

ORIGINAL ARTICLE

Frequency and determinants of erectile dysfunction in Turkish diabetic men

M Kiskac, M Zorlu, M Cakirca, B Büyükdin, C Karatoprak, Erdinç Yavuz¹

Department of Internal Medicine, Bezmialem Vakif University, Faculty of Medicine, Fatih, Istanbul,

¹Family Care Center, Rize, Turkey

Abstract

Background: Erectile dysfunction (ED) or impotence is a sexual dysfunction characterized by the inability to develop or maintain an erection of the penis during sexual performance. ED is observed more frequently and manifests earlier in diabetic patients compared to the normal population.

Material and Methods: One hundred and seventeen consecutive male type 2 diabetes patients seen in our Diabetes Outpatient Clinic were included in our study and these patients were evaluated in terms of the presence and duration of ED, treatment and response to treatment of ED, duration of diabetes mellitus, HbA1c levels, and the presence of microalbuminuria, estimated from 24-hour urine collections.

Results: The patients included in our study were divided into three groups: Patients with no ED, mild-to-moderate ED, and severe ED. Twenty-nine patients (24.8%) fell in the no ED group, 28 (23.9%) in the mild-to-moderate ED group, and 60 (51.3%) in the severe ED group. There were statistically significant differences between these three groups in terms of age ($P = 0.015$) and duration of diabetes mellitus ($P = 0.03$). The groups were similar in terms of microalbuminuria measured from 24-hour urine collections and HbA1c levels ($P = 0.328$ and $P = 0.905$, respectively). Twenty-three of the 88 patients with ED (26.1%) were on ED treatment and 43.5% of these patients reported benefit from the therapy.

Conclusion: Age and duration of diabetes were the main determinants of the presence and severity of ED in male Turkish type 2 diabetic patients. The HbA1c levels were higher in patients with ED, but the differences in levels between the groups did not reach statistical significance.

Key words: Diabetes mellitus, erectile dysfunction, microalbuminuria

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Introduction

Erectile dysfunction (ED) or impotence is a sexual dysfunction characterized by the inability to develop or maintain an erection of the penis during sexual performance.^[1] Although ED may occur at a younger age, it is a disorder most frequently seen in middle-aged and -elderly men. ED in diabetic men is more prevalent and starts to occur approximately 10 years earlier than in the non-diabetic population. Several studies have reported the incidence of erectile dysfunction in 30-75% of diabetic men. ED in diabetic men generally starts in an insidious manner and it takes months to become evident.^[2] Libido is normal in a majority of the cases. ED has many organic as well as

non-organic causes. In diabetes, vascular, neurological, and rarely even psychological causes lead to ED. Organic causes are shown to be predominant and irreversible.^[3] Organic ED can be differentiated from psychogenic ED with a decrease in rapid eye movement (REM), during the sleep period. Organic dysfunction in diabetic men originates from vascular and neurological causes. Autonomic neuropathy forms the basis of neurological ED. Fearman *et al.* found morphological changes in myelinated nerve fibers in the corpus cavernosum of men with diabetes.^[4] In addition, some biochemical changes in the nerves also take place.

Address for correspondence:

Dr. Erdinç Yavuz,
1 No. 2lu ASM Eski Adliye Binası Merkez/Rize, Turkey.
E-mail: erdincyavuz@gmail.com

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Release of acetylcholine in the corporal tissues in diabetic men was found to be less than in non-diabetic men. Vascular causes of ED have a similar prevalence. Both microangiopathic and macroangiopathic changes are involved in the etiology of ED. In the postmortem studies of men with ED, intimal proliferation, medial fibrosis, calcification, and luminal narrowing of the penile artery were detected.^[5] The prevalence of hypertension and hyperlipidemia in the diabetic population is higher than in the non-diabetic population. In addition to diabetes, hyperlipidemia, smoking, and hypertension also contribute to the development of ED. Nowadays, some drugs that provide symptomatic relief in this regard have been introduced.^[6] Drugs used in the treatment of ED are mostly obtained without a prescription. The irresponsible use of these drugs may lead to some adverse effects, even death. Besides these drugs, a number of invasive treatments are also available. In our study, we aim to evaluate ED in type 2 diabetic patients as seen in our Diabetes Clinic, in terms of parameters such as blood glucose regulation, patient's age, duration of diabetes, and so on.

Materials and Methods

Data of patients who were admitted to the Bezmialem Vakif University Diabetes Outpatient Clinic were evaluated retrospectively. An approval from the Ethics Committee of Bezmialem Vakif University was obtained. This was a cross-sectional survey of 117, type 2 diabetic men, consecutively seen at our Outpatient Diabetes Clinic. Patients with peripheral vascular disease, cerebrovascular disease, and patients on beta-blocker treatment were excluded from the study. Patients were evaluated in terms of the presence and duration of ED, treatment for ED, response to treatment, patient's age, duration of diabetes, HbA1c, and microalbuminuria in the 24-hour urine. Patients were also evaluated according to the International Index of Erectile Function (IIEF-5) Questionnaire.^[7] Patients were categorized as follows: No ED (scores ≥ 21), mild-to-moderate ED (scores 6-20), and severe ED (scores 1-5). Patients with ED were further evaluated in terms of treatment for ED and benefits of the treatment. Student's *t*-test, Mann-Whitney U test, and the analysis of variance (ANOVA) test were used for statistical analysis. The results were evaluated with a 95% confidence interval, and a *P* value < 0.05 was considered significant.

Results

Twenty-nine of the 117 patients (24.8%) did not have ED; 60 patients (51.3%) had severe ED and 28 patients (23.9%) had mild-to-moderate ED. A total of 88 patients (75.2%) in all had ED. Of them, 48 (54.5%) reported a duration less than three years, 24 (27.2%) reported a duration of three to five years, and 16 (18.3%) reported a duration of

Table 1: The prevalence of erectile dysfunction in diabetic patients and associated parameters

	Severe ED n: 60 51.3%	mild-to- moderate ED n: 28 23.9%	No ED n: 29 24.8%	P
Mean Age (years)	55.0 \pm 9.9	53.8 \pm 10.1	47.8 \pm 12.9	0.015*
Mean diabetes duration (years)	12.21 \pm 9.38	8.96 \pm 9.30	7.27 \pm 5.65	0.030*
HbA1c (%)	8.67 \pm 1.93	8.20 \pm 1.70	8.16 \pm 1.34	0.328
Microalbuminuria in 24-hour urine samples (mg/dl)	52.2 \pm 60.9	43.7 \pm 51.9	56.3 \pm 66.7	0.905

ED=Erectile dysfunction

more than five years. Sixty-five patients with ED (73.9%) stated that they did not receive any treatment for ED, while 23 patients (26.1%) stated that they used medication for ED. Of the 23 patients who used medication, 13 patients (56.5%) reported no benefit, while 10 (43.5%) reported some benefit from the treatment. The mean ages of 'no ED', 'mild-to-moderate' ED, and 'severe ED' groups were 47.8 ± 12.9 , 53.8 ± 10.1 , and 55.0 ± 9.9 years, respectively, and the difference between the groups in terms of age reached statistical significance ($P = 0.015$). The mean duration of diabetes in the three groups were 7.27 ± 5.65 , 8.96 ± 9.30 , and 12.21 ± 9.38 years, respectively and the difference between the groups in terms of diabetes duration also reached statistical significance ($P = 0.03$). The mean HbA1c levels in the three groups were $8.16 \pm 1.34\%$, $8.20 \pm 1.70\%$, and $8.67 \pm 1.93\%$, respectively, and the difference between the groups in terms of HbA1c levels was insignificant ($P = 0.328$). The mean microalbuminuria levels in the three groups were 56.3 ± 66.7 , 43.7 ± 51.9 , and 52.2 ± 60.9 mg/dl, respectively, and the difference between the groups in terms of microalbuminuria was insignificant ($P = 0.905$). Table 1 summarizes our findings.

Discussion

Global diabetes prevalence is about 10%.^[8] The prevalence increases with age as also the morbidity and mortality rates due to diabetes. The Turkish Diabetes Epidemiology Study (TURDEP) reported that the crude prevalence of diabetes was 7.2% and prevalence of impaired glucose tolerance (IGT) was 6.7% among adults over the age of 20 years.^[9]

Twelve years later the TURDEP 2 study reported that the prevalence of diabetes had reached 16.5% and the prevalence of IGT 14.7%, which translated to an increase in diabetes prevalence of 90%, and an increase in IGT prevalence of 106%. Although it is a benign disease, ED has a negative impact on the quality of life of the affected people, as well as their partners and their families, due to its physical and psychological burden. Many studies have investigated the prevalence of ED. The first large-scale, community-based study, Massachusetts Male Aging Study (MMAS), reported

an ED prevalence of 52% in men between the ages of 40 and 70 years in the Boston region of United States. In this study, the prevalence of minimal, mild-to-moderate, and severe ED were 17.2, 25.2, and 9.6%, respectively.^[10] McCulloch DK *et al.* evaluated 541 diabetic patients and reported an ED prevalence of 6% in the 20-24-year age group and 52% in the 55-59-year age group.^[11] In our study, of the 117 diabetic patients, 29 patients (24.8%) had no ED. We found ED in 75% of our patients. The higher prevalence found in our study compared to the previous studies may be attributed to the older age of our patients. Similar to previous studies, we found a significant association between the severity of ED and older age. Bacon CG *et al.* studied 2108 patients with diabetes and examined the relationship between diabetes duration and ED. Patients were classified into five groups in terms of their ability in the last five years to have and maintain erections sufficient for intercourse without treatment as very good, good, fair, poor, and very poor, and patients with a diabetes duration of 0-5 years fell into these groups as 18.1, 22.1, 21.9, 18.3, and 19.7%, respectively while patients with a diabetes duration of more than 20 years fell into these groups as 8.3, 13.3, 20.1, 21.3, and 37.1%,^[12] showing a significant relationship between diabetes duration and severity of ED. In a recent study, Lo *et al.* reported that of the 603 Chinese men with type 2 diabetes mellitus, the prevalence of ED was 79.1%; very similar to our study. Most subjects had mild ED (28.9%), followed by mild-to-moderate ED (27.9%), then moderate ED (13.4%), and severe ED (9%). They also reported that regardless of the degree of severity, less than 10% of the ED patients sought medical treatment. Their findings suggested that the prevalence of ED was strongly associated with age and patients' perception of ED.^[13]

Oral phosphodiesterase 5 (PDE5) inhibitors are considered the first-line treatment for ED. These drugs promote erection by inhibiting the PDE5 enzyme, which is responsible for the degradation of cyclic guanosine monophosphate (cGMP) in the cavernous smooth muscle. This inhibition leads to the prolonged activity of cGMP, which in turn, reduces the intracellular calcium concentrations, maintains smooth muscle relaxation, and results in rigid penile erections. Sildenafil, vardenafil, and tadalafil are commercially available worldwide.^[14] Rendell *et al.* studied sildenafil treatment in 267 diabetic patients with ED and reported a success rate of 61% compared with the placebo group, which achieved a 22% success rate. Adverse effects were observed in 16% of cases in the sildenafil treatment group and only 1% in the placebo group.^[15] In another placebo-controlled study of diabetic ED patients, Goldstein *et al.* reported a success rate of 57% in the vardenafil group compared to 13% in the placebo group.^[16] In our study only a small number of patients used ED treatment and 43.5% of these patients reported benefit from the therapy. This finding may be attributed to insufficient number of patients in our study, the applied doses, and type of the drugs. Larger

placebo-controlled studies, with specific agents and doses, are required in the Turkish population to clarify this.

Giugliano *et al.* examined 611 diabetic patients and found a higher prevalence of ED in patients with HbA1c higher than 6.5%.^[17] Awad *et al.* also observed an increasing prevalence of ED with increasing HbA1c.^[18] In our study, although the HbA1c levels increased as the severity of ED increased, these differences did not reach statistical significance. Again our small sample size may explain this. Chuang *et al.* have examined 666 diabetic men by spot urine microalbumin/creatinine ratio and have found that ED was associated with microalbuminuria, which is considered a marker for vascular endothelial dysfunction.^[19] In our study, we failed to show such an association between microalbuminuria and ED.

Conclusion

Our results suggested that ED was very common in Turkish diabetic men and only a small number of patients were actually receiving treatment. We also found that there was a significant association between age, duration of diabetes, and severity of ED. Even as severity of ED increased with increase in HbA1c levels, this increase did not reach statistical significance. We also failed to show an association between microalbuminuria and ED.

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