

Original Article

Investigation of final causes of death in 5360 deceased patients within a teaching hospital in Isfahan, Iran

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Abstract. To increase quality of care for critically ill patients admitted to hospitals, understanding various causes of death could provide better quality of care. In this study, medical records of 5360 deceased patients were reviewed with reference to the mortality reports. A total of 2019 deceased females and 3341 deceased males were studied from 2011 to 2013. Neurologic disorders could be categorized as the highest cause of mortality report (25%). Pulmonary, gastrointestinal and heart diseases could be expressed as 17%, 17% and 15% of death episodes respectively. Stroke caused mortality among neurologic disorders in 35% at the minimum age of 27 and maximum age of 94 years old. To prevent worse outcome in critically ill patients admitted to hospital, quality of care related to neurological, pulmonary, heart and gastrointestinal disorders was suggested to be upgrading. To avoid financial burden to the family of deceased related to population that stayed more than a month in hospital, further study is recommended in advance.

Keywords: Death, neurologic, pulmonary, endocrine, Isfahan

Introduction

The interruption of all living senses that sustain an organism alive is called death. Aging, malnutrition, disease, suicide, accident or trauma and many other factors could result to death [1]. The unpleasant incident, death could bring nervousness, distress, heartache, sensitive discomfort and many other problems for the family of deceased person. According to the published reports, the most common cause of human death in the world is heart disease, followed by stroke and other cerebrovascular disease and in the third place respiratory infections [2-4]. As of all origins, approximately 150,000 individuals die around the world every day [5]. Termination of breathing, cardiac arrest, mortis (pallor, livor, algor, rigor) and finally putrefaction. The notion of death is vital to human consideration of the incident [6]. For example a point of time that brain activity ceases is called brain death [7]. Psychological resources that stimulate well-being could be affected by aging. Study by Windsor et al. in 2015 [8] examined the correlation between social resource and time-to-death related changes in affective balance. They suggested that social engagement and satisfying relationships confer benefits for affective well-being that are retained into late life [8]. In the United States, among older adults, suicide reported as a main public health problem [9]. Among drug addicts, fatal poisoning related to methadone has been reported in Denmark. In this study

a large additional co-ingested central nervous system depressants, such as simultaneous use of multiple benzodiazepines followed by the abuse of morphine, codeine, amphetamine, cannabis, cocaine and ethanol was predominant between cadavers. They recommended that side-effects from drug-drug interactions were more significant dangerous features for deadly consequence in these deaths [10]. Among children older than 1 year old, trauma reported to be the most common cause of death in Argentina [11].

In order to move toward lower costs for the health system, the aim of this study was to provide information related to the recorded death in a teaching hospital. Therefore, updating and dealing with scientific commands related to demographic data and the cause of death were the main concerns of this investigation.

Materials and Methods

A retrospective study of 5360 deceased patient's medical records including 2019 females and 3341 males at a teaching hospital (Alzahra) in Isfahan, Iran during 2011 to 2013 was performed. The information associated to each individual was obtained from deceased patients' medical records. Analyses of data were based on three periods (P) as named; P1 (year 2011), P2 (year 2012) and P3 (year 2013).

Demographical data, patients' hospital records number,

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TABLE 1
BASELINE CHARACTERISTICS RELATED TO
THE RECORDED DEATH*

Variable/year	P1: 2011	P: 2012	P3: 2013
Total No.	1927	1774	1659
Males	1182	1095	1064
Females	745	679	604

* P: period.

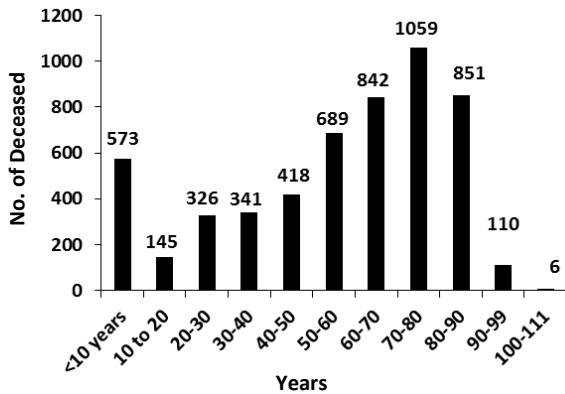


Figure 1 Distribution of deceased patients according to their age (n = 5360).

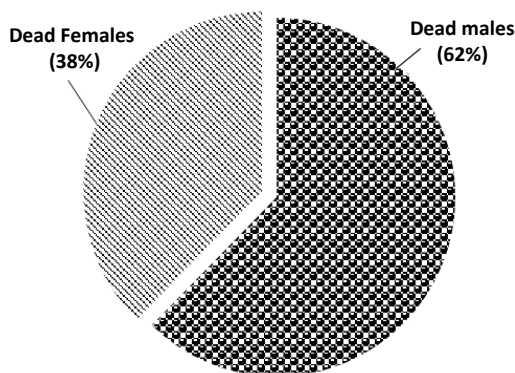


Figure 2 Distribution of deceased patients according to their gender (n = 5360).

date of admission, date of death, duration of hospital stay, and the cause of death were noted in d-Base.

Statistical analysis

The statistical analyses of data were performed using Microsoft Excel and SPSS software (SPSS Inc., Chicago, IL) for windows. Analyzes at the level of less than 0.05 was considered statistically significant.

Results

Table 1 shows the baseline characteristics associated

with deceased males and females within 3 periods; P1, P2 and P3. Out of the total population studied, 62% of recorded deaths were belonged to males. As shown in Figure 1, the numbers of recorded death in under the age of 10 and 50 years old was 11% and 31% respectively. In 20% of cases, death occurred around the age of 70 to 80 years old. From P1 to P2 to P3, there were 36% versus 33% versus 31% of total recorded death corresponding to the years 2011, 2012 and 2013 respectively.

Figure 2 shows that the ratio of deceased males to deceased females could be calculated as 62 % versus 38%. Figure 3 shows the frequency of hospital stay for deceased patients. For 30% of deceased patients, the hospital stay was one day. For 42% of deceased patients, the duration of hospital stay was between two to ten days. However, in 20% the duration of hospital stay was a month but only in 7% it was ranged from more than a month up to three month. In minority of population (1%), duration of hospital stay was ranged as more than three months up to year.

Regarding to the cause for each individual deceased patient, 34% positioned in minority groups such as skin disorders, high temperature, water and electrolyte disorder, sickle cell anemia and so on. As a result, the data related to 66% of the total population were used. As shown in Figure 4, ranking of deceased patient's medical records according to the cause of death could be distinguished as: neurologic (25%), pulmonary (17%), gastrointestinal (17%), heart (15%), kidneys (8%), infection (8%), cancers (8%), and bleeding (3%) respectively. In deceased patients due to neurological cause, the mean age was 57 years old (range from the day of birth to 96 years). Within this population, in 63 % of cases the frequency of causes linked to recorded death were as follows: brain hemorrhage > stroke > brain, and unspecified. By a further separation of causes, stroke caused mortality in 35% of neurological disorders.

Figure 5 shows that, the mean age of deceased patients due to stroke was 74 years (ranged; from 27 to 94 years). However in 11 out of 205 occasions, stroke mortality was associated with age of 56 years old (5%) but the peak age related to disease mortality could be seen at the age between 60 to 90 years (84%). The number of deceased patient's for other neurological disorders could be categorized as: neoplasm of brain (n=34), encephalitis (n=20), hydrocephalous (n=20), convulsion (n=14), motor neuron diseases (n=7), multiple sclerosis (n=7), Guillain-Barre Syndrome (n=7) and so on.

Discussion

The point at which human being terminates could be discussed as the point of death. Stroke and coronary artery disease are leading sources of decease in the world [12, 13]. Diabetes also could be a major risk factor for cardiovascular events. Actually patients with diabetes are two to four times more likely to come to an end of life. In agreement with previous publications [12-14], in our study 27% of patients died at the age of 30 to 60 years old of life. The most frequent causes of death were ranked as neurological (25%) > pulmonary (17%) > gastrointestinal (17%) and heart (15%). According to the previous studies,

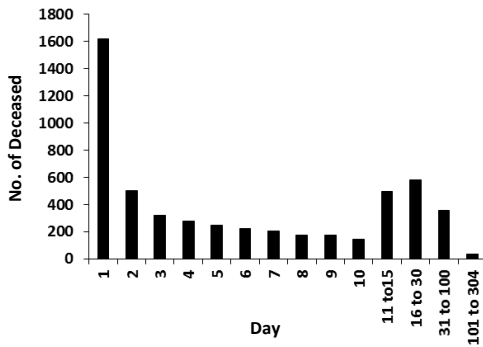


Figure 3 Frequency of hospital stay in total population of deceased patients

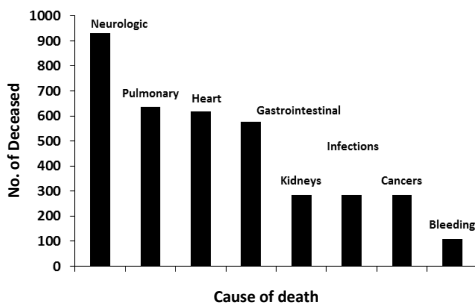


Figure 4 Distribution of final causes of death in 3391 deceased patients.

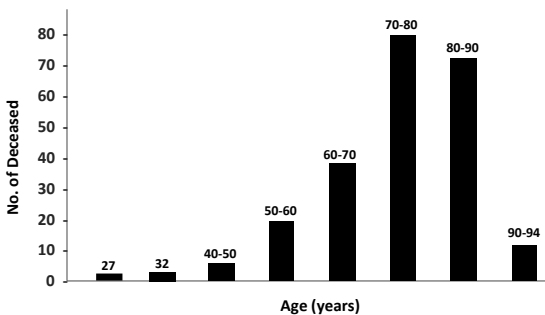


Figure 5 Mortality due to stroke according to the patients' age.

hypertension, diabetes, hypercholesterolemia and smoking are major risk factors for life threatening (12). Cardiac embolic basis could lead to severe brain infarctions [13, 14].

The result of analysis of deceased patient's medical records showed that the highest rate of death belongs to the age between 60 to 80 years old of life (35%). The episode of death in 11% was related to the age group of <10 years old of life. The duration of hospital stay in 42% and 20% was 2-10 days and a month respectively. In 35% of mortems due to neurological disorders, stroke caused mortality at the minimum age of 27 and maximum age of 94 with the mean age of 74 years old (12-14). Regarding to

neurological disorders which caused to death in 25% of population studied here, previous publication suggested that distinguishing related to brain causes could help opportunity for organ donation, as little is known about cerebrovascular events [15]. Related to neurological disorders such as epilepsy and multiple sclerosis thought of death or self-harm in 14-15% was associated to illness severity, depression, quality of life, male sex and being unmarried [16]. The increased 30-day and 1-year mortality risk reported to be associated with hyponatremia, irrespective of underlying disease [17].

To establish the most remarkable approach, in order to: 1) provide scientific and practical care associated to the end stage of life, 2) stay away from unpleasant event of death in hospital, and 3) decrease total cost for family and Iranian health system, further scheduling for updated clinical-pharmacological management are suggested.

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Conflict of Interest

The author declares no conflicts of interest.

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