Annual review of mortality frequency at Shahid Mohammadi hospital in Bandar-Abbas

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Abstract: Background: This study is conducted to determine the cause of death in patients admitted to Shahid Mohammadi hospital, the central hospital of Hormozgan Province. **Methods:** In this retrospective study, the records of 761 patients who died in Shahid Mohammadi hospital in the 12 months ending September 2012 were reviewed. Data was collected as a check list including demographic information of the deceased, the ward, time of death, the underlying cause and the direct cause. Based on ICD-10 classification, the underlying cause was classified into thirteen categories including infectious and parasitic diseases, neoplasms, diseases of blood and blood-forming organs, immune mechanism, endocrine diseases, nutritional and metabolic diseases, nervous system diseases, Circulatory system diseases, respiratory diseases, gastrointestinal diseases, diseases of the skin and underlying tissues, diseases of musculoskeletal system and connective tissue, genitourinary diseases, diseased caused by injuries, poisoning and other external consequences (injuries and poisoning). Collected data were analyzed using SPSS software and descriptive statistics tests. **Results and Conclusion:** In this study, the highest mortality rate has occurred in the age group over 60 years (51.7%) and age range of 41 to 60 year (26.9%), and the most common causes of mortality in these age groups consist of internal system diseases, diseases of the cardiovascular system and malignancies. In this study, mortality was more prevalent among men than women, and most deaths have occurred within the 7 am to 19. Overall, the most common causes of death were circulatory system diseases (43.1%), disease caused by injuries, poisoning and external causes (18%), neoplasms (13.07%) and the lowest rate of mortality belonged to diseases of skin and musculoskeletal system (atherosclerosis) and connective tissue (0.1%).

Keywords: In-hospital mortality, causes of death, Bandar-Abbas

Introduction

Mortality is highly regarded for many reasons. First of all, death is the final experience and inevitable destiny of all human beings, and obviously is extremely important for everyone. From the standpoint of disease occurrence, the risk of dying from a disease in people living in different geographical areas and in certain population subgroups may create little nuances in expression of death in terms of numeric values. Mortality rates can be used to measure the severity of the disease, and help us to understand whether the treatment of a disease over time will be more effective or not (1). Furthermore, reliable information on the causes of death is a fundamental necessity for health policy and disease control in human societies. Since the death occurs only once in the life of any person and is a serious incident, recording mortality cases is more practical and easier that disease cases (2). Followed by health and medical advances, many childhood deaths has declined (3) and some infectious diseases have been controlled properly, but heart-vascular diseases and accidents are causing many deaths (4) . Several studies have been conducted in various countries on the trend of mortality, and statics of mortalities in most countries are published by the World Health Organization (5). The main part of deaths in the society is in-hospital mortality. In-hospital mortality rate is closely related to medical facilities in hospitals, medical and nursing staff,

medical and nursing care quality, type of hospital (teaching or non-teaching), different wards in hospital, patients' characteristics (age, sex, socioeconomic status, etc.), type and severity of disease, and deaths can also be used as a risk index of the disease(1). Distribution of deaths caused by communicable and non-communicable causes in developing countries in 1990 and outlook for 2020 shows that in 1990 the 47.7% of deaths were caused by non-communicable diseases, 41.9% by communicable disease and 10.7% by injuries and trauma-related injuries. It is also predicted that in 2020, non-communicable diseases will cause 68.7% of deaths, communicable diseases 17.6%, and injuries and trauma-related injuries 13.5% (1). In 2004, ten leading causes of death in the United States included heart disease, cancer, brain stroke, chronic respiratory diseases, accidents (unintentional injuries), diabetes, influenza and pneumonia, Alzheimer's disease, kidney disease and septicemia (1).

According to the World Health Organization report in 2008, the most common causes of mortality in the world are: ischemic heart disease 12.8%, brain stroke 10.8%, lower respiratory tract infection 6.1%, and chronic obstructive pulmonary disease 5.8% (6). In a study conducted between 2005 - 2003 in 101 hospitals in the Netherlands, it was shown that mortality rates in different hospitals differ from 3.4% to 13.6%. In this study, the effect of different ward of the hospital and type of patient admission on in-hospital mortality has been identified (7). Studies conducted in Iran indicate that the most common causes of in-hospital mortality include heart and vascular diseases, injuries due to external causes and cancer (9 and 8). Based on the results of a study conducted in 2000 in Iran, it was shown that more than 50% of deaths are caused by communicable diseases, 30% by cancer, more than 35% by heart and vascular diseases, and about 40% by unintentional injuries in hospitals (8). In a study done in 2001 in hospitals in Yasuj, the most common causes of mortality were determined as heart and vascular diseases, accidents, infection and cancer, respectively (10). The study conducted by Fayazi et al. at Mohammadi hospital in Bandar-Abbas in 2004 showed that the most common causes of death in Mohammadi hospital include brain stroke (15%), head trauma (10.5%), heart attack (9.75%) and septicemia (4.25%), and malignant causes 6.8% of deaths (11).

The aim of this study is to determine the in-hospital mortality rate and factors involved in it in Mohammadi teaching-treatment hospital in Bandar-Abbas, which is the largest and most important hospital in Hormozgan province and has the highest patient admissions, both referential and non-

referential. The results of this study can be useful in future planning of officials of universities, departments and teaching hospitals in order to reduce the in-hospital mortality.

Materials and Methods

This retrospective study was conducted in a period of one year from October 2011 to September 2012 in Mohammadi hospital Badar-Abbas. The hospital now has a capacity of about 450 beds, and at the time of the study it had 351 active beds. Active bed occupancy rate during the study has been 81.20%. This hospital is main referral treatment center in Hormozgan province, which admits all patients referred from other hospitals across the province. Also, this hospital is the most important center for admission patients with trauma, poisoning and burn. So that during the study period, 3350 patients (59.88%), of the total 5590 patients in Bandar-Abbas, have been admitted in this hospital. (12). All death cases occurred in this hospital were recorded daily in reports of nursing and different wards. In order to collect information on deaths occurred in the hospital, after reviewing the nursing report, required information were extracted as a check list containing demographic information, cause of death, admission ward and residence. Using the ICD-10, Causes of death was classified into thirteen categories including infectious and parasitic diseases, neoplasms, diseases of blood and blood-forming organs, immune mechanism, endocrine diseases, nutritional and metabolic diseases, nervous system diseases, Circulatory system diseases, respiratory diseases, gastrointestinal diseases, diseases of the skin and underlying tissues, diseases of musculoskeletal system and connective tissue, genitourinary diseases, diseased caused by injuries, poisoning and other external consequences (injuries and poisoning), and the more common causes of death in each group were classified separately and less common causes were placed in category of "other reasons". Statistical software, SPSS, was used for data analysis, and statistical test of Chi Square and Fisher's for comparison.

Results

During the study period, a total number of 42,730 patients were admitted to Mohammadi hospital. The number of patients admitted to the emergency ward was 19,343 and 25,397 patients were hospitalized in different wards of the hospital. The total number of deaths during the study period was 761 of whom 449 (59%) were male and 312 (41%) were female. The average age of death was 21.69 SD ± 57.75 years and in terms of age distribution, minimum number of deaths was for age

under 2 years, and maximum for 102 years (Table 1), as well as 51.7% of deceased were over 60 years old so that 28.8% of them were over 75 years old. 193 deaths of total of 761 (including 119 males and 74 females) were occurred in emergency department which is 25.4% of total number of deaths in hospital. Most of death cases were from Bandar-Abbas (54.3%), Roudan (12.9%), Minab (11.8%) and 1.7% were referential from other provinces. For 19,343 patients admitted to the ED during the study period, the crude death rate in the ED was calculated 9.97% per thousand referential (Table 2). 165 deaths of 193 total emergency deaths were happened in internal emergency department and 28 cases in emergency surgery. Between wards, ICUs (ICU General, Neurology, and Heart Surgery) and Internal Neurology with 23.9% and 21.2% death have the highest mortality. There is no significant difference in mortality in terms of gender between different wards of hospitals (p <0.39) 76.9% of deaths in the age group below 15 years were happened in intensive care unit ICU. The average age of patients at death in different wards of the hospital did not show an obvious difference. The highest mean age at death belonged to patients hospitalized in Neurology, coronary care unit CCU and internal nephrology wards and lowest mean age at death has happened for patients in burn units and emergency surgery and ICUs. The frequency of death in both sexes in different wards of the hospital did not show a statistically significant difference. In the study of causes of death based on 10 – ICD, it was found that circulatory system diseases, injuries due to external causes (accidents and injuries and poisoning) and malignancies are the most common diagnoses of the patients had died, and disorders of the skin systems and underlying tissues and musculoskeletal system and connective tissue causes the lowest deceased. Injuries caused by road accidents, unintentional injuries and burns are the most common cause of death in patients in group of 15 to 44 years, injuries caused external causes for average age of 18 to 39 years.

Discussion and Conclusion:

Results of current study show that 761 patients of total of 42,730 patients admitted to hospital were died. In other words, the crude death rate is 17.81 cases per 1,000 admissions. Also of the total of 19,343 admitted in emergency department, about 193 deaths occurred (crude mortality rate was 9.98 cases per 1,000 admissions). Compared with a similar study conducted in 2004 in Mohammadi hospital of Bandar-Abbas, the hospital mortality rate was 24.7 per thousand admissions (11). Maybe the reason of lower crude mortality rate in this hospital in 2012,

Compared to 2004, is that in 2004 many leading to death cases due to accidents or heart attacks and strokes were died before reaching the hospital. Perhaps it is because of the problems in the timely transfer of patients with accident or having a heart attack or stroke to the hospital. This can be caused by problems such as far highways, lack of standard roads, lack of adequate emergency and road emergency services and etc. However, launching 64-bed emergency equipped with separate wards, technical wards such as angiography, surgery and oncology, using emergency medicine specialists and development of pre-hospital emergency in the province from 17 bases to 44 bases has been efficient in reduction of crude death rate. According to this study, the mortality rate in men compared to women showed no significant difference, but the mean age was 60.91 years for women and 55.47 years for men. Considering the higher rate of injuries and deaths due to external causes, rate of mortality caused by coronary heart disease and cerebrovascular accidents in men than women, this results are expected. Report of the province organization for civil registration shows that 38% of the deceased in the province were over 75 years of age which is consistent with figures of this study (38.8%) (14). It is also noted that a major cause of women morbidity, particularly in women in reproductive age, is symptoms of pregnancy and parturition, Mohammadi hospital lacks the gynecology department. Based on results of study conducted in 2004 in this hospital, the mortality rate was twice for males compared to females. The average age at death in that year was 51.4 ± 22.8 years, there was no statistically significant difference in average age at death between males and females. Results of this study showed that 43.1 of deaths caused by circulatory system diseases. The result of this study is in accordance with reports of WHO the province organization for civil registration, Hatami et al., and Fayzi (15, 9, 11, 12 and 16). So that deaths from circulatory disease is the most common cause of death part of which may be due to the lack of a proper system to record and report the causes of death such as cardiac arrest recorded by doctors. Unfortunately, in some cases instead of recording actual cause of death, doctors record cardiac arrest as the cause of death in Death Certificate, and since cardiac arrest is the sign of death, it is classified in circulatory disease and shows the contribution of this group more than the actual rate. However, growth of cardiovascular disease indicates the increase of risk factors of this disease such as increase in daily caloric consumption, saturated fat consumption, inactivity, and smoking along with economic and social transformation in community. The results of this study also show that 18 percent of disease is caused

by injuries of external causes and is consistent with Hatami et al., Fayazi and Yavari (10, 11). After cardiovascular disease, accidents are the second cause of mortality. Different factors such as increase of motor vehicle and moving towards industrialization in recent years can caused this. In contrast to circulatory system disease, due to non-registration of deaths due to accidents, it seems that the mortality rate caused by this factor is calculated less than the actual amount. Three levels of prevention in controlling damages such as reducing drug abuse, safety training, improving safety measures in the workplace, primary and urgent care at the scene, eliminating the causal factors (slowdown, proper marking, etc.) intensifying traffic enforcement, rehabilitation services are beneficial actions in preventing injuries and deaths caused by them. The results of this study show that 13.7% of those who died in the hospital in 12 months ended September 2012 were malignant and neoplasm diseases, which in terms of ranking is consistent with results of studies of Yavari and Hatami et al. In 2009 the United States ranked second in this category, and according to the Organization of Civil Registration, Hormozgan province ranked seventh (10,16). Increase the proportion of deaths caused by cancer can be linked to factors such as changes in the age structure, increasing urbanization, declining other mortality causes especially infectious diseases, major changes in food consumption patterns, lifestyle and smoking, etc. Paying special attention to identify groups at risk, on time screening and treatment, education about not using tobacco and alcohol, instructions on modifying health habits to prevent cancer, compliance with workplace safety orders, effective protection against contaminants and radiation, will play important role in reducing deaths from cancer. Promotion in public awareness about health through education, reduce malnutrition, immunization, care for people in contact, drug prophylaxis, appropriate remedial action, safe food and water supply, sanitary waste disposal, and control of epidemic diseases, all were effective in this reduction. Compared to global statistics, the most common causes of death in the province is similar to global statistics, since the most common cause of death is cardiovascular disease (9 and 15). However, deaths related to driving accidents ranked eighth in developed countries and seventh in developing countries (17). These statistics demonstrate the importance and priority of tackling underlying causes of traffic accidents and its potential role in increasing life expectancy in the province and entire the country. According to this study results, the lowest average age at death occurs in burn units, emergency surgery, and neurosurgery surgery, and considering that in these wards the leading cause of death is mainly external causes, and most of the deaths and injuries due to external causes occurs in young and middle-aged groups, it is expected that the average age of patients in these wards be low. Despite internal diseases causes about 75 percent of deaths, internal service has the highest mortality rate. This difference is due to wide range servicing of internal services which servic3 a significant portion of patients who died from other causes including malignancy, bites, poisoning and cases with idiopathic causes. Based on this study, approximately 75% of deaths were caused by internal diseases. Studies show that hospitals with mortality committee have lower in-hospital mortality rate (17). The committee considers personal information of patients, the place patients are referred from, admission status of patient, main disease and direct cause of death, laboratory assessment, and other Para clinical findings of patients. Therefore medical care in hospitals with mortality committees has improved. It is recommended that all hospitals in the province have committee mortality more active to increase the level of medical care and subsequent hospital mortality is reduced. However, according to the increasingly develop of the province and changes in lifestyle, the causes of death are also altering and it is required to develop a new and holistic approach and education, prevention and treatment planning. At the same time, the sequence of main causes of death in the province reveals the fact that there is a serious need to plan and take effective action in order to prevent and control the cardiovascular risk factors (18, 19). And it seems that efforts in this direction can be one of the main priorities of the health sector. Such efforts will primarily be focused on changing people lifestyle in order to reduce the mortality rate due to heart attack and increase the life expectancy in the province by modification of factors such as cholesterol-rich diet, lack of exercise and smoking (19).

Generally, the present study suggests that in Hormozgan province, similar to the rest part of the country, developed countries, the Mediterranean and Middle East, cardiovascular disease is a major health and social problem (20), the size of which is increasing rapidly. With special attention to increase the public awareness to identify risk factors and how to modify them and make appropriate changes in lifestyle and habits of population, we can reduce the risk factors in the society. Also identifying people who have risk factors and are at risk for cardiovascular disease (CVD) through screening method and eliminating these risk factors, we can reduce these diseases.

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