

Analysis of pattern of mortality in Medicine and Allied Departments at a tertiary care hospital in Islamabad: A losing battle against sepsis

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Abstract

Objective: To identify the pattern of mortality in medical wards of a tertiary care hospital.

Methods: This retrospective study was conducted at the Khan Research Laboratories Hospital, Islamabad, Pakistan, and comprised medical records of people who died during hospital stay between December 2013 and November 2014. SPSS 11 was used for data analysis.

Results: Of the 3,228 admissions, 105(3.25%) patients expired. Of them, 41(39.04%) were men with a mean age of 55 ± 13.48 years (range: 17-88 years) and 64 ± 11.76 (60.9%) were women with a mean age of 61 ± 15.5 years (range: 23-91 years). The mean length of time between admission and death was 6.58 ± 3.7 days (range: 1-33 days). The causes of death were categorised as infectious in 37(35.23%) patients, cancer-related in 20(19.04%), pulmonary in 19(18.09%), cardiovascular in 18(17.14%), gastrointestinal and neurological in 13(12.38%) each, nephrology in 10(9.52%), autoimmune disorders in 6(5.71%) and miscellaneous in 9(8.57%). Complications of sepsis were the most common cause of death in 38(36.19%) cases.

Conclusion: Sepsis, primarily from pneumonia, was the major cause of mortality.

Keywords: Cause of death, Pakistan, Sepsis, Communicable diseases, In-hospital mortality, Age distribution. (JPMA 67: 54; 2017)

Introduction

In order to develop and monitor effective health policies and programmes, national and international health agencies need accurate statistics on the leading causes of death in different populations. Governments and policymakers especially focus on initiatives to measure healthcare quality and believe that such measurements can drive improvement of quality of health care delivery. Evaluation of patterns of in-hospital and departmental mortality and morbidity rates facilitates an appropriate assessment in this regard. Mortality data from hospitalised patients reveals the causes of major illnesses and standard of care being provided at different levels of health care. Records of vital events like death form a major part of the Health Management Information System (HMIS).

Even if policy relevance is accepted as the appropriate criterion, mortality research appears to be relatively neglected. In Pakistan, the quality of care provided in different settings varies from hospital to hospital and is also dependent on whether it is a teaching, private, commercial or not-for-profit trust hospital. Mortality data are often poorly maintained in developing countries.

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Unfortunately, developing nations do not devote maximum amounts to health-related expenses, but divert portions of discretionary funds to schools, roads, houses and recreational activities that make life more pleasant without necessarily prolonging it. 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 and never reach the HMIS. Health planning requires reliable information about rates, ages and causes of mortality in different sections of society. Accurate and reliable information of such nature is scarce 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.¹ There is very little reliable published data on cause-specific mortality rates in secondary and tertiary care hospitals. The present study was planned to determine the frequency and causes of inpatient mortality in a tertiary care hospital catering to all socioeconomic strata.

Materials and Methods

This retrospective study was conducted at the Khan Research Laboratories (KRL) Hospital, Islamabad, Pakistan, and comprised data from December 2013 to November 2014. The study analysed all deaths in Medicine and allied specialties to see the frequency and cause of death from medical records. Different variables such as age, gender, mode of admission, cause of death, etc. were worked out. After the study was approved by the institutional review

committee.

KRL Hospital is a 350-bed tertiary care hospital recognised by the College of Physicians and Surgeons of Pakistan (CPSP) for postgraduate training. The indoor department comprises 72 beds, including a 13-bed intensive care unit (ICU) and a 6-bed coronary care unit (CCU). On average, 15-20 patients are admitted daily through emergency room (ER) and outpatient departments (OPD). The ICU has 3 ventilators and 2 isolation rooms. The average nurse-to-bed ratio is 1:3 and the average doctor-to-bed ratio is 1:5.

The medical records department at the hospital has a system of computer software-based compilation and retention of records, yet the acquisition of meaningful statistics from these records has never been attempted. For statistical purposes, SPSS 11 was used for data analysis. Mean and median values were calculated for quantitative variables, while frequency and percentage were reported for qualitative variables.

Results

Of the 3,228 admissions, 105(3.25%) patients expired. Of them, 41(39.04%) were men with a mean age of 55±13.48 years (range: 17-88 years) and 64(60.9%) were women with a mean age of 61±11.76 years (range: 23-91 years). The overall mean age of the expired was 52.6±15.5 years (range: 17-91 years). The mean deaths per week were 2.39±0.91 (range: 0-7). Besides, 24(22.8%) of the dead were aged 50-59 years, 17(16.2%) 60-69 years, 21(20%) 70-79 years, and 18(17.1%) above 80 years (Figure-1). The mean length of hospital stay was 6.58±2.9 days per patient (Figure-2).

Predominant mode of admission was through ER. Moreover, 25(23.8%) of the expired patients were hypertensive and 18(17.1%) were diabetic. Sepsis occurred in 43(40.9%) patients. Among patients with sepsis, lower respiratory tract infection (LRTI) was the

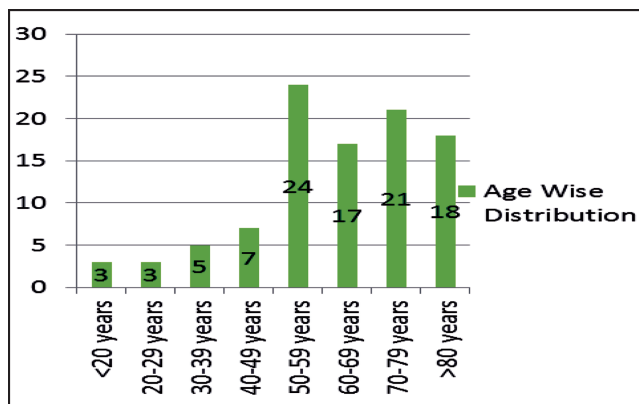


Figure-1: Age wise distribution.

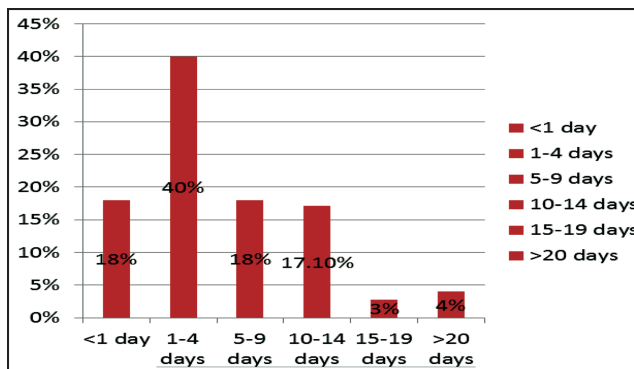
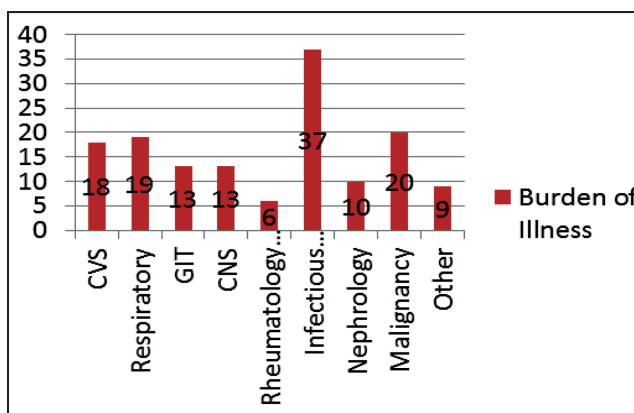


Figure-2: Hospital stay in days.



CVS: Cardiovascular system. GIT: Gastrointestinal tract. CNS: Central nervous system.

Figure-3: Burden of illness.

primary focus of infection in 33(76.7%), followed by urinary tract infection (UTI) in 10(23.2%). Complications of sepsis were found to be the most common cause of death in 38 (36.19%) followed by arrhythmias in 15(14%) patients, progression of primary disease in 8(7%), electrolyte abnormalities in 4(3.8%), anoxia in 3(2.8%), raised intracranial pressure (ICP) in 5(4.7%), adult respiratory distress syndrome (ARDS) in 5(4.76%), cardiogenic shock in 9(8.5%), respiratory failure in 9(8.5%), hyper viscosity in 1(0.09%), acidosis in 7(6.6%) and massive pulmonary embolism in 1(0.09%).

Complications that developed in septic patients included septic shock in 12(28%), disseminated intravascular coagulation (DIC) in 3(8%), ARDS in 2(6%) and septic multiple-organ dysfunction syndrome (MODS) in 6(13%).

The causes of death were categorised as infectious in 37(35.23%) patients, cancer-related in 20(19.045%), pulmonary in 19(18.09%), cardiovascular (CVS) in 18(17.14%), gastrointestinal tract (GIT) and central nervous

system (CNS) in 13 (12.38%) each, nephrology in 10 (9.52%) and autoimmune disorders in 6 (5.71%) (Figure-3).

Most frequent mortality diagnosis were myocardial infarction (MI) and left ventricular failure (LVF) in CVS 10 of 18 (53%), portosystemic encephalopathy/decompensated chronic liver disease (PSE/DCLD) in GIT 7 of 13 (53.8%), bronchiectasis, tuberculosis (TB) and chronic obstructive pulmonary disease (COPD) in respiratory 14 of 19 (73.6%), intracranial bleed in CNS, 5 of 13 (38.4%), chronic kidney disease (CKD) in renal (80%) 8 of 10, lympho proliferative malignancies in malignancy 6 of 20 (30%) and deep vein thrombosis (DVT) in miscellaneous group 6 of 9 (66%).

The total deaths are 105, but the cause of deaths add up to 108 in Abstract and 104 in Results. This apparent discrepancy exists due to the fact that two conditions co-existed and contributed as the cause of death in certain patients.

Of all the admissions, 1,627 (50.4%) were in the winter and 1,601 (49.6%) in the summer. Seasonal variation in mortality rates was found to be 46 (2.82%) in winter months (November-February) and 59 (3.68%) in summer months (March-October) ($p=0.667$). Of the deaths from LRTI, 20 (56%) occurred in the winter 16 (44.4%) in the summer ($p=0.03$).

Discussion

Hospital mortality is an extremely important but understudied issue in a developing country like ours. We found that majority of the deceased were females in contrast to previous published studies in Pakistan and those published internationally.²⁻⁴ Average age of expired patients was 52.6 years, which was again lower as compared to previous studies (median age=63 years).² These differences might have appeared due to a relatively small study group.

Major causes of death in our study was categorised as infections (35.23%), cancer related (19.045%), pulmonary (18.09%), CVS (17.14%), GIT and neurological (12.38% each), nephrology (9.52%), autoimmune disorders (5.71%) and miscellaneous (8.71%). The commonest causes of mortality amongst categories were sepsis, predominantly from LRTI, MI and heart failure, DCLD-related complications, haemorrhagic stroke, haematological malignancies and end-stage renal disease (ESRD).

Our results are comparable to another study carried out in Pakistan which showed infections as the leading cause of mortality.^{2,3}

In some local studies, sepsis was not the most frequent

cause of death. They reported chronic liver disease (CLD) had the highest mortality at 16.8%, followed by cerebrovascular accidents (CVAs) 14% and ischaemic heart disease (IHD) 7.8%.⁵ Another study showed that IHD was responsible for most of the deaths (32%), followed by cerebrovascular accidents (20.05%), CLD (14.35%), malignancies (6.09%), meningitis (5.8%), TB (3.04%), COPD (1.67%), septicaemia (1.47%) and pneumonia (1.37%).⁶ Possible reasons for this difference are increase in incidence of mutant infectious agents and antibiotic resistance. A similar study showed that the biggest cause of death was liver diseases (32.1%), followed by CVAs, respiratory diseases, TB, cardiac diseases, infections, diabetes, GIT diseases, meningitis and miscellaneous.⁷ A study conducted in Thailand and Nigeria in 2010 found septicaemia as the leading cause of in-hospital mortality.^{8,9}

Our findings were consistent with previous studies which showed infectious diseases are at the top of the list among reasons for mortality because of the poor hygiene and sanitary conditions throughout the country and lack of awareness and infection control in lower- and middle-income countries.

Comparison of our results with international studies highlights the fact that high prevalence of sepsis in developing countries as a major mortality cause in contrast to those published in the developed countries constitutes a major lapse in infection control protocols and their implementation in health care settings.

A study conducted in Greece showed a mortality rate of 3.4% with diseases of the circulatory system as the leading cause in dying patients (42.1%), followed by malignancies (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.¹¹

Also, the national mortality data of 2006 showed that lower respiratory infections ranked first amongst the top 10 causes of death, followed by IHDs, diarrheal diseases, perinatal conditions, cerebrovascular diseases, TB, COPD, measles, whooping cough and congenital anomalies.

Another parameter noted was the terminal event, where complications of sepsis turned out to be the most frequent followed by progression of primary disease, electrolyte abnormalities, anoxia, raised ICP, ARDS, cardiogenic shock, respiratory failure, hyper-viscosity, acidosis, pulmonary embolism and intracranial bleed. Previous local studies have not studied this aspect according to the best of our knowledge.

More studies on this topic will be beneficial in assessing the prevailing cause of in-hospital mortality in our country.

The use of proportional mortality rate to determine the pattern of medical mortality is among the limitations of the current study. Moreover, it was a single-centre cross-sectional study, and no correlates of medical mortality were examined.

Conclusion

The cause-specific mortality pattern showed that sepsis was a leading cause of death in medicine and allied departments. Sepsis, primarily from pneumonia, took a huge toll on mortality, followed by haematological malignancies and myocardial infarction. Sepsis is a preventable and treatable entity that calls for effective treatment regimens and protocols for its management. Furthermore, healthcare regulation authorities and hospital administrations should strictly implement standard infection control protocols, including hand hygiene, personal protective equipment (gloves, apron, gowns and footwear), cleaning and safe waste management and incident reporting. It is high time our hospitals upgraded services and adopted bundled protocols to combat sepsis and related complications.

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Conflict of Interest: None.

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