

Epidemiologic Study of Causes of Death in a Selected Military Hospital between 2012-2017

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Abstract

Introduction: Hospital deaths today account for a large proportion of society deaths and is one of the hallmarks of the quality of medical services in the hospital and the effectiveness of health programs and the economic benefit of various groups of society. The aim of this study was to investigate the epidemiology of mortality in a selected military hospital between 2012 -2017. **Materials and Method:** This cross-sectional descriptive study was carried out using data from the medical records department of the hospital during 2012-2017. In order to complete the study, the clinical records of all patients death during the mentioned period, and the gender, season, location, type of death day, death shift, type of death, age group, cause of death, death part, Duration of hospitalization, surgery and blood intake were recorded and Data were analyzed by SPSS software version 25 and descriptive statistics and Chi-square test. **Results:** The total number of deaths in the target hospital during the six years was 403, of which 223 were male (55.3%), 180 were female (44.6%). Also, 42 (10.4%) patients had been admitted for 24 hours and 361 (89.5%) had died after 24 hours of hospitalization, and the patients died at night shift of 165 (59%), the evening of 125 (31%) and morning (113%) (28%) respectively. **Conclusion:** The high age of patients died and chronic and non-communicable diseases as the main cause of mortality indicate the need for more attention to prevention and control of these diseases. Through the screening programs, empowering people, and legislating to promote healthy lifestyles, it will help reduce the incidence of these diseases.

Key words: Hospital Deaths, Causes of Mortality, Epidemiology, Referral.

Introduction

Death is a complete stop, without the return of vital acts of the body, and the cause of death is from the physician's point of view, illness or injury, and conditions under which those circumstances occur. Hospital deaths today account for a large proportion of the deaths of the community. Easy and easy access to the hospital and increased facilities will allow the people to be transferred to the hospital before the death. However, the mortality rate in the hospital is closely correlated with the hospital's facilities and equipment, the type of hospital service and its parts, and the quality of the provision of medical and nursing care, the characteristics of the patients (age, sex, socioeconomic status) and Patients who come to the hospital and the epidemiology of diseases in that area (Fazizi, Esmailzadeh and Mirmiran, 2004; Khorasani Zavareh, 2009; Lopez et al., 2006).

Hospital deaths today account for a large proportion of the deaths of the community and one of the hallmarks of the quality of medical services in the hospital and the extent of the effectiveness of health programs and the economic benefit of various groups of society (Dubois et al., 1987; Wang et al., 2012). Which can be due to the economic conditions at a time to society and reflect the economic developments at a time and reflect the level of growth and development of the community, as well as its comparison in different sectors, including the city and village or groups of men, and Women can identify fair or unfair distribution of resources and income and facilities (Faghihi et al., 2015). In some countries in Latin America and East Asia, only limited numbers have been able to find a stable and comparable statistical system for recording deaths. Epidemiologic studies generally begin with mortality data. Studies have shown changes in the causes of death from infectious diseases to chronic diseases due to the advancement of technology in the diagnosis and treatment of diseases. Therefore, identifying the past and present changes in mortality and the factors that can increase life expectancy in the future seems important (Isfahani, Induced abortion in penal law and forensic medicine of the islamic republic of iran).

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The most important indicator in evaluating the hospital's therapeutic ability is to study the mortality rate to determine the factors that change the mortality rate in the hospital. This information can be used to organize the hospital's health status and reduce the mortality rate, as well as identify the causes of the pattern and the causes of the strategies for the most basic principles of planning, management, and assessment and, if necessary, accountability in the health sector. Unfortunately, only a few developed countries have accurate data on the number and causes of death, given the most important indicator of the assessment of the treatment sector. The hospital, especially the special sections, examines the mortality rate in the hospital. Became (Murray et al., 2007; Jarman et al., 1999; Abrishamcar et al., 2003).

The causes of death are different in different parts of the world, and identifying patterns and causes of death and coping with its underlying factors is one of the most appropriate strategies for preventing it and, consequently, increasing longevity (Nia et al., 2018; Haagsma et al., 2016), in societies. The retardation is usually a major part of mortality due to infectious and parasitic diseases and malnutrition (Salomon et al., 2012). And in advanced societies, non-chronic and chronic diseases have this share (Jafar et al., 2013; Murray et al., 2013). Due to the lack of clinic autopsies in most hospitals in the country to address the causes of death in these hospitals, patients' clinical records or contacts with the families of patients died and their biographies are used. The mortality rate in Iran is about 320-350 thousand people per year, with the largest proportion of about 40-35% of cardiovascular diseases, about 10-12% due to cancers, about 18-20% of accidents and accidents, about 15-12% of infantile congenital infections, infants and malnutrition, and about 12-15% of other chronic diseases (Mahmoudi, Astaraki and Anbari, 2014). Studies in the present study have been carried out that study by Sepandi et al. (2016), Ali Mohammadi et al. In Khorramabad (Mahmoudi, Astaraki and Anbari, 2014), who have high age and chronic and internal illness as the cause of most deaths, as well as foreign studies by Singh et al. In India, the social status of the causes of death (Singh et al., 2007), where the low economic status has played a meaningful role in the occurrence of death.

The study of the causes of mortality is worth knowing about which areas the hospital-centered population is exposed to. If the mortality rate due to a particular disease is more than expected, then the quality of services provided in the hospital should be reviewed (Por et al., 2003). In Iran, the Ministry of Health and Medical Education, with the participation of the Civil Registration Organization and conducting a plan to record deaths based on the cause of death and the identity of the deceased, has taken an important step in determining the pattern of mortality in the country and monitoring its progress. Which will benefit from its results for the formulation, design and implementation of interventions and evaluations of public health programs. Detection of the pattern of mortality and its monitoring will help determine health priorities and health development priorities of health care, allocate resources and moderate the main causes of early deaths and research (Mohseni, 1981). Therefore, in order to better understand the causes of death, a decision was made to investigate the epidemiological causes of death in patients referred to the selected military hospital in the years 2012 -2017.

Materials and Method:

This study is a descriptive, quantitative and quantitative research method. The study population is a military-selected hospital and includes all those who died in this hospital between 2012 and 2017. The criteria for the study included information contained in the patient records, the register of fatal cases and the list of the mortality committee of the hospital. If these cases were incompatible, and the information was incomplete, the patient was excluded from the study. Information from the patient's case was collected using a checklist containing the following information: sex, season, location, Type of death day, Shift death, Time of death, age group, cause of death, Hospital section, Length of stay (days), Surgery and blood transfusion were extracted from a case study by a researcher. The causes of mortality in this study were categorized into nine groups based on ICD-10 international classification. After collecting data, data was analyzed using SPSS-25 software. Descriptive statistics such as mean, standard deviation, and ratio and percentages were used to describe the data. Chi-Square test and correlation coefficient test were used to examine the relationship between patient's age and hospital stay ($P < 0.05$).

Findings:

According to the results of the study, it was found that most of the focus was male sex 223 (55.3) and in winter 114(28/2), the mean age was 73.77 (15.67) years. The majority of fatalities in the city were 343 (85.11) and most of the victims died in the night shift of 165 (59%), the age of 125 (31%), and the morning of 113 (28%). And 361 (89.5%) patients died 24 hours after hospitalization and 378 (93.8%) were married (Table 1).

Table 1: Frequency distribution of patient's mortality by sex, death season, location, type of death day, Shift death

| Percentage | Total | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | Variable |
|------------|-------|------|------|------|------|------|------|-----------------|
| 55/3 | 223 | 30 | 40 | 50 | 40 | 43 | 20 | Sex |
| | | | | | | | | Man |
| 44/6 | 180 | 23 | 44 | 34 | 24 | 33 | 22 | Female |
| | | | | | | | | Season of death |
| 23/8 | 96 | 13 | 30 | 17 | 13 | 15 | 8 | Spring |
| 25/3 | 102 | 17 | 20 | 25 | 13 | 22 | 5 | Summer |

| | | | | | | | | |
|-------|-----|----|----|----|----|----|----|-------------------------------------|
| 23/3 | 94 | 8 | 18 | 23 | 17 | 16 | 12 | Fall |
| 28/2 | 114 | 15 | 16 | 19 | 21 | 23 | 17 | winter |
| | | | | | | | | Location |
| 85/11 | 343 | 43 | 75 | 72 | 56 | 59 | 38 | City |
| 14/8 | 60 | 10 | 9 | 12 | 8 | 17 | 4 | Village |
| | | | | | | | | Type of death day |
| 22/3 | 90 | 14 | 13 | 11 | 16 | 27 | 9 | Holiday |
| 77/6 | 313 | 39 | 71 | 73 | 48 | 49 | 33 | Non-holiday |
| | | | | | | | | Shift death |
| 28 | 113 | 23 | 20 | 28 | 15 | 16 | 11 | Morning |
| 31 | 125 | 15 | 27 | 25 | 22 | 21 | 15 | Afternoon |
| 59 | 165 | 15 | 37 | 31 | 27 | 39 | 16 | the night |
| | | | | | | | | Time of death |
| 10/4 | 42 | 5 | 9 | 14 | 5 | 5 | 4 | Before 24 hours of admission |
| 89/5 | 361 | 48 | 75 | 70 | 59 | 71 | 48 | After 24 hours of admission |

Most death age groups were (70-79), (80-89) and (69-60), respectively 131 (32.5), 113 (28) and 54 (13.3) respectively (Table 2). According to the results of the study, it was found that most patients in the hospital died of due to neurological diseases 96(22.9) cardiovascular diseases of 64 (15.3) and infectious and parasitic diseases 64(15.3). (Table 3)

Table 2: Frequency distribution of patient mortality based on age

| Percentage | Total | Sex | | Age group (year) |
|------------|-------|--------|-----|------------------|
| | | Female | Man | |
| 4 | 14 | 4 | 10 | 5-29 |
| 1 | 4 | 0 | 4 | 30-39 |
| 3/4 | 14 | 5 | 9 | 40-49 |
| 9/4 | 38 | 15 | 23 | 50-59 |
| 13/3 | 54 | 24 | 30 | 60-69 |
| 32/5 | 131 | 57 | 74 | 70-79 |
| 28 | 113 | 61 | 52 | 80-89 |
| 8/6 | 35 | 14 | 21 | 90< |
| 100 | 403 | 180 | 223 | Total |

Table 3: Frequency distribution according to cause of death

| Percentage | Total | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | International division of diseases based on ICD code 10 |
|------------|-------|------|------|------|------|------|------|---|
| 15/3 | 64 | 10 | 22 | 10 | 12 | 9 | 1 | Parasitic infectious diseases |
| 5/9 | 40 | 7 | 5 | 9 | 10 | 3 | 6 | Cancers |
| 22/9 | 96 | 8 | 20 | 13 | 16 | 26 | 13 | nervous system diseases |
| 15/3 | 64 | 7 | 11 | 15 | 11 | 13 | 7 | Cardiovascular system diseases |
| 4 | 16 | 3 | 0 | 4 | 4 | 4 | 1 | Endocrine, nutritional and metabolic diseases |
| 15 | 63 | 10 | 11 | 13 | 13 | 10 | 6 | Respiratory System diseases |
| 5 | 21 | 3 | 4 | 6 | 6 | 1 | 1 | digestive system diseases |
| 1 | 3 | 2 | 0 | 0 | 0 | 1 | 0 | Uterine and genitalia diseases |
| 12 | 47 | 3 | 11 | 14 | 3 | 9 | 7 | External causes of death (incidents) |
| 100 | 418 | 53 | 84 | 84 | 75 | 76 | 42 | Total |

Totally, among the section hospitals, highest section ICU¹ with 283 (22.27) and then CCU² with 89 (22.08) and the rest of the sections. Most of the patients with death were also admitted between 1-5 days with 203 (50.3) cases and then 10-6 days with 104 (25.8) cases.

Also, 258 (64) of patients received blood and 291 (72.2%) patients did not undergo surgery during the period of hospitalization (Table 4).

Table 4: Distribution of disease frequency by department, length of hospitalization and surgery

| Percentage | Total | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | Variable |
|------------|-------|------|------|------|------|------|------|-----------------------|
| | | | | | | | | Hospital section |
| 22/08 | 89 | 12 | 26 | 16 | 14 | 17 | 4 | CCU |
| 70/22 | 283 | 41 | 56 | 63 | 42 | 50 | 31 | ICU |
| 4/9 | 20 | 0 | 1 | 2 | 6 | 6 | 5 | Internal men |
| 2/7 | 11 | 0 | 1 | 3 | 2 | 3 | 2 | Internal Women |
| | | | | | | | | Length of stay (days) |
| 50/3 | 203 | 18 | 42 | 51 | 34 | 36 | 22 | 1-5 |
| 25/8 | 104 | 16 | 22 | 18 | 13 | 24 | 11 | 6-10 |
| 16/3 | 66 | 15 | 15 | 11 | 9 | 12 | 4 | 11-20 |
| 7/4 | 30 | 4 | 5 | 4 | 8 | 4 | 5 | 20< |
| | | | | | | | | surgery |
| 27/7 | 112 | 10 | 20 | 24 | 30 | 18 | 10 | Yes |
| 72/2 | 291 | 43 | 64 | 60 | 34 | 58 | 32 | No |
| | | | | | | | | Get blood |
| 35/9 | 145 | 34 | 22 | 21 | 25 | 26 | 17 | Yes |
| 64 | 258 | 19 | 62 | 63 | 39 | 50 | 25 | No |

Finally, in the study of the relationship between the age of death in 2012-2017 and the number of hospital admissions days in the hospital, the results showed a positive and significant correlation ($P = 0.001$) with a high level between the hospital admission time in the hospital, there was an age of patients died. (Correlation coefficient = 0/162)

Discuss:

One of the most important factors that can influence the quality of hospital performance is the analysis of the statistics and causes of mortality in the patients admitted to the collection. The establishment of a mortality committee and a weekly or monthly survey of deaths in our area help us to investigate the causes of mortality in one of the selected military hospitals.

According to the results of the study, a total of 403 patients hospitalized during the period between 2012 and 2017 died in the hospital, of which 223 (55.3) men and 180 (44.6) women died. Also, between 2011 and 2017, over the course of many years, a man has died more than a woman, indicating a direct relationship between admissions and fatal cases. In studies in the United States (Kuller et al., 1997), Macken Bach and Constance (Mackenbach et al., 1997), Christopher and colleagues (Murray and Lopez, 1997), Forouzanfar and his colleagues (Sharifzadeh, Namakin and Mehrjoofard, 2008), and Sepandi et al. (2016) coincided. While he was not studying Tahmatan (Gheisari m, Karami and Hesam, 2015). The higher the mortality rate in men than women can be attributed to the early referral of women to a doctor and a higher sensitivity to their health. Due to the high mortality rate due to cardiovascular disease, the nervous system, as well as external causes of injury and death from men in men than women, are expected. Also, one of the causes of death in women during pregnancy, complications from pregnancy and childbirth, as well as during menopause, is their level of resistance to cardiovascular disease.

In this study, the percentage of mortality in urban areas was higher than in rural areas. These results were consistent with the study of Azami et al. (2015), and Ahmadi et al. (2009), but with the study of Amani et al. (2011), because the study by Amani et al. was conducted over a period of 38 years, while the studies were done in a cross-sectional fashion. The cause of most death in urban life, stress, neuropsychiatric stresses and environmental pollution are among the most important causes of death, and economic crises, poverty, etc., are actually other causes of increased strokes and death. Shock-induced, urban life stress and economic problems.

¹ Intensive care unit

² Critical Care Unit

Therefore, it is recommended that the culture of referral to a physician throughout the year be continuously developed in people and people will be aware of their physical health during a continuous examination throughout the year. In this case, exposure to diseases in the early stages of growth in the body can be will be in ours. In this study, more deaths occurred in contrast to similar studies in winter.

In this study, 90 (22.3) patients died on holiday days. Several studies have been done regarding the effect and role of holidays on the mortality rate of hospitalized patients in hospitals. In a study in the United States on 2300 cases of myocardial infarction, the results showed that the mortality rate of hospitalized patients on more holiday days and the use of invasive therapies is lower (Kostis et al., 2007), the findings of another study in Canada showed That holiday days is a dangerous time period for patients with CVA (Saposnik et al., 2007). The findings of a study on patients admitted to ICU in Finland show that not only the mortality rate of hospitalized patients on holiday days is more than the rest of the week, but is higher in the hours of dusk and at night than in the morning hours of death. And the study of Por et al. (2003), Carm et al. (2004) and Shahsavari et al (2014) this is probably due to a shortage of specialized personnel on the weekend, which increases mortality rates.

Based on the time distribution of the dead in the center, the highest mortality rates were in the night, evening and morning shift, with most of the fetus close at about 4-7 in the morning, and this frequency distribution was indicative of a significant referral of patients in The shift of the night was comparable to that of other shifts of time that was not coherent with the study by Sepandi et al. (2016), and Mahmoudi et al. (2014), but coincided with the study of Chen et al. (2001) and Abrisham Kar et al. (2003), This is probably because of the fatigue of the staff especially in the morning and the lack of doctors at the end of the night shift, which requires the use of more experienced and knowledgeable personnel and more precision It is followed up by patients and more careful monitoring of the injured, especially in the near morning.

The shortage of medical staff in the hospital is noticeable on holidays and before the holidays in the hospital, and diagnostic tests such as radiology and ultrasound are also in short supply. And the patient may be deprived of specialized and diagnostic visits that are done on normal days for up to 36 to 48 hours, which seems to show more of the effects of holidays in educational hospitals that have a double burden of remission, working in The holidays are not commonplace and staffing is a must and keeping forces in order to reduce mortality in order to perform the therapeutic activity. Also, paying more attention to the care and treatment levels on weekends may reduce the disturbance in the morning after the shutting down. If the results of the study in California show that deaths on school holidays were higher than in non-teaching hospitals (Cram et al., 2004).

In this study, 131 (32.5%) of deaths were in the age group of 70-79 years, which is based on the findings of Wang et al., Entitled Age and Species Deaths in 187 countries, from 1970 to 2010, systematic analysis for studying the load Global disease 2010 (Abubakar, Tillmann and Banerjee, 2013), Fereshtehnejad et al. (2008), and Ansari et al. (2012), Shahsavari et al. (2014), Mahmoudi et al. (2014), and Reza Pour et al. (2016), who had the highest mortality at the age of 70 He was a year old. It can be said that high age makes people vulnerable to diseases; in heart disease infarction, the most common cause of death can be attributed to the lack of response to preservative therapy. Also, the stiffness of the arteries at an advanced age can increase the risk of cardiovascular disease. It is necessary that serious complaints of aging should be considered because the symptoms of the disease in the elderly are late and obscure, which is recommended that the examinations of these patients in the department be done with greater accuracy.

In this study, 70/22 patients died in the ICU segment, which complied with the results of Fayyazi et al. (2004), Sepandi et al. (2016), but did not follow the results of Mahmoudi et al. (2014), in Another study in Mexico in 1988 to 2002 showed that mortality rates in special sectors were 27%, as well as the study of Rosell et al. In Japan (Rosel-Ramirez et al., 2004), which is probably due to the geographical area the hospital is the target. As well as hospitalization of most patients as soon as they become ill in the ICU.

In this study, 222/9 patients died due to diseases of the nervous system that were consistent with the results of the study by Fayyazi et al. (2004), Mason and colleagues (Arboix et al., 1994), but with the results of Shahsavari et al., (2014), Worldwide et al., And Collaborators did not match. This is probably due to the lack of control of blood pressure and the lack of compliance with doctor's orders and the lack of knowledge of doctors about the need for accurate control of blood pressure and the inadequacy of food consumption, which requires a better and more effective control of blood pressure.

The mortality rate of patients in the hospital between the years 2012 and 2017 has been upward and downward trend, with a statistically significant difference, and it can be said that the mortality rate of patients during these years is not constant.

Conclusion:

The results showed that most deaths occurred due to diseases of the nervous system, cardiovascular diseases and infectious parasitic diseases, and these diseases are to some extent prevented. Therefore, it is necessary to know more about the causes of the events and the design of interventions to prevent these diseases, which are most often over the age of 70 years, and, on the other hand, to be aware of signs and symptoms of diseases in order to reduce the mortality rate and it is necessary.

Offers:

Regarding the results of the study that chronic and non-chronic disease is the main cause of mortality, planning for screening, identifying risk factors, controlling, preventing and reducing non-communicable diseases is important, as well as measures through education and empowerment of people. Policies and regulations are in place to create an appropriate environment and, ultimately, not to use an inappropriate diet.

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References

- Abrishamcar S, Abedinzadeh M, Arti H, Hoshmand F. Survey of inpatient cases and mortality rate in ICU in Ayatallah Kashani Hospital of Sharehkord. *Journal of Sharehkord University of Medical Science*. 2003;3:73-8.
- Abubakar II, Tillmann T, Banerjee A. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*. 2015 Jan 10;385(9963):117-71.
- Ahmadi A, Shojaee M. Estimation of life expectancy changes in Chaharmahal va Bakhtiyary Province, Iran, during 2005-2009. *Journal of Shahrekord University of Medical Sciences*. 2011;13.
- Amani F, Kazemnejad A, Habibi R, Hajizadeh E. Pattern of mortality trend in Iran during 1970-2009. *Journal of Gorgan University of Medical Sciences*. 2011;12(4).
- Ansary LA, Esmail SA, Adi YA. Causes of death certification of adults: an exploratory cross-sectional study at a university hospital in Riyadh, Saudi Arabia. *Annals of Saudi medicine*. 2012;32(6):615-22.
- Arboix A, Massons J, Oliveres M, Garcia L, Titus F. Mortality in the acute phase of cerebrovascular disease: The registry of La Alianza-Hospital Central of Barcelona. *Med Clin (Barc)*. 1994;103(14):529-33.
- Chen Y-C, Lin S-F, Liu C-J, Jiang DD-S, Yang P-C, Chang S-C. Risk factors for ICU mortality in critically ill patients. *Journal-Formosan Medical Association*. 2001;100(10):656-61.
- Cram P, Hillis SL, Barnett M, Rosenthal GE. Effects of weekend admission and hospital teaching status on in-hospital mortality. *The American journal of medicine*. 2004;117(3):151-7.
- Dubois RW, Rogers WH, Moxley III JH, Draper D, Brook RH. Hospital inpatient mortality. *New England Journal of Medicine*. 1987;317(26):1674-80.
- Faghihi F, Jafari N, Akbari Sari A, Nedjat S, Hosainzadeh M. Trend of Mortality Rate and Causes of Death in Qazvin Province, 2004-2008. *IJFM*. 2015;21(1):35-42.
- Fazizi F, Esmailzadeh A, Mirmiran P. Obesity and cardiovascular disease risk factors in Tehran adults: a population-based study. 2004.
- Fereshtehnejad sm, asadi lm, moradi lm, vaez mm, motevalian sa, eshagh am. estimation of life expectancy and its association with social determinants of health (sdh) in urban population of different districts of tehran in 2008 (urban heart study).
- Gheisari m, karami k, hesam s. Epidemiology, trend and common cause of mortality in mahshahr city during 2010-2014. 2015.
- Haagsma JA, Graetz N, Bolliger I, Naghavi M, Higashi H, Mullany EC, et al. The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the Global Burden of Disease study 2013. *Injury prevention*. 2016;22(1):3-18.
- Isfahani hrt. Induced abortion in penal law and forensic medicine of the islamic republic of iran.
- Jafar TH, Haaland BA, Rahman A, Razzak JA, Bilger M, Naghavi M, et al. Non-communicable diseases and injuries in Pakistan: strategic priorities. *The Lancet*. 2013;381(9885):2281-90.
- Jarman B, Gault S, Alves B, Hider A, Dolan S, Cook A, et al. Explaining differences in English hospital death rates using routinely collected data. *Bmj*. 1999;318(7197):1515-20.
- Khamutian R, Najafi F, Soltanian M, Shokoohzadeh MJ, Poorhaghighat S, Dargahi A, et al. The association between air pollution and weather conditions with increase in the number of admissions of asthmatic patients in emergency wards: a case study in Kermanshah. *Med J Islam Repub Iran*. 2015;29:229.
- Khorasani Zavareh D. Toward safety promotion among road users: Epidemiology and prevention of road traffic injuries in Iran: Institutionen för folkhälsovetenskap/Department of Public Health Sciences; 2009.
- Kostis WJ, Demissie K, Marcella SW, Shao Y-H, Wilson AC, Moreyra AE. Weekend versus weekday admission and mortality from myocardial infarction. *New England Journal of Medicine*. 2007;356(11):1099-109.
- kuller I, ives d, buhari a, editors. is the decline in chd mortality over in the 35-44 year old cohort? *american journal of epidemiology*; 1997: johns hopkins univ school hygiene pub health 111 market place, ste 840
- Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *The lancet*. 2006;367(9524):1747-57.
- Mackenbach JP, Kunst AE, Lautenbach H, Oei Y, Bijlsma F. Competing causes of death: a death certificate study. *Journal of clinical epidemiology*. 1997;50(10):1069-77.
- Mahmoudi GA, Astaraki P, Anbari K. Epidemiological survey of mortality rate in patients admitted to Shohada Hospital of Khorramabad in 2011. *IJFM*. 2014;20(1):393-400.

- Moghadamnia a, Jahani M, Bijani A, Yaminfirooz M, Naghshineh A, Mohammadnia K. Evaluation of performance indicators and frequency of patient referrals in the hospitals affiliated to babol university of medical sciences in 2013. 2016.
- Mohseni M. Introductory sociology. Tehran. Tehran University of Medical Sciences in collaboration. 1981;4:100-8.
- Murray CJ, Lopez AD, Black R, Mathers CD, Shibuya K, Ezzati M, et al. Global burden of disease 2005: call for collaborators. *The Lancet*. 2007;370(9582):109-10.
- Murray CJ, Lopez AD. Mortality by cause for eight regions of the world: Global Burden of Disease Study. *The lancet*. 1997;349(9061):1269-76.
- Murray CJ, Richards MA, Newton JN, Fenton KA, Anderson HR, Atkinson C, et al. UK health performance: findings of the Global Burden of Disease Study 2010. *The lancet*. 2013;381(9871):997-1020.
- Nia KS, Ghaffarad A, Ala A, Alikhah H, Ghoreishi SA, Asghari E, et al. Causes of mortality in patients referred to emergency unit of Tabriz Imam Reza hospital, in 2014-2015. *Majallah-i pizishki-i Danishgah-i Ulum-i Pizishki va Khadamat-i Bihdashti-i Darmani-i Tabriz*. 2018;39(6):57-64.
- Por H, Afshon, Esfandyari, Jalili, Yamin. Causes of mortality in patients referring to Yasuj hospitals in 2001. *Bringing Knowledge*. 2003;8(1):9-16.
- Rezapour A, Arabloo J, Tofighi S, Alipour V, Sepandy M, Mokhtari P, et al. Determining Equity in Household's Health Care Payments in Hamedan Province, Iran. *Archives of Iranian Medicine (AIM)*. 2016;19(7).
- Rosel-Ramirez R, Loria A, Dominguez-Cherit G, Gutierrez-Sougarret B. A predictive model of mortality in the ICU of a Mexico City hospital. *Revista de investigacion clinica; organo del Hospital de Enfermedades de la Nutricion*. 2004;56(5):591-9.
- Salomon JA, Wang H, Freeman MK, Vos T, Flaxman AD, Lopez AD, et al. Healthy life expectancy for 187 countries, 1990–2010: a systematic analysis for the Global Burden Disease Study 2010. *The Lancet*. 2012;380(9859):2144-62.
- Sapoznik G, Baibergenova A, Bayer N, Hachinski V. Weekends: a dangerous time for having a stroke? *Stroke*. 2007;38(4):1211-5.
- Sepandi M, Jalali A, Alidadi A, Ebrahimi MP, Zrabizadeh A, Mahmoudi N. Epidemiologic Study on Causes of Mortality among Hospitalized Patients. *Health Research*. 2016;1(4):199-206.
- Shahsavari N, Ghaffar K. Causes of Death in Emergency Patients in Imam Reza Tabriz Hospital in 2014.
- Sharifzadeh GR, Namakin K, Mehrjoofard H. An epidemiological study on infant mortality and factors affecting it in rural areas of Birjand, Iran. *Iranian Journal of Pediatrics*. 2008;18(4):335-42.
- Singh RB, Pella D, Mechirova V, Kartikey K, Demeester F, Tomar RS, et al. Prevalence of obesity, physical inactivity and undernutrition, a triple burden of diseases during transition in a developing economy. The Five City Study Group. *Acta cardiologica*. 2007;62(2):119-27.
- Wang H, Dwyer-Lindgren L, Lofgren KT, Rajaratnam JK, Marcus JR, Levin-Rector A, et al. Age-specific and sex-specific mortality in 187 countries, 1970–2010: a systematic analysis for the Global Burden of Disease Study 2010. *The Lancet*. 2012;380(9859):2071-94.