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## Original Article

# Evaluation of Erectile Dysfunction and Associated Factors in Type-II Diabetic Patients in Birjand, Iran in 2008-2009

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## ABSTRACT

**Background:** Erectile dysfunction (ED) is one of the important complications in diabetic patients. Various factors trigger the onset and intensity of erectile dysfunction. This study was done to determine the prevalence of erectile dysfunction and some associated factors among type II-diabetic patients in Birjand, Iran.

**Methods:** In this cross-sectional study, which was carried out in Birjand during 2008 and 2009, 171 male diabetic patients aged 29 to 76 years who were sexually active and had no history of prostate surgery were included. Data on demographic characteristic and history of diabetes was collected using a questionnaire. International Index of Erectile Dysfunction-5 and Beck's standard questionnaire were used to determine erectile dysfunction and depression, respectively. Data were analyzed using multiple statistical tests including chi square, *t*-test, and logistic regression.

**Results:** The mean age of study population was 52.78 [95% CI: 51.25, 54.32] years (range between 29 to 76 years) and 43.3% of individuals were under 50 years. ED was diagnosed in 140 out of 171 (81.9%) diabetic patients. ED was mild in 28 (20%) subjects, moderate in 66 (47.1%), and severe in 46 (32.9%). Suffering from Long-term of diabetes ( $P<0.001$ ), progressive depression ( $P<0.001$ ), increased level of HbA<sup>1c</sup> ( $P<0.001$ ), and decreased level of HDL ( $P<0.001$ ) were among the most related factors with ED.

**Conclusion:** The prevalence of ED is high among diabetic patients. Control of the disease and its relevant risk factors might be helpful in decreasing sexual dysfunction in diabetic patients.

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## Introduction

Erectile dysfunction (ED) is defined as constant inability of enough erection or maintaining it to be followed by having a satisfactory sexual relationship<sup>1</sup>. Diabetes mellitus is one of the important risk factors for developing ED<sup>2,3</sup>. The etiology of the disorder is multifactorial<sup>4</sup>. Among the causes to be mentioned are vasculogenic, neurogenic, and hormonal

complications in diabetes<sup>5</sup>. Moreover, other complications of diabetes such as renal failure, hypertension, and chronic hepatic disease can lead to ED in a diabetic patient<sup>6</sup>.

Complications of diabetes are the most common reasons for referring to physicians and hospitalization in more than 25% of cases<sup>7</sup>. ED is one of the most important complications of

diabetes in young people while its pathogenesis and treatment is different from those of non-diabetic patients<sup>3</sup>. The main cause of ED in diabetic patients and renal failure associated with organic disorders. In a few of studies, factors such as medicines, diet, and the amount of sleep have also been mentioned to be effective on pathogenesis of ED<sup>1</sup>. The prevalence of ED in diabetic patients differs from 20% to 85%<sup>4</sup>. In addition, diabetes increases ED to threefold in males. Although occurrence of ED is age-related, recent studies have shown that the age of affected ED in diabetes is 10 to 15 years earlier than that of general population and this has no relationship to insulin dependence<sup>4</sup>.

Prevalence of ED in Iran is about 18.8%; of which 45% is severe, 37% moderate, and 18% mild<sup>8</sup>. In addition, the risk of ED development is significantly higher in diabetic patients than non-diabetics<sup>8</sup>. A study in Hamadan, North West of Iran indicated that prevalence of mild to severe ED in diabetic patients was 34%. In addition, parallel to increase time span of diabetes, possibility of ED increases 10% per year<sup>9</sup>.

With respect to the increasing prevalence of type II diabetes, particularly at lower ages and the importance of ED in the sexual activity, the present study was done to determine the prevalence of ED and related factors in type II diabetic patients in Birjand, Iran.

## Methods

This cross-sectional study was done on 171 male diabetic patients aged 29 to 76 years who referred to the Diabetes Clinic of Valli-e-Asr Hospital in Birjand during 2008 and 2009.

Exclusion criteria included history of prostate and pelvic surgery, cerebro vascular accident (CVA), benign prostate hyperplasia (BPH), prostate cancer, polygamy, existence or sexual disorders in patient's spouse, presence of sexual disorders and medication for ED before getting diabetes.

The subjects were sexually active without history of prostate surgery. Diabetes was defined fasting blood sugar (FBS) equal to or greater than 126 mg/dl at two different times or FBS greater than 200 mg/dl along with diabetes

symptoms (polyuria, polydipsia, and weight loss) which were recorded in their clinical files<sup>10</sup>.

Age, education level, history of smoking, tobacco products and history of diabetes was recorded in questionnaire for each subject. In order to determine ED, the international index of erectile dysfunction (IIEF-5) questionnaire was used<sup>11</sup>. The IIEF-5 score is the sum of the ordinal responses (1 to 5) to five items; thus, the score can range from 5 to 25. Individuals with grade greater than 21 were considered without dysfunction (normal) and those with grade equal to or lower than 21 were considered as dysfunction. Regarding the intensity of ED, subjects with ED grades 17 to 21, 12 to 16, and less than 12 were considered as mild, moderate, and severe, respectively<sup>11</sup>.

For assessing depression the Beck depression inventory (BDI), a 21-Item screening questionnaire was used each of the 21 Item on the BDI measures the presence and severity of a depression symptom was evaluated by requiring self-rating from 0 to 3. Thus, the total score ranges from 0 to 63 and scores zero to 10, 11 to 20, 21 to 30, and greater than 30 were considered as normal, mild, moderate, and severe depression, respectively<sup>12</sup>. HbA<sub>1c</sub> level was studied in two groups: more than 6.5 and equal or less than 6.5<sup>13</sup>. It is noteworthy that the questionnaire of the present study was filled out by diabetic patients in a pilot study and its validity coefficient was estimated 0.95 using Cronbach's Alpha test.

Data were analyzed at the significant level  $P < 0.05$  using SPSS software (version 15) and statistical tests including Chi-square, independent  $t$ , and logistic regression.

## Results

Totally, 171 patients were recruited into the study. The mean age was 52.78 [95% CI: 51.25, 54.32] (ranges from 29 to 76) years. The mean duration of diabetes was 6.02 [95% CI: 5.22, 6.81] years. Patients were categorized into 3 age groups: less than 50, between 51 and 60, and over 60 years old. The majority of patients were in the less than 50 age group (43.3%). HbA<sub>1c</sub> results showed that diabetic

control was categorized as poor in 85.4% of patients ( $\text{HbA}_{1\text{C}} > 6.5$ ).

The prevalence of ED among the respondents was 81.9%. Out of 171 subjects, 140 cas-

es had some degree of ED which included mild, moderate severe in 20%, 47.1%, and 32.9% of them, respectively (Table 1).

**Table 1:** The distribution of severity of erectile dysfunction in diabetic men by age

Age (yr)	Mild	Moderate	Severe	Total
	Number (%)	Number (%)	Number (%)	Number (%)
≤50	14 (24.6)	25 (43.9)	18 (31.6)	57 (100)
51-60	20 (40.0)	24 (48.0)	6 (12.0)	50 (100)
>60	12 (36.4)	17 (51.5)	4 (12.1)	33 (100)
Total	46 (32.9)	66 (47.1)	28 (20.0)	140 (100)

Logistic regression analysis results are presented in Table 2. The odds ratio estimates of ED was 24.76, [95% CI: 6.48, 94.67] for severity of depression, 6.17 [95% CI: 2.46, 15.5] for higher of  $\text{HbA}_{1\text{C}}$ , and 10.29 [95% CI: 3.71, 28.51] for lower of HDL. Risk of ED was higher among older age but was not significant. There was no significant relationship between ED and cigarette smoking, BMI, and hypertension.

## Discussion

In our study, the prevalence of ED in diabetic men was 81.9%. Rate of ED in our study was higher than other studies in Iran<sup>9, 14</sup> and the world<sup>15</sup>. Mofid et al<sup>14</sup> performed a study on 700 diabetic men in Tehran and reported ED with a rate of 36.7% among diabetic patients. The rate of ED in diabetic patients was 34% in North West of Iran<sup>9</sup>. Furthermore, the rate of ED in diabetic patients was 50% in some areas of the world<sup>15</sup>.

ED is a universal health problem whose prevalence is increasing in all countries<sup>16</sup>. Several studies have shown that the prevalence of the disease is increased in diabetic patients to such an extent that diabetic patients at lower ages are more probable to develop the disease compared to healthy individuals<sup>4, 17</sup>.

On the other hand, the chance of ED occurrence is related to the duration of diabetes<sup>9, 15</sup>. Our findings showed that ED was occurred in 100% of diabetic patients with history of diabetes over 10 years.

According to our results, the odds ratio estimate of ED in patients with high level of  $\text{HbA}_{1\text{C}}$  compared to low level was 1.56. Lu et al<sup>18</sup> indicated that a better control of blood sugar might cause a decrease in the prevalence and severity of ED in diabetic patients. In contrast, Ziaei-Rad et al<sup>19</sup> showed that control of blood sugar had no effect on sexual dysfunction in diabetic patients.

Hypertension is one of the important vascular causes of ED in general population and in diabetic patients<sup>20-22</sup>. Nonetheless, we could not find a correlation between ED and history of hypertension.

Furthermore, we indicated that  $\text{HDL} < 40$  could increase the occurrence of ED in diabetic patients 11.23 times. Decreasing of HDL as well as increasing of sera cholesterol is important factor related to the high rate of ED in ordinary people<sup>23</sup>. Giugliano et al study on diabetic patients demonstrated that prevalence of acute ED was associated with low levels of HDL and high levels of triglycerides<sup>24</sup>. Dyslipidemia can disturb the erectile function of penis through affecting its endothelial and smooth muscle cells. Moreover, LDL is an important factor in the responsive dysfunction and loosening of the corpora cavernosa of penis<sup>23</sup>.

One of the advantages of the present study compared to similar studies was the assessment of depression among diabetic patients and its relationship to ED prevalence. Mental disturbances such as depression and anxiety play a role in the occurrence and severity of ED<sup>25, 26</sup>. Fedele et al study<sup>27</sup> in Italy reported a significant relationship between depression and ED

prevalence. In our study, 38% of the subjects suffered from severe depression, all of which complained of ED. In contrast, only 35% of individuals without depression symptoms had

ED. It seems that depression may increase the probability of ED in a diabetic patient.

**Table 2:** The effect of various potential risk factors on erectile dysfunction using logistic regression analysis

Variables	Non Erectile Dys- function	Erectile Dys- function	Odds Ratio	95% CI	P value
Age (yr)					
≤50	17	57	1.00		
51-60	11	50	1.36	0.58, 3.17	0.482
≥60	3	33	3.28	0.89, 12.04	0.073
Duration of diabetes (yr)					
≤2	18	32	1.00		
2-5	10	47	2.64	1.08, 6.46	0.033
5-10	3	24	4.50	1.19, 17.05	0.027
>10	0	37	0.86	0.06, 9.82	0.998
Hypertension					
Absent	21	80	1.00		
Present	10	60	1.58	0.69, 3.59	0.280
BMI (kg/cm <sup>2</sup> )					
Normal	4	28	1.00		
Over weight	24	89	0.53	0.17, 1.66	0.275
Obese	3	23	1.09	0.22, 5.40	0.911
Depression					
Normal	26	14	1.00		
Mild	2	21	19.50	3.98, 95.55	<0.001
Moderate	3	40	24.76	6.48, 94.67	<0.001
Severe	0	65	0.86	0.06, 9.82	0.997
Cigarette smoking					
Absent	30	121	1.00		
Present	1	19	4.71	0.61, 36.60	0.138
HbA <sub>1</sub> C (ratio)					
<6.5	12	13	1.00		
≥6.5	19	127	6.17	2.46, 15.50	<0.001
Cholesterol(mg/dl)					
<200	18	87	1.00		
200-239	8	35	0.91	0.36, 2.27	0.832
≥240	5	15	0.75	0.24, 2.27	0.604
High density lipoprotein(mg/dl)					
≥40	26	47	1.00		
<40	5	93	10.29	3.71, 28.51	<0.001
Low density lipoprotein(mg/dl)					
<100	13	47	1.00		
>100	18	93	1.43	0.65, 3.16	0.379

## Conclusion

This study showed that prevalence of erectile dysfunction is high among diabetic patients and related to various factors. Controlling the

diabetes and its relevant risk factors may decrease erectile dysfunction and improve sexual activity in diabetic patients



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## Conflict of interest statement

There is no conflict of interest in this article.

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