



The rate of some complications and risk factors of diabetes in diabetic patients: Study on cases of 3218 diabetic patients

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Introduction: Diabetes is a metabolic disease characterized by chronic hyperglycemia which causes damage to various organs of the individual and reduces longevity. Because diabetes has multiple complications and risk factors which needs to be identified and prevented and So far, few studies have been conducted in Khuzestan province and in Shoushtar city about diabetes and its complications and risk factors. Therefore, this study is a five-year study of diabetic patients from 2014 to 2018 in Khatam-ol-Anbia Hospital of Shoushtar city, which contains 3218 cases. And it was done with the aim of determining the rate of some complications and risk factors of diabetes in diabetic patients. **Materials and Methods:** This study is a retrospective cross-sectional analytical descriptive study. 3218 cases of diabetes patients hospitalized in Khatam-ol-Anbia Hospital, Shoushtar which was studied over the course of 5 years from 2014 to 2018. Information required for this study by survey of patients' cases from 2014 to 2018 in the hospital medical records unit were extracted. Information reviewed in this study included demographic, laboratory and clinical data of patients. Then, data was entered into SPSS version 17 and using descriptive statistics and analytical tests and a significance level of $P < 0.05$ was analyzed. **Results:** This study included 3218 individuals with diabetes mellitus with an average age of 58.06 ± 32.58 years of these, 1853 (57.5%) were male and the rest were female. Also the mean of BMI was 32.16 ± 5.08 , representing patients with class 1 obesity. In this study, 14.4% of individuals had the diabetic foot ulcers and the rest did not have. Also, 10.1% of subjects had limb amputations. 13.0% had diabetes eye disease, 23.4% had diabetes kidney disease. There was a significant relationship between education level and diabetic foot ulcer ($p = 0.002$), that way People with lower levels of education were more likely to develop diabetic foot ulcers. In this study, there was a significant relationship between drug use or smoking with diabetes mellitus and cardiovascular disease ($P = 0.003$). **Conclusion:** Because in this study, there was a significant relationship between drug use or smoking with diabetic foot ulcer and cardiovascular disease, and that drug use increases the risk of infection and it reduces the healing of diabetic foot ulcers and it can increase the amputation of the limbs, Therefore, planning and training through mass media should be given in this regard. Also, the mean of BMI in this study, was represents obesity grade 1 in these individuals. Therefore, by preventing more obesity, eating healthy and light food and doing aerobic exercise, can prevented from complications of obesity that provides the necessary grounds for cancer and other harmful complications.

INTRODUCTION

Diabetes is the most common endocrine disorder (1). It is a metabolic disorder characterized by chronic hyperglycemia, which affects the various members of the individual and reduces longevity (2), and a major cause of death in the industrialized world, causing 1.5 million deaths in 2012. Diabetes also accounts for 15 percent of health care costs in the United States (3). Currently, in Iran, the prevalence of type 2

diabetes is 7.7%, and WHO has estimated that this amount will reach 8.6% in 2025. People with diabetes who are have a BMI higher than normal, are at risk of secondary complications of diabetes (4). The inappropriate combination of low physical activity and unhealthy food consumption has led to an increase in diabetes worldwide (5,6). Diabetes complications, while causing high costs on individuals and the community, also increase mortality in people with diabetes (7). The catching likelihood of a diabetic person to foot lesions throughout his life is 15 to 25 percent with an annual incidence of 1 to 4.1 percent. It is estimated that more than 15% of these ulcers eventually lead to amputation of the organ (8). Foot ulcer is one of the most common, most serious and costly complications of diabetes, which increases the risk of death in diabetic patients 2-4 times (9). Diabetic foot is one of the major causes of impotence in diabetic patients and is one of the chronic and preventable complications of this disease (10). Considering that the

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study results of piran et al., showed that, 70% of foot ulcers in diabetic patients may recur within five years (11) and because of the long hospitalization time of these patients, amputation costs are higher than the cost of preventing or caring for diabetic foot ulcers (12) and as usual steps to create a diabetic wound in the leg, included damage to the soft tissue of the foot, forming a gap between the toes or in the dry areas of the skin or is the formation of a callus in the foot. And the lack of sweating, that is one of the symptoms of autonomic neuropathy. That can lead to drying and cracking of the skin and in this case also leads to infection (13,14), therefore, can prevent its irreversible complications, with identifying risk factors and people at risk. Also the diabetes has a multiple risk factor that needs identification and prevention and so far few studies have been conducted in Khuzestan province and in Shoushtar city about diabetes and its complications and risk factors. Therefore, this study is a five-year study of diabetic patients from 2014 to 2018 in Khatam-ol-Anbia Hospital of Shoushtar city, which contains 3218 cases, and it was done with the aim of determining the rate of some complications and risk factors of diabetes in diabetic patients.

MATERIALS AND METHODS

This study is a retrospective cross-sectional analytical descriptive study. 3218 cases of diabetes patients hospitalized in Khatam-ol-Anbia hospital, Shoushtar which was studied over the course of 5 years from 2014 to 2018, that by ten researchers their files were reviewed. These patients are diagnosed with diabetes and have a history of the disease and referring to Khatam al-anbia hospital Shoushtar which were from 2014 to 2018 and entered the study.

This article is the result of the research project of Behbahan University of medical sciences with the code IR.BHN.REC.1397.9578. After obtaining the necessary permissions and financial support from Behbahan University of medical sciences, this license was referred to the research department of Shoushtar University of medicine, then research committee of Shoushtar issued the necessary permission to Khatam-ol-anbia hospital and then patients through written informed consent and their cases were used for this study. The required data for the study were extracted from patients' files from 2014 to 2018 in the medical records section of the hospital. The inclusion criteria included all patients with a medical diagnosis and history of any type of diabetes, and in each age group and sex. And the exit criteria included other records of patients who had non-diabetic medical diagnosis as well as cases that were incompletely filled. To study records and collect data first a written letter of introduction from deputy of education and research Shoushtar University of medical Sciences was taken, then, the files of patients referring to Khatam-ol-anbia hospital were used in the archives section, that the required information was collected through a researcher checklist from the records. The data in this study included demographic, laboratory and clinical information such as gender, age, BMI, marital status, ethnicity, Job, the economic situation, level of education, having or not having diabetic foot ulcers, limb amputation, family history of diabetes, also having or not having a cardiovascular disease, history of drug use and smoking and also having or not having diabetic eye disease and diabetic kidney disease and taking insulin was investigated. Then, data was entered into SPSS version 17 and were analyzed by descriptive statistics including enumerated tables, mean, standard deviation and variance, and analytical tests including T test, ANOVAs, chi-square and chi-square Pearson and at the significant level of $P < 0.05$.

RESULTS

This study included 3218 individuals with diabetes mellitus with an average age of 58.06 ± 32.58 years, of these, 1853 (57.5%) were male and the rest were female. Also, the average BMI was 32.16 ± 5.08 , that indicating patients with moderately obese (Obese Class I), also the average blood glucose of patients was 342.48 ± 53.21 . In this study, 1953 (60.6%) of people with a post-diploma degree and the rest had diplomas and higher. In terms of ethnicity, 1458 patients (45.3%) were lor. 852 people (26.4%) Arabs, 762 (23.6%) Shuoshtari-Dezfuli and 146 (4.5%) were kord. In this study there was a significant relationship between gender and limb amputation ($p < 0.0001$), also there was a significant relationship between education level and diabetic foot ulcer ($p = 0.002$). This means that people with lower levels of education were more likely to develop diabetic foot ulcers. Table 1 shows the demographic information of these individuals.

In this study, there was a significant relationship between employment status and insulin consumption ($p < 0.0001$), (Figure 1). In the present study, there was a significant relationship between high blood sugar (Bs) and diabetic foot ulcer ($p = 0.005$), However, there was no significant relationship between this variable and limb amputation ($P < 0.05$). In this study, 465 (14.4%) patients had diabetes mellitus and the rest did not have any. Also, 326 (10.1%) of the subjects had limb amputation and the rest did not. of these 326 people, 211 (64.7%) had lower limb amputation and the rest had upper limb amputation. In this study, a significant relationship was found between lower limb ulcer and lower limb amputation ($p = 0.009$), (Figure 2). Also, 854 (26.5%) had a family history of diabetes and the rest did not have it, 489 patients (15.1%) had cardiovascular disease and the rest did not have it. 856 people (26.6%) had a history of drug use or smoking, and the rest did not consume. 421 (13.0%) had diabetic eye disease, 754 people (23.4%) have diabetic kidney disease and also 987 people (30.6) consumed insulin and did not consume the rest, (Figure 3). In this study there was a significant relationship between drug use or smoking with diabetic foot ulcer and cardiovascular disease ($P = 0.003$). Also, there was a significant relationship between insulin consumption and diabetic foot ulcer ($P = 0.009$). There was a significant relationship between family history of diabetes and limb amputation ($p < 0.0001$).

DISCUSSION

In this study most people with diabetes were male. In studies by Madmoli et al (4), Urbančič Rovani et al (15), Stockenbroek et al. (16), most people with diabetes were women that was not consistent with the present study. But in the study Frykberg et al., 90.3% of the population was male (17), and in the study of tan et al., the number of men and women was equal (18). The population of diabetic women is more than men in many studies which may be attributed to their gender characteristics, but in terms of complications of diabetes, the men more than women affected. But in this study, diabetic foot ulcer, limb amputation and diabetic kidney disease were higher in men than in women.

In the present study, the economic status of more than 61% of people was low to moderate, while in the study of Madmoli et al. (4), 50% of the patients had moderate economic terms, which study (4) is consistent with the study of Amalraj et al. (19). In the present study, a significant relationship was found between economic status and diabetic foot ulcer ($P = 0.003$). But in the study of Madmoli et al. (4), there was no significant relationship between the economic status and the prevalence of diabetic foot ulcers. However, in many studies, care for diabetic patients with foot problems is extremely costly (18).

Table 1 Demographic characteristics of patients with diabetes and its association with diabetic foot ulcer, limb amputation and taking insulin by using Chi-square and Chi-square Pearson tests

Variable	Classification	Number	Percentage	Relationship with diabetic foot ulcer P value	Relationship with Limb amputation P value	Relationship with taking insulin P value
sex	Male	1853	57.5	p=0.09	p <0.0001	p=0.08
	Female	1365	42.4			
Education	Under the diploma	1953	60.6	p=0.002	p=0.06	p=0.02
	Diploma and higher	1265	39.3			
Occupation	Free	921	28.6	P=0.004	p=0.03	p <0.0001
	Housewife	906	28.1			
	Unemployed	765	23.7			
	Employee	626	19.4			
The economic situation (Monthly-Tomans)	Up to 1.5 million	1986	61.7	P=0.003	P=0.01	P=0.008
	Above 1.5 million	1232	38.2			

* A significant level below 0.05 is considered.

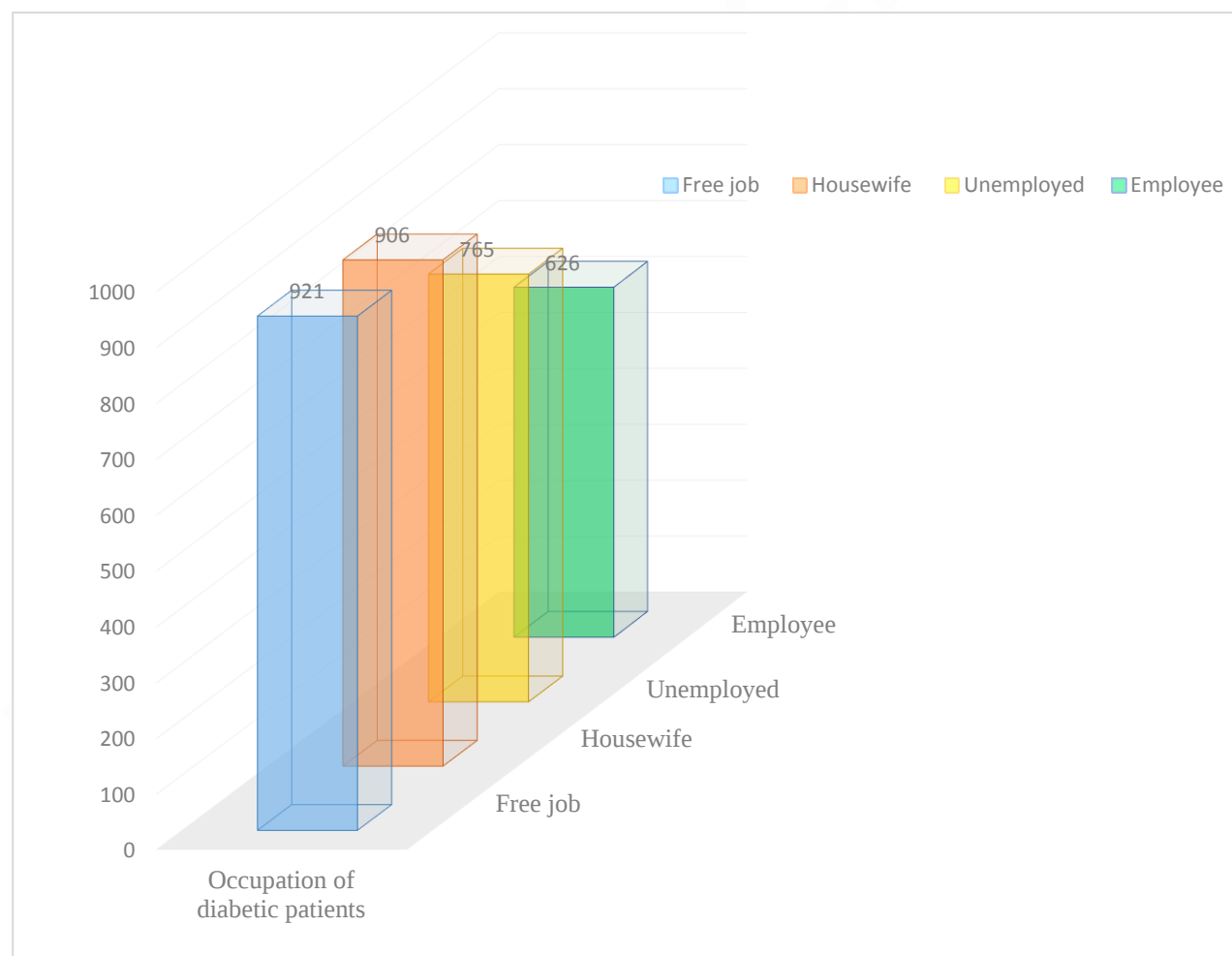


Figure 1 Frequency of employment status of diabetic patients

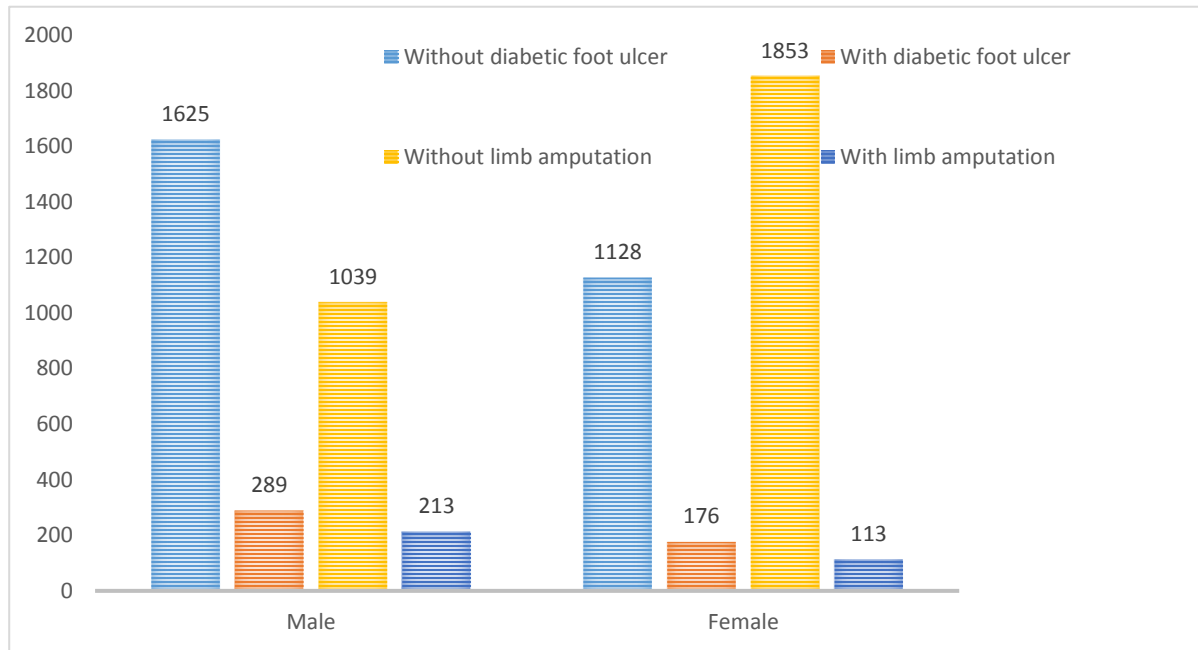


Figure 2 Frequency comparison of diabetic patients without diabetic foot ulcer and with diabetic foot ulcer and also without limb amputation and with limb amputation according to gender

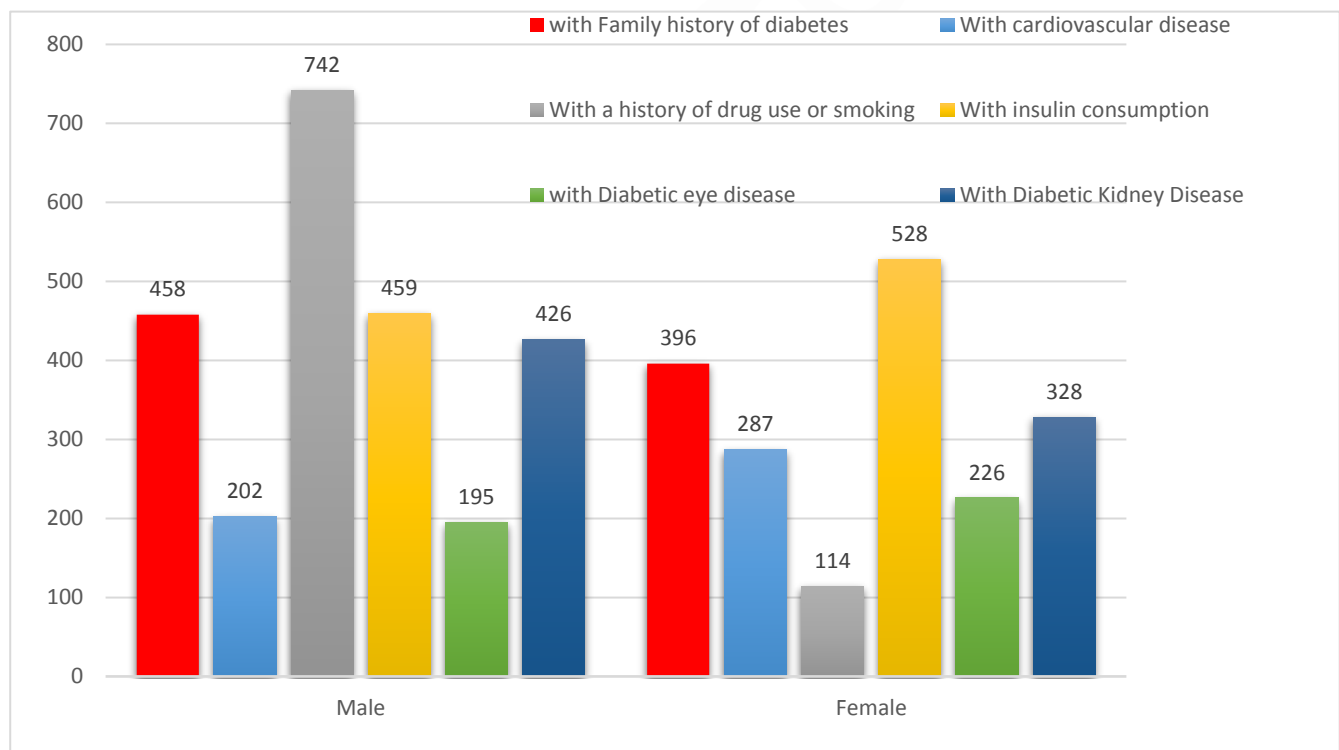


Figure 3 Frequency comparison of diabetic patients with family history of diabetes, cardiovascular disease, history of drug use or smoking, insulin consumption, with diabetic eye disease and with diabetic kidney disease according to gender

In the present study, there was a significant relationship between high blood sugar (Bs) and diabetic foot ulcer ($p = 0.005$), however, there was no significant relationship between this variable and limb amputation ($P < 0.05$). In the study of Madmoli et al. (4), there was a significant statistical relationship between rate prevalence of foot ulcer (last 2 years) and variable blood glucose levels. So that in people with

lower limb ulcer, there was a higher level of glucose. However, there was no significant relationship between age and mean hemoglobin with the prevalence of the lower limb ulcer. Also there was no significant relationship between the history of diabetic foot ulcers before the last two years with age, hemoglobin and blood glucose levels.

In this study there was a significant relationship between gender and limb amputation ($p < 0.0001$). Also there was a significant relationship between education level and diabetic foot ulcer ($p = 0.002$). That way people with lower levels of education were more likely to develop diabetic foot ulcers. In the study of Rostami et al. (3), People with lower literacy than those who are more literate significantly, they have been more likely to suffer from amputation before 2 years and over the past two years. This can be due to the fact that educated people have a higher level of health information.

In this study, there was a significant relationship between employment status and limb amputation ($p = 0.03$). Also, in the study of Rostami et al. (3), there was a significant relationship between occupation of patients and the prevalence of lower limb amputation and most of the patients were unemployed but in the study of Amalraj et al., 52% of patients who were under amputation had a free occupation and 23 percent were unemployed (19).

In this study also, there was a significant relationship between lower limb ulcer and limb amputation ($p = 0.009$), which is in line with Rostami et al. (3). In many studies, there was also a significant relationship between lower limb ulcer and amputation (20-22). Because of increased diabetic foot ulcers and foot infections and its progress, affected amputation also increases.

In this study, 23.4% of the patients had diabetes kidney disease. Many studies have shown that diabetes is the most common cause of acute kidney damage and ESRD (23). The results of the study by Venot et al., showed that the serum creatinine level in diabetic patients is higher than non-diabetic patients and more are undergoing dialysis treatment (24). The results of Davis et al. showed that only 20.2% of diabetic patients with lower limb amputation had acute kidney damage (21). Also, in a study by Rostami et al. (3), was not found significant relationship between the prevalence of kidney problems and the prevalence of lower limb amputation. However, there was a significant relationship between a history prevalence of amputation and kidney problems.

One of the complications of diabetes is Alzheimer's disease in some studies (25). Diabetes and Alzheimer's disease are increasing in prevalence and numerous studies have shown that diabetes patients increase the risk of developing AD compared with healthy people (26). Also, hypercholesterolemia is another factor that has shown its relevance due to its potential association with diabetes (27). Also in a study that was studied four major cardiovascular risk factors, that one of these risk factors was diabetes (28).

CONCLUSION

In this study, high complications of diabetes mellitus were evident. Also, more than 60% of people had a lower education level than a diploma and considering in this study, there was a significant relationship between education level and diabetic foot ulcer, this means that people with lower levels of education were more likely to develop diabetic foot ulcers. Therefore, it is essential to follow the necessary steps to raise the level of literacy of individuals. Also in this study, there was a significant relationship between drug use or smoking with diabetic foot ulcer and cardiovascular disease, and that drug use increases the risk of infection and it reduces the healing of diabetic foot ulcers and it can increase the amputation of the limbs. Therefore, planning and training through mass media should be given in this regard. Also, the mean of BMI in this study, was represents obesity grade 1 in these individuals. Therefore, can prevented from complications of obesity that provides the necessary

grounds for cancer and other harmful complications by preventing more obesity, eating healthy and light food and doing aerobic exercise.

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Article Keywords

Diabetes, Diabetes complications, Risk factor, Diabetic patients, Diabetic foot ulcers

Acknowledgment

The researchers in this study appreciated and thanked everyone who cooperated with us. The names of the ten researchers who helped in investigating cases and collecting data are as follows: Mostafa Madmoli, Yaghoob Madmoli, Pouriya Darabiyan, Mohammad Madmoli, Iman Madmoli, Reza Madmoli, Karim Madmoli, Alireza Madmoli, Amin Madmoli and Mohsen Madmoli.

Conflict of interest

There are no conflicts of interest in this study.

Article History

Received: 04 October 2018

Accepted: 30 November 2018

Published: January-February 2019

Citation

Mostafa Madmoli, Zahra Mahmoudi Dehcheshmeh, Alireza Rafi, Zahra Kord, Fariba Mobarez, Pouriya Darabiyan. The rate of some complications and risk factors of diabetes in diabetic patients: Study on cases of 3218 diabetic patients. *Medical Science,* 2019, 23(95), 63-68

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