

Major Sexual Function Domains Affected in the Diabetic Females: A Cross-sectional Study from North India

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Abstract

Introduction: Diabetes adversely affects sexual health with its negative consequences on well-being in both males and females. Literature is scanty regarding female sexual dysfunction (FSD) in diabetic women, furthermore reported literature is lacking regarding the differential impact on different domains of sexual health, especially in Indian females. In the present analysis, we aim to study the prevalence of sexual dysfunctions in diabetic women as well as different domains affected by diabetes. **Materials and Methods:** This cross-sectional study was carried out at a tertiary care teaching centre in North India over a duration of 6 months (January 2021 to June 2021). A total of 100 married females were enrolled including 50 diabetics and 50 healthy non-diabetic females. All the participants were subjected to a validated female sexual function index (FSFI) questionnaire for sexual function assessment. **Results:** FSD was seen in 35 diabetic females (70%) with desire being the most affected domain (92%) in comparison to 15 healthy subjects (30%) with an overall mean FSFI of 23.5 in diabetics and 29.2 in the control group. Mean FSFI in diabetic females with sexual dysfunction was 21.04 ± 9 . All domains of FSFI were affected significantly (P value < 0.05) in the diabetic group in comparison to the control group except for the satisfaction domain. There was no significant association of different domains of FSFI seen with the duration of diabetes and other comorbidities. A significant association of arousal and pain domain was seen with the glycaemic (HbA1C) index (P value-0.006 and 0.031, respectively). **Conclusion:** Females with diabetes mellitus (DM) have a higher prevalence of sexual dysfunction affecting all domains. Glycosylated haemoglobin is associated independently with arousal and pain domains of FSFI as well as desire being the most affected domain, although further randomized studies with larger sample sizes are needed to authenticate our findings. To improve the quality of life of diabetic females, clinicians should focus on this aspect also while treating diabetes.

Keywords: Diabetes mellitus, female, FSFI, sexual dysfunction

INTRODUCTION

Diabetes is one of the most common chronic disorders worldwide and its prevalence is increasing day by day. World Health Organization (WHO) termed this as a hidden pandemic because of the rate of increase in the diabetic population. 6.4% population of the world is affected by diabetes, projected to increase by 7.7% in 2030, and values are expected to double in India in the year 2045.^[1] Diabetes is characterized by hyperglycaemia and metabolic disturbances leading to many microvascular as well as macrovascular dysfunction in the body, notably retinopathy, coronary artery disease, nephropathy, microangiopathy and neuropathy. Diabetes adversely affects sexual health with its negative consequences on well-being in both males and females.^[2,3]

Sexual well-being is an integral part of normal healthy human life. WHO defined sexual health as physical, emotional and

social well-being related to sexual desire and response, not just the absence of disease or disability.^[4] There is a complex interplay of hormonal, vascular and neuronal factors along with the relationship with the partner and cultural and religious practices that affect the quality of sexual life. Sexual health can be studied under different domains like desire, arousal, lubrication, orgasm, satisfaction and dyspareunia.^[5]

Diabetes is associated with neuropathy and vasculopathy, which can lead to tissue hypotrophy and sensory disturbances.

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Impaired sexual function is a common complication of diabetes in both males and females. Many vascular, neurological, infection, endocrinal, hyperglycaemia and psychosocial factors have been described in the pathophysiology of sexual dysfunction in diabetic patients.^[2] In diabetic men, it was first described as a collapse of sexual function by Avicenna in the tenth century AD.^[6] Following that there is plenty of literature available regarding sexual dysfunction in diabetic men. Contrary to this, literature is scanty regarding female sexual dysfunction (FSD) in diabetic women, furthermore reported literature is lacking regarding the differential impact on different domains of sexual health, especially in Indian females. This may be due to shyness, intricacy, perception of sexual health, social and cultural beliefs or lack of interest in the scientific community in this field. Indian females find it taboo to discuss their sexual problems. For comprehensive diabetic management with a holistic approach, sexual health should also be taken care of to add not just quantity of years but also the quality of life to diabetic patients, especially diabetic females. Therefore, in this cross-sectional study, we aim to find the prevalence of sexual dysfunctions among the study population (Indian diabetic women) as well as different domains of female sexual function index (FSFI) affected by diabetes. We will also compare the prevalence and pattern of sexual dysfunction with healthy control.

MATERIALS AND METHODS

This study was conducted on diabetic females attending the outpatient diabetic clinic at a tertiary care teaching hospital in North India from July 2021 to December 2021. Considering the taboo attached to the topic and the absence of estimates on sexual dysfunction among females in India, we recruited 50 diabetic females and 50 controls. Fifty consecutive diabetic females attending the outpatient department (OPD) were invited to participate in the study after obtaining approval from the institutional research review board with letter no. IEC/387/2021. Inclusion criteria for this study include married females of >18 years of age in a heterosexual stable relationship. Exclusion criteria include females with known pre-existing sexual dysfunction before the diagnosis of diabetes, >65 years of age, male partners diagnosed with sexual dysfunction, females with psychiatric disorders and females who were not willing to participate. In the control group, 50 non-diabetic female participants from OPD not

having diabetes, matched for age \pm 5 years and duration of marriage \pm 1 year were invited to participate. Written informed consent was taken before enrolling in the study and participants were assured and counselled regarding the confidentiality of the responses.

A validated questionnaire of FSFI was used to assess the different domains of sexual dysfunction including desire, arousal, lubrication, orgasm, satisfaction and pain. Every domain has six points with a sum total of 36. As per the reported literature, a score of less than 26 was taken as a cut-off for sexual dysfunction as well as a cut-off, and a multiplication factor was used for different domains as shown in Table 1.^[7] Statistical analysis was performed with IBM SPSS Statistics for Windows, Trail Version 25 (Armonk, NY: IBM Corp). Descriptive statistics were used to describe the demographics and characteristics of study participants. To analyse the level of significance, the χ^2 test was used. The *P* value of < 0.05 was considered significant.

RESULTS

In this study, 50 diabetic women with a mean age of 43.2 ± 8.68 years and 50 healthy subjects with a mean age of 41.58 ± 8.08 years were enrolled, the majority being housewives (86% of diabetics and 76% of the control group) and all were married and sexually active without sexual problems in the husband. Their socio-demographic and clinical profile has been documented in Table 2 and Table 3. In diabetic females, 50% were having normal regular menstruation, 26% attained menopause and 56% of females were having normal obstetric history. 28% of participants had diabetes of <5 years of duration, diabetes duration was >10 years in 22%, type 2 diabetes mellitus (DM) was seen in 96% of patients and type 1 in 4% of patients. 92% of patients were having Hemoglobin A1c/ Glycated hemoglobin (HbA1c) of >7 and 58% of participants were having comorbidities other than diabetes. The mean FSFI score in all participants was 23.48 ± 7 and the mean total FSFI score in females with sexual dysfunction (after considering 26.5 as the cut-off) was 21.04 ± 9 [Table 4]. On analysing the association of different domains of FSFI with the duration of diabetes, the *P* value was not significant for desire, arousal, orgasm, lubrication, satisfaction and pain (*P* value 0.14, 0.67, 0.20, 0.97, 0.62, 0.14, respectively); similar observations were noted with comorbidities [Table 5]. Significant *P* values of arousal and pain domain were found in association with HbA1c levels (*P* value 0.006 and 0.031, respectively).

Table 1: Criteria of scoring of different domains of FSFI⁷

Domain of FSFI	Number of questions	Score range	Multiplication factor	Cut-off	Minimum score	Maximum score
Desire	2	1-5	0.6	4.28	1.2	6
Arousal	4	0-5	0.3	5.08	0	6
Lubrication	4	0-5	0.3	5.45	0	6
Orgasm	3	0-5	0.4	5.05	0	6
Satisfaction	3	1-5	0.4	5.04	0.8	6
Pain	3	0-5	0.4	5.51	0	6
Total	19				2	36

Table 2: Socio-demographic and clinical profile of diabetic females

Parameter	Total	Female with FSD	Female without FSD	P
Age				
<50 years	37	26	11	0.94
>50 years	13	9	4	
Occupation				
Housewife	43	31	12	0.42
Inservice	7	4	3	
Marital status				
Married	50	35	15	
Menstrual History				
Regular	25	19	6	0.54
Abnormal	12	7	5	
Menopause	13	9	4	
Obstetric history				
Normal	28	21	7	0.67
Abortion	19	12	7	
Not able to conceive	3	2	1	
Type of diabetes				
Type 1	2	0	2	0.14
Type 2	48	35	13	
Duration of diabetes				
<5 year	14	10	4	0.95
5-10 year	25	17	8	
>10 year	11	8	3	
HbA1c				
<7	4	2	2	0.52
7-9	21	14	7	
>9	25	19	6	
Family history of DM	27	20	7	
Comorbidities other than diabetes	28	18	10	0.86

In the control group, 80% of females were <50 years of age with 74% having a normal regular menstrual cycle. Nineteen subjects (38%) had comorbidities other than diabetes and 15 were having FSFI of <26 [Table 3]. FSD was seen in 35 diabetic females in comparison to 15 healthy subjects with an overall mean FSFI of 23.5 in diabetics and 29.2 in the control group. A statistically significant difference was found with almost all domains of FSFI in diabetics except overall satisfaction [Table 4].

DISCUSSION

FSD is a highly understated and underreported issue that affects the quality of life of many women. We included a total of 100 patients in the study, 50 patients in the case and 50 patients in the control arm. On comparing the baseline socio-demographic and clinical profiles of participants, there was no statistically significant difference among case or control arms.

We used the FSFI score to evaluate sexual dysfunction, which is a reliable tool.^[8] In our study, the mean total FSFI score in females with diabetes was 23.5 ± 5.14 . Some of the previous studies done across the world had shown near similar FSFI scores among diabetic females with sexual dysfunction. A study done in Turkey had an FSFI score of 29.3 ± 6.4 . Another study on the Nigerian population had a score of 20.5 ± 8.3 .^[9-11]

The real prevalence of FSD is difficult to obtain because of socio-cultural issues. According to Prevalence of Female Sexual Problems Associated with Distress and Determinants of Treatment Seeking (PRESIDE) study done in the USA, sexual problems in the form of desire, arousal and orgasm affect almost 43.1% of women.^[12] The risk of FSD is even

Table 3: Socio-demographic and clinical profile of control group

Parameter	Total	Female with FSD FSFI <26.5	Female without FSD >26.5	P
Age				
<50 years	40	12	28	1.00
>50 years	10	3	7	
Occupation				
Housewife	38	12	26	0.664612
Inservice	12	3	9	
Marital status				
Married	50	15	35	
Menstrual History				
Regular	37	10	27	0.354098
Abnormal	3	2	1	
Menopause	10	3	7	
Obstetric history				
Normal	21	8	14	0.64836
Abortion	23	7	16	
Not able to conceive	6	0	6	
Family history of DM				
Present	10	2	8	0.440401
Absent	40	13	27	
Comorbidities other than diabetes	19	7	12	0.782083

Table 4: Total scoring, frequency of different affected domains and comparison between diabetic females and controls

	Mean score	Frequency below cut-off value	Percentage
Diabetic females group			
Desire (<4.28)	2.7	46	92
Arousal (<5.08)	3.5	44	88
Lubrication (<5.45)	3.9	44	88
Orgasm (<5.05)	3.88	40	80
Satisfaction (<5.04)	5.23	14	28
Pain (<5.51)	4.27	35	70
Total score	23.48		
Control group			
Desire (<4.28)	3.67	35	70
Arousal (<5.08)	4.32	37	74
Lubrication (<5.45)	5.184	24	48
Orgasm (<5.05)	5.048	24	48
Satisfaction (<5.04)	5.6	7	14
Pain (<5.51)	5.35	16	32
Total score	23.48		

Comparison of diabetic females and control group

	Diabetes	Control	P
Age	43.22 (8.68)	41.58 (8.08)	0.127
Duration of marriage	21.14 (9.8)	19.96 (8.88)	0.264
Other Comorbidities	28	19	0.0726
Females with FSD	35	15	0.0032
Mean FSFI score	23.5 (5.14)	29.2 (5.75)	0.0017
Desire	2.7 (1.03)	3.7 (1.2)	0.0001
Arousal	3.5 (1.08)	4.3 (1.28)	0.001
Lubrication	3.9 (1.44)	5.2 (1.1)	0.0004
Orgasm	3.9 (1.27)	5 (1.11)	0.0011
Satisfaction	5.2 (0.88)	5.7 (0.68)	0.1
Dyspareunia	4.27 (1.62)	5.3 (1.17)	0.0084

high among diabetic patients. The meta-analysis by Rahmanian *et al.*^[13] has shown that the overall prevalence of sexual dysfunction in type 2 diabetes women was 68.6% (95 CI 61.1–75.3%).

Sexual dysfunction is a common and well-known complication of diabetes. A meta-analysis by Pontiroli *et al.*^[14] has shown that FSD is more frequent in diabetic women than in control. In our study, the mean FSFI score was 23.5 ± 5.14 compared to the control 29.2 ± 5.75 with a statistically significant *P* value (<0.05). Our study has shown that all domains of sexual dysfunction (desire, arousal, orgasm, lubrication and dyspareunia) were affected and it was statistically significant (*P* value < 0.005) compared to control. This result is in a similar trend to various previous studies.^[13]

In our study, the desire to engage in sexual activity was the most affected and almost 92% (46 patients) of diabetic females had low desire compared to 70% (35 patients) in the controls. It was followed by decreased arousal and lubrication in

88% (44 patients) of cases. In one of the previous case-control studies in Iran, they found a similar trend of decreased desire and arousal which were affected more adversely in diabetic females than in control.^[15] Various possible explanation for these symptoms is given in different studies, like decreased nitric oxide production because of vascular dysfunction which decreases vascular vaginal relaxation. Apart from this vascular, psychiatric and neurological disorders cause reduced desire, arousal, vaginal discharge, lubrication and orgasm in diabetic women.^[16]

In our study, 70% (30 subjects) of diabetic females complained of painful intercourse compared to only 32% (16 subjects) in the control group. Dyspareunia is also common among diabetic patients. Diabetics have decreased secretion of the endocrine glands leading to vaginal dryness and irritation. Other causes of painful intercourse include vaginal, uterine and pelvic infections which are more frequent in diabetic women.^[17]

Previous studies had shown a significant correlation of the duration of diabetes with sexual dysfunction. The meta-analysis by Shiferaw *et al.*^[18] showed a statistically significant correlation of the duration of diabetes with erectile dysfunction in males (adjusted odds ratio (AOR) = 2.63; 95% CI 1.27, 5.43). We also tried to find a correlation of different domain FSD with the duration of diabetes, but it was statistically insignificant. Also, we had not found any significant relationship between domains of FSD and other comorbidities like hypertension or thyroid disorder. In our study, we found a significant correlation between high HbA1C and some of the domains of FSD, i.e. arousal and pain (*P* < 0.05). In some of the previous studies like Esposito *et al.*,^[19] they had not found any correlation of FSD with uncontrolled glycaemic control.

Our study showed that all domains of female sexual function are more commonly affected in diabetics than in the control group. Desire was the most affected domain in the diabetic patient. But as our study was a single-centre study with a limited number of patients, a further multicentric study is needed with a larger number of patients to confirm our results.

The major strength of our study is that interview of the participants was conducted in the hospital setting with full privacy by a single female resident doctor and responses were noted at the same time thus avoiding recall bias. We had taken match control to account for differences related to age, comorbidities and duration of the marriage. The randomly selected small sample size was the main limitation of the study though we could find a significant decrease in sexual function in diabetic females compared to non-diabetics; the study results might have been different with larger sample size. Prevalence and risk factors of sexual dysfunction cannot be generalized due to the limited sample size. Further study is needed for the true prevalence of sexual dysfunction among diabetic females using the current estimate (70%). Some participants may prefer to give socially desirable responses rather than reality.

Table 5: Association of sexual dysfunction with HbA1c, comorbidities and duration of diabetes

Subgroups	Desire <4.28	Arousal <5.08	Lubrication <5.45	Orgasm <5.05	Satisfaction <5.04	Pain <5.51
Duration of diabetes in years						
<5	13/14	13/14	11/14	11/14	5/14	7/14
5-10	22/25	21/25	22/25	20/25	7/25	20/25
>10	11/11	10/11	11/11	9/11	2/11	8/11
total	46/50	44/50	44/50	40/50	14/50	35/50
<i>P</i>	0.140876	0.677154	0.200751	0.979912	0.62524	0.142551
HbA1c						
<7	3/4	2/4	4/4	3/4	1/4	3/4
7-9	12/12	9/12	8/12	8/12	3/12	1/12
>9	31/34	33/34	32/34	29/34	10/34	30/34
total	46/50	44/50	44/50	40/50	14/50	35/50
<i>P</i>	0.568975	0.00663	0.786793	0.89073	0.970521	0.031692
Comorbidities other than diabetes						
0	21/22	20/22	20/22	17/22	4/22	16/22
1	22/25	21/25	21/25	20/25	8/25	17/25
>1	3/3	3/3	3/3	3/3	2/3	2/3
Total	46/50	44/50	44/50	40/50	14/50	35/50
<i>P</i>	0.380794	0.475627	0.574727	0.669123	0.17594	0.931735

CONCLUSIONS

Females with DM have a higher prevalence of sexual dysfunction affecting all domains compared to non-diabetic females. To improve the quality of life, clinicians should focus on this aspect also while treating diabetes. Glycosylated haemoglobin is associated independently with arousal and pain domains of FSFI as well as desire being the most affected domain, although further randomized studies with larger sample sizes are needed to authenticate our findings.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- International Diabetes Federation. IDF Diabetes Atlas. 9th ed. Belgium: International Diabetes Federation; 2019.
- Vafaieimanes J, Raei M, Hosseinzadeh F, Parham M. Evaluation of sexual dysfunction in women with type 2 diabetes. *Indian J Endocr Metab* 2014;18:175-9.
- Owiredu WK, Amidu N, Alidu H, Sarpong C, GyasiSarpong CK. Determinants of sexual dysfunction among clinically diagnosed diabetic patients. *Reprod Biol Endocrinol* 2011;9:70.
- Defining sexual health: Report of a technical consultation on sexual health. Geneva: WHO; 2006. World Health Organization.
- Bargiota A, Dimitropoulos K, Tzortzis V, Koukoulis GN. Sexual dysfunction in diabetic women. *Hormones (Athens)* 2011;10:196-206.
- Giraldi A, Kristensen E. Sexual dysfunction in women with diabetes mellitus. *J Sex Res* 2010;47:199211.
- Wiegel 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.
- Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, *et al.* The female sexual function index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *J Sex Marital Ther* 2000;26:191-208.
- Erol B, Tefekli A, Ozbey I, Salman F, Dincag N, Kadioglu A, *et al.* Sexual dysfunction in type II diabetic females: A comparative study. *J Sex Marital Ther* 2002;28(Suppl 1):55-62.
- Olarinoye J, Olarinoye A. Determinants of sexual function among women with type 2 diabetes in a Nigerian population. *J Sex Med* 2008;5:878-86.
- Ogbera AO, Chinenye S, Akinlade A, Eregie A, Awobusuyi J. Frequency and correlates of sexual dysfunction in women with diabetes mellitus. *J Sex Med* 2009;6:3401-6.
- Shifren JL, Monz BU, Russo PA, Segreti A, Johannes CB. Sexual problems and distress in United States women: Prevalence and correlates. *Obstet Gynecol* 2008;112:970-8.
- Rahmanian E, Salari N, Mohammadi M, Jalali R. Evaluation of sexual dysfunction and female sexual dysfunction indicators in women with type 2 diabetes: A systematic review and meta-analysis. *Diabetol Metab Syndr* 2019;11:73.
- Pontiroli AE, Cortelazzi D, Morabito A. Female sexual dysfunction and diabetes: A systematic review and meta-analysis. *J Sex Med* 2013;10:1044-51.
- 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;21:554-9.
- Balletshofer BM, Rittig K, Enderle MD, Volk A, Maerker E, Jacob S, *et al.* Endothelial dysfunction is detectable in young normotensive first-degree relatives of subjects with type 2 diabetes in association with insulin resistance. *Circulation* 2000;101:1780-4.
- Dennerstein L, Randolph J, Taffe J, Dudley E, Burger H. Hormones, mood, sexuality, and the menopausal transition. *Fertil Steril* 2002;77(Suppl 4):S42-8.
- Shiferaw WS, Akalu TY, Petrucka PM, Areri HA, Aynalem YA. Risk factors of erectile dysfunction among diabetes patients in Africa: A systematic review and meta-analysis. *J Clin Transl Endocrinol* 2020;21:100232.
- Esposito K, Maiorino MI, Bellastella G, Giugliano F, Romano M, Giugliano D. Determinants of female sexual dysfunction in type 2 diabetes. *Int J Impot Res* 2010;22:179-84.