

## Prevalence of Type 2 Diabetes in Population Over 30 Years Old (2017-2018)

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**ABSTRACT** The current study attempts to evaluate the prevalence of type 2 diabetes in the population older than 30 years old in Varamin city in the years 2017-2018. As a novel strategy, in this descriptive-analytical study, data was collected from 1,102 diabetic patients who had referred to the Diabetes Patient Support Centre of Varamin city. The questionnaire was used to collect data. Data was analysed using SPSS software and chi-square test was used for independent variables and qualitative t-test. According to the results of the present study, the prevalence of type 2 diabetes among this population is lower than similar studies in other centres. Finally, given the prevalence of twelve percent and an increase over a year in both men and women and not having diabetics go to health centres, screening and remedies for affected people and formulation of a prevention plan for healthy people in Varamin is recommended.

### INTRODUCTION

In the past, communicable diseases were recognised as the biggest health problem in the world, but non-communicable diseases are now being developed in developing countries and play a very important role in mortality and health system threats (Lotfi et al. 2013). Type 2 diabetes is one of the most common metabolic disorders that is associated with an absolute or relative deficiency in insulin secretion or function in the body and has increased in recent decades among adults worldwide and in different societies (Barceló and Rajpathak 2001; Guariguata et al. 2014).

According to WHO experts, just in 2016, 442 million people suffering from diabetes are living in the world and the number of people with fasting glucose disorder in the world has been about 250 million, and the prediction of diabetes in 2035 is over 640 million. The prevalence of type 2 diabetes in Iran is estimated to be 10.3 percent (WHO 2016, 2018).

Diabetes risk factors include overweight, obesity, high blood fat, low physical activity, low fibre intake, age, family history, low birth

weight, and hypertension. If the number of risk factors in a society increases over a period of time, people in that community will be more susceptible to diabetes and this will pose a threat to the health of that community (Lotfi et al. 2013).

The results of numerous studies in several countries indicate that high levels of glycated haemoglobin or long-term glucose (HbA1c) are an independent risk factor for the onset of diabetes complications (Lind et al. 2019). In Iran, studies show that the prevalence of this disease among adults in the metropolitan area of Tehran in 2017 was 14.4 percent (Rashedi et al. 2017).

Since there has been no comprehensive study in Varamin for this type of type 2 diabetes, there has been an increase in the number of diabetic patients admitted to the centre over recent years, according to reports from the city's health network.

### Research Objectives

The purpose of the current study is to determine the prevalence of type 2 diabetes in the population over 30 years old in Varamin city in the years 2017 and 2018.

### MATERIAL AND METHODS

In this work, firstly, using the reports of Varamin County Health Network, general information about diabetic individuals was collect-

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ed, however, many individuals were referred to the private sector and their statistics were not available, so it can be considered as the limitation of the research.

The researcher then referred to the Diabetic Patient Support Centre of Varamin city and obtained information about six cases of diabetic patients who first visited the center in 2017 and 2018. These included gender, age, fasting blood sugar, HbA1c, blood cholesterol, systolic blood pressure, diastolic blood pressure, and triglyceride and blood pressure. The process of data collection was in accordance with the National Diabetes Screening Program so that people with a history of diabetes and hypertension who were monitored by a physician at the Diabetes Support Centre in Varamin were selected and their medical records information including fasting blood sugar, age, cholesterol, HbA1c, blood pressure, and triglyceride were extracted.

Standard criteria variation for fasting blood glucose in the form of fasting blood glucose was less than 100 mg/dl for a healthy person. Those between 126-100 mg/dl were considered pre-diabetics and for those whose fasting blood glucose was greater than 126 mg/dl were considered as individuals with diabetes. Also, the level of glycosylated haemoglobin HbA1c less than 5.7 percent were healthy subjects, above 5.7 percent and above 6.4 percent were considered as pre-diabetic and with HbA1c greater than 6.4 percent as diabetic.

Systolic blood pressure equal to or greater than 139 mmHg, diastole equal to and greater than 89 mmHg, triglycerides greater than 250 mg/dl and cholesterol greater than 200 mg/dl were considered risk factors for diabetes. Finally, the data of 1,102 patients was analysed using SPSS 25 software and descriptive and inferential statistics including chi-square for qualitative variables and independent t-test was used to analyse the differences between the two groups of women and men.

## RESULTS AND DISCUSSION

The results of this study show that the prevalence of type 2 diabetes in the population over 30 years old in Varamin city in the year 2017 and 2018 is eleven percent and twelve percent, respectively. Prevalence in males at 2017 and 2018

years was eight and nine percent, and the results of the demographic data analysis of participants, including age and gender, are also shown in Table 1. Other characteristics of the studied samples including mean fasting blood sugar, HbA1c, cholesterol, triglyceride, systolic blood pressure, diastolic blood pressure and pulse pressure are shown in Table 2.

**Table 1: Absolute and relative frequency of patients with type 2 diabetes referring to Diabetes Patient Support Centre of Varamin in 2017-2018 by gender and age**

<i>Gender</i>	<i>Frequency</i>	<i>Percent</i>
Male	355	32.2
Female	744	67.8
<i>Age (year)</i>	<i>Frequency</i>	<i>Percent</i>
(30-45)	236	21.4
(45-60)	480	43.6
(60-75)	294	26.7
75 and older	92	8.3
Minimum	31	
Maximum	97	
Mean	56.29	
Standard deviation	13.11	

Table 1 shows that of the 1,102 people with type 2 diabetes referred to the Diabetes Patient Support Centre in Varamin city in the years 2017 and 2018, 355 people (32.2%) were male and 747 people (67.8%) were female. Also, according to Table 1, the age of the study population was 21.4 percent (30-45), 43.6 percent (45-60), 26.7 percent (60-75) and 8.3 percent were 75 years old and older. Most of the studied subjects were in the age range of 45-60 years. The mean age of the subjects was 56.29 years. The youngest was 31 and the oldest one was 97 years old.

Table 2 shows that in women, the mean and standard deviation of fasting blood glucose was (209.55±94.01), along with HbA1c (8.88±2.67), cholesterol (191.80±60.34), triglyceride (176.37±89.76), systolic blood pressure (126.99±18.43), diastolic blood pressure (79.67±7.61) and pulse pressure (47.33±14.61). In men, the standard deviation of fasting blood glucose was (203.91±92.43), HbA1c (9.05±2.98), cholesterol (174.70±46.62), triglyceride (168.67±99.24), systolic blood pressure (124.28±15.48), diastolic blood pressure (78.76±6.52) and pulse pressure (45.56±12.46).

**Table 2: Mean and standard deviation of fasting blood glucose, HbA1c, cholesterol, triglyceride, systolic blood pressure, diastolic blood pressure and pulse pressure in type 2 diabetic men and women referred to the Diabetes Patient Support Centre of Varamin, 2017-18**

	Female		Male	
	Mean	Standard deviation	Mean	Standard deviation
Fasting blood sugar (mg / dl)	209/55	94/01	203/91	92/43
HbA1c (%)	8/88	2/67	9/05	2/98
Cholesterol (mg / dl)	191/80	60/34	174/70	46/62
Triglyceride (mg / dl)	176/37	89/76	168/67	99/24
Systolic Blood Pressure (mmHg)	126/99	18/43	124/28	15/48
Diastolic blood pressure (mmHg)	79/67	7/61	78/76	6/52
Pulse Pressure (mmHg)	47/33	14/61	45/56	12/46

Table 3 shows women in terms of HbA1c, 16 people were normal (2.1%), 76 people were moderate (10.2%) and 655 people were high (87.7%). Also, in men, in terms of HbA1c levels, 5 people (1.4%) were normal, 33 people moderate (9.3%) and 317 people high (89.3%).

**Table 3: Absolute and relative frequency of men and women with type 2 diabetes referred to the Diabetes Patient Support Centre of Varamin in 2017-18 from HbA1c surveyors**

HbA1c levels	Male		Female	
	Freq- uency	Per- cent	Freq- uency	Per- cent
Normal (<5.7%)	5	1.4	16	2.1
Moderate (5.7%-6.4%)	33	9.3	76	10.2
High (>6.4%)	317	89.3	655	87.7
Total	355	100	747	100

Based on Table 4 and comparing fasting blood glucose, HbA1c, cholesterol, triglyceride, systolic blood pressure, diastolic blood pressure and pulse pressure in two groups of men and women using independent samples t-test, the results showed fasting blood glucose ( $p=0.933$ ), HbA1c ( $p=0.554$ ), cholesterol ( $p=0.571$ ), triglyceride ( $p=0.192$ ) and diastolic blood pressure ( $p=0.317$ ), and there was no statistically significant difference between the two genders. But there was a statistically significant difference in mean systolic blood pressure ( $p=0.000$ ) and pulse pressure ( $p=0.001$ ) between men and women.

In this study, according to the information obtained from the health and treatment centre in Varamin and the city's Diabetes Support Centre,

the prevalence of type 2 diabetes in the population over 30 years old, in 2017 and 2018, was eleven percent and twelve percent, respectively. The prevalence of type 2 diabetes in men in 2017 and 2018 was eight and nine percent, respectively, and in women was thirteen and fourteen percent, respectively. In a study by Hasan Aamir on 378 people in Pakistan in 2018, type 2 diabetes was reported in the country at 16.98 percent (Aamir et al. 2019). Also in a study by Bikbov, on 7,328 people over 40 years old in urban and rural areas of Russia in 2018, the prevalence of type 2 diabetes was estimated to be 11.7 percent (Bikbov et al. 2019). In a study investigated by Song on 3,388 people aged over 18 years in the East Bango China region in 2019, the prevalence of type 2 diabetes was reported to be 11.5 percent (Song et al. 2019). Also, in a study by Campbell with 211 people in the population of San Blas Panama in the year 2019, the prevalence of diabetes was higher in women than in men (Campbell et al. 2019), which is consistent with the results of the present study. According to the results of these studies, the prevalence of diabetes in these countries is equal to and higher than the prevalence in the present study.

However, in Varamin, a large number of individuals referred to the private sector and their information is unavailable, and the prevalence of type 2 diabetes in the Varamin city population is more than twelve percent, which is one of the limitations of the present study. The mean age of the subjects in the present study was  $56.29 \pm 13.11$  years. In Anderson's study on 500 people in Indian Kamba in 2019, the mean age was 50 years (Anderson et al. 2019). In Izadi's

study on people referring to diabetes centres in Kermanshah in 2013, the mean age was 59 (Izadi et al. 2017). The highest number (70.3%) of the subjects was 45-75 years old. The high mean age in the studied population indicates the high prevalence of diabetes in the country.

Therefore, the complications of diabetes are higher in these individuals and it is necessary to consider selective medications and age-appropriate diabetes prevention programs. It is often pre-diabetes in people with type 2 diabetes and is defined as high blood sugar, which is on the verge of being diagnosed (HbA1c ranging from 5.7% to 6.4%). People in this group are at higher risk for cardiovascular disease and are more likely to develop diabetes (Mataftsi et al. 2019). Severe control of blood glucose with HgA1c less than seven percent can reduce the risk of diabetes-related amputation by up to thirty-five percent (Hasan et al. 2016). In the present study, in 88.8 percent of people had a glycated haemoglobin (HbA1c) of above 6.4 percent, and given that 6.3 percent of people with HbA1c are between 6.4 percent and 7.5 percent, necessary training in self-care techniques is essential to prevent and reduce the complications of diabetes. In diabetic patients with dyslipidaemia, increased total blood cholesterol, triglycerides, harmful blood lipids (LDLs), and decreased blood lipids (HDLs) are common, which increases the risk of cardiovascular disease in these patients (Warrach and Rana 2017). In Ren's study on 223.612 type 2 diabetic patients, from 630 hospitals in China, the results showed that although high triglyceride levels are associated with an increased risk of cardiovascular disease in the short-term in diabetic patients, low triglyceride levels in the long-term are also associated with cardiovascular disease and increases this (Ren et al. 2018). The mean level of triglyceride in the present study was 173.89±92.94 mg/dl. in blood. Triglycerides were higher in women than men, but there was no statistically significant difference between the two genders.

In a study conducted by Özkan et al. (2018) on 251 people in Turkey in 2018, LDL cholesterol levels were normal in most obese individuals, but high triglyceride and HDL cholesterol levels were found to be low in these patients (Özkan et al. 2018). In the present study, the mean cholesterol level in the studied subjects was

186.29±56.83 mg/dl. and there was no statistically significant difference between males and females ( $P = 0.05$ ). This result is also in agreement with the results of the present study. The mean systolic blood pressure in the study population was 126.12±17.57 mmHg.

Sixty-one percent of subjects with systolic blood pressure less than 120 mmHg, 10.4 percent of those with a blood pressure of 120 mmHg, 16.2 percent of those with a blood pressure of 130-140 mm Hg and 10.3 percent of people with hypertension systolic blood levels were above 160 mmHg. In Navar's study on 14.671 people in Duke city in USA university, for four years from 2008 to 2012, 31.8 percent of people with systolic blood pressure were under 130 mmHg and 13.1 percent of them with systolic blood pressure was under 120mm hg (Navar et al. 2017). Hypertension in diabetic patients not only complicates the treatment process and increases health care costs but also significantly increases the risk of macrovascular and microvascular complications (Tsimihodimos et al. 2018). In the present study, systolic blood pressure was normal and there was a statistically significant difference between the two groups of males and females, but it was higher in women. This indicates that blood pressure in diabetic women needs to be measured more periodically and more accurately and proper planning must be programmed to control it. Overall, according to the results of the present study, the prevalence of diabetes was twelve percent in 2019 and its increase in a one-year period and referring the diabetic patients to care centres, screening and remedies for affected people and planning for disease prevention in healthy people in Varamin is recommended.

## CONCLUSION

For ensuring the national and legal security, it is necessary to develop and adopt federal laws, audit normative acts adopted by the executive authorities of the USSR, and regulate different types of special disciplines. The present study demonstrated and analysed the regulatory legal acts, which establish special disciplinary liability that currently contradicts the Constitution of the Russian Federation and the Labour Code of the Russian Federation. Consequently, it is cru-

cial to deal with the above contradictions. Finally, it should be noted that the study makes suggestions on the improvement of legislation, implementation of which will be used as one of the additional guarantees of the stable and safe functioning in the performance of the work associated with the people's life and health, protection and preservation of the natural environment, property, and prevention of technological and environmental disasters.

### RECOMMENDATIONS

The present study was designed to evaluate the prevalence of type 2 diabetes in the population older than 30 years old in Varamin city in the years 2017-2018. Further studies are required to develop methods for screening and remedies for affected people and the formulation of a prevention plan for healthy people in Varamin. Other cities and different age groups can also be the topic of future studies.

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