of the patients in the morning hours. The average length of hospital stay was 4±3.8 days, median 2 days. The time of death was almost similar in morning, day and night (Table-2). The cause of death was categorised as infections 161 (27.6%), followed by respiratory disorders 126 (21.6%), cardiovascular 81 (13.9%), gastrointestinal (GI) and liver

diseases 69 (11.8%), cancers 45 (7.7%), neurological disorders 20 (3.4%) and miscellaneous cases in 82 (14.4%) (Figure). Within each category, the most common diagnoses were septicaemia (n=1193; 73.9% of infectious cases); pneumonia (n=79; 62.7% of pulmonary cases); myocardial infarction (n=42; 51.9% of cardiovascular cases); meningitis (n=14; 70% of neurological cases); and chronic liver disease (n=59; 85.50% of GI and liver diseases).

Discussion

Proportional hospital mortality which was used in this study has its limitations. The majority of the deceased were males, which could be related to the biological vulnerability of males to infections or discrimination against female offspring in our region. This could also reflect the care-seeking behaviour amongst the females and regarding females in dominating males of lower middle class community of Karachi. The male preponderance of admission has been documented in various national[7-9] and international[10,11] hospital-based studies as well.

The findings have significant implications for measuring and describing the leading cause of death in hospital. For example, infections were in the leading cause of deaths in the audit.

Communicable diseases are still a big burden in our part of the world because of the poor hygiene and sanitary conditions throughout the country and lack of awareness and infection control in lower middle and low socioeconomic classes. The national mortality data of 2006 showed that lower respiratory infections ranked first amongst the top 10 causes of death, followed by ischaemic heart diseases, diarrhoeal diseases, perinatal conditions, cerebrovascular diseases, tuberculosis, chronic obstructive pulmonary disease, measles, whooping cough and congenital anomalies.[12]

This could be compared to the study carried out in 2009 of general and specialty medical services in a university hospital which showed a total mortality of 6.2%; 21.2% of the deaths were due to infections, 17.2% due to pulmonary causes, 15.7% were cancer-related, 12.6% were cardiovascular causes, 11.4% were due to GI and hepatic causes, and 11.4% due to neurological diseases.[7]

A study conducted in Lahore depicted that chronic disease (CLD) had the highest mortality 16.8%, followed by cerebrovascular accidents 14% and ischaemic heart disease 7.8%.[8]

In another study reported in 2001 at Nishtar Hospital, Multan, ischaemic heart disease was responsible for most of the deaths (32%), followed by cerebrovascular accidents (20.05%), chronic liver disease (14.35%), malignancies (6.09%), meningitis (5.8%), pulmonary tuberculosis (3.04%), chronic obstructive pulmonary disease (COPD) (1.67%), septicaemia (1.47%) and pneumonia (1.37%).[9]

Similar studies were also conducted at Karachi; one at a medical unit of a tertiary care hospital over a period of 2 years which revealed a total mortality of 12.05% and the two most important causes found were CLD (33.8%) and cerebrovascular accidents (CVAs) (21.4%).[13] The other study showed that the top-most cause of death was liver diseases (32.1%), then CVAs, respiratory diseases, tuberculosis, cardiac diseases, infections, diabetes, GIT diseases, meningitis and miscellaneous.[14]

The cause-specific mortality pattern of a study conducted in Thailand[15] and Nigeria[11] in 2010 showed comparable results with the current study with infectious diseases resulting in septicaemia also including human immunodeficiency virus and acquired immunodeficiency syndrome (HIV/AIDS) as the top-most cause of in-hospital mortality.

An international study done in Tokyo traced the mortality pattern from 1983 to 2000.[16] It showed the major causes of death as malignancies, heart diseases, CVAs, pneumonia and bronchitis, accidents, suicide, death from old age, renal failure, diseases of liver and COPD.[16]

Another international five-year study conducted in a public urban hospital of Greece published in 2008 showed a total mortality of 3.4% with diseases of the circulatory system as the leading cause (42.1%), followed by neoplasms (17.7%), CVAs (15.8%) and infectious and parasitic diseases (3.2%).[10] The reported burden of total cardiovascular mortality in European countries represents 40% of all causes of mortality for ages 45-74 years.[17] Mortality due to ischaemic heart diseases is declining in the USA.[18]

The relative speed of mortality decline for major diseases and injuries, or even reversals of mortality decline such as that observed in Africa,[19,20] Eastern Europe,[21,22] and parts of Asia,[23] are more competently addressed in terms of public policy responses with reliable information on cause-of-death trends.

Conclusions

Infections and pneumonia were the leading causes of inhospital mortality in our setting, followed by cardiovascular causes and CLD. Communicable diseases are still a big burden in our part of the world. Inhospital

mortality from several non-communicable diseases, especially at ages that constitute premature mortality, indicates the need for improved clinical, therapeutic, and case management protocols.

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