Urban and Rural Differences in Mortality and Causes of Death in Jahrom County

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ABSTRACT

Background: The mortality rate in the society is one of the most important development indicators especially in the field of health, which is considered as the main component of health assessment regarding age and gender.
Aim: To determine the causes of mortality in the urban and rural population of Jahrom County in 2016.
Method: This descriptive-analytic study was conducted on recorded data on death. The data pertaining to the research variables were collected via a researcher-constructedinstrument of data from Center for Health Statistics of the health center in Jahrom and also mortality statistics announced by the organization for civil registration. Then,the most important causes of death were identified for every residential location.
Results: The results showed that cardiovascular diseases (34.7%), cancer (14.2%), endocrine and metabolic diseases (7.7%), respiratory diseases (8.5%), birth defects (5.9%), and road accidents (2.5%) were the six main causes of death in urban areas in 2016, respectively. However, the six major causes of death in rural areas included cardiovascular diseases (43.1%), road accidents (4.8%), cancers (7.3%), respiratory diseases (4.6%), endocrine and metabolic diseases (3.7%), and birth defects (2.9%).
Conclusion: Cardiovascular disease is the primary and most common cause of mortality in rural and urban populations of Jahrom city; however, the order and share of other major causes of death in rural and urban areas are different.
Key words: Cause of Death, Rural areas, Urban, Jahrom

INTRODUCTION

The investigation of mortality and its causes has assumed high importance from the perspective of demographics, sociology, and health since mortality is not just a biological issue; rather, various factors, such as level of development in societies, environmental and geographical factors, socio-cultural factors, economic factors, health therapeutic factors, etc. have a highly determining role in the rate and causesof mortality. Evidence suggests that levels of mortality are different between both genders, among different age groups, and in different communities[1,2]. Consequently, providing and promoting health require specific policies and strategies and, thereby, precise information and indicators are needed for the adoption of these measure[3]. Given the resource constraints, governments must identify and address the most important health needs by systematically monitoring the health system and should plan and work through effective interventions to reduce the burden of these needs[4,5].

In developing countries, which constitute four fifth of the world's population, non-communicable diseases are rapidly replacing infectious diseases. In these countries, non-communicable diseases currently account for less than 50% of death rates while it is predicted to account for 70% of deaths in 2020. Therefore, the complexity of disease prioritization for resource allocation has challenged health policy-makers[6].

On the other hand, the first step in planning the health interventions is to achieve priorities and, to this end,it is required to clearly determine the real health needs of the community[7,8].

Comparison of reliable, valid and comparable indicators of the health status of individuals and populations is an essential part of the provision of evidence-based information for the management of the health system. The simplest and most common method of calculating community health indicators is to aggregate individual data for calculating the rate of a specific medical problem ordisease[9]. On the other hand, the emergence of many problems and the need to compare indices over time and between populations or before and after specific interventions has made this method ineffective[8]. Accordingly, one of the most important indicators of health at the community level is mortality. In fact, death data by age and gender are the main components of health assessment and, together with other epidemiological, economic and social data, is considered the basis of the health care decision-making process[10].

Death is a complete stop and without recoveryof vital functions of the body and the cause of death from the physician's point of view is illness or injury and the conditions under which death occurs. Knowledge of the causes of death from the point of view of epidemiological transition, especially for developing countries, is of particular importance. The number of deaths, type and severity, age-sex distribution of deaths, the comparison of causes of death in different regions, life expectancy at birth and other related issues are the most important health, social and human development indicators in societies[8]. Indicators such as child mortality rates have long been used as one of the tools of social economic development[1,3].

In Iran, The Ministry of Health and Medical Education (MOHME), with the participation of the Organization for Civil Registration and conducting a program to record

deaths based on the cause of death and birth certificate information of the diseased , has taken a significant step in determining the pattern of mortality in the country and monitoring its trends, contrary to population surveys of the number and causes of mortality that is an expensive, time consuming way requiring several reviews within one year[11].

Despite the death registration system in Iran, there is no accurate information on the causes of the death of rural communities and its comparison with the causes of mortality in urban communities. Information about geographical areas can be used as a valuable tool to prioritize health problems in different regions, in order to prevent mortality and complications, before any decisions are made to determine large-scale solutions. For it is necessary to clarify the main problem of each society by collecting information from the same region and analysing that information so that, based on the real needs of the community, decisions and policies can be made.

Location and geographical area have an important effect on the analysis of the rate and causes of mortality and, therefore, mortality is one of the main components of population movements[12]. As a result, the final aim of determining the rates and causes of death in different communities and regions is to identify demographic changes. Another important goal is providing the most objective evidence necessary to plan and manage health programs, prioritizing strategic research in population health, developing and allocating human and financial resources as well as extending organizational capacities in order to design, implement, and evaluate cost-effectiveness interventions, prevention, as well as treatment and rehabilitation[13,14]. Consequently, this study aimed to determine the causes of mortality in urban and rural populations of Jahrom County in 2016.

MATERIALS AND METHODS

This descriptive-analytic study was performed by secondary data analysis in rural and urban areas of Jahrom County in 2016. The death certificates that are compatible with the International Classification of Diseases (ICD10) are composed of two parts, the death certificate and the burial rights. In Iran, these death certificates are issued for cases such as stillbirth (from the beginning of the 20th week of pregnancy), new-born babies, babies less than 7 days old and other ages. As for abortions (before the 20th week of Pregnancy) there is no need to complete these certifications. The causes of death in villages are often reported by caregivers through a precise verbal autopsy and a history of illness of the deceased by asking relatives and acquaintances. These death records are reported from the health care homes to the rural health center, and then from there are registered in the city registration for death canter. The causes of deaths in urban areas are also documented by doctors based on examination and documentation of the deceased in addition to verbal autopsy often from four sources including forensics, hospitals, birthing centers, and health centers. The recorded data is then registered in the city health center within a month. Repetitious death records at the health center are also reviewed by the relevant statistics expert by observing and matching the variables recorded on the death certificate of the deceased person and the similarity of at least 5 variables from the variables recorded on the

death certificate. The criterion for determining repetitious death data is based on the similarity of three main variables which are the first name of the father of the deceased, gender, and the date of birth and death of the deceased.

Death data in this study were calculated by different age groups, gender, as well as location (city or village). The data needed to conduct the study in a researcher-made questionnaire were collected from the data already collected by the expansion and statistics units as well as health center in Jahrom County (Death Registry System), in addition to the statistics reported by the organization for civil registration. The questionnaire used in the study included demographic information such as age, gender, location, and the cause of death based on the standard form of ICD10. Causes of death were collected from all deceased population of Jahrom University of Medical Sciences, which was collected according to the death registration system and based on the standard form of ICD10. Mortality causes were classified into 18 categories which included infectious and parasitic diseases, cancers and tumours, hematopoietic and immune systemdiseases, endocrine diseases, nutritional and metabolic diseases, mental illness and behavioural disorders, diseases of the nervous system, cardiovascular diseases, respiratory diseases, gastrointestinal diseases, diseases of the genitourinary system, congenital and chromosomal abnormalities, birth-related illnesses, ill-defined and vague symptoms and conditions, unintentional injuries, violence by others, suicide, transportation accidents, and unknown death causes.

Entry criteria for this study were the deceased peoples in Jahrom County in 2016, whose death certificate and death registration were issued in the death registration system. Exit criteria included death information which was based on causes for the death of impossible, improbable and garbage codes which cannot be considered as causes of death. Impossible codes include the causes of death that cannot occur, such as death due to pregnancy complications and childbirth in women, or prostate cancer in men. Improbable codes consisted of causes of death that are unlikely to occur and their registration requires accurate documentation, such as maternal deaths from pregnancy complications and childbirth at the age of 50 or above or the death of children from birth defects over the age of 2 or so. Garbage codes are the causes of mortality with signs and conditions that can normally exist or appear as interconnected to causes of death but unlikely to cause death. In Iran, the most commonly used garbage codes are cardiac arrest and aging without dementia[11]. Finally, the data were analysed by Excel and spss18 using descriptive statistics and charts as well as student's t-test at a significance level of 0.05. The age-specific mortality rate by gender for urban and rural areas was calculated using the formula based on the latest national census in 2016: It is noteworthy that this research project was approved by the Ethics Committee of the Vice-Chancellor of Research of Jahrom University of Medical Sciences with the code of ethics ID IR.jums.REC.1395.131.

$$ASMR = \frac{Death\ in\ each\ age\ and\ gender\ group}{Population\ of\ the\ same\ age\ group\ in\ the\ same\ year} \times 1000$$

RESULTS

A total number of 1032 of deaths occurred in Jahrom County in 2016, of which 577 (55.92%) happened in urban areas and 455 cases (44.08%) in rural areas. Regarding gender distribution, 636 cases (61.6%) were deaths in males and 396 cases (38.4%) in females, with the mean age of death being 63.37 ± 28.20 years in men and 65.97 ± 26.95 yearsin women. This difference was statistically significant (P <0.001). The highest frequency of death in men and women was in the age group of 80 years, with the highest and the lowest frequency being in the age group of 14 to 10 years (Table 1). In Jahrom, in the year 2016, the leading causes of death were examined based on the ICD10 classification by the area of residence and gender (Table 2, Figure 1). Results indicated that in both genders, cardiovascular diseases (34.7%), cancers (14.2%), endocrine and metabolic diseases (8.7%), respiratory diseases (5.8%), birth defects (5.9%), road accidents (2.5%), were the six main causes of death in urban areas of Jahrom, while in the same year, cardiovascular diseases (43.1%), road accidents (4.8%), cancers (7.3%), respiratory diseases (4.6%), endocrine and metabolic diseases (3.7%) and birth defects (2.9%) were major cause of mortality in rural regions. In addition, as for violence by others (killed by others in conflict), in the year 2016 in Jahrom, it accounted for 0.3% of the causes of mortality, all occurring in men. In rural areas, in contrast, this cause of death accounted for only 1.5% (7 people) of total mortality, and regarding gender distribution, out of 7 people, 5 were female and 2 were male. This rate for the suicide factor as a cause of death was 0.7% in urban areas (3 males and 1 female) and 1.5% in rural areas (4 males and 3 females).

Figure 2 shows the age-specific mortality rates by gender in 2016 based on urban and rural areas in Jahrom. As can be seen, the mortality rate of people under the age of 5 first rises and then rapidly decreases, followed by a rise again at the age of 50, reaching its peak at 75-79. In addition, according to Chart 2, the age-specific mortality rate by gender in urban women is lower than all other age-gender groups but the mortality rate of rural men is higher compared all age-gender groups.

Table 1: Frequency Distribution of Death by Age in Men and Women in Different Urban and Rural Areas of Jahrom County, 2016

Classification of age groups	Age group	Urban						Rural					
		Men		Women		Total		Men		Women		Total	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Children	<4	39	10.6	12	5.8	51	8.8	21	7.9	Children	6.9	34	7.5
Adolescent	5-9	3	0.8	1	0.5	4	0.7	2	0.7	0		2	0.4
	10-14	0	0	0	0	0	0	1	0.4	Adolescent	0	1	0.2
	15-19	6	1.6	0	0	6	1	4	1.5		2.7	9	2
Young adult	20-24	5	1.4	1	0.5	6	1	8	3	Young	3.2	14	3.1
	25-29	3	0.8	4	1.9	7	1.2	5	1.9	adult	2.8	10	2.2
Middle-aged	30-34	10	2.7	9	4.3	19	3.3	4	1.5	Middleaged	2.7	9	2
	35-39	6	1.6	5	2.4	11	1.9	5	1.9		1.1	7	1.5
	40-44	7	1.9	5	2.4	12	1.2	6	2.2		3.7	13	2.9
	45-49	13	3.5	5	2.4	18	3.1	3	1.1		3.7	10	2.2
	50-54	15	4.1	9	4.3	24	4.2	7	2.6		3.2	13	2.9
	55-59	19	5.1	12	5.8	31	5.4	12	4.5		2.7	17	3.7
Elderly	60-64	21	5.7	7	3.4	28	4.9	17	6.4	Elderly	5.3	27	5.9
	65-69	24	6.5	14	6.7	38	6.6	21	7.9	11	5.9	32	7
	70-74	24	6.5	7	3.4	31	5.4	8	3	10	5.3	18	4
	75-79	46	12.5	23	11.1	69	12	24	9	19	10.1	43	9.5
	>80	128	34.7	94	45.2	222	38.5	119	44.6	77	41	196	43.1
	جمع	396	100	208	100	577	100	267	100	188	100	455	100

Table 2: Frequency distribution of death by age in men and women in Jahrom2016

Age group	Men		Women	
	Frequency	%age	Frequency	%age
4<	60	9.4	25	6.3
5-9	5	0.8	1	0.3
10-14	1	0.2	0	0
15-19	10	1.6	5	1.3
20-24	13	2.0	7	1.8
25-29	8	1.3	9	2.3
30-34	14	2.2	14	3.5
35-39	11	1.7	7	1.8
40-44	13	2.0	12	3.0
45-49	16	2.5	12	3.0
50-54	22	3.5	15	3.8
55-59	31	4.9	17	4.3
60-64	38	6.0	17	4.3
65-69	45	7.1	25	6.3
70-74	32	5.0	17	4.3
75-79	70	11.0	42	10.6
80>	247	38.8	171	43.2
Total	636	100	396	100

Table 3: Frequency Distribution of Causes of Death Based on the Classification of ICD10 by Location inJahrom County 2016.

Death cause based on ICD10	Urban						Rural					
	Men		Women		Total		Men		Women		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Infectious and parasitic diseases	18	4.9	5	2.4	23	4.0	3	1.1	1	0.5	4	0.9
Cancers and tumors	50	13.6	32	15.4	82	14.2	19	7.1	14	7.4	33	7.3
Hepatobiliary disorders and immune system	14	3.8	3	1.4	17	2.9	2	0.7	3	1.6	5	1.1
Endocrine, nutritional and metabolic diseases	32	8.7	18	8.7	5	8.7	11	4.1	6	3.2	17	3.7
Mental illness and behavioral disorder	4	1.1	0	0	4	0.7	3	1.1	1	0.5	4	0.9
Diseases of the nervous system	16	4.3	9	4.3	25	4.3	1	0.4	2	1.1	3	0.7
Cardiovascular disease	124	33.6	76	36.5	200	34.7	119	44.6	77	41.0	196	43.1
Respiratory diseases	27	7.3	22	10.6	49	8.5	11	4.1	10	5.3	21	4.6
Gastrointestinal diseases	6	1.6	4	1.9	10	1.7	2	0.7	2	1.1	4	0.9
Diseases of the genitourinary system	1	0.3	0	0	1	0.2	1	0.4	0	0	1	0.2
Congenital and chromosomal abnormalities	7	1.9	2	1.0	9	1.6	7	2.6	5	2.7	12	2.6
Birth-related disease	26	7.0	8	3.8	34	5.9	9	3.4	4	2.1	13	2.9
Ill-defined and vague symptoms and situations	12	3.3	10	4.8	22	3.8	46	17.2	34	18.1	80	17.6
Unintentional injuries	1	0.3	5	2.4	6	1.0	5	1.9	2	1.1	7	1.5
Violence by others	2	0.5	0	0	2	0.3	2	0.7	5	2.7	7	1.5
Suicide	3	0.8	1	0.5	4	0.7	4	1.5	3	1.6	7	1.5
Unknown	7	1.9	2	1.0	9	1.6	2	0.7	1	0.5	3	0.7
Transportation accidents	19	5.1	11	5.3	30	5.2	20	7.5	18	9.6	38	8.4
Total	396	100	208	100	577	100	267	100	188	100	455	100

Fig.1. The Frequency of Death Causes Based on ICD10 Distribution by Urban and Rural Areas of Jahrom County in 2016.
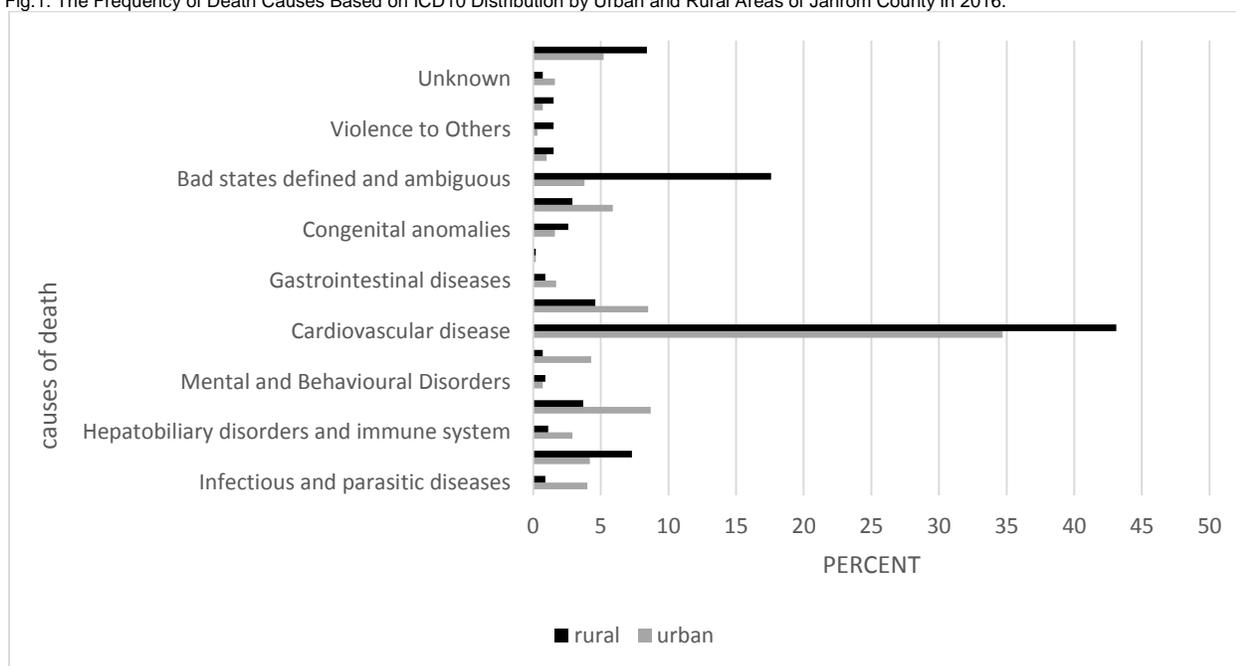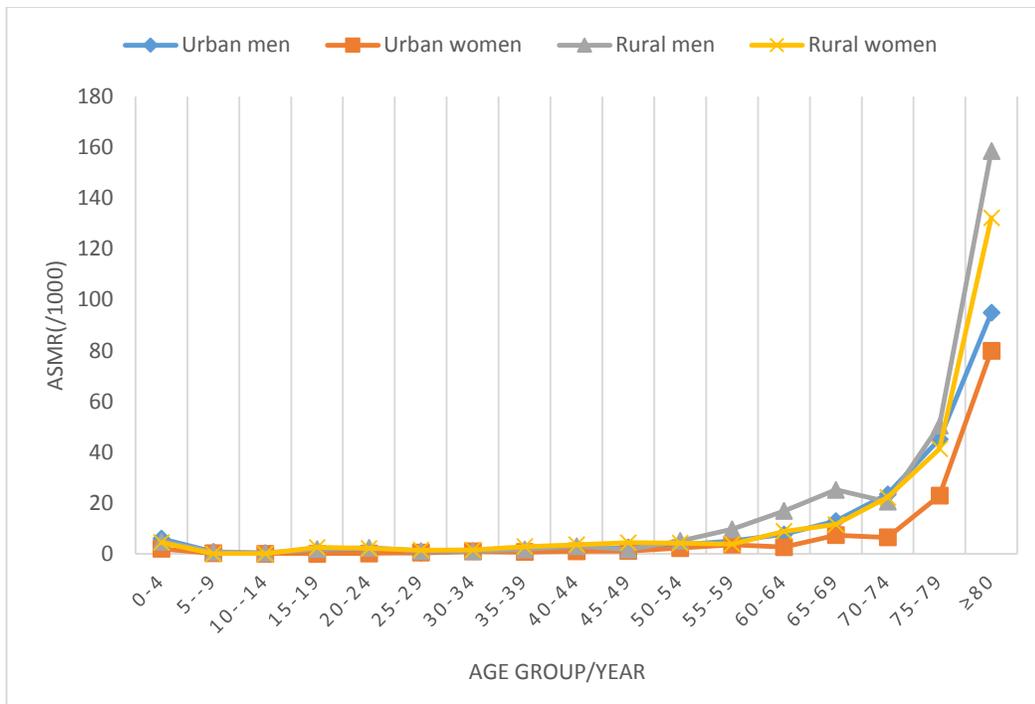

Fig.2. Specific Mortality Rate in 1000 People (Age-specific Mortality Rate (ASMR)) in Urban and Rural Areas in Jahrom County 2016.

DISCUSSION

On the whole 1032 deaths occurred in Jahrom County in 2016, with the major causes of death being different based on ICD10 classification in urban and rural areas. In urban areas the leading causes of death were cardiovascular diseases (34.7%), cancers (2.6% 14.8%), metabolic and endocrine diseases (7.7%), respiratory diseases (8.5%), birth defects (5.9%) and road accidents (2.5%), while in rural areas cardiovascular diseases (43.1%), road accidents (4.3%), cancers (7.3%), respiratory diseases (6.6% 4%), metabolic and endocrine diseases (7.7%) and birth defects (2.9%) were the six main causes of mortality. Results suggested that cardiovascular disease in rural and urban areas ranked first among cause of death. However, the share of this cause was higher in people living in rural areas, making it a major cause of inability and premature death, as well as the huge health costs worldwide[15,16].

Most cardiovascular diseases can be prevented by modifying behavioral risk factors such as smoking, unhealthy diet and weight gain and obesity as well as physical activity[17]. Based on the findings of the present study, it can be concluded that lifestyle changes such as inactive lifestyle, increased tobacco use, increased alcohol consumption, high-calorie and fast food consumption, etc. have happened both in urban and rural areas, thus making cardiovascular diseases the main cause of mortality in urban and rural areas.

But the order and share of the other major causes of death is different in rural and urban areas, with cancer being the second leading cause of death in urban areas and the third highest death rate in rural areas. Road accidents are the sixth cause of death in urban areas and second in rural areas.The main causes of traffic accidents in the rural areas of Iran are the head-to-head collision of vehicles, motorcycle and pedestrian accidents, asphalting

of rural roads and the resulting increase in speed and demand for travel on these roads, lack of sufficient traffic signs in roads in rural areas, high speed on low-standard rural roads that are not proportionate to the road's condition, traffic and the traffic of low-speed vehicles such as agricultural vehicles and motorcycles in addition to individual factors such as not having a driver's licenses and lack of necessary information and training on ways to prevent traffic accidents.

According to the statistics available in 2015 in Iran, leading causes of death, ranking first to fifth, were cardiovascular diseases (45.79%), cancers (76.12%), road accidents (8.7%)), diabetes and endocrine and metabolic diseases (6.55%), and diseases of the nervous system (4.14%). Findings of the study coincided with national statistics. Nevertheless, the world's first to fifth mortality rates in 2015 were cardiovascular diseases (32.12%), cancers (15.71%), diarrhea (8.89%), respiratory diseases (6.8%) and diabetes and endocrine and metabolic diseases (6.11%)[18].

Results of the present study indicated that cardiovascular diseases, cancer, road accidents, and endocrine and metabolic diseases, such as diabetes, were among the leading causes of death in urban and rural regions, which indicatesthe epidemiological transition and the replacement of infectious diseases by non-communicable diseases as the main cause of death. In a study done by Khazaei et al. in Tuyserkan, cardiovascular diseases, road accidents, and respiratory diseases were the three leading causes of death, respectively[6]. In another study, Poorolajal et al. examined the deaths of Hamedan province in 2010 and found that cardiovascular diseases and road accidents were estimated as two main causes of loss of life[14]. Moreover, in their study in East Azerbaijan in 2010, Farahbakhsh et al. concluded that the three major causes of premature death were classified as ischemic and

myocardial infarction (MI), unintentional injuries, and cerebrovascular disease[19]. Additionally, in a study done in Spain, cancer and cardiovascular diseaseswererecognized as the two main causes of death, respectively[20].

Although suicide is not the most significant dilemma in the world, statistics released by the World Health Organization and health organizations of courtiers of the world have raised global concern about suicidal rates among young people. About one million young people commit suicide each year. Suicide rate in the world is 16 people per a hundred thousand. In the present study, 0.7% of (3 males and 1 female) residents in urban areas and 1.5% (4 males and 3 females) of residents in rural areas committed suicide. On the other hand, the failure to report such deaths and the abortive suicidal attemptshave made the issue more sensitive; therefore, it is necessary to think of appropriate measures in this area.

In addition, the factor of violence imposed by others (killed by others in conflicts) in the cityaccounted for 0.3% of the causes of mortality where all the three ones were male; however, this accounted for only 1% of the causes of death in rural areas and 5 individuals out of 7 people were female and 2 ones were male. It necessitates the conduct of accurate surveys on this issue as well as the provision of appropriate solutions to prevent it, especially for women whose death often arises from ethnic and cultural issues.

In the present study, mortality rate based on age and gender in urban women was lower than that in all age groups; and the mortality rate of rural men was higher than that in all age groups. These differences can be attributed to the differences in women's life expectancy compared with men, gender differences in lifestyle, the occurrence of more road accidents in men, higher risk behaviors in men, such as smoking, access to better health services in urban areas, and more sensitivity of women to health issues than men.

One of the problems in the death registration system in Iran is the lack of complete coverage of this system[5]. In the present study, the ratio of the codes registered as ill-defined and ambiguous symptoms and situations was 3.8% in urban areas and 17.6%in rural areas, which can be attributed death registration in death certificates in rural regions by caregiversof the health care homes compared to the registration of causes of death in urban areas by a physician confirmed by forensics. This reflects the efforts of most county health authorities to record deaths in the system, especially in rural areas, since this percentage of deaths hasreal reasons which are not recorded in the data and will affect the calculated indicators.

CONCLUSION

The results of this study indicated that cardiovascular diseases are the leading and most common causes of mortality in rural and urban populations of Jahrom. This finding suggeststhat the epidemiological transition and the replacement ofcontagious diseases with non-communicable diseases are the main causes of death in consistency with the results of national statistics. However, the order and share of the other major causes of death differbetween rural and urban areas, with cancer being the second major cause of mortality in urban areas while it is

rankedthird among causes of death rate in rural areas.In addition, road accidents are the sixth death cause in urban areas but the second leading cause of mortality in rural areas. Such differences are often the result of social disparities in urban and rural regions of Iranin addition to the non-uniform and inappropriate change in lifestyles on part of social activists in these areas. Accordingly, in order to better manage this social and health problem, it should be separated from specialized and medical aspects and be perused through cultural and social development, lifestyle modification,and health-threatening behaviors, such as smoking and alcohol use, lack of exercise, inappropriate nutrition and non-standard diet, anxiety and stress, ignorance, and non-compliance with traffic laws and etc. With the cooperation of policymakers and other institutions, such as broadcasting organization, education system, traffic department, etc. and by means of effective interventions, it is possible to improve health level and reduce mortality arising from non-communicable diseases in different geographical areas.

Conflictsof interest: The authors declarethat there is no conflict of interest regarding the publication of this article.

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