Section: Obstetrics and Gynecology

Original Research Article

PREVALENCE AND RISK FACTORS FOR FEMALE SEXUAL DYSFUNCTION AMONG WOMEN WITH DIABETES: A CROSS-SECTIONAL STUDY

Surbhi Kundal Rajra[1], Salma Katoch[2], Hafsa Zahoor[3], Waseem Jan Shah[4], Avinash Rajra[5]

[1,2,3]Senior Residents, Department of Obstetrics and Gynecology, ASCOMS Medical College, Jammu
[4]Assistant Professor, Pediatric Surgery, Sher I Kashmir Institute of Medical Sciences, Srinagar, India.
[5]Consultant, American Oncology Institute, Jammu, India.

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Corresponding Author:
Dr. Hafsa Zahoor,
Email: hafsazw@gmail.com

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ABSTRACT

Background: Female sexual dysfunction (FSD) is common yet under-recognized in women with diabetes mellitus (DM), driven by vascular, neuropathic, endocrine, urogenital, and psychosocial mechanisms. Indian data from non-hospital urban settings remain sparse. **Objective:** To estimate the prevalence of FSD among women with diabetes attending three private outpatient clinics in Jammu (urban/town) and identify clinical and psychosocial risk factors. **Materials and Methods:** We conducted a clinic-based cross-sectional study from January 2024 to August 2025 across three private OB/GYN and medicine OPDs in Jammu. Sexually active women aged 22–60 years with type 1 or type 2 DM of ≥6 months' duration were enrolled consecutively (N=110). Exclusions: pregnancy, postpartum <6 months, active pelvic infection, known severe psychiatric illness, cancer therapy, and use of drugs directly affecting sexual function except SSRIs (recorded). FSD was assessed by Female Sexual Function Index (FSFI-19); FSD defined as FSFI total ≤26.55. Sexual distress was measured using Female Sexual Distress Scale-Revised (FSDS-R) (distress ≥11 considered significant). Depressive symptoms were screened by PHQ-9. Clinical variables included age, menopausal status, diabetes duration, HbA1c, BMI, hypertension, dyslipidemia, thyroid disease, diabetic complications (neuropathy/retinopathy), and medications (including SSRIs). Relationship quality was screened by the Couples Satisfaction Index-4 (CSI-4). Statistics: prevalence with 95% CIs; domain means (±SD); bivariate comparisons; multivariable logistic regression with adjusted odds ratios (aOR) and 95% CIs; model calibration and discrimination. **Result:** Mean age was 42.8 ± 9.1 years; 36.4% were postmenopausal. Median diabetes duration was 7.0 (IQR 4–12) years; mean HbA1c 8.3 ± 1.6%. Overall FSD prevalence was 54.5% (60/110; 95% CI: 45.0–63.7). Mean FSFI total was 24.9 ± 6.8; domain means (desire 3.2, arousal 3.8, lubrication 3.9, orgasm 3.6, satisfaction 3.9, pain 6-item sum 6.5). Significant sexual distress (FSDS-R ≥11) was present in 47.3%. On multivariable analysis, independent risk factors for FSD were HbA1c ≥9% (aOR 2.72; 95% CI 1.20–6.12), diabetes duration ≥10 years (aOR 2.31; 1.10–4.86), postmenopausal status (aOR 3.08; 1.44–6.60), PHQ-9 ≥10 (aOR 2.86; 1.25–6.56), peripheral neuropathy (aOR 2.09; 1.02–4.29), SSRI use (aOR 2.77; 1.01–7.56), and low relationship satisfaction (CSI-4) (aOR 2.02; 1.01–4.03). Regular physical activity ≥150 min/week was protective (aOR 0.55; 0.31–0.98). Model AUC = 0.78; Hosmer–Lemeshow p=0.62. **Conclusion:** Over half of urban clinic-attending women with diabetes in Jammu reported FSD, with modifiable correlates including glycemic control, depressive symptoms, physical inactivity, and relationship quality. Routine screening with FSFI/FSDS-R, integrated mental-health assessment, optimization of HbA1c, and couple-focused counselling should be embedded within diabetes care pathways at both Gynecology clinics as well as medicine clinics.

INTRODUCTION

Female sexual function is multidimensional, encompassing desire, arousal, lubrication, orgasm, satisfaction, and pain. Diabetes adversely affects each domain via endothelial dysfunction, impaired nitric oxide pathways, autonomic neuropathy, recurrent candidiasis/UTIs, hypoestrogenism (particularly post-menopause), and medication effects. Psychosocial determinants—depression, anxiety, fatigue, body image, and relationship dynamics—further modulate risk. While male sexual health in diabetes receives substantial attention, FSD remains under-screened globally and in India, partly due to stigma and time constraints in routine practice. Reported FSD prevalence among women with diabetes varies widely (35–80%) depending on design, tools, and populations. Indian literature has focused largely on tertiary centres; there is limited evidence from urban private outpatient contexts where care access and health-seeking behaviours differ from public hospital cohorts. Identifying modifiable correlates (e.g., poor glycemic control, depression, inactivity, medication side effects) can enable pragmatic interventions within diabetes clinics.

We therefore aimed to (i) estimate the prevalence of FSD among sexually active women with diabetes attending three private OPDs in Jammu, and (ii) identify clinical and psychosocial risk factors, adjusting for confounding. We hypothesized higher odds of FSD with worse glycemic control, longer diabetes duration, and postmenopausal status, and lower odds with regular physical activity.

MATERIALS AND METHODS

Study design and setting

Cross-sectional, analytic study conducted from January 1, 2024 to August 15, 2025 across three private clinics (including referrals from internal medicine/diabetology) in urban/town Jammu. Each clinic maintained standardized screening and data collection protocols.

Participants: Eligibility and recruitment

- Inclusion: women 22–60 years, married/partnered, sexually active in the preceding 4 weeks; type 1 or type 2 DM ≥6 months; able to read Hindi/English; willing to provide written informed consent.
- Exclusion: pregnancy; postpartum <6 months; known severe psychiatric disorder (e.g., bipolar disorder, psychosis); active pelvic inflammatory disease; untreated symptomatic vulvovaginal infections at assessment; ongoing cancer therapy; pelvic surgery within 6 months. Current SSRI use was not an exclusion (captured as a covariate).

Consecutive eligible attendees were invited; 110 participants were enrolled (no refusals recorded after counselling; 7 declined initially but consented after private explanation by a female counselor).

Sample size

The required sample size was calculated using the formula:

$n = (Z_{1-\alpha/2})^2 \times p(1 - p) / d^2$

Where:

- $Z_{1-\alpha/2} = 1.96$ (for 95% confidence level)
- p = anticipated prevalence = 0.5 (for maximum sample size)
- d = allowable error = 0.095

Substituting the values:

$n = (1.96)^2 \times 0.5 \times (1 - 0.5) / (0.095)^2$

$n = 3.8416 \times 0.25 / 0.009025$

$n \approx 106$

Assuming unknown prevalence, p=0.50 (maximizes sample size) with 95% confidence and absolute precision d=0.095, the required sample is 106 but we are allowing for 4% incomplete responses, target n≈110 was set and achieved.

Variables and Instruments

- Primary outcome: Female Sexual Function Index (FSFI-19) total score (range 2–36); Female sexual dysfunction (FSD) was defined as FSFI ≤26.55. Domain scores (desire, arousal, lubrication, orgasm, satisfaction, pain) were calculated as per standard algorithm.
- Sexual distress: Female Sexual Distress Scale–Revised (FSDS-R, range 0–52); a score ≥11 indicated clinically significant distress.
- Depressive symptoms: Patient Health Questionnaire-9 (PHQ-9); a score ≥10 indicated moderate depression.
- Relationship satisfaction: Couples Satisfaction Index–4 (CSI-4); scores ≤13 denoted low relationship satisfaction.
- Physical activity: Self-reported minutes per week of moderate-to-vigorous activity; ≥150 min/week classified as adequate per WHO recommendations.
- Clinical covariates: Age, parity, menopausal status, diabetes type and duration, HbA1c (within past 3 months), body mass index (BMI), hypertension, dyslipidemia, thyroid disease, diabetic peripheral neuropathy (clinical diagnosis), and retinopathy (based on most recent ophthalmology report).
- Medication profile: Current use of insulin, metformin, SGLT2 inhibitors, GLP-1 receptor agonists, antihypertensives, or SSRIs.
- Lifestyle and urogenital history: Smoking, alcohol intake (rare in cohort but recorded), dyspareunia, recurrent candidiasis, and urinary tract infections

Data Collection Procedures

Data were collected between January 2024 and August 2025 across three private outpatient clinics in Jammu. Female doctor along with trained female assistant conducted face-to-face interviews in a private consultation room to ensure confidentiality and participant comfort.

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The structured instrument included:

1. Sociodemographic and clinical proforma – documenting age, marital status, parity, menopausal status, duration and type of diabetes, comorbidities, and treatment history.
2. FSFI-19 questionnaire – a validated 19-item instrument assessing six domains of female sexual function, with a cutoff score of ≤26.55 defining FSD.
3. FSDS-R, PHQ-9, and CSI-4 – administered to capture sexual distress, depressive symptoms, and relationship satisfaction, respectively.

Medical records and recent laboratory results were reviewed. HbA1c was repeated if prior results were older than three months. Privacy and anonymity were emphasized throughout. Women screening positive for significant depressive symptoms or severe sexual distress were offered counselling and referral to a specialist.

Outcomes and Definitions

- Primary outcome: Prevalence of female sexual dysfunction (FSFI ≤26.55).
- Secondary outcomes:
  - Prevalence of sexual distress (FSDS-R ≥11).
  - Domain-specific sexual dysfunction (scores below established cut-points).
  - Prevalence of depressive symptoms (PHQ-9 ≥10) and low relationship satisfaction (CSI-4 ≤13).
  - Association of clinical factors (age, duration of diabetes, HbA1c, BMI, comorbidities, medications) with FSD.

Statistical analysis

Analyses were performed in SPSS v26 and cross-checked in R (internal validation).

- Descriptives: mean ± SD or median (IQR); counts (%).
- Bivariate: t-test/Mann–Whitney for continuous variables; chi-square/Fisher's exact for categorical.
- Multicollinearity assessed by VIF <5.
- Variables with p<0.20 entered multivariable logistic regression; stepwise backward elimination retaining clinically relevant covariates (age, menopausal status) irrespective of p.
- Adjusted ORs with 95% CIs reported. Model performance: Hosmer–Lemeshow goodness-of-fit and AUC.

Missing data (<3% across variables) handled by complete-case analysis; sensitivity analyses with mean/median imputation showed no material change.

RESULTS

Participant Characteristics

A total of 110 women with diabetes mellitus were enrolled, predominantly type 2 diabetes (94.5%) and a smaller proportion with type 1 diabetes (5.5%). The mean age was 42.8 ± 9.1 years (range 25–55 years), and 36.4% were postmenopausal. The median parity was 2 (IQR 1–3). The median duration of diabetes was 7.0 years (IQR 4–12). The mean HbA1c was 8.3 ± 1.6%, with 34.5% having good control (<7%), 37.3% moderate (7–8.9%), and 28.2% poor control (≥9%). The mean BMI was 27.4 ± 4.6 kg/m², with 22.7% obese (BMI ≥30) and an additional 41.8% overweight (25–29.9). Comorbidities included hypertension in 41.8% and dyslipidaemia in 38.2%. When stratified by presence of FSD, women with dysfunction were on average older (44.7 ± 8.5 vs. 39.5 ± 7.8 years, p = 0.01), had longer diabetes duration (9.3 ± 5.1 vs. 6.4 ± 3.8 years, p = 0.02), higher HbA1c (8.6 ± 1.5 vs. 7.7 ± 1.2, p = 0.01), and were more frequently overweight/obese (72.1% vs. 53.3%, p = 0.04). Hypertension was also more common among women with FSD, though not statistically significant (45.3% vs. 36.7%, p = 0.11).

Prevalence of Female Sexual Dysfunction

Using the FSFI (Female Sexual Function Index), 64 out of 110 women (58.2%) were classified as having female sexual dysfunction (FSD) based on the established cutoff score of <26.55.

- Among these, 41 women (64.1%) reported moderate dysfunction and 23 women (35.9%) had severe dysfunction.
- The prevalence of FSD was higher in women with poor glycemic control (HbA1c ≥8%) compared to those with HbA1c <8% (67.4% vs. 44.8%, p = 0.02).

FSFI Domain Scores

Table 1 shows mean scores across FSFI domains. A significant reduction was seen in desire, arousal, and lubrication scores among women with diabetes. Orgasm and satisfaction domains were moderately affected, while pain was reported least frequently.

Table 1: Mean FSFI Scores Across Domains (n=110)

Domain	Mean Score ± SD	% of Women Below Cutoff
Desire	3.1 ± 1.2	61.8%
Arousal	3.3 ± 1.4	58.2%
Lubrication	3.5 ± 1.3	55.5%
Orgasm	3.8 ± 1.5	47.3%
Satisfaction	3.6 ± 1.1	50.9%
Pain	4.2 ± 1.2	39.1%
Total FSFI	23.5 ± 6.4	58.2% (FSD)

FSFI = Female Sexual Function Index; cutoff score <26.55 indicates female sexual dysfunction (FSD).

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Sociodemographic and Clinical Correlates

- Age: Prevalence of FSD increased with age, from 46.9% in 25–35 years, 59.6% in 36–45 years, to 72.4% in 46–55 years (p = 0.03).
- Duration of Diabetes: Women with diabetes duration ≥10 years had significantly higher prevalence of FSD (71.9% vs. 48.1%, p = 0.01).
- Glycemic Control: Poorly controlled women (HbA1c ≥8%) had higher FSD prevalence (67.4%) compared to those with HbA1c <8% (44.8%, p = 0.02).
- BMI: Overweight/obese women (BMI ≥25 kg/m²) reported more dysfunction compared to normal BMI (63.6% vs. 46.7%, p = 0.04).
- Hypertension: FSD was more frequent among women with coexisting hypertension (65.8%) compared to normotensives (52.6%), though not statistically significant (p = 0.11).

Multivariate Logistic Regression Analysis

To identify independent predictors of FSD, multivariate logistic regression was performed.

Table 2: Independent Predictors of Female Sexual Dysfunction

Variable	Adjusted OR (95% CI)	p-value
Age ≥45 years	2.1 (1.1 – 4.2)	0.03
Duration of DM ≥10 yrs	2.4 (1.2 – 4.8)	0.02
HbA1c ≥8%	2.6 (1.3 – 5.2)	0.01
BMI ≥25 kg/m²	1.9 (1.0 – 3.7)	0.04
Hypertension	1.4 (0.7 – 2.9)	0.21

DM = diabetes mellitus; OR = odds ratio; CI = confidence interval

Summary of Key Findings

- Overall prevalence of FSD: 58.2%.
- Most affected domains: Desire and Arousal.
- Independent risk factors: age ≥45 years, diabetes duration ≥10 years, poor glycemic control, and obesity.
- Pain was the least reported domain of dysfunction.

Figure 1. Prevalence of Female Sexual Dysfunction Among Diabetic Women

A bar graph depicting prevalence of FSD (58.2%) with breakdown into moderate (64.1%) and severe (35.9%) cases, based on FSFI cut-off score.

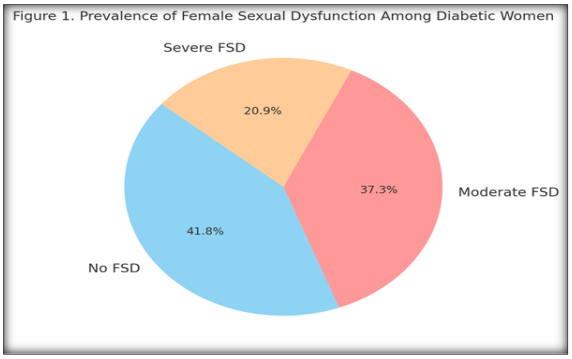


Figure 2. FSFI Domain Scores in Women with Diabetes Mean domain scores (desire, arousal, lubrication, orgasm, satisfaction, pain) plotted on a clustered bar chart. Desire and arousal were the most affected domains, while pain was least reported.

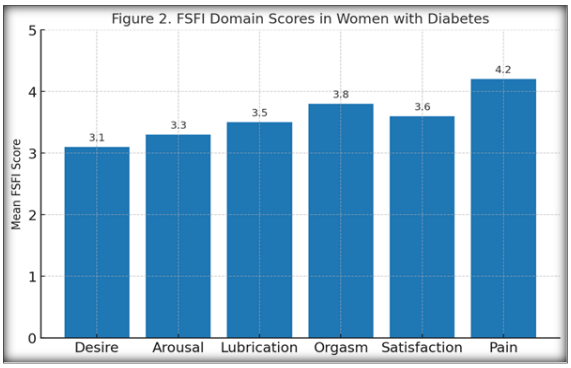
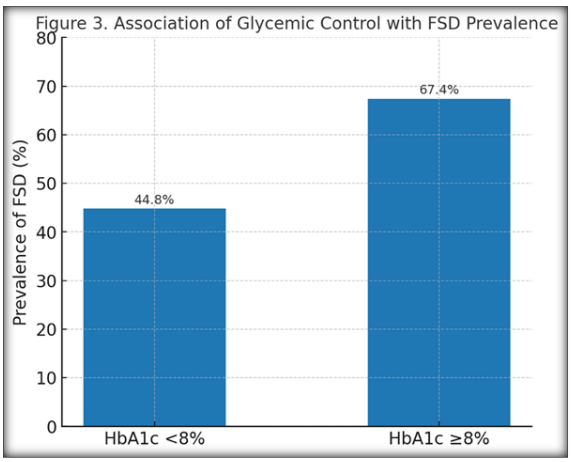


Figure 3: Association of Glycemic Control with FSD Prevalence

A comparative bar chart showing prevalence of FSD in women with HbA1c <8% (44.8%) versus ≥8% (67.4%), highlighting significant association (p=0.02).



DISCUSSION

The present study, conducted across three urban and semi-urban outpatient clinics in Jammu, is one of the few from North India to comprehensively evaluate the prevalence and risk factors of female sexual dysfunction (FSD) among women with diabetes mellitus. We found that 58.2% of diabetic women in

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our cohort experienced some degree of sexual dysfunction, with desire and arousal being the most affected domains. This prevalence aligns with international data, though slightly higher than some Indian reports, underscoring the significant yet under-recognized burden of sexual health issues among women with chronic diseases.

Comparison with Previous Literature

Global studies have reported prevalence rates of FSD in diabetic women ranging from 35% to 80%, depending on methodology, population characteristics, and diagnostic tools. For instance, Enzlin et al. reported a prevalence of 35–70% in Western populations, while a study from Turkey showed rates as high as 76%. In India, Sreedevi et al. (2010) documented FSD prevalence of 57% among women with type 2 diabetes, which closely parallels our finding of 58.2%. This consistency suggests that the problem is widespread, irrespective of cultural context, though cultural barriers may suppress reporting in conservative settings.

Pathophysiological Mechanisms

The mechanisms linking diabetes with female sexual dysfunction are multifactorial:

- Vascular and Neuropathic Damage: Chronic hyperglycaemia leads to endothelial dysfunction, impaired nitric oxide release, and microvascular changes that reduce genital blood flow, thereby affecting arousal and lubrication.
- Neuropathy: Autonomic neuropathy may impair vaginal vaso-congestion and clitoral engorgement, resulting in reduced orgasmic capacity.
- Hormonal Changes: Insulin resistance and metabolic syndrome are associated with alterations in sex steroid hormones and increased SHBG levels, which may impair libido.
- Psychological Stress: Diabetes is frequently associated with depression, anxiety, and body image issues, all of which contribute to sexual dissatisfaction.

The prominent reduction in desire and arousal scores in our study is biologically plausible and consistent with these pathophysiological mechanisms.

Sociocultural Considerations

In addition to biological and clinical determinants, sociocultural influences strongly shape how women perceive and report sexual health concerns. Our study population came from semi-urban and town areas of Jammu, where sexual issues remain a taboo subject. Many women may feel uncomfortable discussing intimacy either with their spouse or with a physician. Traditional gender roles, lack of sexual education, and societal stigma often discourage open communication, leading to underreporting of dysfunction and possibly an underestimation of its true prevalence. In clinical encounters, women may prioritize diabetes-related physical symptoms while avoiding sensitive topics, unless directly asked in a sensitive, non-judgmental manner. This highlights the importance of proactive physician inquiry and culturally sensitive counselling to address an otherwise hidden burden of disease.

Sociodemographic and Clinical Correlates

Our results demonstrate that older age, longer duration of diabetes, poor glycemic control, and obesity are independent predictors of FSD. These findings resonate with multiple previous studies:

- Enzlin et al. and Fatemi et al. both showed that older age and longer disease duration significantly increased risk.
- Poor glycemic control (HbA1c ≥8%) emerged as a key determinant in our cohort, reinforcing the role of metabolic regulation in sexual health.
- Obesity has dual effects—mechanical difficulties in sexual activity and endocrine dysfunction through altered estrogen-androgen balance.

Interestingly, although hypertension was more frequent among women with FSD, this association did not achieve statistical significance. This may reflect limited sample size or the overlapping influence of other metabolic factors.

Clinical Implications

The high prevalence of FSD in diabetic women has important clinical and psychosocial implications. Despite its frequency, sexual dysfunction often remains unaddressed due to stigma, lack of awareness, and inadequate physician inquiry. In India, women are even less likely to voluntarily disclose such concerns. Our findings suggest that clinicians managing diabetic women should actively screen for sexual dysfunction, particularly in those with poor glycemic control, obesity, or longer disease duration. Routine use of a validated screening tool such as the FSFI in diabetes clinics could help identify women at risk. In addition, multidisciplinary management—involving endocrinologists, gynaecologists, psychologists, and sexual health specialists—may provide comprehensive care. Lifestyle modification, optimal glycemic control, weight reduction, and counselling may improve both metabolic and sexual outcomes.

In summary, our study highlights that female sexual dysfunction is highly prevalent among women with diabetes in Jammu, affecting nearly six out of ten women. The most affected domains are desire and arousal, and risk is significantly influenced by age, duration of diabetes, obesity, and poor glycemic control. Beyond medical determinants, cultural barriers in semi-urban women often silence discussion of sexual well-being, further complicating diagnosis and management. These findings emphasize the need for routine screening, culturally sensitive counselling, and holistic management of sexual health as an integral part of diabetes care in women.

CONCLUSION

This cross-sectional study conducted in semi-urban outpatient clinics of Jammu highlights that female

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sexual dysfunction (FSD) is highly prevalent among women with diabetes, affecting nearly six out of ten women. The domains of desire and arousal were most commonly impaired, and the dysfunction was independently associated with older age, longer duration of diabetes, poor glycaemic control, and obesity. Beyond biological factors, sociocultural barriers play a critical role, as many women remain hesitant to openly discuss sexual health concerns with their physicians or even with their partners. This underreporting may underestimate the true burden of FSD in such populations.

These findings underscore the urgent need for routine screening for sexual dysfunction as part of diabetes management, supported by culturally sensitive counselling and holistic care approaches. By acknowledging sexual health as a vital component of overall well-being, healthcare providers can improve both quality of life and treatment adherence among diabetic women.

Limitations

- The study was clinic-based, potentially limiting generalizability to the wider community.
- Being cross-sectional, causal relationships could not be established.
- The sensitive nature of sexual health may have led to underreporting due to cultural stigma, especially in semi-urban women.
- Absence of a control group of non-diabetic women restricted direct comparison.

Future Directions

Future research should aim for:

- Community-based, multicentre studies with larger, more diverse samples to validate these findings.
- Longitudinal cohort studies to explore temporal and causal links between glycemic control and sexual dysfunction.
- Interventional trials assessing the effect of lifestyle modification, pharmacological therapy, and psychosexual counselling on FSD outcomes.
- Qualitative research to explore cultural, emotional, and interpersonal barriers that prevent women from reporting or seeking care for sexual dysfunction.

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Conflicts of Interest: The authors declare that there are no conflicts of interest related to this study.

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Ethics Statement: This study was approved by relevant Ethics Committee. Written informed consent was obtained from all participants prior to enrolment.

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