The Social Determinants of Health Related to Diabetes Control–Yazd

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Abstract

Objective: Social determinant of health (SDH) are different from medical care and services. These factors themselves are affected by social policies, and they influence health more than medical care and services do. Due to the importance of chronic non-communicable diseases especially diabetes in Yazd, and assuming the effect of SDH, the present study was conducted in order to examine the relationship between diabetes control and SDH.

Materials and Methods: This was a cross-sectional study. The statistical population were diabetic patients who has referred to diabetes center of Yazd. Sampling method was systematic random selection. The study inclusion criteria was type II diabetes, and exclusion criteria were gestational diabetes, type I diabetes, lack of inclination to participate in the study, lack of access to the patient, death, and immigration from Yazd. In order to examine the SDH more precisely, a combined variable labeled "socioeconomic position (SEP)" including the patient's place of residence and job was created.

Results: Totally 511 type II diabetes patients were studied; 288 women (56.4%) and 223 men (43.6%). The mean age of participants was 56.68 years with a standard deviation (SD) of 10.566. Among patients 119 patients (23.3%) reported tobacco consumption. (Table 1) Out of the sample, 223 men whose mean (±SD) HbA1c was 8.6284±1.87 and 288 women whose mean (±SD) HbA1c was 8.6269±1.69 were reported to have no significant difference in terms of their gender and hemoglobin number (*P*-value=0.922). There were significant difference in HbA1c mean between different groups and SEP.

Conclusion: It can be concluded that the role of social factors and also psychological and mental criteria in understanding the risk of chronic disease and health is due to the negative effects of economic and collective factors, and that the highest level of physical and mental risks is among patients who have experienced hard conditions over time.

Keywords: HbA1c, Social determinant of health (SDH), Diabetes

Introduction

Diabetes is a chronic disease in which patients should be equipped with efficient tools that cover all aspects of the disease. Diabetes control is a big challenge for most diabetes patients (1). Glycemic control is the most crucial factor in diabetes care and treatment. The major aim in treating diabetes is to reduce and maintain blood sugar in a normal range (2). Moreover, diabetes is

the most common metabolic and endocrine disease (3).

Demographic and cultural transition of communities and the aging phenomenon in developing countries have made diabetes a global epidemics. Diabetes is an expensive disease that is the main cause of cardiovascular diseases, blindness, kidney failure, and amputation among adult population of many countries (4).

It was proved that there is correlation between low socioeconomic status and poor health (5). According to Word Health Organization (WHO), currently 347 million people live with diabetes and 80% of them live in low socioeconomic status (6).

Over the recent two decades public health community has paid more attention to social factors that influence health. Social determinant of health (SDH) are different from medical care and services. These factors themselves are affected by social policies, and they influence health more than medical care and services do (5). SDH is the condition in which an individuals is born, grows up, lives, works, and gets old, and a context where all above conditions exist. SDH include race and ethnicity, income, place of residence, economic status, age, gender, education, occupation, childhood conditions, transportation, diet, access to health services, addiction, tobacco consumption, etc. (5-6).

Nowadays, inequality and injustice in health are seriously focused on by health practitioners in different communities and studies (7-8). Justice in health is also the result of SDH, and they are the major cause of injustice in health. In developed countries and those with high revenues, justice in health is now considered as a sublime health goal toward which they are approaching (5-9).

SDH can be considered as a newfound subject in medical studies, and there were few studies on the effect of SDH like workplace and cardiovascular diseases, mothers and children' health, depression, childbirth results, and sexually transmitted diseases on health. Due to the importance of chronic non-communicable diseases especially diabetes in Yazd, and assuming the effect of SDH, the present study was conducted in order to examine the relationship between diabetes control and SDH.

Materials and Methods

This was a cross-sectional study. The statistical population were diabetic patients who has referred to diabetes center of Yazd. Sampling method was systematic random selection. Since there were 17000 active files of type II diabetes patients in the diabetes center and the required sample size was 500 individuals, file number 4 was selected randomly and next selections were done by adding 35 to the previous selected file number. The study inclusion criteria was type II diabetes, and exclusion criteria were gestational diabetes, type I diabetes, lack of inclination to participate in the study, lack of access to the patient, death, and immigration from Yazd.

Whenever a selected file was excluded, it was replaced with the next file. Given α=0.01 and power=90%, , the formula of comparing two means was used and the sample size was determined to be around 475 which was finally increased to 500 patients considering the sample loss and missing data.

Data were collected from patients' files, whenever the data were not complete, required data were obtained by calling patients. Data collection checklists included the following data: 1. Age; It is a quantitative independent variable that was calculated in years, 2. Gender, 3. Education level defined as education years of accomplished educational levels divided into under diploma, diploma, and over diploma,4. Occupation defined as the job that the individuals have been doing over last year and from which they have earned, 5. Income defined as the average income over the last three months divided by the number of the family members, divided into subgroups of without income, under 600,000 Tomans, between 600,000 and 1,200,000 Tomans, and over 1,200,000 Tomans (1 US dollar equals to 3,200 Tomans), 6. Marital status divided into subgroups of single, married, divorced,

widowed, 7. Smoking, 8. Treatment; oral medication or insulin injection, 9. Socioeconomic status as a criterion to examine the individual's socioeconomic status, given his/her job and place of residence.

In order to examine the SDH more precisely, a combined variable labeled "socioeconomic position (SEP)" including the patient's place of residence and job was created.

According to global classification of the jobs and their final scores according to the available jobs of the participants were as follow:

1. Professional job: physician, dentist, university professor
2. Job with a specific skill: office worker, nurse, university worker, and teacher
3. Semi-skilled worker: barber/hairdresser, tailor, embroidery, driver, curtain maker, blanket maker, etc.
4. Simple worker: salesperson, carpentry, farmer
5. Unemployed, housekeeper, and retire

Place of residence was divided into four groups:

6. Neighborhoods with high income: University, Jomhouri Boulevard, and Safaiye
7. City center neighborhood: Bahonar, Imam Hossein, Maskan, Modarres, and Kashani
8. Average neighborhoods: Rahmat Abad and Hamidiya
9. Neighborhoods with low income: Fahadan, Shahediyeh, Dahey-e Fajr, Imam Shahr, and Azad Shahr

By multiplying the scores of the residence place and job groups, the new "socioeconomic position" variable was obtained and classified into 5 groups; subgroup 1 has the best and highest socioeconomic status and subgroups 5 has the worst.

The relationship between descriptive variables of age, gender, income, education, etc. was separately evaluated with the level of HbA1c through T-test, ANOVA, and Pearson correlation test. In descriptive analysis was used in of means, median, standard deviation, maximum and minimum, frequencies, percentages, and tables. Chi-square test, T-test, and ANOVA were applied in data analysis.

Results

Totally 511 type II diabetes patients were studied; 288 women (56.4%) and 223 men (43.6%). The mean age of participants was 56.68 years with a standard deviation (SD) of 10.566. Among patients 119 patients (23.3%) reported tobacco consumption. (Table-1) Out of the sample, 223 men whose mean (±SD) HbA1c was 8.6284±1.87 and 288 women whose mean (±SD) HbA1c was 8.6269±1.69 were reported to have no significant difference in terms of their gender and hemoglobin number (*P*-value=0.922).

There were significant difference in HbA1c mean between different groups and SEP which is shown in table 2. There was no significant difference between the illiterate group and any other group except for the one with degrees over diploma. The individuals of below diploma were significantly different only with those over diploma in terms of HbA1c. About 392 patients did not consume tobacco, whose mean of HbA1c was 8.2285. On the contrary, the other 119 patients who were smoking had an HbA1c mean of 9.935. Therefore, the two groups were significantly different in this regard.

Discussion

The aim of present study was to investigate the differences of blood sugar control based on social and demographic factors among type II diabetes patients.

The treatment type proposed in the present study was in agreement with the results of the studies conducted by Carter et al, (Ruggiero) et al, and (Bezie) et al (7-9). As Carter et al (7) reported, it can be stated that patients treated with insulin are more likely to conduct self-monitoring of blood sugar due to more regular schedules, habit of specific style of treatment, fear of development of disease complications in case of treatment failure, and emphasis on behavioral factors involved with insulin.

Table 1. Relationship between HbA1C in diabetic patients with social factors effecting health.

Variable		Frequency (%)	Mean ±SD	*P*-value
Sex	Male	223(43.6%)	8.6284±1.8727	0.992
	Female	288(56.4%)	8.6269±1.6925	
Smoking	Yes	119(23.3%)	9.9356±1.6359	0.000
	No	392(76.7%)	8.2285±1.5626	
Type of treatment	Insulin	328(64.2%)	8.2453±1.5537	0.000
	Oral medication	183(35.8%)	9.5756±1.6468	

Table 2. Difference of HbA1c mean between different groups and SEP

Subgroup of variable		*P*-value
SEP 1 (Best)	SEP2	0.817
	SEP3	0.002
	SEP4	0.001
	SEP5(Worst)	0.000
SEP2	SEP3	0.000
	SEP4	0.000
	SEP5(Worst)	0.000
SEP3	SEP4	0.900
	SEP5	0.004
SEP4	SEP5	0.089
Single	married	0.000
	widow	0.211
	divorced	0.710
Married	widow	0.000
	divorced	0.190
Widow	divorced	0.000
Without income	<600000	0.000
	600000-1200000	0.000
	>1200000	0.000
<600000	600000-1200000	0.000
	>1200000	0.019
600000-1200000	>1200000	0.612
Illiterate	Under diploma	0.998
	diploma	0.185
	Top of diploma	0.000
Under diploma	diploma	0.051
	Top of diploma	0.000
Diploma	Top of diploma	0.005

Except for self- monitoring of blood sugar, it seems that the two groups are slightly different in terms of other aspects of self-management.

In regard with the relationship between smoking and HbA1c in diabetes patients, the results of the present study were in line with those reported by Isaac Booger (10). According to Booger et al and based on the results of the present study, it can be concluded that smoking is an unhealthy habit that is in contradiction with self-care and self-treatment behaviors. The correlation between smoking and socioeconomic position has also been proved in other studies, such that prevalence of smoking among individuals with lower socioeconomic position is higher and they start smoking in younger age.

Blood sugar control was significantly different according to marital status, which indicates better control among married individuals. This finding is in agreement with that of the study conducted by (Jerant) et al (11). In justifying this finding, it can be stated married individuals compared to unmarried ones are provided more exciting support and information which provides the patient with better control. On the other hand, exciting, social, and psychological problems are outstanding in some groups such as divorced and widowed individuals, which in turn reduces self-care behaviors and disease control among the patients.

Diabetes control was significantly different according to educational status. This finding is in agreement with those reported by Cartervet

al, Goldman et al, (Rose) et al, (Lukoschek) et al (7,12,13,14) who concluded that low education causes serious problems for disease control while high education facilitates disease control. As (Lukoschek) et al (14) believe, it can be stated that there is a positive correlation between the patient's education level and understanding of medical and health information which in turn facilitates disease control. Moreover, Krishnan et al discovered that the level of diabetes prevalence was 1.28 times higher among individuals with an education of below 12 years compared to those with an education of over 17 years (15,16).

Disease control was significantly different according to income status. In follow-up comparisons, it has been concluded that the higher total income associates with higher disease control. This finding is in agreement with those reported by Adams et al, Carter et al, (Piette & Heisler &Wagner), (Rose) et al, Brown et al, (von friederichs- fitswater), and American Diabetes Association (17,7,18,13,19,11,22) who concluded that low or lack of income causes serious problems to disease control while a higher income makes self-care and care behaviors possible and enhances access to healthcare services in treatment procedures. In justifying this finding, it can be stated that groups with low income conduct self-management behaviors that lead to better control of blood sugar because they lack financial and instrumental support. They also perform poorly in sticking to their medical and diet schedules, exercise, physical activity, self-monitoring of blood sugar because they fail even in meeting their primary needs. As(Zgibor & Simmons) (23) and (Jerant) et al (11) concluded that high treatment costs, lack of medication, and lack of enough income prevent the patients from having access to examination centers, medications, diabetes preventive care, and educational programs, which in turn postpones control and care process. Moreover, Adams et al (17) have stated that poor socioeconomic position is the main cause of failure to conduct self-care behaviors. Robinson et al also concluded that the income-poverty proportion (calculated by dividing annual income by the country's poverty threshold) has a powerful relation with diabetes prevalence. On the other hand, lack of income is positively correlated with educational level, such that individuals with lower educational level and mostly illiterate ones have lower incomes, and low education and income simultaneously influence health literacy and patient's search for medical and/or treatment pursuit. On the one hand, while referring to their physician, patients with lower socioeconomic positions do not fully understand his/her advice and make no effort to understand due to low literacy and lower self-confidence. Health practitioners may not spend much time communicating with such patients, either. Understanding the importance of medicine consumption especially self-regulation of insulin, anti-blood pressure medications, and understanding the importance of observing medicine consumption intervals are completely dependent on the patient's literacy.

Based on the previous studies, it can be concluded that the role of social factors and also psychological and mental criteria in understanding the risk of chronic disease and health is due to the negative effects of economic and collective factors, and that the highest level of physical and mental risks is among patients who have experienced hard conditions over time. Azar Tal et al figured out that low socioeconomic status can be involved with insufficient and inappropriate reception of services because the nature of diabetes after treatment and care and after the influence on occupational status and absence from work can be related to low socioeconomic position. The effect of social difference on health has been proved, and life expectancy in low socioeconomic classes is remarkably dissatisfying. In addition, differences in socioeconomic levels brings about social inequality (24).

It has been proved that ability and tendency of caretakers of health systems to get access to exact examinations of complications among

diabetes patients and information on newer scientific resources in deprived areas are weaker. In similar studies dealing with the effects of socioeconomic position on other diseases, similar results have been reported, such that low socioeconomic position causes mental health to remarkably drop. Moreover, disease risk factors including physical activities, consumption of fast foods, and smoking are more common among community groups with lower socioeconomic position. Global studies have indicated that diabetes complications especially diabetic neuropathy deteriorates in lower socioeconomic position. Moreover, the lower the socioeconomic position is, the more unfavorable the prediction of health development will be (25).
In fact, the individual's living conditions and social class can to some extent determine his/her lifestyle, his/her method of dealing with complications of diabetes, and the extent of his/her access to needed individual and social services. This issue needs further studies consisting of larger sample so that the results can be generalized in which social and cultural conditions of Iran should be taken into account, which is one of the limitations of the present study.

Conclusion

The positive effect of social support on reducing depression and increasing self-care among patients requires the individuals to be supplied with more potent networks of social support. Moreover, due to the chronic process of the disease, treating the patient's psychological problems such as depression is necessary and inevitable and should be taken into serious account. Therefore, it is suggested that the effect of social support, as an important variable, on self-management and self-care among diabetes patients should be paid more attention.

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