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Sexual Function Disorders in Type 2 Diabetic Women; Cross-Sectional Study

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Abstract

Our aim was to investigate the frequency of sexual dysfunction in type 2 diabetic women.
329 married female subjects were included in the study. 213 of these women were diabetic and 116 were not diabetic. All of them filled the Female Sexual Function Index (FSFI). This questionnaire consists of 6 parts: Desire, lubrication, arousal, satisfaction, orgasm, and pain. Cases' age, menopause status, number of children, income status, and smoking habits were recorded.
Sexual functions were impaired in 267 (81.9%) of all cases; in 170 (79.8%) diabetic cases and 97 (85.8%) non-diabetic cases. Lumbrication($p = 0.001$) and orgasm($p = 0.003$) were significantly impaired in diabetics. There was a significant relationship between sexual dysfunction and age (In diabetics $p=0.000$ and in non-diabetics $p=0.000$). Sexual dysfunction was 85.1% in diabetic women postmenopausal and 74.5% in diabetic women premenopausal ($p = 0.052$). There was a significant relationship between the number of children and lubrication($p = 0.042$), orgasm($p = 0.036$) in all cases; and desire ($p = 0.04$), orgasm ($p = 0.007$) in diabetic patients. Lubrication($p = 0.044$) and orgasm($p = 0.008$) were significantly impaired in smokers.
Sexual dysfunction was high in both type 2 diabetic women and the control group. Sexual dysfunction in diabetic subjects was evident in the field of lubrication and orgasm. Sexual dysfunction increased with age, menopause. As the number of children increased, sexual dysfunction was evident in the field of desire, lubrication and orgasm.

Key Words: Type 2 diabetes, women, sexual dysfunction

Introduction

The type 2 diabetes is the most common type of diabetes; insulin resistance develops, accompanied by a decrease in insulin release (1). About 425 million people are estimated have diabetes all around the world (2). Diabetes mellitus is a disease that causes many medical complications. One of them is sexual dysfunction. Sexual dysfunction may be the earliest missed finding in type 2 diabetics (3). Diabetes causes ischemia in the vaginal vascular area (4,5). Sexual dysfunction can simply be defined as failure to meet sexual life expectations (1). Sexual dysfunction leads to physical, social and psychological problems (2). Moreover, sexual dysfunction remained as a taboo for women. Diagnosis in women is more difficult (1). In this study, our aim was to investigate the frequency of sexual dysfunction in type 2 diabetic women. In order to measure sexual dysfunction in type 2 diabetic subjects the Female Sexual Function Index (FSFI) was used. Current studies support the use of this scale in chronic diseases such as cancer and diabetes (6).

Materials and Methods

Three hundred and twenty nine female patients with diabetes who consulted the Internal Medicine outpatient clinics in a tertiary medical care center in Turkey were included in the study. (400 female patients who came to our hospital for one year were scanned.) Non-volunteers, those meeting exclusion criteria, type 1 diabetics were not included in the study. 329 female subjects were enrolled in the study. 213 of these were diabetic and 116 were not diabetic. All subjects were informed about the study. Their approval were received. All subjects were sexually active. All questionnaire questions were asked to the patients face to face in a quiet room. All of them filled the questionnaire completely. Not sexually active, seriously ill, pregnant, breastfeeding, volunteers who do not have a husband or have a health problem to prevent sexual intercourse were excluded from the study. The FSFI developed to determine sexual dysfunction was applied to the participants. The control group came to the hospital with loss of my hair, suspected thyroid, dry mouth, and had no

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Table 1. Demographic Features of the Cases

	Diabetic(n:213) (Mean±SD)	Control(n:116) (Mean±SD)	Total(n:329) (Mean±SD)
Age (years)	49.4±7.8	44.4±9.2	47.6±8.7
İncome (Turkish lira)	1240.6±993.1	1447.1±971.4	1313.2±989.0
Number of children	3.0±1.4	2.6±1.3	2.9±1.4

±SD: ±standard deviation

Table 2. Number of Sexual Dysfunction in Diabetic, Control and all Cases

	Diabetic	Control	Total
Sexual dysfunction n(%)	170 (79.8%)	97 (85.8%)	267 (81.9%)

Table 3. P Values of FSFI and its Subgroups in Diabetic and Non-Diabetic Cases

	Diabetic (Mean±SD)	Control (Mean±SD)	P
Total FSFI	23.82±3.36	23.04±3.72	0.178
Desire	4.44±1.06	4.39±1	0.592
Arousal	5.26±1.32	5.09±1.41	0.477
Lubrication	5.58±0.91	5.30±0.85	0.001
Orgasm	2.96±0.58	2.81±0.60	0.003
Satisfaction	2.32±0.97	2.21±0.90	0.430
Pain	3.28±1.04	3.27±1.13	0.967

±SD: ±standard deviation

serious illness in the examinations. Both groups did not use drugs that could cause sexual dysfunction.The participants of the study were not asked about the mode of delivery.

The reliability of this index was performed by Rosen et al. (2000); cronbach alpha coefficient was found 0.82, test retest reliability was 0.79-0.86 (7). This questionnaire consists of 6 parts: Desire, lubrication, arousal, satisfaction, orgasm, and pain (7,8). Each title is scored between 0 or 1 and 6 (7). The questions 1, 2, 15 and 16 are scored from 1 to 5; other questions from 0 to 5. Total score of all fields ranges from 2 to 36. High scores are indicative of normal sexual function (7). Total score is obtained by multiplying with 0,6 for desire subgroup; 0.3 for lubrication, arousal subgroups; 0.4 for orgasm, pain, satisfaction (9). According to sensitivity and specificity analysis conducted in 2005 and CARD ((Classification and Regression Trees) applications, sexual the optimal cut-off value for FSFI total score was found to be 26.55 in women with and without function (6). While values above 26.5 show normal functions for women; values below showed sexual dysfunction (6). Sexual dysfunction was calculated for both groups and the groups were compared (8).

Statistic: The data were analyzed with windows compatible SPSS 17th version. P <0.05 was taken as the limit of significance. Compliance of data to normal distribution with the Kolmogorov Smirnov Test determined. In comparison of variables that are not suitable for normal distribution, Mann-Whitney U test was used for 2 groups and Kruskal Wallis test was used for more than 2 groups. Chi-square analysis was used to compare categorical data. Pearson correlation analysis was applied for the correlation analysis of numerical variables that fit the normal distribution, and Spearman correlation analysis was applied for the correlation analysis of numerical variables.

Results

A total of 329 cases, 213 of whom were diabetic and 116 controls, were included in the study. 33 (10.0%) of 329 cases were smoking. 296 patients did not smoke (90.0%). 103 patients did not use any drugs (31.3%), 126 patients used oral antidiabetic, antihypertensive, anti cholesterol, and insulin (68.7%). 193 (58.6%) patients were premenopausal. 136 (41.3%) patients were postmenopausal. 18 cases had no children. The other 311 cases had children. 203 of these cases had 3 or more children. The average number of children in diabetic cases is 3.07 ± 1.45, 2.60 ± 1.34 in cases without diabetes, 2.90 ± 1.43 in all cases. The mean duration of diabetes in diabetic cases was 6.71 ± 6.07 years (Table 1). According to FSFI, sexual functions were impaired in 267 (81.9%) of all cases; sexual dysfunction was present in 170

Table 4. Sexual dysfunction rates in all cases according to smoking, entering menopause and having children

	Total Cases (329)(100%)	Sexual Dysfunction Ratio (%)
Smoker	33(10.00%)	90.6%
non-smoker	296(90.00%)	80.5%
in menopause	136(41.40%)	85,1% diabetic
not in menopause	193(58.60%)	74,5% diabetic
1 child	18(5.47%)	83,3%
2 children	311(94.53%)	85,0%
3 and more children	203(61.70%)	80,3%

Table 5. Sexual dysfunction p values of total cases by number of children

	1 child (Mean±SD)	2 children (Mean±SD)	3 or more children (Mean±SD)	P
Total FSFI	23.572±3.603	23.002±3.572	23.906±3.238	0.158
Desire	4.467±0.925	4.290±1.028	4.496±1.054	0.258
Arousal	5.133±1.704	5.090±1.504	5.273±1.236	0.729
Lubrication	5.889±0.854	5.358±0.869	5.519±0.901	0.042
Orgasm	2.783±0.711	2.816±0.579	2.975±0.573	0.036
Satisfaction	2.267±0.750	2.223±0.942	2.317±0.968	0.742
Pain	3.033±0.835	3.225±1.152	3.328±1.048	0.427

±SD: ±Standard deviation

Table 6. Sexual dysfunction p values of smoking and no smoking cases

	Smoker (+) (Mean±SD)	Smoker (-) (Mean±SD)	p
Total FSFI	23.022±2.793	23.702±3.440	0.237
Desire	4.319±0.988	4.454±1.040	0.557
Arousal	5.138±1.253	5.219±1.355	0.943
Lubrication	5.238±0.684	5.516±0.923	0.044
Orgasm	2.700±0.487	2.937±0.597	0.008
Satisfaction	2.188±0.870	2.308±0.947	0.576
Pain	3.441±0.838	3.269±1.082	0.429

(79.8%) diabetic cases and 97 (85.8%) non-diabetic cases (Tablo 2). There was no significant relationship between FSFI and whether or not diabetes (p = 0.178). When we look at the subgroups of FSFI, there was no significant relationship between diabetes and desire, arousal, satisfaction and pain, (p = 0.592, p = 0.477, p = 0.430, p = 0.967, respectively), lubrication (p = 0.001) and orgasm (p = 0.003) were significantly impaired in diabetics (Table 3). Other complications in diabetic patients have not been questioned. There was significant relationship between sexual dysfunction and age (In diabetics p = 0.000 and non-diabetics p = 0.000). While sexual dysfunction was 85.1% in diabetic women in postmenopausal, sexual dysfunction in premenopausal diabetics was 74.5% (p = 0.052). Sexual dysfunction was 83.3% in volunteers with one child, 85.0% in volunteers with 2 children, and 80.3% in volunteers with 3 or more children (Table 4). There was not any significant relationship between FSFI and the number of children in all volunteers (p = 0.578). There was not any significant relationship between sexual dysfunction and the number of children in diabetic cases (p = 0.774) and in non-diabetic cases (p = 0.948). When we look at the subgroups of FSFI, there was no significant relationship between the number of children and desire, arousal, satisfaction, pain (p = 0.258, p = 0.729, p = 0.742, p = 0.427, respectively); there was a significant relationship between the number of children and lubrication (p = 0.042) and orgasm (p = 0.036) in all volunteers (Tablo 5). There was a significant relationship between desire (p = 0.04), orgasm (p = 0.007) subgroups and the number of children in diabetic patients. There was no significant relationship between arousal (p = 0.229), lubrication (p = 0.68), satisfaction(p = 0.293), pain (p = 0.670) subgroups and the number of children in diabetic patients. There was also no significant relationship

between FSFI subgroups of non-diabetic patients and the number of children (desire p = 0.388, arousal p = 0.123, lubrication p = 0.514, orgasm p = 0.357, satisfaction p = 0.664, pain p = 0.188). Sexual dysfunction in non-smoker patients was 80.5% and 90.6% in smokers (p = 0.237) according to FSFI. When we look at the subgroups of FSFI, there was no significant relationship between smoking and desire (p = 0.557), arousal (p = 0.943), satisfaction (p = 0.576,), pain (p = 0.479); lumbrication (p = 0.044) and orgasm (p = 0.008) were significantly impaired in smokers (Table 6). There was no significant relationship between sexual dysfunction (p = 0.754) and its subgroups (desire p = 0.730, arousal p = 0.829, lumbrication p = 0.124, orgasm p = 0.258, satisfaction p = 0.641, pain p = 0.377) and smoking in diabetic women. In diabetic women, there was no significant relationship between those whose income level was above 1000 TL and those below 1000 TL in terms of sexual dysfunction according to FSFI (p = 0.109).

Discussion

As it is known, sexual dysfunction is common in the society. It increases with age and in the presence of chronic diseases such as diabetes. About 425 million people are estimated have diabetes all around the world (2). In this study, our aim was to investigate the frequency of sexual dysfunction in type 2 diabetic subjects. Sexual dysfunction in diabetic patients develops due to endothelial dysfunction, atherosclerosis, neuropathy and nephropathy (2). Albuminuria and retinopathy were significantly higher in subjects with diabetes with sexual dysfunction (10). Sexual dysfunction in type 2 diabetic women was found to be associated with retinopathy, but not related to neuropathy (10,11).

Sexual dysfunction was 50%-80% higher in subjects with type 2 diabetes (12,13). These disorder included desire, arousal, orgasm, satisfaction, dyspareunia, lubrication (12). In iran type 2 diabetic women, sexual dysfunction was found 78.7% (3,10). In a study conducted among diabetic patients in Ethiopia, sexual dysfunction was found to be high at 53.3% (14). In one study according to the FSFI score, sexual dysfunction in type 2 diabetic women was 94.4% (10). In another study, sexual dysfunction was found to be 68% in type 2 diabetics (12). In a study of Chinese type 2 diabetic females, sexual dysfunction was found 79.2% (15). In our study, sexual dysfunction in diabetic women was found to be 79.8% high. Sexual dysfunction in a study using the FSF in diabetic women in Turkey had been 26.2% (4). In contrast to our study of us, all of the cases in this study were under 40 years of age and the duration of diabetes was less than 5 years. In a study using FSFI in Czech females with type 1 diabetes, sexual dysfunction was found to be 58% (1). In a study of both type 1 and type 2 diabetic womens, the prevalence of sexual dysfunction was 51% in type 1 diabetics and 17% in type 2 diabetics (16). In another study, the sexual dysfunction in diabetic women was measured as 88% (17). These differences in prevalence may be due to age of cases, duration of diabetes, blood sugar regulation, diabetic complications, menopausal status, differences in assessment questionnaires, diabetic person's psychological status, education, income level, and social pressure. The studies referred shown here used FSFI as the scale of sexual function in diabetic women (1,3,4,10,11,12,16,15,17). In a study in type 2 diabetics, it was seen that desire and arousal, which were among the subgroups, were affected more negatively in women (12). Also, another study has described low desire, lack of satisfaction, low lubrication and orgasmic dysfunction among women with DM (2). In a study from Iran, desire, lubrication, arousal and orgasm were found low in diabetic women (10). A study sexual dysfunction in type 2 diabetic women was evident in the areas of desire, pain and arousal (18). Similarly, in our study, there was a significant impairment in lubrication and orgasm in type 2 diabetic women. In another study, arousal, lubrication, dyspareunia, and orgasm subtypes of FSFI were found low in type 1 diabetics and desire in both type 1 and type 2 diabetics (16). In one study; arousal, desire and orgasm subgroups of FSFI were most affected in women with sexual dysfunction (4). In the study performed in type 1 diabetics using FSFI, the negative effect was evident in the areas of arousal, orgasm and satisfaction (1). In one study, type 1 diabetic women complained most about lubrication and arousal scarcity (4,19). In another study, the most affected areas of sexual dysfunction in diabetic women were desire, arousal, dyspareunia and satisfaction (4,20). Age shows up as a risk factor for sexual dysfunction (1). Sexual dysfunction in subjects with diabetes correlates with the age and the duration of diabetes (12). In this study, there was a relationship between age and sexual dysfunction in both study and control groups. Especially, sexual dysfunction in type 2 diabetic subjects increased with age. In another study, sexual dysfunction in diabetics increased with age (2). The reasons for this increase was poor control of diabetes, complications of diabetes, long-term treatment, comorbidity (2). However, in the Iran an study, there was no relationship between sexual dysfunction and age in diabetic women (3). In a study conducted in both type 1 and type 2 diabetics, again, no significant relationship was found between age and sexual dysfunction (16). İn another study; in type 1

diabetics, duration of diabetes, age and presence of chronic complications were not related to sexual dysfunction (1).

In our study, sexual dysfunction tended to increase in type 2 diabetic women in postmenopausal (85.1%) compared to type 2 diabetic women in premenopausal (74.5%). In a study conducted in type 2 diabetic women, sexual dysfunction was 90.5% in premenopausal women and 98.7% in postmenopausal women (10).

In this study, looking at all women, as the number of children increased, deterioration in lubrication and orgasm increased. Also, as the number of children increased in diabetic women, the desire was also significantly impaired. In women who smoke, orgasm was significantly impaired, the lubrication was less impaired. We found, it was seen that income level did not affect sexual functions in type 2 diabetic women. Elyas et al's study was also compatible with our data; income level was not effective on sexual functions in diabetic women (3). In another study, sexual dysfunction was less common in diabetic women with better income (4).

In our study, sexual dysfunction was high in both type 2 diabetic subjects and control group. Because the average age is high in both groups (45 years old and above). Moreover, all cases were selected from the hospital setting. Selecting the control group from the outside, wholly healthy and younger individuals could change the results. In a study conducted in Iran (18) as in our study, sexual dysfunction was high in both type 2 diabetes and control group. As a result, sexual dysfunction was higher than expected in all women with or without diabetes. Desire, arousal, lumbrication, orgasm parts of sexual functions were more affected especially in type 2 diabetic patients. For this reason, diagnosis and treatment of sexual dysfunction should be more consciously included in diabetic patient management in health institutions. In diabetic patients, sexual function examination polyclinics should be added to routine outpatient follow-ups such as cardiology, eye, neurology etc.

References

1. Stechova K, Mastikova L, Urbaniec K, Vanis M, Hylmarova S, Kvapil M, et al.Sexual Dysfunction in Women Treated for Type 1 Diabetes and the Impact of Coexisting Thyroid Disease. Sex Med 2019; 7: 217-226.
2. Belete TM. A Recent Achievement In the Discovery and Development of Novel Targets for the Treatment of Type-2 Diabetes Mellitus. J Exp Pharmacol. 2020; 12: 1-15.
3. Elyasi F, Kashi Z, Tasfieh B, Bahar A, Khademloo M.Sexual dysfunction in women with type 2 diabetes mellitus. Iran J Med Sci 2015; 40: 206-213.
4. Duman NB.Frequency of sexual dysfunction and its causative factors among diabetic women in Turkey. Pak J Med Sci 2014; 30: 558-563.
5. Giraldi A, Persson K, Werkstrom V, Alm P, Wagner G, Andersson KE. Effect of diabetes on neurotransmission in ratvaginalsmooth muscle. Int J ImpotRes 2001; 13: 58-66.
6. Wıegel M, Meston C, Rosen R. The female sexual function index (FSFI): cross-validation and development of clinical cutoff scores. J Sex Marital Ther 2005; 31: 1-20.
7. Rosen R, Brown C, Heıman J, Leıblum S, Meston C, Shabsıgh R, Ferguson D, D'agostıno JrR. The female sexual function ındex (FSFI): a multidimens ional self-report ins trument for the assessment of female sexual function. J Sex Marital Ther 2000; 26: 191-208.
8. Oksuz E, Malhan S. Prevalence and rısk factors for female sexual dysfunction in turkish women. J Urol 2006; 175: 654-658.
9. Doruk H, Akbay E, Cayan S, Akbay E, Bozlu M, Acar D. Effect of dıabetes mellıtus on female sexual functıon and rısk factors. Arch Androl 2005; 51: 1-6.
10. Afshari P, Yazdizadeh S, Abedi P, Rashidi H.The Relation of Diabetes Type 2 with Sexual Function among Reproductive Age Women in Iran, a Case-Control Study. Adv Med 2017; 2017: 4838923.
11. Vafaeimanesh J, Raei M, Hosseinzadeh F, Parham M. Evaluation of sexual dysfunction in women with type 2 diabetes. Indian J Endocrinol Metab 2014; 18: 175-179.
12. Bąk E, Marcisz C, Krzemińska S, Dobrzyn-Matusiak D, Foltyn A, Drosdzol-Cop A.Relationships of Sexual Dysfunction with Depression and Acceptance of Illness in Women and Men with Type 2 Diabetes Mellitus. Int J Environ Res Public Health 2017; 16: 14(9).
13. Abu Ali RM, Al Hajeri RM, Khader YS, Shegem NS, Ajlouni KM. Sexual dysfunction in Jordanian diabetic women. Diabetes Care 2008; 31: 1580-1581.
14. Asefa A, Nigussie T, Henok A, Mamo Y. Prevalence of sexual dysfunction and related factors among diabetes mellitus patients in Southwest Ethiopia. BMC Endocr Disord 2019; 19: 141.
15. Shi YF, Shao XY, Lou QQ, Chen YJ, Zhou HJ, Zou JY. Study on female sexual

dysfunction in type 2 diabetic Chinese women. Biomed Environ Sci 2012; 25: 557-561.

16. Mazzilli R, Imbrogno N, Elia J, Delfino M, Bitterman O, Napoli A, Mazzilli F. Sexual dysfunction in diabetic women: prevalence and differences in type 1 and type 2 diabetes mellitus.Diabetes Metab Syndr Obes 2015; 8: 97-101.
17. Ziaei-Rad M, Vahdaninia M, Montazeri A.Sexual dysfunctions in patients with diabetes: a study from Iran. Reprod Biol Endocrinol 2010; 8: 50.
18. Sharifiaghdas F, Azadvari M, Shakhssalim N, Roohi-Gilani K, Rezaei-Hemami M.Female sexual dysfunction in type 2 diabetes: a case control study. Med Princ Pract 2012; 21: 554-559.
19. Enzlin P, Mathieu C, Van Den Bruel A, Bosteels J, Vanderschueren D, Demyttenaere K. Sexual dysfunction in women type 1 diabetes. Diabetes Care 2002; 25: 672-677
20. Yildiz H. Evaluation of sexual dysfunction among diabetic patients. Marmara University Health Sciences Institute, Istanbul 2008.