



Severity of Female Sexual Dysfunction in Chronic Kidney Disease and Its Correlates: A Single Centre Study

Abstract

Background: Female sexual dysfunction (FSD) is multifactorial and often overlooked in females with chronic kidney disease (CKD). This study aims to assess the prevalence, severity, and determinants of FSD in females with CKD and explore its association with other comorbidities.

Materials and methods: This prospective study was conducted between September 2023 and January 2025 in the Institute of Medical Sciences, Banaras Hindu University. Fifty-four married females aged ≥ 21 years with CKD were evaluated using the Female Sexual Function Index-6 (FSFI-6). FSD was assessed by the six domains of FSFI namely, desire, arousal, lubrication, orgasm, satisfaction, and pain. The dysfunction was also checked for any correlation with factors like, age, stage, and duration of CKD and comorbidities like, hypertension, diabetes, and tuberculosis.

Results: As CKD progressed, the likelihood of FSD increased 10.97 times. Severe FSD (FSFI ≤ 7.2) was observed in 16.7% of patients, predominantly in Stage 5 CKD. Diabetes mellitus (DM) showed a significant association with FSD ($p = 0.003$).

Conclusion: FSD is highly prevalent yet frequently under-recognized in Indian population.

Keywords: Chronic kidney disease, Sexual health, Diabetes, Female sexual function score

Introduction

Female sexual dysfunction (FSD) is a multifactorial disorder that influences the physical, behavioral, and personal life of a female. It is a prevalent yet frequently ignored complication in patients with chronic kidney disease (CKD).¹ While male erectile dysfunction (ED) in CKD cases has been widely researched, FSD remains under-reported and underdiagnosed, despite its notable occurrence in this population.²

Female patients with CKD frequently suffer from hypoactive sexual desire disorder, vaginal dryness, dyspareunia, and anorgasmia due to anemia, increased levels of prolactin, decreased estrogen, and endothelial dysfunction, which impairs vascular flow to the genital organs.³ FSD in patients with CKD is impacted by multiple comorbidities such as hypertension, hormonal imbalance, psychological factors, and diabetes mellitus (DM). FSD is defined as any sexual complaint or problem resulting from disorders of desire, arousal, orgasm, or sexual pain that causes marked distress or interpersonal difficulty. To qualify as a dysfunction, the problem must be present for more than 75% of the

time for more than 6 months, leading to significant distress.⁴

Our objective was to examine the relationship between the extent of CKD and the grade of sexual dysfunction that occurred in female patients in a society where it is ignored. Our secondary objective was to detect any relevant comorbidities that influenced the sexual function of the patients with CKD.

Materials and Methods

This prospective study was conducted in the Department of Obstetrics & Gynecology, in collaboration with the Urology and Nephrology departments, Institute of Medical Sciences, Banaras Hindu University, between September 2023 and January 2025. The study was approved by the ethical committee (EC 6575). A total of 54 married females aged ≥ 21 years, who gave informed consent, were included.

We used the female sexual function index (FSFI), a questionnaire specifically developed to assess female sexual function across six key domains: desire, arousal, lubrication, orgasm, satisfaction, and pain. Each domain is scored on a scale of 0-5,

Vindhya Goyal^{1,2},
Lalit Kumar³, Sakshi
Agarwal¹, Shivendra
Singh⁴, T B Singh⁵

¹Department of Obstetrics and Gynecology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, ²Department of Obstetrics and Gynecology, Government Medical College, Ernakulum, Kerala, ³Departments of ³Urology, ⁴Nephrology, ⁵Biostatistics, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India.

Corresponding author: Sakshi Agarwal, Department of Obstetrics and Gynecology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India.
E-mail: sakshi.grmc@gmail.com

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with lower scores indicating greater dysfunction. The FSFI provides a collective yet concise evaluation of sexual function, making it a valuable tool for identifying FSD.⁵ The Hindi translated version of the FSFI score, developed and validated in 2023, was utilized in our study.⁶ FSD cases were divided into five categories based on FSFI scores as suggested by Ismail *et al*, with lower scores indicating greater dysfunction [Table 1]. A FSFI score of ≤ 7.2 is considered indicative of severe sexual dysfunction, 7.3-14.4 moderate FSD, 14.5 - 21.6 mild to moderate, and 21.7 - 28.1 mild sexual dysfunction.⁷

The patients were provided with a proforma consisting of personal and medical details including their name, age, comorbidities like hypertension, DM, coronary artery disease (CAD), external genitalia examination, creatinine, urea, CKD stage, CKD duration, FSFI score parameters, type and duration of renal replacement therapy/dialysis (RRT), probable etiology of sexual dysfunction, and drug history. Their estimated GFR was calculated using the CKD-EPI equation.

Statistical analysis was conducted using IBM SPSS Statistics software, version 28. Independent t-tests and one-way ANOVA were used to analyze the FSFI Questionnaire data. The Chi-Square test of independence was conducted on the categorical data from the FSFI Questionnaire, and $p < 0.05$ was considered statistically significant. The linear regression examined relationships between FSD and clinical

factors, renal function indicators, etiology, and medication history.⁸

Results

The mean age of the study participants was 52.5 ± 13.4 years, with the majority belonging to the 49-62 year age group. The participants presented with a range of comorbidities, with hypertension being the most prevalent, affecting 32 (59.2%), followed by DM in 12 (22.2%). The mean duration of CKD was 12.3 months. At the time of evaluation, 20 patients (37%) were receiving dialysis: 18 (90%) on hemodialysis and 2 (10%) on peritoneal dialysis. The mean serum creatinine for the entire cohort was 5.87 ± 2.65 mg/dL, and the mean hemoglobin was 8.39 ± 1.58 g/dL. The probable etiologies of sexual dysfunction in our study were idiopathic in 46 (85.18%) patients, as compared to psychological in 8 (14.82%) patients. The females in our study had hemoglobin levels ranging from 4.3 g/dL to 13.2 g/dL, with a mean of 8.38 g/dL. The disease duration ranged from 1 to 48 months, with an average of 12.31 months.

The patients were categorized according to their CKD stages and analyzed for the amount of sexual dysfunction as per the FSFI scoring. According to our study, as CKD progresses, the risk of FSD increases by 10.97 times. As CKD progressed from stage I-V, a larger proportion experienced FSD. In stage V of CKD, 9 (16.67%) out of 54 patients had

Table 1: Sociodemographic details of the study population

Variable	Female Sexual Function Index				(%)
	<7.2	7.3-14.4	14.5-21.6	21.7-28	
Age (years)					
21-34	3	0	2	3	8 (14.8)
35-48	2	0	2	4	8 (14.8)
49-62	6	4	13	2	25 (46.3)
63-75	6	2	4	1	13 (24.1)
CKD stage (according to GFR)					
1	1	0	1	0	2
2	1	0	1	0	2
3a	1	0	1	0	2
3b	1	1	2	0	4
4	1	2	5	1	9
5	12	3	11	9	35
CKD Duration (months)	17.06 \pm 15.15	8.50 \pm 3.20	9.86 \pm 11.88	11.70 \pm 8.27	
FSFI score	4.47 \pm 1.58	11.33 \pm 2.06	17.67 \pm 1.98	23.40 \pm 1.35	
Duration of RRT (months)	8.12 \pm 6.99	4.33 \pm 1.63	5.24 \pm 6.09	6.30 \pm 4.29	
Creatinine (mg/dL)	6.42 \pm 2.72	5.37 \pm 2.17	4.82 \pm 2.39	7.42 \pm 2.64	
Hemoglobin (g/dL)	8.07 \pm 1.60	7.85 \pm 2.02	8.64 \pm 1.72	8.71 \pm 0.83	
DM	9	0	2	1	12/54 (22.22)
HTN	8	4	15	5	32/54 (59.30)
COPD	0	0	1	0	1/54 (1.90)
CAD	1	0	0	0	1/54 (1.90)
Tuberculosis	0	1	1	0	2/54 (3.7)

CKD: Chronic kidney disease, DM: Diabetes mellitus, HTN: Hypertension, COPD: Chronic obstructive pulmonary disease, CAD: Chronic artery disease

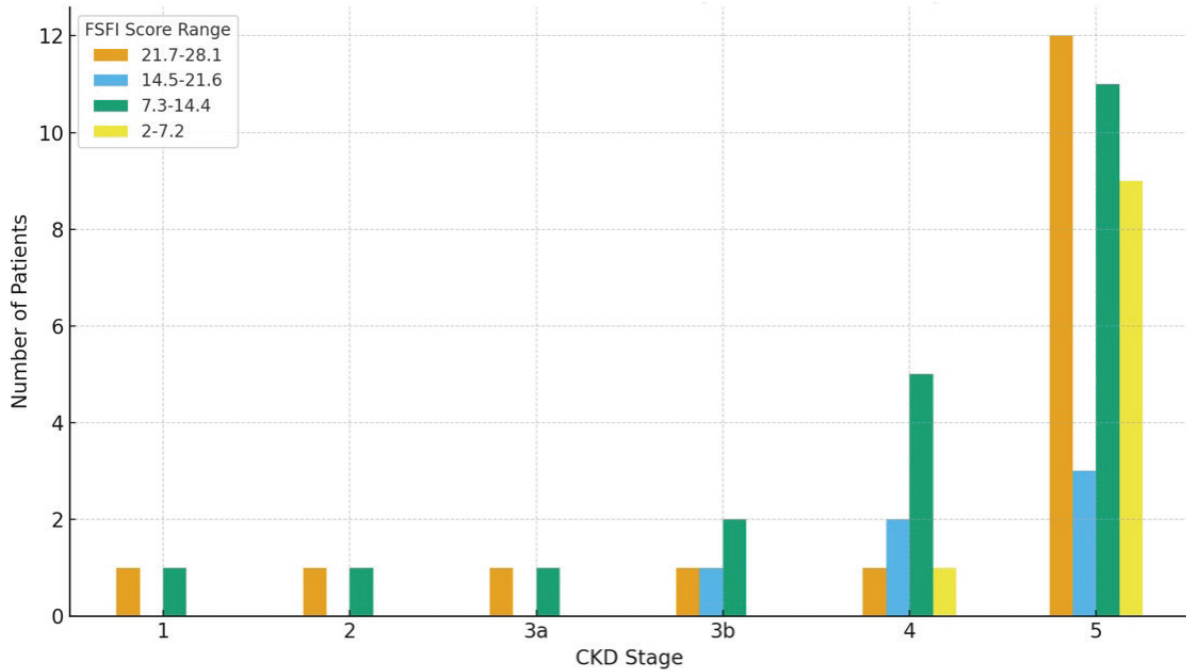


Figure 1: Female sexual function scoring across CKD stages.

Table 2: Association of diabetes with decreasing Female Sexual Function Index scores

Diabetes mellitus (DM)	Female Sexual Function Index				Total %
	<7.2	7.3-14.4	14.5-21.6	21.7-28	
No. of females with diabetes in each FSFI group	9	0	2	1	12
Percentage within DM group	75% (9/12)	0% (0/12)	16.7% (2/12)	8.3% (1/12)	100 (12/12)
Percentage within FSFI group	52.9% (9/17)	0% (0/6)	9.5% (2/21)	10% (1/10)	22.2 (12/54)
Percentage of total	16.7% (9/54)	0% (0/54)	3.7% (2/54)	1.9% (1/54)	22.2 (12/54)

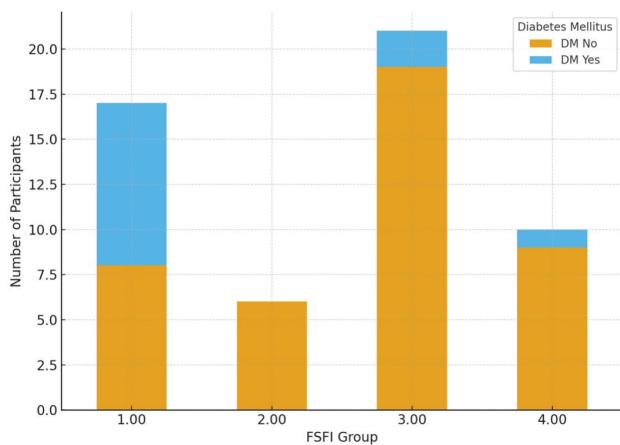


Figure 2: Distribution of diabetes mellitus across FSFI groups - Group 1 = 2-7.2; Group 2 = 7.3-14.4; Group 3 = 14.5-21.6; Group 4 = 21.7-28.1.

severe FSD. However, in the initial stages of CKD, 1-3, no patients had severe FSD. A similar trend was seen in the group of females having FSFI scores between 7.3-14.4. In this group, 11(52.3%) out of 21 females had CKD Stage 5 [Figure 1]. The frequency of sexual dysfunction was greater in diabetic females with CKD ($p = 0.003$).

Discussion

In this study of females with CKD, advanced stages emerged as a key correlate of sexual dysfunction as they contribute to endothelial, hormonal, and psychological changes underlying FSD. The highest proportion of moderate dysfunction was observed between 49-62 years (13), while severe dysfunction was most prevalent between 49-75 years (12). The decline with increasing age may reflect reduced libido as age advances. In a study with 123 females the median age group was 50-68 years.⁹ This explains the similar age-related trend in both studies.

The association between CKD and lower FSFI scores supports earlier work, A meta-analysis showed that in 307 females, prevalence of sexual dysfunction ranged from 30-80%.¹⁰

In our study, the mean FSFI score was 13.87. This score is less than the average sexual function score in postmenopausal patients as described by a study involving 30 postmenopausal females whose average score was 24.8.¹¹

We identified a trend of worsening sexual function from early to terminal stage patients. It also established

diabetes as a potent independent risk factor. 81.5% of FSD was observed in our cohort of females with Stage 4 and 5 CKD. This is consistent with another study, where 81% patients in the pre-dialysis category had FSD.¹²

In Group 1, there is a considerable proportion of females with diabetes, indicating that impaired sexual function is more frequently observed in individuals with diabetes. Group 2 has fewer participants overall, with majority not having diabetes. Group 3, with moderate FSFI scores, shows the highest number of participants, without diabetes. Group 4, which represents the highest FSFI scores, has only a small of diabetic participants. The overall pattern highlights that diabetes has a negative influence on female sexual function, as its presence is more concentrated in the lower FSFI categories [Figure 2].

In our study, out of 12 females having concurrent diabetes with CKD, 9 (75%) had FSFI scores of <7.2 [Table 2]. Our finding that DM is a significant predictor of FSD severity aligns with a meta-analysis, including 50 studies of variable size where 20 studies identified diabetes as a primary cause of FSD in females with CKD.¹⁰ In another study, the incidence of hypoactive sexual symptoms was significantly higher when compared to controls.¹³ The chronically increased blood sugar levels can lead to vasculopathy and neuropathy reducing genital vascularity and sensory feedback from the genitals.³

Our study revealed no association between dialysis status and sexual function outcomes. Another study showed 41% patients during dialysis and 88% transplanted patients acknowledging an active sexual life. The FSFI improved significantly after successful transplantation.¹⁴ In our study, the assessment was not done as a pre- and post-transplant workup as no transplant patients were involved.

Factors such as hypertension, dialysis status and type were assessed, but the association wasn't significant with FSFI. Studies have identified dialysis modality as predictor of sexual dysfunction. This discrepancy may reflect the relatively small sample size of our analysis.

Most of the patients belonged to rural areas, which lack sexual education. As concluded in another study that sex education reduced the FSD by 58.1% in the intervention group.¹⁵

This study provides valuable insights, but has several limitations too. Firstly, the restricted sample size may limit the generalizability of the findings. The sample size can cause a lack of statistical significance in the observed trend between advancing CKD Stage and FSD severity. Secondly, the majority of the patients belong to the CKD Stage 4 and 5. Thirdly, we have used FSFI, a subjective questionnaire, which increases the chance for biases, such as recall and social desirability, and doesn't assess the quality of life. The post menopausal status of most of the females in our study can play a role as a confounding factor in the decline

of female sexual function. Furthermore, the study has no control group, which can provide a picture of normal sexual function. We took patients who had either hemodialysis or peritoneal dialysis for CKD. But, there were no transplant patients included due to the limited scope of the health services.

Our study provides robust confirmation of the high prevalence of FSD in females with CKD. Almost 80% females with FSD belonged to the CKD stage 4 and 5. As the stage of CKD progresses, the risk of developing FSD increases by 10.97 times. To further validate the findings, a prospective study with a large sample size and a control group is needed to shed light on missing aspects.

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Conflicts of interest: There are no conflicts of interest.

The authors declare that no generative AI or AI-assisted tools were used in drafting, editing, or preparing this manuscript.

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