Original Research Article

Prevalence of complications of type 2 diabetes and its socioeconomic factors affecting it in Bushehr

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Abstract

Background: Type 2 diabetes is one of the most important health problems in the world. This study evaluates the prevalence of complications of type 2 diabetes and its socioeconomic factors in Bushehr province. **Method:** The present study was descriptive-correlation type. The subjects were 341 patients with type 2 diabetes who were referred to two-level diabetes clinics in Bushehr province. They were selected by simple random sampling. The data collection tool was a self-made questionnaire containing 60 questions and the reliability of this tool was analyzed by Cronbach's alpha test (0.72). Questions were about demographic information, socioeconomic status, treatment care status, and complications of the disease. The collected data were analyzed by SPSS version 20 and descriptive and inferential statistical tests. **Results:** 40.8% were male and 59.2% were female. 56% of patients had complications. The most complications included ocular complications (33.5%) and the least complications of diabetic foot disorder (4.5%). There was a significant relationship between the age of the affected people, the duration of complications, the nutritional status of people, lipid disorders, income level with complications.(p <0/05). The prevalence of neurological complications was 31%, ocular complications were 33.5%, cardiovascular complications were 19%, kidney complications were 5.9%, and diabetic foot was 4.5%. In people who were more than 9 years old with diabetes, complications were observed in 6.2% of those who were less than 6 years old. **Conclusion:** Based on the results of this study, attention to preventive measures (proper nutrition, self-care education for patients), and regular examinations for the early prevention and diagnosis of the disease and its complications, as well as special attention to the low income of the population, seems necessary.

Key Words: Type 2 diabetes, socioeconomic factors, complications.

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INTRODUCTION

Diabetes is one of metabolic diseases and is a multifactor disorder that is specified with chronic increase of blood glucose and it is due to disorder in secretion or function of insulin or both of them. Considering the increasing trend and statistics of Diabetes all over the world, World Health Organization has declared it as a hidden epidemy and since 1993 has called all countries of the world for fighting with this epidemy. According to world health organization in 6 April 2016 9 (Genève), the number of people with diabetes has increased from 108 million people in 1980 to 422 million in 2014 9 (about four times) that most of them are living in developing countries. World prevalence of diabetes among above 18-years old adults has increased from 4.7% in 1980 to 8.5% in 2014. Diabetes prevalence in low and moderate income countries is rapidly increasing. Besides high prevalence, diabetes is along with various disorders such as disorder

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in glucose, protein and fat metabolism and chronic glucose increase causes destruction, function disorder and failure of various members especially eyes, kidneys, nerves, heart and vessels. Two important complication of diabetes type II include retinopathy and nephropathy which are respectively the main reason of blindness and kidney diseases in final stages. This disease in the adult population is the main reason of blindness, advanced kidney failure and mutilation in many countries. One of the most prevalent complications of diabetes is cardiovascular diseases which are one of the most prevalent reasons of death in many societies. A high percent of deaths are due to non-epidemic diseases so that from 56 million death cases in 2015, about 40 million cases have been due to non-epidemic diseases (70%) and 1.6 million death due to diabetes (4%). Diabetes is a costly disease due to creating complications. Besides financial costs, inappreciable costs such as pain, anxiety, disturbance and so mainly follow life quality reduction which is almost incomputable. Here, diabetes type II is the most prevalent type of diabetes and designates 90% of disease cases. Prevalence of diabetes type II is continually increasing. Health status of a population depends on complex and various factors that have both genetic and environmental aspect and in a wide range, they find a social aspect. Among effective risk factors in accession of diabetes type II are diabetes family record (heredity), obesity, age 45 years and more, race, pregnancy diabetes record or birth of child with the weight of 45 kg and higher, high blood pressure, high cholesterol level, disorder of glucose tolerance test, dietary, stress, smoking and so on. One of important effective factors is socioeconomic factors which have a considerable impact on health and its consequences such as life quality. Weak socioeconomic conditions during life impact health. People, who are in low social classes, suffer serious disease and early death twice as people who are in higher classes. Financial and mental social reasons such as family low capital, insecure job and living in inappropriate houses, low education contribute in creation of these differences that finally their impact leads to diseases or early death. In recent years, considerable increase is observed in evidences like socioeconomic status and diabetes type II. Most available socioeconomic inequalities among countries and various social groups in the countries are considered among underlying factors effective on health and definitive solution of such health problems especially in deprived classes won't be possible, unless the available inequalities in the society are considered by policy makers. Diabetes, in respect of disease prevalence and complications, mortality due to it and respective costs is considered one the most important healthcare and socioeconomic problems of the world. The relation of accession of this disease and complications due to it with socioeconomic factors have been confirmed in the world various studies. One of these studies is the study of Fonokashi *et al* that showed low socioeconomic status of diabetic patients is related to higher possibility of diabetes type II accession in younger adults. Considering the above mentioned cases and special attention to this disease and necessity of recognition of effective socio-economic factors in accession of complications sue to it, we decided to conduct a study with aim of determining prevalence of diabetes complications and socio-economic factors effective on it in diabetes clinics of Boushehr province.

MATERIAL AND METHODS

The present study has been of descriptive and cross sectional type which was conducted with the aim of determining prevalence of diabetes type II complications and effective socioeconomic factors in Bouchehr province in 2017. The studied population includes all patients with diabetes type II referring to diabetes clinics in Bouchehr province. Diabetic patients are referred to diabetic clinics for examination by specialists by healthcare centers. Research subjects were selected with simple random and multistage method as 400 persons. Data collecting tool was scholar made questionnaire which was used after determining reliability and validity. So that after preparing the primary version of the questionnaire, the validity of the questionnaire content was evaluated using specialists panel. Also, for investigating the reliability of the questionnaire, Cronbach's alpha method was used (a=0.72). This questionnaire has 4 sections including demographic information, information relating to socioeconomic status, information relating to healthcare status of the patient and information relating to disease complications that the information relating to three primary sections were completed according to the patient statements and information relating to complications from portable system of diabetes clinic. For performing this study, required coordination was performed with research vice-chancellor, university protection presidency and treatment vice-chancellor. Names of patients were extracted from diabetic clinic portable system. After work completion, the questionnaire data was analyzed using SPSS software and using statistical tests of qui-square (X2), independent t, logistic regression and Kolmogorov- Smirnov test.

Findings: In this study, 341 persons with diabetes type II that had agreed for preforming the survey with age range of 18 to 85 years and with age 56.7 years were studied. Among these people, 40.8% was men and 59.2%. 47.4% of people was family warden, 78.8% was living in cities, 82.7% of people was married, 62% of people had

elementary education and less and in respect of gender, 93.5% was Persian. 49.9% was housewife and 26% was unemployed. 21.8% of people has income lower than 500,000 Toomans, 18.8% of people was smoking cigarette and hookah. 99.1% of people had treatment insurance and 64.9% had no complementary insurance. 14% lacked personal property and 58% didn't exercise. 38.9% of people had abnormal HbA1c, 46.2% high blood pressure, 58.8% had blood fat disorders, 48.7% had obesity or extra weight. 56% of people had diabetic complications that among them 28.3% had one complication, 19.65 two complications, 6% three complications and 2.1% had four complications. Ocular and neural complications included the greatest complications. 23.5% had ocular complications and 30.9% neural complications and other complications included 19% of cardiac complications, 5.9% nephrogenic complications and 4.5% had diabetic leg.

Table 1: Frequency distribution of patients based on the research variables

Percent	Number	Specifications		Percent	Number	Specifications	
83.2	283	Married		93.5	319	Persian	
4.1	14	Single		0.2	1	Turk	
1.7	6	Divorced	Marital status	0.2	1	Kord	Race
9.7	33	Widow		0.8	3	Lor	
1.4	5	Living separated		4.9	17	Arab	
59.2%	202	woman	Gender	42.8	145	Office)employee-military-retired(	
40.8%	139	man		14.2	48	Hand job	Status occupation supervisor
48.7%	165	has	Obesity or extra weight	23.3	79	Other jobs) self-employed - tradesman (	
51.3%	174	don't have		19.8	67	housewife and unemployed	
61.1	193	normal	HbA1c status	24.9	85		
38.9	123	abnormal		5.3	18	hand job	Patient employment status
46.2	157	above normal level	blood pressure	12	41	other jobs))self-employed-tradesman (	
53.8	183	natural		57.8	197	housewife and unemployed	
26.9	90	treatment services		44	148	no complication	
39.1	131	social security	type of insurance	28.3	95	one complication	
20.9	70	rural insurance		19.6	66	2 complications	number of complications
6.9	23	armed forces		6	20	3 complications	
1.2	4	relief committee		2.1	7	4 complications	
4.2	14	other insurances		35.1	118	yes	complementary insurance
0.9	3	no insurance		64.9	218	no	

DISCUSSION AND CONCLUSION

In this study, the greatest prevalence of complications is related to ocular complications (33.5%) and neuropathy (31%) and the least prevalence was related to diabetic foot complication (4.5%). MeisamOlfatifar *et al* showed that in diabetic patients type II, neuropathy complication with prevalence of 57.34% and retinopathy complication with prevalence of 47.55% were respectively the greatest prevalence of chronic diabetes type II. Khamseh *et al* in their study showed that in patients' neuropathy was declared (57.7%) and after that respectively ocular complications (38%), renal (27.9%), cardiovascular (27.7%) and diabetic foot ulcer (7.9%). In the study of Heshmati *et al* it was specified that (65.8%) of patients suffered neuropathy, (26.8%) retinopathy, (14.5%) nephropathy, (38.8%) cardiovascular complication and (50.5%) other complications. Retinopathy was an important complication that in case of non-diagnose may lead to blindness. Determining the accurate time of this complication is not possible and occurs during time. So, regular reference to specialist physician and screening is very significant. Neuropathy is the early complication of diabetes type II and timely non-diagnose of diabetes and its complications may be the reason of relatively high prevalence of this complication in the present study. Diabetic foot complication is one of the most serious complications of diabetes which is preventable. Lack of sufficient care may lead to mutilation and dysfunction. Here, training patients and sensitivity of physicians to early diagnose of this complication seems necessary.

Table 2: Complications prevalence in patients with diabetes type II

Prevalence	Confidence Interval	Frequency	Complications
31%	26-36%	(30.9%)04	neural (neuropathy)
33.5%	29-39%	(33.5%)113	ocular (retinopathy)
19%	15-23%	(19%)64	cardiovascular
5.9%	3-8%	(5.9%) 6	renal (nephropathy)
4.5%	2-7%	(4.5%) 16	diabetic foot

The results of the present study showed that families that have less income, have greater chance of suffering complications. In the study of Azar Tal *et al*, there is a significant statistical relation between income status and prevalence of complications of diabetes type II. Also, a significant relation was observed between house ownership status and prevalence of complications. And the chance of suffering complications in patients who lived in rented housed was higher. This variable was not investigated in similar studies. In the study of Askarshahi *et al* and Manaviat *et al*, no significant relation was observed between smoking and complications. In the study of Azartal *et al*, no statistically significant relation was found between diabetes consequences and physical activity. Regarding the impact of physical activity in reduction of resistance to insulin, it seems necessary that in the similar studies the physical activity rate is accurately calculated and this rate is not merely based on the patients statements.

Table 3: Relation between the study variables and complications in patients with diabetes type II

P-Value	With Complication		No Complication		Frequency	Variable	
	Percent	Number	Percent	Number			
0.459	55	111	45	91	(59.2%)202	woman	gender
	59	82	41	57	(40.8%)139	man	
0.181	58.8	157	41.2	110	(78.7) 267	city	residence place
	50	36	50	36	(21.2%)72	village	
0.566	52.9	36	47.1	38	(19.9%) 68	diploma and higher	educations
	63.9	39	36.1	56	(17.9%)61	less than diploma	
	54.1	66	45.9	22	(38.5%)122	elementary	
	57.3	51	42.7	32	(26.1%)82	illiterate	
0.653	51.7	15	48.3	14	(8.5%)22	yes (regular and daily)	smoking
	62.9	22	37.1	13	(10.3%)35	yes (sometimes)	
	56.2	153	43.8	119	(81.1%) 275	no smoking	
0.648	58	83	42	60	(42%)143	do exercise	exercise
	55.6	110	44.4	88	(58%)198	don't exercise	
0.023	72.1	31	27.9	12	(13.2%) 43	less than 250 toomans	income
	66.7	18	33.3	9	(8.3)27	between 250-500 thousand tooman	
	43.4	33	56.6	43	(22.3%)7	between 500000-1million toomans	
	57.4	81	42.6	60	(43.3%) 101	between 1-2 million toomans	
	50	19	50	19	(11.6%) 68	more than 2 million tooman	
0.000	67	134	33	66	(58.8%)200	no	fat disorders
	41.4	58	58.6	82	(41.1%) 42	yes	
0/047	3/54	159	7/45	134	(%85/9)293	personal property	house ownership status
	4.79	27	6.20	7	(10%)34	rented property	
	25	1	75	3	(1.2%)4	organizational property	
	5.62	5	5.37	3	(2.3%)8	relatives property (others)	
	50	1	50	1	(0.6%)2	others	

In this study, no significant relation was observed between the variable of the patient educations and job with complications. But there was a significant relation between the family warden job and complications. And the chance of suffering complications in people whose warden job was hand job or other occupations was more than people who were unemployed or housewife. It seems that occupational busyness and as a result less free time in caring patients have been effective in following the illness and treatment. In the study of Khani Jeihooni *et al*, the relation between educations and occupation with complications was significant. The results showed that the percent of diabetic complications in residents of urban regions is more than rural regions but the observed difference was not significant. In the study of Heshmati *et al* no significant relation was observed between the patients' resident place and prevalence of diabetic complications. It seems that urban and rural referees to diabetic clinic receive similar services and there is no difference in patients' access to diabetic clinic services

Table 4: The relation between social variables and complications in patients with diabetes type II

Chance ratio	Significance level	Variable	
0.820	0.130	employment status of the patient	social factors
0.849	0.90	education level	
1.257	0.208	education level of the patient father	
0.863	0.483	education level of the mother	
	0.202	family warden job	
1.071	0.863	handy job	
2.240	0.120	office job	
2.395	0.027	other occupations	
1.308	0.347	residence place	
92	0.191	number of family members	

The results of the study showed that the percent of prevalence of diabetic complications in men is more than women, but the observed difference was not statistically significant. In the study of Manaviat *et al* (retinopathy) and in the study of Nezakati *et al* (nephropathy) and in study of Marvasti *et al* (neuropathy) and Kouhian *et al* and Khani Jehooni *et al* and Askarshahi *et al* (retinopathy) no significant relation was observed between gender and complications. But in the study of Sheghagi *et al* this relation was significant and complications relating to diabetes in men were higher than women and in the study of Marvasti *et al* this relation became significant. But the complications in women were estimated more than men. It seems that attention of men and women to treatment cares is not the same. And men refer the physician when they suffer complications. But women are more sensitive to treatment and refer physician timelier but in the present study no significant difference was observed. The present study results showed that prevalence of diabetes complications has no significant relation with marital status and rave. In Marvasti *et al* study a significant relation was observed between neuropathy prevalence and race (Persian).

Table 5: The table of relation between demographic factors variable and complications in patients with diabetes type II

Chance Ratio	Significance Level	Variable	
1.031	0.007	age	Demographic factors
0.904	0.680	gender	
0.953	0.680	marital status	
10.39	0.761	race	

The results of the study showed that the average age of patients with complication is more among patients who have no complication, that is, with age increase, diabetic complications are increased. Heshmati *et al* in their study showed that by increase of age, prevalence of neuropathy, retinopathy and cardiovascular disease significantly increased. In the study of Azartal *et al*, it was specified that there is a statistically significant relation between the number of diabetic consequences and age group. Bonakdaran *et al* (nephropathy), Nezakati *et al*, Kouhian *et al* (retinopathy) showed that there is a significant relation between age and complications. In the study of Godberg *et al*, a significant relation was found between age above 50 years old and complications. Regarding the role of time in accession of diabetic complications, regular follow up, continuous examinations and training patients in the field of self-care could be effective in reducing complications.

Table 6: The relation between variables of age and complications in patients with diabetes type II

Significance Level	T	Standard Deviation	Mean	Number	Complications	
0.005	2.809	10.536	54.910	145	without	age

	10.011	58.090	188	complication with complication

The results of the present study showed that the relation between the variable of blood fat disorders and diabetes complications was significant. This issue shows the significance of controlling blood fat in diabetic patients. Abdi *et al* showed that there is a significant relation between neuropathy and cardiovascular failure with blood fat. Godberg *et al* also showed that micro-scholar complications are related to high blood pressure and high triglyceride. In this study, no significant relation was observed between the variable of blood pressure status and complications. In the study of Manaviat *et al* and Khani *et al* (retinopathy complication), Nezakati *et al* (nephropathy) and Askarshahi *et al*, no significant relation was observed between blood pressure and complications accession. Also, no significant relation was observed between the number of references to physician and performing blood test and obesity with complications. In the study of Manaviat *et al* no significant relation was observed between obesity and complications (retinopathy). The results of the present study showed that there is no significant relation between HbA1c and complications. In the study of Marvasti *et al* this relation was significant. In this study, the duration of suffering diabetes with complications showed a significant relation. In the study of Bonakdaran *et al* (nephropathy), Nezakati *et al*, Kouhian *et al* (retinopathy) and Marvasti *et al* (neuropathy) showed that there is a significant relation between duration of suffering the disease and the complication.

Table 7: Table of relation between variables of treatment and complications in patients with diabetic type II

Chance Ratio	Significance Level	Variable	
1.149	0.64	times of referring to physician	treatment status
0.761	0.27	time of performing blood glucose test	
1.024	0.92	statusHbA1C	
1.329	0.27	blood pressure status	
1.232	0.41	extra weight or obesity	
2.782	0.000	fat blood disorders	
1.044	0.013	illness duration	

Also, it was specified that people without complication enjoy more appropriate nutrition. In the study of Azartal *et al*, it was specified that there is a statistically significant relation between the number of diabetic consequences and nutrition status. Study of Hamingsen *et al* showed that there is no evidence that nutrition alone impacts the risk of diabetic complications. In fact, the poorer social classes of the society have more appropriate nutrition status and less selection power for using healthcare services, so enjoy lower health level.

Table 8:

Chance Ratio	Significance Level	Variable	
	0.000	duration less than 6 year	term of diabetes suffering
2.54	0.004	duration less than 6-9 years	
2.61	0.000	duration above 9 years	

People whose diabetes duration was 6 to 9 years, 2.5 times equal to (p=0.004) and people who were involved in diabetes more than 9 years, 2.6 times (p<0.0001), in people who suffered less than 6 years complications was observed.

Table 8: The relation between nutrition status and complications

P-Value	Sum of Ranks	Rank Average	Number	Name Of Variable	
0.000	35966	243.01	148	no complication	nutrition status
	45440	178.02	255	with complication	

In this study, the most important factors which have a great impact on diabetes complications were age, income, nutrition status and patients' blood fat. Attention to these factors seems required for promoting health level and preventing diabetes complications and as a result increasing the patient's life quality. In fact life conditions and individual social category may influence style and method of people living and way of fighting the disease

complications and also their access rate to required services, that affirmation of this subject needs studies with greater sample content. Since diabetes complications are in the first degree predictable and in case of creating complication are controllable and treatable, it is required that diabetic patients receive required trainings about significance of continuous regular examinations, observing dietary and so on.

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