Sexual dysfunction in female patients of reproductive age group with recurrent urinary tract infection—a cross-sectional study

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BACKGROUND: Sexually active female patients often present with urinary tract infection. Recurrent urinary tract infections negatively affect a patient’s social and sexual life, leading to deterioration of overall life quality.

OBJECTIVE: This study aimed to determine the prevalence of sexual dysfunction in recurrent urinary tract infection patients of reproductive age, and the association between recurrent urinary tract infections and sexual dysfunction.

STUDY DESIGN: A total of 697 women of reproductive age with urinary tract infection attending a urology outdoor patient department in a tertiary-care center in eastern India were evaluated with a comprehensive history (including a validated questionnaire), physical examination, and relevant investigations. To assess sexual dysfunction and sexual distress profiles, the Female Sexual Function Index scale and the revised Female Sexual Distress Scale were used.

RESULTS: Recurrent urinary tract infection was found in 143 of 697 (20.5%) patients. Women with recurrent urinary tract infection had a lower Female Sexual Function Index score (<26.55) and a higher Female Sexual Distress Scale score (>11), suggestive of sexual dysfunction, in 59.4% and 58.1% of cases, respectively (P<.001), whereas such scores were found among 22.6% and 19.1% of patients without recurrent urinary tract infection, respectively (P<.001). Relationship status and bowel history were independent predictors of Female Sexual Distress Scale score of >11.

CONCLUSION: Nearly 60% of sexually active women of reproductive age with recurrent urinary tract infection had low Female Sexual Function Index and high Female Sexual Distress Scale scores, which are suggestive of sexual dysfunction. Thus, every patient with recurrent urinary tract infection should be evaluated for sexual dysfunction to improve quality of life.

Keywords: female, Female Sexual Distress Scale, Female Sexual Function Index, recurrent urinary tract infection, reproductive age

Introduction
Female sexual dysfunction is an umbrella term, not a diagnosis, that may encompass one or more distressing conditions that interfere with a woman’s ability to enjoy a satisfying sexual life. Female sexual dysfunction is assessed with the Female Sexual Function Index (FSFI) score and Female Sexual Distress Scale (FSDS). The FSFI is the most widely used and cited research in urologic sexual medicine. It is a 19-item

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INFORMED CONSENT FORM
Sexual dysfunction in female patients of reproductive age group with recurrent urinary tract infection-a cross-sectional study
1. I confirm that I have read and understood the information sheet for the above study and have had the opportunity to ask questions
2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without having to give a reason, and without my medical care or legal rights being affected
3. I understand that my data would be kept confidential but individuals authorized by the Principal Investigator, the ethics committee of the institute where the study will be conducted and government drug regulatory authority will have access to my health records both in respect of the current study and further research that may be conducted in relation to it. Even if I withdraw, I agree to this access. However, I understand that my identity will not be revealed and confidentiality of information will be maintained
4. I agree not to restrict the authorized use of any data or results that arise from this study.
5. I agree to voluntarily take part in the above study
Signature / Thumb impression of the legally acceptable representative (LAR):
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questionnaire that assesses 6 domains of female sexual experience (desire, arousal, lubrication, orgasm, satisfaction, and pain). The FSFSD is a 12-item scale that specifically measures sexually related distress.

Increasing evidence shows that sexual and urinary problems are often comorbid and possibly synergistic with urinary tract infections (UTIs) in women.1–3 Most recurrent UTIs (approximately 60%) in reproductive-age women are postcoital.4 UTIs can reduce the quality of life.3–6

UTIs are one of the most common bacterial infections globally. They cause a significant proportion of medical consultations in primary and outpatient settings.5,6 Approximately 50% to 60% of women of reproductive age develop UTI.9 More than 2 episodes of uncomplicated UTI within 6 months or >3 within 12 months, with positive urine culture, are considered to define recurrent UTI.9,10 Approximately 20% to 30% of UTI patients develop recurrent UTI.11 Most recurrence occurs within the first 3 months after the initial infection. Younger age and constipation are significantly associated with female sexual dysfunction.12

The risk factors are the same for sporadic UTI and recurrent UTI, which suggests possible individual factors of UTI susceptibility. These include behavioral factors such as sexual intercourse frequency, new partnerships, and use of diaphragms with spermicide.13,14

Urinary symptoms may be associated with sexual dysfunction and sexual bother. To the best of our knowledge, no clinical study in India has examined the impact of recurrent UTIs on women’s sexual functioning using validated psychometric questionnaires.

### Objectives

This study aimed to determine the prevalence of sexual dysfunction in female patients of reproductive age with recurrent UTI and investigate the association between recurrent UTI and sexual dysfunction.

### Materials and Methods

This cross-sectional study was conducted between January 2021 and January 2022. Female patients with UTI who had attended a urology outdoor patient department of a tertiary-care hospital in eastern India were included in this study. A total of 697 patients were selected for the study. Of these, 24 were not interested in answering questions regarding their sexuality and were excluded. Thus, 673 patients who agreed to participate in the study were included. Assuming a 12.5% prevalence rate of recurrent UTI11 among the study population and considering 95% confidence limits with absolute precision of 2.5%, the sample size (n) was calculated as 673, as per the formula nc=Z2pq/e2, where $Z=1.96$, $P=0.125$, $q=1-P=0.875$, $e=0.025$.

### Inclusion criteria

All sexually active (at least 4 occasions of sexual intercourse per month12) female patients with UTIs aged 18 to 50 years were included.

### Exclusion criteria

The following groups were excluded from this study:

1. Patients aged <18 or >50 years
2. Patients who used combined hormonal contraception during the previous 6 months found on history
3. Catheterized patients and patients with white discharge per vagina found on examination
4. Patients with significant postvoid residual urine and any urinary tract anomalies, vesicoureteral reflux, diabetes mellitus, calculi, incontinence, neurologic conditions, etc.

After approval from the ethical committee (IPGME&RIEC/2022/049), informed consent was signed by patients willing to participate in this study. Subsequently, face-to-face interviews with all UTI patients were conducted with the help of a trained nurse using a predesigned pretested schedule, 4 weeks after first presenting to the urology outdoor patient department with UTI.

Patients’ medical and sexual history were thoroughly assessed. BMI was categorized according to the National Institutes of Health standards, and socioeconomic status classified according to the modified Kuppuswamy scale. Urine cultures obtained through clean-catch samples were analyzed. Patients having the same sexual partner for ≥12 consecutive months were considered to be in a stable relationship.12 Pelvic examinations were done for all patients, excluding them from the study if any abnormality was present.

To assess sexual dysfunction and sexual distress profiles, the FSFSD scale and FSFSD-Revised validated questionnaire form in the local language were used. The questionnaire was filled by the nurse for all UTI patients. The FSFSD was categorized with the cutoff value of 26.55, as proposed by Wiegel et al.15
whereas FSDS was categorized with the cutoff of 11, as proposed by DeRogatis et al.\textsuperscript{16}

**Statistical analysis**

The data were tabulated in Microsoft Excel software (Microsoft Corporation, Redmond, WA) and analyzed with IBM SPSS Statistics, Version 24 software (IBM Corp., Armonk, NY). The chi-square test was used for comparisons between groups. A \( P \) value \( \leq 0.05 \) was considered statistically significant. Binary logistic regression was used to find an association between clinical predictors (bowel history and relationship status) and low FSFI (<26.55) or high FSDS (>11) score.

**Results**

A total of 697 patients of reproductive age with UTI were included in this study, but only 673 agreed to complete the study. The mean age of the patients was 33.2±5.1 years, and other demographic details are shown in Table 1.

Among the 697 patients, 143 (20.5%) had recurrent UTIs. Of these 143 patients, 85 (59.4%) were found to have an FSFI score of <26.55. The mean FSFI score of patients with recurrent UTI was lower (24.9±4.5) than that of patients without recurrent UTI (28.4±3.5). This association of FSFI score (<26.55) with recurrent UTI was found to be statistically significant (\( P<0.05 \)) (Table 2).

Out of 143 patients with recurrent UTI, 83 (58.1%) were found to have an FSDS score of >11. The mean FSDS score of the patients with recurrent UTI was higher (11.6±4.8) than that of patients without recurrent UTI (7.9±3.1). This association of FSDS score (>11) with recurrent UTI was found to be statistically significant (\( P<0.05 \)) (Table 3).

Among the 143 patients with recurrent UTIs, 42 (29.4%) were found to have an unstable relationship. The association of relationship status with UTI was statistically significant (\( P<0.05 \)) (Table 4). Out of the 85 patients with FSFI scores of <26.55, 35 (41.2%) were found to have an unstable relationship (Table 5). Among the 83 patients with FSDS scores of >11, 35 (42.25%) were found to have an unstable relationship (Table 6).

Out of the 143 patients with recurrent UTI, 45 (31.5%) were found to have constipation. The association of bowel history with the type of UTI was statistically significant (\( P<0.05 \)) (Table 7). Of the 85 patients with FSFI scores of <26.55, 36 (41.2%) were found to have constipation (Table 8). Among the 83 patients with FSDS scores of >11, 35 (42.2%) were found to have constipation (Table 9).

The age distribution of patients with and without recurrent UTI is shown in Table 10. The association of age with the type of UTI was statistically significant (\( P<0.05 \)) (Table 10). The age-wise distribution of FSFI scores (<26.55) of patients with recurrent UTIs is shown in Table 11. Similarly, the age-wise distribution of FSDS score (>11) of

**TABLE 1
Demographic details**

| Variables          | Percentage |
|--------------------|------------|
| Educational status |            |
| Illiterate         | 20.9       |
| Primary/secondary school | 43.3       |
| High school        | 31.6       |
| University         | 4.2        |
| Socioeconomic status |        |
| Low                | 53.5       |
| Average            | 46.5       |
| Religion           |            |
| Hindu              | 60.7       |
| Muslim             | 39.3       |
| BMI                |            |
| Underweight        | 5.3        |
| Normal             | 86.6       |
| Obese              | 8.1        |

BMI, body mass index.

**TABLE 2
Female Sexual Function Index score in women with or without recurrent urinary tract infection**

| FSFI score | Recurrent UTI | Without recurrent UTI |
|------------|---------------|-----------------------|
| <26.55     | 85 (59.4%)    | 120 (22.6%)           |
| >26.55     | 58 (40.6%)    | 410 (77.4%)           |
| Total      | 143 (100.0%)  | 530 (100.0%)          |

Mean (SD) 24.9±4.5 28.4±3.5

\( P \) value \(< .001 \)\textsuperscript{a}

FSFI, Female Sexual Function Index; SD, standard deviation; UTI, urinary tract infection.

*\textsuperscript{a} p value is significant.
patients with recurrent UTIs is shown in Table 12. The association of age with FSDS (<26.55) and FSDS (>11) scores was found to be statistically significant.

Bowel history and relationship status were independent predictors of FSDS score >11 (odds ratio [OR], 1.070; 95% confidence interval [CI], 0.934–1.226; and OR, 1.016; 95% CI, 0.879–1.173; respectively) (Table 13), but none of them were statistically significant.

**Discussion**

This cross-sectional study was conducted in a tertiary-care hospital in eastern India. The study used multiple psychometric tools to establish female sexual dysfunction prevalence in female patients of reproductive age with recurrent UTIs. Six of 10 women in this group reported sexual dysfunction, whereas 2 of 10 patients without recurrent UTIs had sexual dysfunction. Age, constipation, and unstable sexual relationships were associated with both FSDS scores and recurrent UTIs. The prevalence of recurrent UTIs in our study was 20.6%. According to Foxman, approximately 20% to 30% of UTI patients develop recurrent UTIs. In this study, we found that low FSFI and high FSDS scores, indicating sexual dysfunction, were significantly more frequent among younger patients with recurrent UTIs. Previous studies have shown that younger women tend to have greater sexual distress associated with urinary tract problems. However, some studies have also shown that perimenopausal women have increased chances of recurrent UTIs owing to a significant reduction of estrogen in the vagina. In our study, age-controlled and matched selection of cases was not conducted. This may have led to selection bias according to age group. Thus, definitive comments about women in the perimenopausal and menopausal groups cannot be made.

In this study, patients in stable relationships were found to be less likely to have recurrent UTIs compared with patients in unstable relationships. For patients with recurrent UTI, low FSFI and high FSDS scores were significantly associated with having unstable relationships. According to Aydin et al, multiple sexual partners are a strong risk factor for recurrent UTI in premenopausal women. Scholes et al showed that patients with recurrent UTIs had sexual intercourse and multiple sexual partners more frequently compared with those without recurrent UTIs. This

### TABLE 3

**Female Sexual Distress Scale score in women with or without recurrent urinary tract infection**

| FSDS score | Recurrent UTI | Without recurrent UTI |
|------------|---------------|-----------------------|
| <11        | 60 (41.9%)    | 429 (80.9%)           |
| >11        | 83 (58.1%)    | 101 (19.1%)           |
| Total      | 143 (100.0%)  | 530 (100.0%)          |
| Mean (SD)  | 11.6±4.8      | 7.9±3.1               |
| *P value*  | <.001<sup>a</sup> |                       |

FSDS, Female Sexual Distress Scale; SD, standard deviation; UTI, urinary tract infection.

*Mondal. Sexual dysfunction in female patients of reproductive age with recurrent urinary tract infection. Am J Obstet Gynecol Glob Rep 2022.*

<sup>a</sup> p value is significant.

### TABLE 4

**Association of relationship status with types of urinary tract infection**

| Relationship status | Recurrent UTI | Without recurrent UTI |
|---------------------|---------------|-----------------------|
| Stable              | 101 (70.6%)   | 504 (95.1%)           |
| Unstable            | 42 (29.4%)    | 26 (4.9%)             |
| Total               | 143 (100.0%)  | 530 (100.0%)          |
| *P value*           | <.001<sup>a</sup> |                       |

UTI, urinary tract infection.

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<sup>a</sup> p value is significant.

### TABLE 5

**Association of relationship status with Female Sexual Function Index score**

| Relationship status | FSFI <26.55 | *P value* |
|---------------------|-------------|-----------|
| Stable              | 50 (58.8%)  | .021      |
| Unstable            | 35 (41.2%)  |           |
| Total               | 85 (100.0%) |           |

FSFI, Female Sexual Function Index.

*Mondal. Sexual dysfunction in female patients of reproductive age with recurrent urinary tract infection. Am J Obstet Gynecol Glob Rep 2022.*

<sup>a</sup> p value is significant.
may be owing to the increased risk of colonization of *Escherichia coli* in vaginal and urethral mucosa from multiple sexual partners.

Constipation was found to be associated with both recurrent UTI and FSDS scores. Available studies have suggested that fecal flora acts as a reservoir for microbial strains that cause recurrent UTI because of recolonization of microbial flora in the introitus and urethra.\(^{22,23}\)

### Limitations

This study is not devoid of limitations. The study population was small, thus validation of results by large and more diverse samples is needed. We lacked baseline FSFI and FSDS scores recorded before patients developed UTIs and during a disease-free period. We also lacked age-matched controls, which may have led to selection bias.

### Conclusion

This cross-sectional study reports a high prevalence of low FSFI and high FSDS scores suggestive of sexual dysfunction...
### TABLE 9
**Association of bowel history with Female Sexual Distress Scale score**

| Bowel history | n  | FSDS >11 | P value |
|---------------|----|----------|---------|
| Stable        | 35 | 42.2     | .044    |
| Unstable      | 48 | 57.8     |         |
| Total         | 83 | 100.0    |         |

FSDS, Female Sexual Distress Scale.

Mondal. Sexual dysfunction in female patients of reproductive age with recurrent urinary tract infection. Am J Obstet Gynecol Glob Rep 2022.

### TABLE 10
**Association of age with types of urinary tract infection**

| Age groups (y) | Recurrent UTI | Without recurrent UTI | P value |
|----------------|---------------|------------------------|---------|
|                | N   | %      | N   | %      |         |
| 20−30          | 65  | 45.5   | 170 | 32.1   | .008 a  |
| 30−40          | 58  | 40.6   | 286 | 53.9   |         |
| 40−50          | 20  | 14.0   | 74  | 13.9   |         |
| Total          | 143 | 100.0  | 530 | 100.0  |         |

UTI, urinary tract infection.

Mondal. Sexual dysfunction in female patients of reproductive age with recurrent urinary tract infection. Am J Obstet Gynecol Glob Rep 2022.

* p value is significant.

### TABLE 11
**Association of age with Female Sexual Function Index score**

| Age groups (y) | N   | FSFI <26.55 | P value |
|----------------|-----|-------------|---------|
|                |     | %           |         |
| 20−30          | 42  | 49.4        | <.001 a |
| 30−40          | 36  | 42.4        |         |
| 40−50          | 7   | 8.2         |         |
| Total          | 85  | 100.0       |         |

FSFI, Female Sexual Function Index.

Mondal. Sexual dysfunction in female patients of reproductive age with recurrent urinary tract infection. Am J Obstet Gynecol Glob Rep 2022.

* p value is significant.
in female patients of reproductive age with recurrent UTIs. Of clinical importance, we found a positive association between high FSDS scores and a history of constipation and relationship status. This study highlights the importance of caregivers being more aware of the impact of recurrent UTIs on sexual dysfunction and resultant poor quality of life, an issue that is still unknown or overlooked by urologists and gynecologists.

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**TABLE 12**

| Age groups (y) | N   | FSDS >11 % | P value |
|---------------|-----|------------|--------|
| 20–30         | 40  | 48.2       | <.001a |
| 30–40         | 36  | 43.4       |        |
| 40–50         | 7   | 8.4        |        |
| Total         | 83  | 100.0      |        |

FSDS, Female Sexual Distress Scale.

*Mondal. Sexual dysfunction in female patients of reproductive age with recurrent urinary tract infection. Am J Obstet Gynecol Glob Rep 2022.

*P value is significant.

**TABLE 13**

| Variables               | Odds ratio | 95% confidence interval | P value |
|-------------------------|------------|-------------------------|--------|
| Bowel history           | 0.999      | 0.887–1.124             | .981   |
| Relationship status     | 0.906      | 0.798–1.029             | .128   |
| Bowel history           | 1.070      | 0.934–1.226             | .327   |
| Relationship status     | 1.016      | 0.879–1.173             | .832   |

FSDS, Female Sexual Distress Scale; FSFI, Female Sexual Function Index.

*Mondal. Sexual dysfunction in female patients of reproductive age with recurrent urinary tract infection. Am J Obstet Gynecol Glob Rep 2022.

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