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Original Research Article

Sexual Dysfunction in Males with Diabetes: A Cross-Sectional Study from Central India

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Abstract

Background: Sexual dysfunction is a highly prevalent yet under-recognized complication of diabetes mellitus that profoundly affects quality of life, psychological well-being, and interpersonal relationships. Systematic data from central India remain limited, particularly among younger diabetic men.

Objective: To determine the prevalence and severity of sexual dysfunction and erectile dysfunction in young-to-middle-aged diabetic men, evaluate comorbid depression, and identify associated clinical and demographic determinants.

Methods: This cross-sectional observational study enrolled 370 male diabetic patients aged 18–50 years at L.N. Medical College and J.K. Hospital, Bhopal, over 18 months. Patients were assessed using the Brief Sexual Function Inventory (BSFI), International Index of Erectile Function-5 (IIEF-5), and Hamilton Depression Rating Scale (HAM-D). Chi-square tests and Pearson correlation coefficients were employed.

Results: Mean age was 34.99 ± 9.36 years. Sexual dysfunction was present in 67.6% by BSFI and erectile dysfunction in 94.6% by IIEF-5. Depression affected 83.0%. Duration of diabetes ($\chi^2 = 15.20$, $p < 0.001$), HbA1c ($\chi^2 = 16.69$, $p < 0.001$), and depression ($\chi^2 = 63.96$, $p < 0.001$) were significantly associated with sexual dysfunction; age was not ($\chi^2 = 4.82$, $p = 0.307$). Depression was the strongest correlate (BSFI: $r = -0.455$, $p < 0.001$). Sexual dysfunction was more prevalent in uncontrolled diabetes (73.6% vs. 50.0%; $\chi^2 = 17.42$, $p < 0.001$).

Conclusion: Sexual dysfunction is highly prevalent in young-to-middle-aged diabetic men, strongly associated with depression and poor glycaemic control. Routine screening should be integrated into standard diabetes care.

Keywords: Sexual Dysfunction, Diabetes Mellitus, Erectile Dysfunction, Depression, Glycaemic Control, India.

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Introduction

Sexual dysfunction in diabetic males has emerged as a major yet frequently neglected clinical concern, particularly as diabetes increasingly affects men at younger ages worldwide. Although erectile dysfunction has received the greatest scholarly attention, the available literature suggests that the true burden is far wider and should be viewed through a syndromic lens that includes diminished libido, ejaculatory disturbance, impaired satisfaction, emotional distress, and relationship dysfunction (Shindel & Lue, 2000; Ma et al., 2024). Diabetic men often develop sexual

dysfunction earlier than non-diabetic men, during years that are socially, psychologically, and reproductively crucial, with significant effects on self-esteem, intimacy, and overall quality of life (Malhi & Bell, 2022; Weber et al., 2024). Diabetes mellitus is one of the most pressing global health challenges. According to the International Diabetes Federation (IDF, 2025), over 589 million adults are currently living with diabetes globally, and the numbers are projected to rise to 853 million by 2050. India, with approximately 90 million adults with diabetes, contributes substantially to the worldwide burden (Sekher et al., 2025). While diabetes has traditionally been studied in the context of its microvascular and macrovascular complications (Chawla et al., 2016; Li et al., 2023), sexual dysfunction in males remains under-recognized and under-reported.

The World Health Organization defines sexual health as a state of physical, emotional, mental, and social well-being in relation to sexuality (WHO, 2025a, 2025b). Sexual dysfunction in men with diabetes is multifaceted, encompassing erectile dysfunction, diminished desire, ejaculatory disturbances, and orgasmic dysfunction (Ma et al., 2024). The aetiology involves vascular, neurological, hormonal, and psychological factors (Giri et al., 2018). Chronic hyperglycaemia leads to endothelial dysfunction and accelerates atherosclerosis (Machnica et al., 2014; Seid et al., 2017). Diabetic neuropathy damages autonomic and peripheral nerves (Agochukwu-Mmonu et al., 2020; Defeudis et al., 2022). Hypogonadism contributes to reduced libido (Sizar et al., 2025), while depression and anxiety create a vicious cycle of worsening dysfunction (Ciaccio & Di Giacomo, 2022; Narang et al., 2016).

Depression and psychological distress are intimately linked with sexual dysfunction in diabetes (Rathod et al., 2024). Importantly, erectile dysfunction has been described as a sentinel symptom of cardiovascular disease, often preceding coronary artery disease by several years (Montorsi et al., 2005; Yannas et al., 2021; Vlachopoulos et al., 2013). Despite its high prevalence, sexual dysfunction remains one of the least discussed complications in clinical practice, particularly in the Indian context where cultural barriers and stigma contribute to widespread under-diagnosis (Humaida, 2022). The present study was designed to evaluate the prevalence, severity, and determinants of sexual dysfunction in male diabetic patients aged 18–50 years attending a tertiary care hospital in central India.

Materials and Methods

This single-centre, hospital-based, cross-sectional observational study was conducted at the Department of General Medicine, L.N. Medical College and J.K. Hospital, Bhopal, Madhya Pradesh, India. Ethical clearance was obtained from the Institutional Ethical Committee prior to data collection, in accordance with the Declaration of Helsinki. All participants provided written informed consent. The study spanned 18 months (3-month planning, 12-month data collection, 3-month analysis). A total of 370 adult diabetic male patients aged 18–50 years, diagnosed according to American Diabetes Association criteria, were enrolled using purposive sampling.

Inclusion Criteria: Adult diabetic males aged 18–50 years with a confirmed diagnosis of diabetes mellitus, willing to disclose detailed sexual health information after counselling, and providing written informed consent.

Exclusion Criteria: Age outside 18–50 years, consent not given, severe psychiatric disorders or cognitive impairment, unwillingness to disclose sexual health information.

Data collection covered sociodemographic data, diabetes history, current treatment, laboratory investigations (fasting blood glucose, post-prandial blood glucose, HbA1c), and comorbidities. Sexual dysfunction was assessed using three validated instruments: the Brief Sexual Function Inventory (BSFI; 11 items, total score 0–44) evaluating sexual drive, erections, ejaculation, problem assessment, and overall satisfaction (O'Leary et al., 1995); the International Index of Erectile Function-5 (IIEF-5; total score 0–25), classifying ED severity as severe (1–7), moderate (8–11), mild-to-moderate (12–16), mild (17–21), or no ED (22–25) (Cappelleri & Rosen, 2005); and the Hamilton Depression Rating Scale (HAM-D; 17 items), with scores of 0–9 (no depression), 10–13 (mild), 14–17 (mild-to-moderate), and >17 (moderate-to-severe) (Rathod et al., 2024). All questionnaires were administered during the same session in a private setting.

Statistical Analysis: Data were entered into Microsoft Excel 2021 and analysed using R software version 4.5.2. Descriptive statistics were calculated for continuous and categorical variables.

Chi-square tests assessed categorical associations, and Pearson correlation coefficients evaluated continuous variable correlations. A p-value < 0.05 was considered statistically significant.

Results

A total of 370 male diabetic patients aged 18–50 years were enrolled and assessed using the HAM-D, BSFI, and IIEF-5.

Baseline demographic and clinical characteristics: The mean age was 34.99 ± 9.36 years (median 36.00, range 18–50). The largest proportion belonged to the 18–30 years age group

(36.2%). Secondary education comprised 37.0%, and 15.9% were illiterate. Skilled workers formed the majority (43.0%), and 61.9% resided in urban areas. Most participants (68.4%) had diabetes duration of 1–5 years (mean 4.06 ± 2.96 years). Poor glycaemic control (HbA1c ≥7%) was present in 74.6% (mean HbA1c 8.45 ± 1.86%). Oral hypoglycaemic agents were the most common treatment (76.5%). Hypertension was the most common comorbidity (35.9%) (Table 1).

Table 1: Baseline demographic and clinical characteristics of the study population

Characteristic	Value
Demographic characteristics	
Age, years, mean ± SD	34.99 ± 9.36
Age, years, median (range)	36.00 (18–50)
18–30 years	134 (36.2)
31–40 years	105 (28.4)
41–50 years	131 (35.4)
Education level	
Illiterate	59 (15.9)
Primary	107 (28.9)
Secondary	137 (37.0)
Graduate	52 (14.1)
Postgraduate	15 (4.1)
Occupation	
Unemployed	44 (11.9)
Skilled worker	159 (43.0)
Professional	96 (25.9)
Business	71 (19.2)
Place of residence	
Urban	229 (61.9)
Rural	141 (38.1)
Clinical characteristics	
Duration of diabetes, years, mean ± SD	4.06 ± 2.96
<1 year	37 (10.0)
1–5 years	253 (68.4)
6–10 years	66 (17.8)
>10 years	14 (3.8)
HbA1c (%), mean ± SD	8.45 ± 1.86
Good control (<7%)	94 (25.4)
Poor control (≥7%)	276 (74.6)
Treatment type	
OHA only	283 (76.5)
Insulin only	29 (7.8)
Both insulin and OHA	58 (15.7)
Comorbidities	
Hypertension	133 (35.9)
Dyslipidemia	88 (23.8)
Hypothyroidism	26 (7.0)
None	195 (52.7)

Values are n (%) unless otherwise stated. SD = standard deviation; OHA = oral hypoglycaemic agents. Comorbidity categories are not mutually exclusive, as some patients had more than one comorbidity; percentages therefore do not sum to 100%.

Depression severity and depressive symptom profile: Depression was present in 83.0% (307/370), with a mean HAM-D score of 17.50 ± 9.10. Moderate-to-severe depression (HAM-D >17) was the most prevalent category (50.0%). Work and activities impairment was the most common symptom (87.0%), followed by depressed mood (85.1%) and agitation (83.5%). Genital symptoms and loss of libido were reported by 76.2% (Table 2).

Table 2: Depression severity and depressive symptom profile (HAM-D scale)

Characteristic	Value
Depression severity (HAM-D score)	
HAM-D score, mean ± SD	17.50 ± 9.10
No depression (0–9)	63 (17.0)
Mild depression (10–13)	54 (14.6)
Mild to moderate (14–17)	68 (18.4)
Moderate to severe (>17)	185 (50.0)
Depression present (HAM-D ≥10)	307 (83.0)
Most common depressive symptoms (scored ≥1)	
Work and activities impairment	322 (87.0)
Depressed mood	315 (85.1)
Agitation	309 (83.5)
Anxiety (somatic)	307 (83.0)
Hypochondriasis	291 (78.6)
Genital symptoms / loss of libido	282 (76.2)
Weight loss	273 (73.8)
Feelings of guilt	270 (73.0)
Retardation	263 (71.1)
GI somatic symptoms	261 (70.5)

Values are n (%). HAM-D = Hamilton Depression Rating Scale.

Sexual function and erectile dysfunction assessment: Sexual dysfunction was present in 67.6% (250/370) by BSFI (mean score 26.63 ± 9.05 out of 44), with severe dysfunction in 30.0%, moderate in 26.5%, and mild in 11.1%. The erection domain showed the highest rate of severe impairment (21.1%), followed by sexual drive (19.5%) and ejaculation (17.3%). Erectile dysfunction was present in 94.6% (350/370) by IIEF-5 (mean score 12.67 ± 4.51 out of 25), with mild-to-moderate ED (34.6%) being the most common category. Only 5.4% had no ED (Table 3).

Table 3: Sexual function and erectile dysfunction assessment (BSFI and IIEF-5)

Characteristic	Value
Overall sexual function (BSFI)	
BSFI total score, mean ± SD (out of 44)	26.63 ± 9.05
Sexual dysfunction present	250 (67.6)
Normal sexual function	120 (32.4)
BSFI severity category	
Normal	120 (32.4)
Mild dysfunction	41 (11.1)
Moderate dysfunction	98 (26.5)
Severe dysfunction	111 (30.0)
BSFI domains – severe impairment	
Sexual drive	72 (19.5)
Erections	78 (21.1)
Ejaculation	64 (17.3)
Erectile dysfunction severity (IIEF-5)	
IIEF-5 score, mean ± SD (out of 25)	12.67 ± 4.51
Severe ED (1–7)	66 (17.8)
Moderate ED (8–11)	106 (28.6)
Mild to moderate ED (12–16)	128 (34.6)
Mild ED (17–21)	50 (13.5)
No ED (22–25)	20 (5.4)
ED present (IIEF-5 ≤21)	350 (94.6)

BSFI = Brief Sexual Function Inventory; IIEF-5 = International Index of Erectile Function-5; ED = erectile dysfunction.

Association between clinical parameters and sexual dysfunction: Duration of diabetes (χ^2 = 15.20, $p < 0.001$), HbA1c (χ^2 = 16.69, $p < 0.001$), and depression (χ^2 = 63.96, $p < 0.001$) were significantly associated with sexual dysfunction. Depression demonstrated the strongest association: 94.0% with sexual dysfunction had depression vs. 60.0% in the normal group. Age was not significant

(p = 0.307). Sexual dysfunction was more prevalent in uncontrolled diabetes (73.6%) than controlled (50.0%; $\chi^2 = 17.42$, $p < 0.001$) (Table 4).

Table 4: Association between clinical parameters and sexual dysfunction

Factor	Normal (n=120)	Dysfunction (n=250)	χ^2	p value
Duration of diabetes				
<5 years	90 (75.0)	133 (53.2)	15.20	<0.001*
≥5 years	30 (25.0)	117 (46.8)		
HbA1c levels				
<7%	47 (39.2)	47 (18.8)	16.69	<0.001*
≥7%	73 (60.8)	203 (81.2)		
Depression (HAM-D)				
No depression	48 (40.0)	15 (6.0)	63.96	<0.001*
Depression present	72 (60.0)	235 (94.0)		
Age group				
18–50 years (3 age bands compared)	120	250	4.82	0.307
By glycaemic control	Controlled (n=94)	Uncontrolled (n=276)		
Sexual dysfunction	47 (50.0)	203 (73.6)	17.42	<0.001*
Normal function	47 (50.0)	73 (26.4)		

***p < 0.05 considered significant. The age-group comparison (18–30, 31–40, 41–50 years) was tested as a single 3×2 chi-square (df = 2); the per-band breakdown is not shown.**

Correlation of sexual function scores with clinical parameters: Depression (HAM-D) showed the strongest correlation with sexual dysfunction (BSFI: $r = -0.455$, $p < 0.001$; IIEF-5: $r = -0.287$, $p < 0.001$). In the uncontrolled subgroup, correlations were amplified (BSFI: $r = -0.523$, $p < 0.001$). In the controlled subgroup, correlations were attenuated (BSFI: $r = -0.298$, $p = 0.004$) (Table 5).

Table 5: Correlation of sexual function scores with clinical parameters

Variable	r (BSFI)	p value	r (IIEF-5)	p value
Overall cohort (n = 370)				
Duration of diabetes	−0.159	0.002*	−0.131	0.012*
HbA1c levels	−0.152	0.003*	−0.047	0.364
HAM-D score	−0.455	<0.001*	−0.287	<0.001*
Age	−0.067	0.197	−0.051	0.331
Uncontrolled (HbA1c >7%, n=276)				
Duration of diabetes	−0.312	<0.001*	−0.245	<0.001*
HbA1c levels	−0.278	<0.001*	−0.189	0.002*
HAM-D score	−0.523	<0.001*	−0.384	<0.001*
Age	−0.098	0.104	−0.072	0.233
Controlled (HbA1c ≤7%, n=94)				
Duration of diabetes	−0.187	0.071	−0.142	0.173
HbA1c levels	−0.213	0.039*	−0.168	0.106
HAM-D score	−0.298	0.004*	−0.215	0.038*
Age	−0.054	0.605	−0.038	0.717

Pearson's correlation coefficient (r). *p < 0.05 considered significant.

Discussion

The present study addresses a clinically significant and widely under-recognized complication of diabetes mellitus. The mean age of 34.99 ± 9.36 years reflects a young-to-middle-aged population, clinically significant because sexual dysfunction in diabetes tends to manifest 10–15 years earlier than in non-diabetic men (Maiorino et al., 2017; Weber et al., 2024). The finding that 68.4% had diabetes duration of 1–5 years, yet sexual dysfunction was already prevalent, is consistent with Gupta et al. (2022), who reported significant correlation between sexual dysfunction and diabetes duration in 460 North Indian type 2 diabetic patients. The suboptimal glycaemic control (mean HbA1c 8.45%) is comparable to Xu et al. (2019) and Langer et al. (2019), who reported poor glycaemic control as a significant risk factor for erectile dysfunction.

Sexual dysfunction was present in 67.6% by BSFI, consistent with published literature reporting rates of 50–75% globally (Ma et al., 2024; Gupta et al., 2022). This aligns with the pooled estimate of 60.6% reported by Rana et al. (2025) in their meta-analysis of Indian men with type 2 diabetes. Globally, the umbrella review by Kitaw et al.

(2024) estimated the pooled prevalence at 65.8% (95% CI: 58.3–73.3%) based on 108,030 patients.

The high prevalence of erectile dysfunction (94.6% by IIEF-5) is comparable to Halder et al. (2021), who reported 89.9% among 109 Indian diabetic men. Kumar et al. (2004) reported 94% prevalence in those with poor glycaemic control, supporting the observation that glycaemic status significantly modulates ED prevalence.

Depression was present in 83.0%, consistent with the bidirectional relationship between diabetes and depression (Ciaccio & Di Giacomo, 2022; Dewitte et al., 2021; Hussein Hamad, 2024). The finding that 76.2% reported genital symptoms and loss of libido suggests a significant psychogenic component. Depression reduces sexual desire through central serotonergic and dopaminergic pathways, creating a vicious cycle (Defeudis et al., 2022; Narang et al., 2016). The significant associations between sexual dysfunction and diabetes duration ($p < 0.001$), HbA1c ($p < 0.001$), and depression ($p < 0.001$) are consistent with Parmar et al. (2022) and Kitaw et al. (2024). The lack of significant association with age ($p = 0.307$) may be explained by the restricted age range, wherein disease-specific factors overwhelm age effects. Depression emerged as the strongest correlate ($r = −0.455$, $p < 0.001$), explaining approximately 20.7% of variance. In the uncontrolled subgroup, correlations were amplified, suggesting chronic hyperglycaemia potentiates all risk factors synergistically (Binmoammar et al., 2016; DCCT Research Group, 1987). In the controlled subgroup, correlations were attenuated, reinforcing the importance of intensive glycaemic management. The high ED prevalence in this young population carries cardiovascular implications. The artery size hypothesis suggests penile arteries are affected by atherosclerosis earlier than coronary arteries (Montorsi et al., 2005; Yannas et al., 2021). Vlachopoulos et al. (2013) demonstrated that ED increased cardiovascular event risk by 44% and all-cause mortality by 25%. Several limitations qualify these findings. The study was single-centre, cross-sectional, and lacked a non-diabetic control group. The HAM-D may have overestimated depression due to overlap with somatic symptoms. Serum testosterone and hormonal parameters were not assessed. Concurrent medication effects and partner-related factors were not evaluated. Social desirability and recall bias may have influenced responses.

Conclusion

Sexual dysfunction is a highly prevalent complication in young-to-middle-aged diabetic men (67.6% by BSFI, 94.6% by IIEF-5). Depression is not merely a comorbidity but a major determinant (83.0% prevalence; $r = −0.455$, $p < 0.001$). Poor glycaemic control (HbA1c ≥7%) is significantly associated with worse sexual function, while good control is protective. Diabetes-related factors outweigh age in determining sexual function. Routine screening for both sexual dysfunction and depression should be integrated into standard diabetes care. The high ED prevalence carries cardiovascular implications as a sentinel marker of systemic vascular disease.

Ethical Approval: Obtained from the Institutional Ethical Committee, L.N. Medical College, and Bhopal.

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