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Evaluation of Sexual Dysfunction and Related Factors in Iranian Men with Type 2 Diabetes: A Cross-Sectional Study

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Abstract

Objective: Recently, the association between sexual dysfunction (SD) and diabetes has been proven in various studies. The study aimed to determine the frequency of SD and identify risk factors related to SD in men with Type 2 diabetes mellitus (T2DM).

Materials and Methods: The cross-sectional study was conducted on 114 men with T2DM who had referred to the Yazd Diabetes Center from 2019-2020. All of them filled out a standard questionnaire with a specified validity and reliability. The analysis was performed using ANOVA and Chi-square by SPSS, version 22 software.

Results: The mean age of participants was 52.48 (±5.33). The SD frequency was 73.7%. The mean SD score was 17.89 (±12). There was a significant relationship between the total SD and neuropathy (*P*: 0.0001), retinopathy (*P*: 0.0001), nephropathy (*P*: 0.023), type of treatment (*P*: 0.0001), age (*P*: 0.0001) and addiction (*P*: 0.031). There was no significant relationship between the total SD score and hyperlipidemia (*P*: 0.371), hypertension (*P*: 0.683), Hb1Ac (*P*: 0.816), duration of diabetes (*P*: 0.101) and smoking (*P*: 0.29).

Conclusion: Due to the high frequency of sexual dysfunction in men with T2DM, it is recommended that SD be considered as an important complication in these patients so that by identifying indicators related to this complication in patients with diabetes, sexual health clinics take the necessary measures to solve sexual problems in these patients.

Keywords: Type 2 diabetes mellitus, Men, Sexual dysfunction

QR Code

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Introduction

Sexual dysfunction (SD) define as sexual impotence in successful sexual intercourse with a sexual partner (1). SD is one of the most factors that affect the quality of life. Effective factors such as obesity, alcohol, some medications, and some diseases have been identified that lead to male sexual disorder (2).

Nowadays, among the disease factors, diabetes has attracted a lot of attention among researchers. It is estimated that the global diabetes prevalence was 9.3% in 2019 (3). In Iran, 11/4% of the population over the age of 25 had diabetes in 2011, and it has estimated in 2030, 9.2 million Iranians will have diabetes (4). The prevalence of diabetes in Yazd, is so high and it is estimated that one in five adults suffer from diabetes (5).

Diabetes and poor glycemic control, for a long time, will cause micro and macrovascular complication (6). Retinopathy, nephropathy, and neuropathy are classified as microvascular complications, and ischemic heart disease and stroke are classified as macrovascular complications (7,8). To prevent complications of diabetes, it is necessary to have accurate information about the disease (9).

It is reported that men with type 2 diabetes mellitus (T2DM) may experience SD and results in erectile dysfunction, hypogonadism, ejaculatory dysfunction, and sexual desire dysfunction (10). SD occurs in diabetics in both physical and psychological forms. Mental disorders are caused by decreased sexual desire, decreased irritability, and decreased self-confidence, as well as decreased marital satisfaction. Physical disorders include autonomic neuropathy, hormonal disorders, atherosclerosis, and vascular insufficiency (11-13).

It is estimated that 51.3% of men with diabetes suffer from ejaculation dysfunction. Important factors such as vascular insufficiency, neuropathy, and under expression of vascular endothelial growth factor (VEGF), lead to diabetes-related ejaculation dysfunction (2).

SD is one of the major concerns for diabetic patients and identifying the effective factors related to sexual domains is essential to the management of diabetes. Some literature has reported that age, duration of diabetes, depressive symptoms, and some anti-diabetic drugs play a role in sexual dysfunction in men with T2DM (10,14). In 2019, Adane et al reported that physical inactivity, depression, and having complications are significantly related to SD in diabetic patients (15).

SD is extremely common not only in men with type 2 diabetes but also in pre-diabetic men (16). On the other hand, in developing countries, sexual dysfunction is not seen as a complication of diabetes and there is no strategy for this complication in diabetic patients (17). In this study, we measured the frequency of SD in men with T2DM, and then SD-related factors in them were assessed.

Materials and Methods

Research design

In the cross-sectional study, convenience sampling method was done, and 114 T2DM patients from 2019-2020 who referred to the Yazd Diabetes Center, were studied. All patients met the following inclusion criteria: type 2 diabetes lasting for at least two years, age 35-60 years, married and cohabitation, no alcohol addiction, and satisfaction with participation in the study. The exclusion criteria were: having neurological diseases, history of performing surgeries on genitals, the existence of severe physical disabilities or disabilities of oneself or partner, consumption of known drugs that affect sexual function (increasing or decreasing), and the existence of known chronic diseases affecting sexual function such as cardiovascular disease and cancer. Blood pressure >80/135 as hypertension and triglycerides > 250 as hyperlipidemia were regarded. Moreover,

drugs included opium, morphine, codeine, and tramadol.

Questionnaire

To evaluating sexual function in participants, a standard questionnaire with a specified validity and reliability was used (18). Based on patients' self-report, a checklist related to the studied contextual variables such as patients' demographics was used. In the second part of the questionnaire, the International Index of Erectile Function (IIEF) was assessed in five domains: erectile, orgasm, sexual desire, the satisfaction of intercourse, and overall satisfaction. The final analysis of the questionnaire was performed in the form of a general score and components of the questionnaire. The total score was regarded from 15 to 75 and based on the sexual function the patients were categorized into dysfunction (15-20), moderate function (25-50), and good function (>50).

Statistical analysis

The Kolmogorov-Smirnov test was used to assess the normality of distribution. The chi-square test was used for relationship between clinical symptoms and addiction with sexual function. The ANOVA test was used for relationship between age and HbA1c with domains of sexual function. All statistical analysis was performed using SPSS, version 22 software, and *P* less than 0.05 ($P<0.05$) was considered significant.

Ethical considerations

The protocol used in this study was approved by the ethics committee of Shahid Sadoughi University of Medical Sciences, Yazd, Iran. (IR.SSU.MEDICINE.REC. 1397.195)

Results

Baseline characteristics of participants

The demography and clinical characteristics are summarized in Table 1. The mean age of participants was 52.48 (±5.33), the mean HbA1c value was 7.76 (±1.07) and the mean smoking (pack/year) obtained 4.49 (±10.32). None of the subjects had thyroid disease.

Assessment of sexual function in the diabetic population

As shown in Table 2, based on the total IIEF score, 73.7% of patients with T2DM were in a state of SD.

Sexual dysfunction in participants and its related factors

The correlation of studied variables with five sexual domains to the etiology of sexual dysfunction in men with T2DM is shown in the following tables (Tables 3,4).

Table 1. Demographic and clinical data of the participants

Variable		Frequency (%), n:114
Job	Government employee	6 (5.3%)
	Private employee	66 (57.9%)
	Retired	38 (33.3%)
	Unemployed	4 (3.5%)
Education	Illiterate	8 (7%)
	Primary	38 (33.3%)
	Middle school	32 (28.1%)
	High school	14 (12.3%)
	Diploma	16 (14.0%)
	Associate Degree	6 (5.3%)
Blood sugar treatment	Oral	58 (50.9%)
	Insulin	56 (49.1%)
Neuropathy		90 (78.9%)
Retinopathy		60 (52.6%)
Nephropathy		12 (10.5%)
Hyperlipidemia		80 (70.2%)
Hypertension		72 (63.2%)
Drug Addiction		29 (25.4%)

There was a significant relationship between the total IIEF score and neuropathy (*P*: 0.0001), retinopathy (*P:* 0.0001), nephropathy (*P:* 0.023), type of treatment (*P:* 0.0001), age (*P*: 0.0001), and addiction (*P:* 0.031). On the contrary, there was no significant relationship between the total IIEF score and hyperlipidemia (*P*: 0.371), hypertension (*P*: 0.683), Hb1Ac (*P*: 0.816), duration of diabetes (*P*: 0.101), and smoking (*P*: 0.29).

Table 2. Sexual function in patients with type 2 diabetes

Domain		Frequency (%), n:114
Overall sexual function	Dysfunction	84 (73.7%)
	Moderate function	12 (10.5%)
	Good function	18 (15.8%)
Orgasm	Dysfunction	78 (68.4%)
	Moderate function	22 (19.3%)
	Good function	14 (12.3%)
Sexual desire	Dysfunction	96 (84.2%)
	Moderate function	18 (15.8%)
	Good function	0 (0%)
Overall satisfaction	Dysfunction	94 (82.5%)
	Moderate function	20 (17.5%)
	Good function	0 (0%)
Erectile	Dysfunction	82 (71.9%)
	Moderate function	22 (19.3%)
	Good function	10 (8.8%)
Intercourse satisfaction	Dysfunction	90 (78.9%)
	Moderate function	22(19.3%)
	Good function	2 (1.8%)

Table 3. Correlation of patients' clinical symptoms with sexual domains

Sexual domains		Frequency		*p*
		Yes	No	
	Neuropathy			
Total score	Dysfunction	74 (66%)	10 (8%)	0.0001*
	Moderate function	2 (2%)	10 (8%)	
	Good function	14 (12%)	4 (3%)	
Orgasm	Dysfunction	68 (62%)	10 (8%)	0.0001*
	Moderate function	10 (8%)	12 (10%)	
	Good function	12 (10%)	2 (2%)	
Sexual desire	Dysfunction	76 (67%)	20 (18%)	0.894
	Moderate function	14 (12%)	4 (3%)	
	Good function	0	0	
Overall satisfaction	Dysfunction	78 (69%)	16 (14%)	0.022*
	Moderate function	12 (10%)	8 (7%)	
	Good function	0	0	
Erectile	Dysfunction	72 (64%)	10 (8%)	0.0001*
	Moderate function	8 (7%)	14 (13%)	
	Good function	10 (8%)	0	
Intercourse satisfaction	Dysfunction	74 (65%)	16 (14%)	0.121
	Moderate function	14 (13%)	8 (7%)	
	Good function	2 (2%)	0	
	Retinopathy			
Total score	Dysfunction	54 (47%)	30 (26%)	0.0001*
	Moderate function	2 (2%)	10 (8%)	
	Good function	14 (13%)	4 (4%)	
Orgasm	Dysfunction	50 (44%)	28 (25%)	0.001*
	Moderate function	6 (5%)	16 (15%)	
	Good function	4 (3%)	10 (8%)	

Continued

Sexual domains		Frequency		*p*
		Yes	No	
	Retinopathy			
	Dysfunction	56 (50%)	40 (35%)	
Sexual desire	Moderate function	4 (3%)	14 (12%)	0.005*
	Good function	0	0	
	Dysfunction	54 (46%)	40 (35%)	
Overall satisfaction	Moderate function	6 (5%)	14 (12%)	0.026*
	Good function	0	0	
	Dysfunction	52 (45%)	30 (28%)	
Erectile	Moderate function	8 (7%)	14 (12%)	0.001*
	Good function	4 (3%)	6 (5%)	
	Dysfunction	54 (46%)	36 (32%)	
Intercourse satisfaction	Moderate function	6 (5%)	16 (15%)	0.007*
	Good function	0	2 (2%)	
	Nephropathy			
	Dysfunction	7 (6%)	77 (68%)	
Total score	Moderate function	0	12 (10%)	0.023*
	Good function	5 (5%)	13 (11%)	
	Dysfunction	6 (5%)	72 (63%)	
Orgasm	Moderate function	3 (2.5%)	19 (16%)	0.265
	Good function	3 (2.5%)	11 (11%)	
	Dysfunction	7 (6%)	89 (78%)	
Sexual desire	Moderate function	5 (5%)	13 (11%)	0.009*
	Good function	0	0	
	Dysfunction	7 (6%)	87 (75%)	
Overall satisfaction	Moderate function	5 (5%)	15 (14%)	0.020*
	Good function	0	0	
	Dysfunction	7 (6%)	75 (65%)	
Erectile	Moderate function	2 (2%)	20 (17%)	0.110
	Good function	3 (3%)	7 (7%)	
	Dysfunction	7 (7%)	83 (73%)	
Intercourse satisfaction	Moderate function	5(5%)	17 (14%)	0.109
	Good function	0	2 (1%)	
	Hyperlipidemia			
	Dysfunction	56 (50%)	28 (24%)	
Total score	Moderate function	10 (8%)	2 (2%)	0.371
	Good function	14 (12%)	4 (4%)	
	Dysfunction	50 (44%)	28 (24%)	
Orgasm	Moderate function	18 (16%)	4 (4%)	0.110
	Good function	12 (10%)	2 (2%)	
	Dysfunction	66 (58%)	30 (26%)	
Sexual desire	Moderate function	14 (12%)	4 (4%)	0.442
	Good function	0	0	
	Dysfunction	64 (56%)	30 (26%)	
Overall satisfaction	Moderate function	16 (14%)	4 (4%)	0.290
	Good function	0	0	
	Dysfunction	54 (47%)	28 (24%)	
Erectile	Moderate function	18 (16%)	4 (4%)	0.270
	Good function	8 (7%)	2 (2%)	
	Dysfunction	62 (54%)	28 (24%)	
Intercourse satisfaction	Moderate function	16 (14%)	6 (6%)	0.610
	Good function	2 (2%)	0	
	Hypertension			
	Dysfunction	55 (48%)	29 (26%)	
Total score	Moderate function	7 (6%)	5 (5%)	0.683
	Good function	10 (8%)	8 (7%)	

Continued

Sexual domains		Frequency		*P*
		Yes	No	
		Hypertension		
	Dysfunction	51 (44%)	27 (24%)	
Orgasm	Moderate function	13 (11%)	9 (8%)	0.763
	Good function	8 (7%)	6 (6%)	
	Dysfunction	62 (55%)	34 (29%)	
Sexual desire	Moderate function	10 (9%)	8 (7%)	0.466
	Good function	0	0	
	Dysfunction	58 (51%)	36 (31%)	
Overall satisfaction	Moderate function	14 (12%)	6 (6%)	0.485
	Good function	0	0	
	Dysfunction	54 (48%)	28 (24%)	
Erectile	Moderate function	13 (11%)	9 (7%)	0.561
	Good function	5 (5%)	5 (5%)	
	Dysfunction	60 (53%)	30 (26%)	
Intercourse satisfaction	Moderate function	10 (8%)	12 (11%)	0.100
	Good function	2 (2%)	0	
		Type of treatment		
		Oral	Insulin	
	Dysfunction	32 (28%)	52 (45٪)	
Total score	Moderate function	12 (11٪)	0	0.0001*
	Good function	14 (13٪)	4 (3٪)	
	Dysfunction	32 (28٪)	46 (40٪)	
Orgasm	Moderate function	14 (13٪)	8 (7٪)	0.004*
	Good function	12 (11٪)	2 (1٪)	
	Dysfunction	44 (38٪)	52 (46٪)	
Sexual desire	Moderate function	14 (13٪)	4 (3٪)	0.013*
	Good function	0	0	
	Dysfunction	42 (36٪)	52 (47٪)	
Overall satisfaction	Moderate function	16 (14٪)	4 (3٪)	0.004*
	Good function	0	0	
	Dysfunction	32 (28٪)	50 (42٪)	
Erectile	Moderate function	18 (16٪)	4 (3٪)	0.0001*
	Good function	8 (7٪)	2 (2٪)	
	Dysfunction	38 (32٪)	52 (47٪)	
Intercourse satisfaction	Moderate function	18 (16٪)	4 (3٪)	0.001*
	Good function	2(2٪)	0	

*The Chi-square test was used to analyze the data.
* Significant

Discussion

This study was conducted to evaluate the frequency of SD and SD-related factors in men with T2DM. SD influences the quality of life as well as can threaten the health of society (2,19). Recent studies demonstrated that SD is very common in men with T2DM (2,14,20). The cooperation of the central nervous system and peripheral neurotransmitters is critical to erection and ejaculation, and a factor such as anxiety, which is higher in patients with diabetes, disrupt this cooperation (11,21). Therefore, it makes sense for physicians to pay more attention to this complication in diabetic patients'. Our findings confirm previous studies and demonstrate that 73.7 % of men with T2DM suffer from SD. Among the five domains of sexual function, erectile dysfunction is common in diabetic patients (15,22). Bahar et al. reported that 62.5 % of men with T2DM had erectile dysfunction in Iran (23). In another study in the U.S, Selvin et al. reported erectile dysfunction occurs in more than 50% of male diabetic patients (24).

Our results revealed that the occurrence of sexual desire dysfunction and erectile dysfunction were 84.2% and 71.9% respectively. One of the reasons for erectile dysfunction and decreased sexual desire is hypogonadism (25). It has been reported that hypogonadism is common in men with T2DM (26). Giovanni et al demonstrated that the use of Phosphodiesterase type 5 inhibitors (PDE5i), as an erectile dysfunction drug, can

Table 4. The relationship between sexual function and addiction in the diabetic population

Sexual domains		Frequency Addiction		*P*
		Yes	No	
Total score	Dysfunction	18 (15٪)	66 (59٪)	0.031*
	Moderate function	2 (2٪)	10 (8٪)	
	Good function	9 (8٪)	9 (8٪)	
orgasm	Dysfunction	16 (14٪)	62 (54٪)	0.157
	Moderate function	7 (6٪)	15 (14٪)	
	Good function	6 (5٪)	8 (7٪)	
Sexual desire	Dysfunction	22 (19٪)	74 (64٪)	0.153
	Moderate function	7 (6٪)	11 (10٪)	
	Good function	0	0	
Overall satisfaction	Dysfunction	20 (17٪)	74 (64٪)	0.027*
	Moderate function	9 (8٪)	11 (10٪)	
	Good function	0	0	
Erectile	Dysfunction	16 (15٪)	66 (60٪)	0.013*
	Moderate function	11 (10٪)	11 (10٪)	
	Good function	2 (2٪)	8 (7٪)	
Intercourse satisfaction	Dysfunction	20 (17٪)	70 (62٪)	0.139
	Moderate function	9 (8٪)	13 (11٪)	
	Good function	0	2 (2٪)	

*Addiction includes opium, morphine, codeine, and tramadol. The chi-square test was used for the variable of addiction.
* Significant

boost sexual function and reduce the symptoms of depression in men with T2DM (27). Therefore, this disease can be better managed by further research and finding effective factors in sexual dysfunction in men with diabetes.

Several studies showed a higher risk of SD with a higher age in men and women with diabetes (2,15). Among the participants, based on a total score of IIEF, the age was remarkably associated with SD. Although SD in men and women increases with age (28), a comparison of men and women with diabetes to healthy people showed SD increases with age in patients with type 2 diabetes compared to the control group (14).

Smoking is linked to sexual dysfunction in both non-diabetics and diabetics (29,30). In our study smoking, HbA1c, and duration of diabetes were not predictors of SD. Based on Mark's study, the duration and extent of smoking are associated with sexual dysfunction (31). This can be examined in future studies by dividing consumption by pack/year. On the contrary, addiction, as well as the diabetic patients' type of treatment, was associated with their SD. Bahar et al. by researching on 350 men with T2DM, reported that based on the IIEF total score, SD had been associated with age, as well as the type of treatment and there had no significant relation between SD with HbA1c (23).

Increasing evidence suggested that hypertension, as well as hyperlipidemia, leads to SD especially erectile dysfunction (2,32,33). Evaluating important cardiovascular risk factors including hypertension and hyperlipidemia, there was no significant relationship between any of the sexual domains and hypertension as well as hyperlipidemia in men with T2DM. These findings were consistent with Sharifi's study. Based on Sharifi's study on 200 men with T2DM, there were no significant associated with blood pressure and levels of triglycerides (34). On the contrary, a study on men with T2DM showed hypertension decreases the IIEF mean score, and those not had hypertension reported better sexual function significantly (23). To the best of our knowledge, no study has ever evaluated the association between sexual dysfunction and diabetes complications including neuropathy, retinopathy, and nephropathy in men with type

2 diabetes in Iran. Interestingly, the results of our study showed based on a total score of IIEF, there is a significant relationship between neuropathy, retinopathy, and nephropathy with SD.

Conclusions

Based on our study, the frequency of SD in studied men with T2DM was high. Parameters such as neuropathy, retinopathy, nephropathy, type of treatment, age, and addiction were correlated with SD. Therefore, it is suggested that physicians pay special attention to this disorder in diabetic men and by conducting more studies and assessing more predictors for sexual dysfunction, establish sexual health clinics, like other clinics that treat microvascular complications of diabetes, and perform sexual counseling for these patients.

Acknowledgments

The protocol used in this study was approved by the ethics committee of Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

Conflict of Interest

No conflict of interest has been declared by the authors.

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