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# Quality of Sexual Function in Type 2 Diabetes Mellitus: A Comparative Cross-Sectional Study Using the QSF Scale in a South Indian Tertiary Care Hospital

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## ABSTRACT

**Background:** Type 2 diabetes mellitus (T2DM) is associated with high rates of sexual dysfunction, yet comparative data using gender-neutral tools in Indian tertiary settings remain limited. This study compared quality of sexual function between T2DM patients and non-diabetic controls.

**Materials and Methods:** This cross-sectional study enrolled 80 T2DM patients (age 31–50 years, disease duration ≥6 months) and 80 age- and sex-matched non-diabetic controls at Government Stanley Medical College Hospital, Chennai (August 2024–October 2025). Participants completed the Quality of Sexual Function (QSF) scale after informed consent. Socio-demographic and clinical data were collected. Groups were compared using chi-square tests; correlations with glycemic control were assessed using Spearman's coefficient (SPSS v27.0, $p < .05$ significant).

**Results:** Sexual dysfunction (mild to severe) was present in 56.2% of diabetic patients versus 25.0% of controls ($\chi^2 = 18.76$, $p < .001$). Diabetic patients reported significantly worse sexual activity (severe problems: 51.2% vs 20.0%, $p = .002$), self-perceived dysfunction ($p = .004$), and partner-perceived dysfunction ($p = .001$). Poorer glycemic control correlated moderately with higher QSF severity ($r_s = .42$, $p = .008$). Groups were well-matched on socio-demographic variables.

**Conclusion:** T2DM is associated with significantly impaired quality of sexual function across multiple domains. Routine screening and optimization of glycemic control should be integral to diabetes care to improve patient-centered outcomes in tertiary settings.

***Keywords****: Diabetes Mellitus, Type 2; Sexual Dysfunction; Quality of Life; Sexual Health; Glycemic Control; India.*

## INTRODUCTION

The rising global burden of type 2 diabetes mellitus (T2DM) extends far beyond metabolic derangements, profoundly affecting multiple domains of health, including sexual function and overall quality of life [1]. T2DM, characterized by chronic hyperglycemia, insulin resistance, and associated microvascular and macrovascular complications, disrupts endothelial function, autonomic and somatic nerve integrity, and hormonal balance, all of which are critical for normal sexual response in both men and women. Sexual dysfunction in this population manifests as erectile dysfunction (ED) and reduced libido in men, and as arousal, lubrication, orgasmic, and desire disorders in women, often compounded by psychological factors such as depression and anxiety [2]. These impairments not only diminish personal well-being but also strain intimate relationships, erode self-esteem, and contribute to poorer adherence to diabetes management [3].

Epidemiological evidence consistently demonstrates a markedly elevated prevalence of sexual dysfunction among individuals with T2DM compared to the general population. In men, ED rates range from 35% to over 90%, with meta-analyses indicating approximately 60-70% prevalence in T2DM cohorts, often three-fold higher than in non-diabetic peers

[4]. In women, female sexual dysfunction (FSD) affects 20-80% or more, with recent studies reporting figures as high as 87% in certain populations. These disturbances arise through multiple pathophysiological pathways: hyperglycemia-induced oxidative stress and advanced glycation end-products damage vascular endothelium, impairing nitric oxide-mediated vasodilation essential for genital arousal; diabetic neuropathy affects sensory and autonomic nerves supplying pelvic organs; hormonal alterations, including reduced testosterone in men and estrogen dysregulation in women, further exacerbate dysfunction [5]. Poor glycemic control, longer disease duration, obesity, hypertension, and dyslipidemia amplify these risks, creating a vicious cycle wherein sexual difficulties may worsen psychological distress and glycemic management [6].

Beyond physical mechanisms, psychosocial elements play a substantial role. Depression and anxiety, highly prevalent in T2DM (often 2-3 times higher than in non-diabetic individuals), negatively influence sexual desire, arousal, and satisfaction. Chronic illness-related stress, body image concerns, fear of complications, and medication side effects compound these issues [7]. Sexual dysfunction itself can precipitate or worsen mood disorders, leading to reduced quality of life (QoL), social withdrawal, and marital discord. Generic and disease-specific QoL instruments frequently reveal lower scores in diabetic patients with sexual complaints, with domains related to vitality, emotional well-being, and social functioning most affected [8].

Despite its high prevalence and significant impact, sexual dysfunction remains under-recognized and under-addressed in routine diabetes care, particularly in resource-constrained settings. Cultural stigma, lack of physician training, and patient reluctance to discuss intimate concerns contribute to this gap. In India, where T2DM affects over 70 million adults with rising incidence in younger age groups, studies from tertiary centers report ED prevalence of 59-78% in diabetic men and comparably high FSD rates in women [9].

The Quality of Sexual Function (QSF) scale, a self-report instrument developed by Heinemann et al., offers a comprehensive, gender-neutral approach. Comprising 40 items across four domains—psychosomatic quality of life, sexual activity, sexual (dys)function from self-reflection, and from partner's perspective—it enables quantification of dysfunction severity and its QoL impact. Its brevity, ease of administration, and established reliability make it suitable for clinical and research settings [10].

The present study was undertaken to perform a comparative analysis of the quality of sexual function in patients with type 2 diabetes mellitus versus age-matched non-diabetic controls. This investigation aimed to quantify sexual dysfunction using the QSF scale, assess associated depression and anxiety, and elucidate differences between diabetic and non-diabetic groups while controlling for potential confounders. The study seeks to highlight the importance of routine sexual health screening in diabetes management and inform multidisciplinary interventions to improve patient-centered outcomes.

## MATERIALS AND METHODS

**Study Setting:** This comparative cross-sectional observational study was designed to evaluate and compare the quality of sexual function in patients with type 2 diabetes mellitus and age-matched non-diabetic controls. The research was conducted in the Departments of Diabetology and General Medicine at Government Stanley Medical College Hospital, Chennai, Tamil Nadu, India—a major tertiary care teaching institution serving a diverse urban and semi-urban population with high diabetes prevalence. The study duration extended from August 2024 to October 2025, spanning 15 months to ensure adequate recruitment of eligible participants across both case and control groups.

**Study Participants:** The study population comprised outpatients attending the Department of Diabetology (case group) and age-matched non-diabetic attendants or relatives accompanying patients in the General Medicine outpatient department (control group). Inclusion criteria for the case group were: adults aged >30 and <50 years, diagnosed with type 2 diabetes mellitus based on American Diabetes Association criteria, with a minimum disease duration of 6 months, and willingness to provide informed consent. Controls were age-matched non-diabetic individuals from the same hospital setting who consented to participation.

Exclusion criteria for both groups included: comorbid physical conditions such as hypertension, alcoholic cirrhosis, endocrine disorders, history of genitourinary surgery, neurological or spinal cord lesions; past or present history of any mental illness; primary sexual dysfunction predating diabetes diagnosis (for cases); substance use disorders including alcohol dependence or cannabis use; and use of medications known to affect sexual function (e.g., antipsychotics, antidepressants, antihypertensives, steroids, fibrates). These criteria minimized confounding factors and ensured a focused comparison of diabetes-related effects on sexual function.

**Sample Size and Sampling Technique:** The sample size was determined as 80 participants in the diabetic (case) group and 80 in the non-diabetic (control) group, based on feasibility within the study period, expected prevalence of sexual dysfunction in T2DM from regional literature, and statistical power to detect meaningful differences in QSF scores.

Consecutive sampling was utilized, enrolling eligible individuals who fulfilled inclusion and exclusion criteria during outpatient visits until the target numbers were achieved in both groups.

**Study Tools:** Data collection employed a semi-structured socio-demographic and medical proforma designed for the study, capturing variables such as age, sex, education, socioeconomic status, diabetes duration, glycemic control (from records), and comorbidities. Quality of sexual function was measured with the Quality of Sexual Function (QSF) scale, a 40-item self-report questionnaire covering psychosomatic QoL, sexual activity, self-reflected sexual (dys)function, and partner's view domains, with domain-specific severity categorizations (no/little, mild, moderate, severe) and high internal consistency.

**Study Procedure:** Eligible participants were identified during routine outpatient visits. After obtaining written informed consent, a thorough clinical evaluation was conducted, including review of medical records for diabetes duration, glycemic status, and complications. The QSF scale (self-administered in English or Tamil after validation through translation and back-translation). Socio-demographic details and relevant clinical information were recorded concurrently. Diabetologist input was sought for any uncertainty regarding disease status. All assessments were performed in a private setting to ensure confidentiality and comfort.

**Ethical Issues:** The study protocol received approval from the Institutional Ethics Committee of Government Stanley Medical College Hospital. All procedures adhered to the principles of the Declaration of Helsinki. Written informed consent was obtained from every participant after detailed explanation of the study purpose, procedures, voluntary nature of participation, and right to withdraw at any time without affecting clinical care. Confidentiality was maintained through unique study identifiers, secure data storage, and restricted access. No financial incentives were provided.

**Statistical Analysis:** Data were analyzed using SPSS version 27.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation or median (interquartile range) based on Shapiro-Wilk normality testing. Categorical variables were presented as frequencies and percentages. Comparisons between diabetic and control groups were performed using independent t-tests or Mann-Whitney U tests for continuous data and chi-square or Fisher's exact tests for categorical data. Correlations between glycemic parameters and QSF domains were assessed using Pearson's or Spearman's coefficients as appropriate. A p-value $<0.05$ was considered statistically significant.

## RESULTS

The diabetic and control groups were well-matched on key socio-demographic variables, including age distribution, sex, education levels, residence, and socioeconomic status. No statistically significant differences emerged (all $p > .05$), supporting valid comparison of sexual function outcomes while minimizing confounding by these baseline factors, consistent with balanced designs in similar Indian tertiary-care studies of sexual health in T2DM (Table 1).

**Table 1: Socio-Demographic Characteristics of Diabetic Cases and Non-Diabetic Controls (N = 160)**

| Variable | Diabetic Cases (n = 80) | Non-Diabetic Controls (n = 80) | Test Statistic | p-value |
|---|---|---|---|---|
| **Age group, n (%)** | | | | |
| 31–35 years | 16 (20.0) | 16 (20.0) | $\chi^2 = 0.00$ | 1.000 |
| 36–40 years | 19 (23.8) | 19 (23.8) | | |
| 41–45 years | 22 (27.5) | 22 (27.5) | | |
| 46–50 years | 23 (28.8) | 23 (28.8) | | |
| **Sex, n (%) male** | 54 (67.5) | 54 (67.5) | $\chi^2 = 0.00$ | 1.000 |
| **Education, n (%)** | | | $\chi^2 = 3.12$ | .541 |
| Illiterate | 5 (6.2) | 9 (11.2) | | |
| Primary | 16 (20.0) | 12 (15.0) | | |
| Middle | 26 (32.5) | 25 (31.2) | | |
| High school | 19 (23.8) | 18 (22.5) | | |
| Undergraduate | 12 (15.0) | 13 (16.2) | | |
| Professional | 2 (2.5) | 3 (3.8) | | |
| **Residence, n (%) urban** | 54 (67.5) | 55 (68.8) | $\chi^2 = 0.03$ | .855 |
| **Socioeconomic status, n (%)** | | | $\chi^2 = 3.45$ | .178 |
| Lower | 45 (56.2) | 42 (52.5) | | |
| Middle | 35 (43.8) | 35 (43.8) | | |
| Upper | 0 (0.0) | 3 (3.8) | | |

Clinical parameters showed no significant group differences in sexual contact in the last month, duration of sexual relationship, perceived importance of sexuality, or menopause status among women. Among diabetic cases, glycemic

control was fair to good in the majority (96.2%), with only 3.8% poor control, reflecting typical outpatient T2DM cohorts in Indian tertiary settings (Table 2).

**Table 2: Clinical Characteristics Related to Diabetes and Sexual Activity in Cases and Controls (N = 160).**

| Variable | Diabetic Cases (n = 80) | Non-Diabetic Controls (n = 80) | Test Statistic | p-value |
|---|---|---|---|---|
| Glycemic control (cases only), n (%) | | | | |
| Good | 37 (46.2) | | | |
| Fair | 40 (50.0) | | | |
| Poor | 3 (3.8) | | | |
| Menopause (women only), n (%) yes | 6 (23.1 of 26 women) | 6 (23.1 of 26 women) | $\chi^2 = 0.00$ | 1.000 |
| Sexual contact in last month, n (%) yes | 58 (72.5) | 64 (80.0) | $\chi^2 = 1.33$ | .249 |
| Duration of sexual relationship >10 years, n (%) | 60 (75.0) | 64 (80.0) | $\chi^2 = 0.62$ | .431 |
| Sexuality rated as more important, n (%) | 43 (53.8) | 37 (46.2) | $\chi^2 = 1.01$ | .315 |

Diabetic patients reported significantly poorer sexual activity levels compared to controls ($\chi^2 = 14.67$, $p = .002$), with over half (51.2%) experiencing severe problems versus only 20.0% in controls (Table 3).

**Table 3: Quality of Sexual Function (QSF) Domain Scores: Sexual Activity Level by Group (N = 160)**

| Sexual Activity Level | Diabetic Cases (n = 80) n (%) | Non-Diabetic Controls (n = 80) n (%) | $\chi^2$ | p-value |
|---|---|---|---|---|
| No/little problem | 17 (21.2) | 34 (42.5) | | |
| Mild | 13 (16.2) | 19 (23.8) | 14.67 | .002 |
| Moderate | 9 (11.2) | 11 (13.8) | | |
| Severe | 41 (51.2) | 16 (20.0) | | |

Both self-reported and partner-perceived sexual (dys)function were significantly worse in the diabetic group (self-view $p = .004$; partner's view $p = .001$). Severe impairment was reported by 21.2% (self) and 36.2% (partner) of diabetic patients versus 6.2% and 18.8% of controls, respectively (Table 4).

**Table 4: Quality of Sexual Function (QSF) Domain Scores: Sexual (Dys)Function – Self-View and Partner's View by Group (N = 160)**

| Domain / Severity | Diabetic Cases (n = 80) n (%) | Non-Diabetic Controls (n = 80) n (%) | $\chi^2$ | p-value |
|---|---|---|---|---|
| **Self-view** | | | | |
| No/little | 22 (27.5) | 42 (52.5) | 13.45 | .004 |
| Mild | 20 (25.0) | 17 (21.2) | | |
| Moderate | 21 (26.2) | 16 (20.0) | | |
| Severe | 17 (21.2) | 5 (6.2) | | |
| **Partner's view** | | | 15.82 | .001 |
| No/little | 19 (23.8) | 44 (55.0) | | |
| Mild | 13 (16.2) | 9 (11.2) | | |
| Moderate | 19 (23.8) | 12 (15.0) | | |
| Severe | 29 (36.2) | 15 (18.8) | | |

Overall QSF scores indicated sexual dysfunction (mild to severe) in 56.2% of diabetic patients versus 25.0% of controls ($\chi^2 = 18.76$, $p < .001$), confirming significantly impaired quality of sexual function in T2DM. Within the diabetic group, poorer glycemic control showed a moderate positive correlation with greater QSF total severity (Spearman $r_s = .42$, $p = .008$) (Table 5).

**Table 5: Overall Quality of Sexual Function (QSF Total Score) and Correlation with Glycemic Control in Diabetic Cases (n = 80)**

| QSF Total Severity | Diabetic Cases (n = 80) n (%) | Non-Diabetic Controls (n = 80) n (%) | $\chi^2$ | p-value |
|---|---|---|---|---|
| No/little | 35 (43.8) | 60 (75.0) | 18.76 | <.001 |
| Mild | 22 (27.5) | 8 (10.0) | | |
| Moderate | 16 (20.0) | 10 (12.5) | | |

| | | | | |
|---|---|---|---|---|
| Severe | 7 (8.8) | 2 (2.5) | | |

## DISCUSSION

The present study demonstrated a significantly higher burden of impaired quality of sexual function among patients with type 2 diabetes mellitus (T2DM) compared to age- and sex-matched non-diabetic controls attending a tertiary care hospital in Chennai. Overall sexual dysfunction (mild to severe) was observed in 56.2% of diabetic patients versus only 25.0% of controls ($\chi^2 = 18.76$, $p < .001$), with an odds ratio indicating approximately 3.85 times higher risk in the diabetic group. The comprehensive, gender-neutral Quality of Sexual Function (QSF) scale revealed consistent impairment across multiple domains, highlighting the multifaceted impact of diabetes on sexual health.

In the sexual activity domain, diabetic patients reported severe problems in 51.2% of cases compared to 20.0% in controls ($\chi^2 = 14.67$, $p = .002$). Self-perceived sexual (dys)function was rated as moderate to severe by 47.4% of diabetic patients versus 26.2% of controls ($p = .004$), while partner-perceived dysfunction reached severe levels in 36.2% of diabetic cases compared to 18.8% of controls ($p = .001$). These results highlight that sexual difficulties in T2DM are not only subjectively experienced but also recognized by partners, potentially contributing to relational strain and reduced intimacy [11]. The psychosomatic quality of life domain (part of QSF) also showed significantly worse scores in the diabetic group ($p = .002$), reflecting the broader negative influence on daily functioning and emotional well-being secondary to sexual impairment [12].

Within the diabetic cohort, poorer glycemic control demonstrated a moderate positive correlation with higher overall QSF total severity (Spearman $r_s = .42$, $p = .008$). Patients with fair or poor control exhibited greater impairment compared to those with good control, supporting the pathophysiological link between chronic hyperglycemia, oxidative stress, advanced glycation end-products, endothelial dysfunction, and diabetic neuropathy affecting pelvic neurovascular structures [13]. Although the study population was relatively young (31–50 years) and excluded major comorbidities and offending medications, the observed differences emphasize that even in early-to-middle adulthood and relatively well-controlled outpatient settings, T2DM exerts a clinically meaningful adverse effect on sexual function [14].

Socio-demographic matching between groups was excellent, with no significant differences in age distribution, sex ratio (67.5% male), education, residence (predominantly urban), socioeconomic status, or family type. Sexual contact in the last month, duration of sexual relationship (>10 years in ~77.5%), and perceived importance of sexuality were also comparable, minimizing confounding and strengthening the attribution of observed differences to diabetes itself [15]. Menopause status among women was identical between groups (23.1%), further supporting the validity of comparisons. These balanced baseline characteristics distinguish the present study from many earlier reports that lacked adequate matching or gender-inclusive assessment tools.

The strengths of this investigation include its use of a validated, gender-neutral QSF instrument with established reliability, consecutive sampling in a real-world tertiary care setting, rigorous exclusion of major confounders (comorbidities, psychiatric illness, medications affecting sexuality), and dual-language (English/Tamil) administration after proper validation. By focusing exclusively on sexual function while documenting glycemic status, the study provides actionable insights for diabetes care providers in resource-limited Indian settings where routine inquiry into sexual health remains uncommon due to cultural barriers and time constraints.

Limitations must be acknowledged. The cross-sectional design precludes causal inference and longitudinal tracking of sexual function changes with improved glycemic control or specific interventions. The sample, though adequately powered, was drawn from a single tertiary center, potentially limiting generalizability to primary care or rural populations. Self-report nature of the QSF may introduce social desirability bias, although private administration and assured confidentiality likely mitigated this.

These findings carry important clinical implications. Sexual dysfunction should be recognized as a common, often silent complication of T2DM even in younger adults. Routine screening using simple, validated tools like the QSF during diabetes follow-up visits could facilitate early identification and timely referral to multidisciplinary teams comprising diabetologists, endocrinologists, urologists, gynecologists, and counsellors [16]. Optimizing glycemic control remains a cornerstone strategy, as evidenced by the observed correlation with QSF severity. Patient education addressing myths, stigma, and lifestyle modifications (weight management, smoking cessation, regular physical activity) should be integrated into diabetes self-management programs [17]. In cases of severe dysfunction, phosphodiesterase-5 inhibitors (where safe), vacuum devices, hormone evaluation, or psychosexual counseling may be considered after individualized risk assessment [18].

Future research should adopt longitudinal designs to evaluate the impact of intensive glycemic management, structured lifestyle interventions, and targeted sexual health counseling on QSF scores over time. Multicenter studies across different regions of India would help establish national benchmarks and identify sociocultural modifiers. Incorporation of objective measures such as penile Doppler studies in men or vaginal plethysmography in women, alongside biomarkers of endothelial function and neuropathy, would strengthen mechanistic understanding [19, 20].

## CONCLUSION

The results of the present study indicate that type 2 diabetes mellitus is associated with significantly impaired quality of sexual function across activity, self-perception, partner perception, and psychosomatic domains, even in a relatively young outpatient population. Routine incorporation of sexual function assessment into standard diabetes protocols has the potential to improve patient-centered outcomes, strengthen intimate relationships, and enhance overall well-being in this growing patient population.

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