Short Communication

Zahedan Journal of Research in Medical Sciences

Journal homepage: www.zjrms.ir

Geographical Distribution of Mortality from Diabetes Complications in Yazd

Rostam Saberifar,[1] Khadijeh Arab-Sheibani,*[2] Mohammad Afkhami-Ardakani [3]

1. Department of Geographic and Urban Planning, Payam-e-Noor University, Tehran, Iran
2. Department of Psychology, Payam-e-Noor University, Tehran, Iran
3. Yazd Diabetes Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

Article information

Article history:
Received: 23 Jan 2013
Accepted: 5 Feb 2013
Available online: 3 June 2013
ZJRMS 2014; 16(6): 89-92

Keywords:
Diabetes
Mortality
Complications

Abstract

***Background*:** The purpose of this study is to present a geographical map of mortality rate due to diabetes complications in different areas of Yazd during 2001-2010.
***Materials and Methods*:** In this ecological study, a sample data of mortality due to diabetic complications in Yazd was gathered. Mortality rate calculation and geographical distribution mapping was performed then using this data.
***Results*:** General rate of mortality from diabetic complications is higher in internal and marginal areas than high-income and new-built regions. This pattern is also consistent regardless of patients' gender.
***Conclusion*:** It seems that the observed pattern is due to inactivity in internal areas, as well as unawareness and lack of access to medical facilities in margins.

Introduction

Diabetes is a major public health problem worldwide with a rapidly increasing prevalence. Diabetes has allocated 15% of healthcare costs to itself in the United States [1]. Personal changes and cultural transition of communities alongside aging phenomenon in developing countries, has made diabetes a global epidemic; so. World Health Organization (WHO) has called all countries to deal with it since 1993[2].

Diabetes is a metabolic disorder with various long-term complications such as cardiovascular, renal, ophthalmic and nervous system disorders. Moreover, 9% of the world's deaths are related to diabetes [2]. In a survey done by Rahimdel et al. on 2350 diabetic patients from Yazd province, including 1071 males and 1279 females, the prevalence of diabetes and sensory neuropathy was 14.5% and 53.2% respectively which increased with age, duration of disease and poor control of diabetes. Based on this epidemiologic data, although research on this disease is necessary all over Iran, it seems more justifiable in Yazd. The most important reason is that diabetes prevalence is higher in Yazd than other cities of Iran [3, 4]. This issue brings about the probability of geographical impacts on distribution of the disease. For better investigation of this issue, drawing a precise epidemiological map of distribution of diabetes-related mortalities for the study population is necessary. This will help to determine the etiological factors of disease as well as the methods to modifying them which in turn accounts for the main strategy for improving survival and health level in diabetics.

Materials and Methods

Due to lack of exact data about diabetic patients' mortality and because recorded causes of mortality consider the final cause of death, diabetic patients' mortality rate was estimated using a sample consisting of 300 diabetic patients who referred to Yazd Diabetes Centre and had died later years due to different reasons Investigations for finding this group led researchers to more than 1000 deaths in Yazd with a history of type 1 or 2 diabetes mellitus. These findings were consistent with this assumption that in developing countries for every known diabetic patient there may be four unknown cases [5]. These people had a proper distribution all over Yazd. In addition, all of them were above 30 years and showed a balanced sex distribution.

Finally collected data was entered in SPSS-17 software and analyzed by descriptive statistical methods and geographical distribution maps. Because the city may have a different sex and age structure, adjusted (standardized) rates were used in drawing disease geographical distribution maps instead of raw rates. In this way disease or mortality status can be compared in two or several geographical districts without confounding effects of age or sex. As a result, in this study direct method was used to compare crude rates of every region with sex separation and totally. For adjusting rates in direct method, the overall population of patients was selected as reference population and the number of expected mortality in reference population was calculated according to sex and age rates in every region. The results then were divided by observed mortality in reference population and "comparative mortality figure" was calculated for every region. If this number is one for a region, it means that the number of expected death according to region's rate equals the number of observed death in the same region. A rate higher than one show an increase in expected deaths and a rate less than one

represent a decrease in such deaths. Afterwards, to determine any statistical differences with 95% confidence interval, comparative mortality figure was calculated in separate sexes and generally [6, 7]. There are two main methods for data classification and presentation on geographical distribution maps [6]. In this study the classification method has been used.

Results

Investigation with statistical method of repeated hunting showed that during 2001-2010 totally 1000 deaths have been occurred in diabetic population. The comparative mortality figure and mortality rate of disease related to diabetes- in 2001-2010 by sex and in general. Comparative mortality figure of overall diabetes mortality shows that during 10 years, region 12 with 236.4×10^5, region 6 with 215×10^5 and region 8 with $196.8.10^5$ (all from central areas) have the highest mortality rate and region 13 with 58.8×10^5, region 10 with 74.7×10^5 and region 3 with 78.5×10^5 (all from new-built regions) have the lowest mortality rate from diabetic disease (Table 1).

Among diabetes deaths, 44.6% belongs to men and 35.4% to women. Comparative mortality figure for complications of diabetes by sex shows that during 10 years the highest rates belong to region 12 with 235.6, region 6 with 235.11, region 11 with 223 and region 8 with 199.3 per 100,000 populations. The lowest mortality rate belongs to region 13 with 71/100,000 (Table1). Moreover, the highest diabetes comparative mortality figure in women is seen in region 12 with 215.7, 6 with 209.4 and 8 with 194.1 in 100,000 and the lowest mortality rate belongs to region 13 with 46 in 100,000 (Table1 and Fig.1).

Evaluation of Comparative mortality figures and 95% confidence interval of diabetes mortality in Yazd during 2001-2010 according to patients' gender and totally, shows that in the three old and crowded regions 12, 6 and 8 the number is meaningfully higher than 1, while for two other marginal regions i.e. 7 and 9, it is higher than 1 with 95% confidence interval including 1 and so its increase is not statistically significant. Moreover, in central region 11, this number is meaningfully higher than 1 for men and less than 1 for women. Only in region 5 it is meaningfully less than 1 for men and women. It is also noticeable that for all southern regions except 14, the number is significantly less than one for both men and women (Table 2).

Table1. Crude and compared mortality rates in 2001-2010 according to patients' gender

Region	Female (Crude)	Female compared	Male (Crude)	Male Compared	Total	Compared Total
1	69.3	87.7	153.9	149.4	122.0	118.2
2	85.7	83.8	116.8	114.5	101.6	99.5
3	75.1	70.2	80.0	79.0	77.6	76.5
4	70.4	69.0	122.5	118.5	97.2	96.6
5	118.1	115.6	104.5	101.3	111.3	108.7
6	210.9	207.4	245.8	233.4	228.9	213.0
7	181.8	178.8	186.1	183.7	184.0	181.7
8	194.2	192.1	204.7	197.3	199.5	194.8
9	168.4	163.5	170.9	168.0	169.7	165.9
10	71.1	70.7	75.4	74.7	73.3	72.7
11	70.1	63.0	248.4	221.0	159.7	144.6
12	219.1	213.7	245.4	233.6	232.4	234.4
13	44.9	44.0	71.5	69.0	58.2	56.8
14	98.5	98.0	163.7	161.6	131.0	129.9
Total	144.6	--------	170.5	---------	157.8	--------

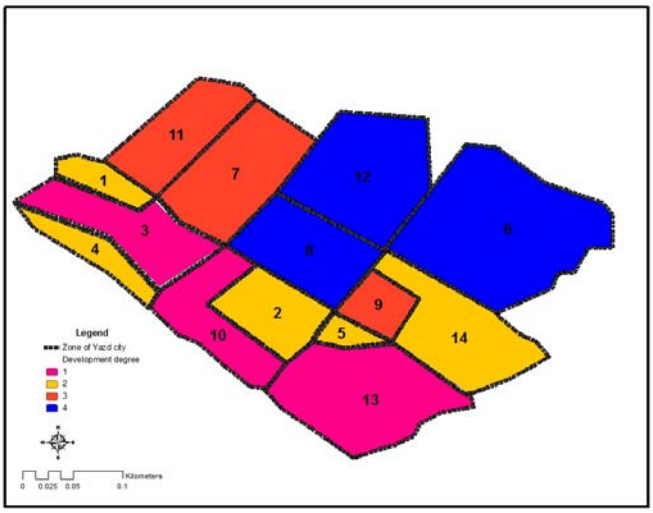

Figure1. The map of Yazd for distribution-adjusted mortality rate in population

Table 2. The comparative mortality figure and mortality rate of disease related to diabetes-related diseases in 2001-2010 by sex and in general

Region	Female	Male	Total
1	0.43	0.60	0.54
2	0.47	0.55	0.52
3	0.56	0.50	0.52
4	0.43	0.65	0.55
5	0.58	0.43	0.50
6	1.23	1.27	1.24
7	1.04	0.89	1.60
8	1.13	1.06	1.08
9	0.85	0.76	0.80
10	0.52	0.43	0.48
11	0.38	1.40	0.83
12	1.31	1.25	1.31
13	0.36	0.50	0.43
14	0.65	0.85	0.79

Discussion

The results of this study show that diabetes mortality rate in central and marginal areas are higher than new-built regions. This is seen for all the population and also for men and women who is statistically meaningful in most of these regions. This may be due to inactivity in central part of the city, unawareness or impossibility of access to medical centers in marginal and colonial parts of the city.

It is believed that diet, physical activity and medicine act as the fundamental basis of diabetes treatment; so, regular physical activity has a key role in type 2 diabetes control especially glycemic control, improvement of cardiovascular changes, improved sensitivity to insulin and lowering blood pressure and serum lipids as well as hemoglobin glycosides. It has also psychological advantages for patients [8]. Close investigations show that people in central and marginal regions don't have proper access to parks and playgrounds or they don't use these facilities for different reasons. These circumstances are more evident for women. This finding is consistent with previous studies. Which show more than 90% of type 2 diabetic women are sedentary and just 28% of women go walking and 11% have physical activities other than walking [9]. However, in most cases, women experience less mortality which is due to their attention to treatment and frequent reference to doctors; while men don't pay enough attention to treatment.

Most residents of marginal and poor regions don't have regular reference to doctor and they don't implement simple instructions related to disease. Moreover, most diabetic people don't have enough information about the role of physical activity and walking in proper control of this disease and don't use this important treatment principle [10]. Diabetes increase, life-style changes, skilful self-care and life quality improvement are some behavioral outcomes of diabetes self-management education [11]. Because the basis of controlling non-contagious disease like diabetes is life style change, making proper policies, rules and principles can produce a suitable environment for promoting healthy life methods and behaviors. Moreover, final purpose of diabetes treatment is increasing self-management abilities. Therefore, using a pattern as a framework in recognizing affecting factors in self-management weakness and designing self-management education programs seems necessary. Resource control shows a better performance of health belief model [12].

Although unawareness and different personal problems can have an important role in this behavior which should be solved through cultural works, providing proper opportunities will have effective consequences. For example, creating some centers of free screening of people with hyperglycemia can encourage low-income families to test their blood glucose levels.

Because an important part of diabetes treatment depends on patients and it's not possible to make health centre or physicians work full-time, the best way is to inform patients according to health belief model. In addition, people in marginal areas are far from health centers and people in central parts of cities experience more environmental stimuli (e.g. fast foods, confectioneries) so they are less aware of diabetes risk comparing to new-built areas. Therefore, exact programming is necessary to increase people's awareness and motivation which can be best done through health education [12].

Acknowledgements

We hereby thank the personnel of Diabetes Research Center of Yazd for their help in gathering data of this study.

Authors' Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

The authors declare no conflict of interest.

Funding/Support

Payam-e-Noor University Tehran.

*Corresponding author at:
Department of Psychology, Payam-e-Noor University, Tehran, Iran
E-mail: shakiba_a_shaibani@yahoo.com

References

1. Azizi F, Hatami H, Janghorbani M. Epidemiology and control of epidemic diseases in Iran. Tehran. 1st ed; Eshteiagh pub: 2000; 52.
2. Jafarizade M, Mirzaie M, Dehghane-Dehnavi AR, et al. Final report of non-communicable disease risk factor surveillance system first program in 2004 in Yazd province. Yazd Uni Med Sci Health Services Pub: 2004: 22.
3. Stuckey HL, Dellasega C, Graber NJ, et al. Diabetes nurse case management and motivational interviewing for change (DYNAMIC): study design and baseline characteristics in the Chronic Care Model for type 2 diabetes. Contemp Clin Trials 2009; 30(4): 366-74.
4. Peimani M, Tabatabaei-Malazy O, Pajouhi M. Nurses role in diabetes care; A review. Iran J Diab Lipid Disord 2010; 9, 1-9.

5. Morovati-Sharifabad MA, Rowhani-Tonkaboni N. Model determinants of self care of diabetes in patients referred to Yazd Diabetes Research Center. Medical Scholar 2009; 16(81): 29-36.
6. Hussain A, Claussen B, Ramachandran A and Williams R. Prevention of type 2 diabetes: A review. Diab Res Clin Pract 2007; 76(3): 17-26.
7. Rezaeian M, Dunn, G. St Leger S and Appleby L. The production and interpretation of disease maps: A methodological casestudy. Soc Psychiatry Psychiatr Epidemiol 2004; 39(12): 947-54.
8. Rezaeian M. An introduction to the practical methods for mapping the geographical morbidity and mortality rates. Tollo-e-Behdasht 2004; 2(4): 41-51.
9. Funnell MM, Brown TL, Childs BP, et al. National standards for diabetes self-management education. Diabetes Care. 2010; 33(Suppl 1): S89-96.
10. Mohammadzedeh Sh, Rajab A, Mahmoodi M and Adili F. Assessment of effect of applying the transtheoretical model to physical activity on health indexes of diabetic type 2 patients. Med Sci J Islamic Azad Univ 2008; 18(1): 21-27.
11. Amin Shokravi F, Alhani F, Kazemnejad A, Vahdaninia M. The relationship between planned physical activities and quality of life among women: a cross sectional study. Payesh Health Monit 2009; 8(4): 407-13.
12. Khazayee M. translator. Familiar by diabetes. Merry S. editor. 1st ed. Ferdowsy Uni Press 1998: 198.
13. Duncan I, Birkmeyer C, Coughlin S, et al. Management education and training (DSME/T). Diabetes Educ 2009; 35(5): 752-760.
14. Sharifi-Rad GH, Hezavaie MM, Mohebbi S, et al. Review the training program based on health belief model on foot care in patients with type 2 diabetes. J Endocrin Metab 2006; 8(239): 3-231.

Please cite this article as: Saberifar R, Arab-Sheibani K, Afkhami-Ardakani M. Geographical distribution of mortality from diabetes complications in yazdrunning title: mortality from diabetes complications. Zahedan J Res Med Sci (ZJRMS) 2014; 16(6): 89-92.