Avicenna Medical Journal of Sirte
2026;1(1):13-17
https://doi.org/10.68706/amjs.26104

Original article

Determinants and Clinical Patterns of Recurrent Urinary Tract Infections Among Women: A Cross-Sectional Study from Tripoli, Libya

Alaa Emtir*[1], Abdulqadir Ali[1], Refat Abusamra[2]

[1]Urology Department, Tripoli Central Hospital, Tripoli, Libya
[2]Urology Department, Ibn Sena Teaching Hospital, Sirte, Libya
Corresponding Email: *alaaemtir61@gmail.com*

Abstract
Recurrent urinary tract infections (rUTIs) are a common clinical and public health issue among women, associated with morbidity and frequent antibiotic use. Data from low- and middle-income settings remain limited. This study was conducted to assess the prevalence, clinical features, and predictors of rUTI among adult women in outpatient clinics in Tripoli, Libya. A retrospective cross-sectional study included 180 women with UTI symptoms (April–August 2025). Data were collected via structured questionnaires covering demographics, medical history, behavioral factors, recurrence, and treatment. rUTI was defined as ≥3 episodes within 12 months. Associations were tested using chi-square, and logistic regression identified independent predictors ($p < 0.05$). rUTI prevalence was 39.4%. Most participants were aged 25–34 years (34.4%) and married (57.2%). Dysuria (75.0%) and frequency (60.6%) were the most common symptoms. Antibiotics were prescribed in 86.7%, with 24.4% reporting no improvement. No significant associations were found between rUTI and age, menopausal status, diabetes, sexual activity, contraceptive use, water intake, or prior urinary conditions (all $p > 0.05$). Logistic regression showed no independent predictors (Nagelkerke $R^2 = 0.038$). rUTIs were highly prevalent, with no significant predictors identified. The findings highlight the complexity of recurrence and the need for improved diagnostic accuracy and more individualized management strategies.
Keywords. Recurrent Urinary Tract Infection, Women, Risk Factors, Antibiotic Use, Primary Care, Libya.

Introduction

Urinary tract infections (UTIs) are among the most common bacterial infections in women, contributing substantially to outpatient visits and antibiotic prescriptions (1). Uncomplicated UTIs occur in otherwise healthy, non-pregnant, premenopausal women without structural or functional urinary tract abnormalities (2). Diagnosis is largely clinical, based on symptoms such as dysuria, urinary frequency, and urgency, with laboratory testing reserved for selected cases (2). Most episodes respond well to short-course antimicrobial therapy, including nitrofurantoin, trimethoprim-sulfamethoxazole, or fosfomycin. However, inappropriate antibiotic use remains a concern due to its role in antimicrobial resistance, prompting guidelines to recommend effective agents with minimal ecological impact and to avoid unnecessary broad-spectrum antibiotics (3).

Recurrent UTIs (rUTIs), defined as two or more episodes within six months or three or more within one year, represent a significant clinical problem due to their impact on quality of life and repeated healthcare utilization (4–6). They are also a major driver of repeated antibiotic exposure in outpatient settings (7). Distinguishing symptomatic infection from asymptomatic bacteriuria (ASB) is essential to prevent unnecessary treatment and support antimicrobial stewardship (1,4).

Several risk factors have been identified. In premenopausal women, frequent sexual activity, spermicide use, and new sexual partners are consistently associated with increased risk, while early onset of UTI and maternal history suggest longer-term influences (5,8). In postmenopausal women, estrogen deficiency, changes in vaginal environment, and increased post-void residual volume contribute to susceptibility (6,7).

Preventive strategies increasingly emphasize non-antibiotic approaches, including behavioral modifications, increased fluid intake, vaginal estrogen therapy, and agents such as cranberry products, D-mannose, and methenamine Hippurate (4,6,9). Despite this, antibiotic prophylaxis—continuous or postcoital—remains necessary in selected patients when conservative measures fail (4,9).

In Libya, particularly in outpatient settings such as Abu Salim in Tripoli, data on rUTI risk factors and antibiotic prescribing patterns remain limited. This highlights the need for locally relevant evidence to guide clinical practice and antimicrobial stewardship. Therefore, this study aims to assess these factors among adult women attending outpatient clinics in Abu Salim, Tripoli, Libya.

Methods

Study Design and Setting

This study was designed as a retrospective cross-sectional analysis conducted across multiple healthcare settings, including public and private outpatient clinics as well as primary healthcare centers in Abu Salim district, Tripoli, Libya.

Data collection was performed over a 5-month period (April 2025 to August 2025), allowing for the evaluation of

Copyright Author (s) 2026. Distributed under Creative Commons CC-BY 4.0
Received: 22-03-2026 - **Accepted**: 25-05-2026 - **Published**: 30-06-2026

Avicenna Medical Journal of Sirte
2026;1(1):13-17
https://doi.org/10.68706/amjs.26104

recent patterns in urinary tract infection (UTI) occurrence and management within a real-world clinical context.

Study Population

The study population comprised adult women aged ≥18 years who presented to outpatient clinics with symptoms suggestive of urinary tract infection (UTI).

Data Collection

Data were collected using a structured, interviewer-administered questionnaire developed based on previously validated approaches in UTI research (10,12). Prior to formal data collection, the questionnaire was pilot-tested on a subset of participants to assess clarity, reliability, and content validity, with necessary modifications implemented accordingly.

Ethical Considerations

The study was conducted in accordance with established ethical standards for human research. Informed consent was obtained from all participants prior to enrollment. Participant data were handled with strict adherence to confidentiality and anonymity principles. No identifiable personal information was recorded or disclosed

Results

Participant Characteristics

A total of 180 women were included in the final analysis, with no missing data. Baseline demographic and clinical characteristics are presented in Table 1& figure 1. The largest age group was 25–34 years (34.4%), followed by 35–44 years (23.3%). More than half of the participants were married (57.2%), 83.9% had a history of childbirth, and 12.2% were postmenopausal. Diabetes mellitus and previous urinary tract problems were reported by 12.8% and 19.4% of participants, respectively.

Table 1. Baseline demographic and clinical characteristics of the study participants (N = 180)

Characteristic	Category	No. (%)
Age (years)	<25	28 (15.6)
	25–34	62 (34.4)
	35–44	42 (23.3)
	45–54	34 (18.9)
	≥55	14 (7.8)
Marital status	Single	52 (28.9)
	Married	103 (57.2)
	Divorced	15 (8.3)
	Widowed	10 (5.6)
History of childbirth	Yes	151 (83.9)
Postmenopausal	Yes	22 (12.2)
Diabetes mellitus	Yes	23 (12.8)
Previous urinary tract problems	Yes	35 (19.4)

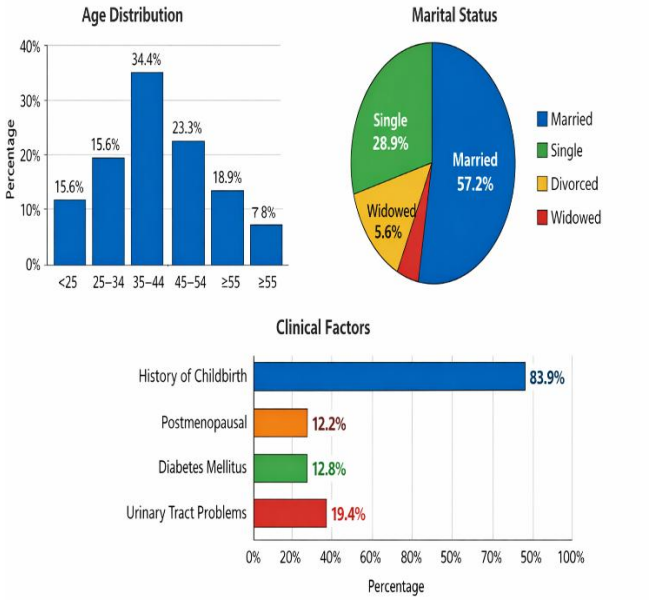


Figure 1. Baseline demographic & clinical characterstics of the study participants (N=180)

Clinical Characteristics

Clinical findings are summarized in Table 2,& figure 2. Recurrent UTI (≥3 episodes during the previous year) was identified in 71 women (39.4%). Previous urine testing had been performed in 63.9% of participants. Dysuria (75.0%) and urinary frequency (60.6%) were the most frequently reported symptoms. Overall, 86.7% of participants received antibiotic therapy, and 59.0% reported symptomatic improvement following treatment.

Table 2. Clinical characteristics and management of urinary tract infection

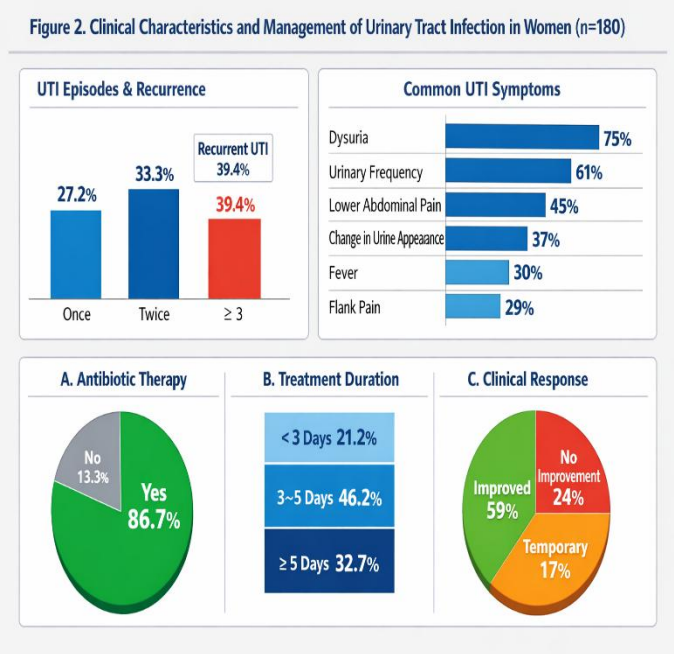
Variable	Category	n (%)
UTI episodes (past year)	Once	49 (27.2)
	Twice	60 (33.3)
	≥3	71 (39.4)
Recurrent UTI	Yes	71 (39.4)
Symptoms *	Dysuria	135 (75.0)
	Urinary frequency	109 (60.6)
	Lower abdominal pain	82 (45.6)

Copyright Author (s) 2026. Distributed under Creative Commons CC-BY 4.0
Received: 22-03-2026 - **Accepted**: 25-05-2026 - **Published**: 30-06-2026

Avicenna Medical Journal of Sirte
2026;1(1):13-17
https://doi.org/10.68706/amjs.26104

	Change in urine appearance	66 (36.7)
	Fever	54 (30.0)
	Flank pain	53 (29.4)
Antibiotic therapy	Yes	156 (86.7)
Treatment duration (n = 156)	<3 days	33 (21.2)
	3–5 days	72 (46.2)
	≥5 days	51 (32.7)
Clinical response (n = 156)	Improved	92 (59.0)
	Temporary improvement	26 (16.7)
	No improvement	38 (24.4)

*Participants could report more than one symptom.



Factors Associated with Recurrent UTI

Associations between participant characteristics and recurrent UTI are presented in Table 3. No statistically significant associations were identified between recurrent UTI and age, menopausal status, diabetes mellitus, previous urinary tract problems, sexual activity, contraceptive method, daily water intake, or parity (all $p > 0.05$).

Table 3. Association between participant characteristics and recurrent urinary tract infection

Variable	Non-recurrent n (%)	Recurrent n (%)	*p*-value
Age group	—	—	0.647
Menopause	11 (10.1)	11 (15.5)	0.280
Diabetes mellitus	15 (13.8)	8 (11.3)	0.624
Previous urinary tract problems	18 (16.5)	17 (23.9)	0.218
Sexual activity	—	—	0.487
Contraceptive method	—	—	0.123
Daily water intake	59 (54.1)	37 (52.1)	0.791
Parity	91 (83.5)	60 (84.5)	0.856

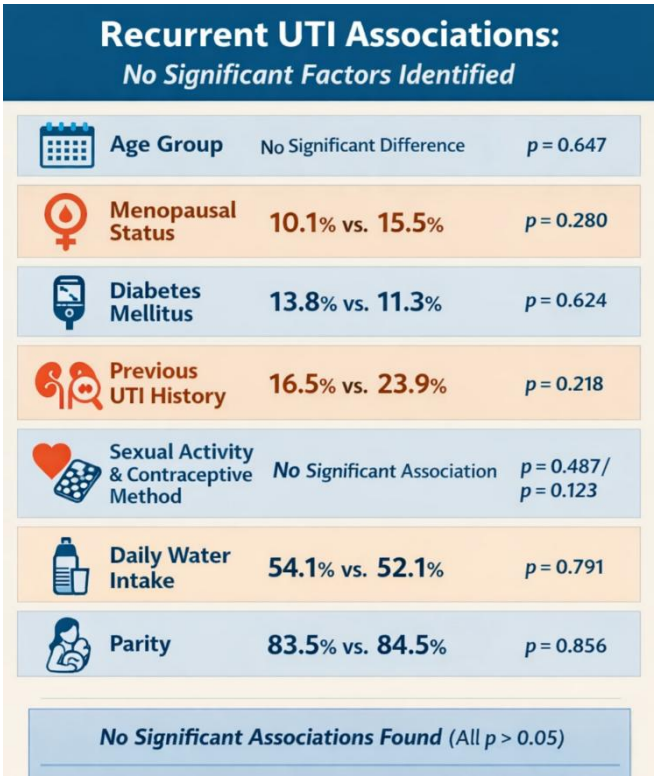


Figure 3 Associations between participant characteristics and recurrent UTI

Discussion

This study provides real-world insight into recurrent urinary tract infections (rUTIs) among women in outpatient settings in Tripoli, Libya. A high prevalence of rUTI (39.4%) was observed, with extensive antibiotic use (86.7%) and a considerable rate of poor clinical response (24.4%). No significant associations were found between

Copyright Author (s) 2026. Distributed under Creative Commons CC-BY 4.0
Received: 22-03-2026 - **Accepted**: 25-05-2026 - **Published**: 30-06-2026

rUTI and assessed demographic, clinical, or behavioral factors.

The prevalence exceeds reported rates (~25%) (10,11), possibly reflecting differences in healthcare access and reliance on symptom-based diagnosis without consistent laboratory confirmation, which may overestimate recurrence.

Notably, traditional risk factors were not significantly associated with rUTI. While prior studies highlight sexual and hormonal factors (10,12–14), their absence here may be due to underreporting of sensitive variables, limited sample size, or unmeasured host-related factors (10,15).

The multivariable model showed very low explanatory power (Nagelkerke R^2 = 3.8%), supporting the multifactorial nature of rUTI and suggesting that conventional variables alone are insufficient to explain recurrence.

High antibiotic prescribing was observed, yet nearly one-quarter reported no improvement. This raises concerns about empirical treatment, suboptimal selection, and inconsistent use of urine testing, indicating a gap between guidelines and practice (10,18).

Diagnostic challenges are also evident, as UTI symptoms overlap with conditions such as overactive bladder, and asymptomatic bacteriuria may be mismanaged, contributing to overtreatment (16,19).

Clinically, these findings support a shift toward more individualized management, with greater emphasis on accurate diagnosis, reduced reliance on antibiotics, and incorporation of non-antibiotic preventive strategies such as behavioral measures and vaginal estrogen where appropriate (13,14,20,21). Patient-initiated therapy may also be considered in selected cases (22).

Limitations

This study is limited by self-reported data (recall bias), lack of consistent laboratory confirmation, modest sample size, and single-center design, which may affect generalizability. Improving diagnostic accuracy through appropriate testing and strengthening antimicrobial stewardship are essential. Clinicians should adopt a broader management approach incorporating prevention and patient education. Future research should include larger, multicenter studies to better identify predictors of rUTI and optimize management strategies.

Conclusion

In summary, this study demonstrates a high burden of recurrent urinary tract infections and substantial antibiotic use among women in outpatient settings in Libya, with no significant complexity of rUTI pathogenesis, and underscores the need for improved diagnostic strategies, rational antibiotic prescribing, and the integration of non-antibiotic preventive approaches

References

1. Gupta K, editor. Urinary tract infections: Diagnostic and management issues. Infect Dis Clin North Am. 2013;27(1).
2. Hooton TM. Uncomplicated urinary tract infection. N Engl J Med. 2012;366(11):1028-37. doi:10.1056/NEJMcp1104429
3. Gupta K, Hooton TM, Naber KG, Wullt B, Colgan R, Miller LG, Moran GJ, Nicolle LE, Raz R, Schaeffer AJ, Soper DE. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women. Clin Infect Dis. 2011;52(5):e103-20. doi:10.1093/cid/ciq257
4. American Urogynecologic Society. Best practice statement: Recurrent urinary tract infection in adult women. 2020.
5. Scholes D, Hooton TM, Roberts PL, Stapleton AE, Gupta K, Stamm WE. Risk factors for recurrent urinary tract infection in young women. J Infect Dis. 2000;182(4):1177-82. doi:10.1086/315827
6. Anger J, Ackerman AL, Bernier B, Chai TC, Ferreira-Coelho A, Vaddi A, Rogers RG. Recurrent urinary tract infection in women: AUA/CUA/SUFU guideline. J Urol. 2019;202(2):282-9. doi:10.1097/JU.0000000000000296
7. Naber KG, Kranz J, Wagenlehner FM. Recurrent urinary tract infections in women: Diagnosis, prevention, and treatment. J Infect. 2023;87(3):117-25. doi:10.1093/jac/dlad156
8. Scholes D, et al. Risk factors for recurrent urinary tract infection in young women. J Infect Dis. 2000;182(4):1177-82.
9. Kwok M, McGeorge S, Mayer-Coverdale J, Misurac B, Birch BR, Moore KH, Qu LG, Rane A. Guideline of guidelines: Management of recurrent urinary tract infections in women. BJU Int. 2022;130(S3):11-22. doi:10.1111/bju.15756
10. Nosseir SB, Lind LR, Winkler HA. Recurrent uncomplicated urinary tract infections in women: A review. J Womens Health (Larchmt). 2012;21(3):347-54. doi:10.1089/jwh.2011.3056
11. Rizvi RM, Siddiqui KM. Recurrent urinary tract infections in females. J Pak Med Assoc. 2010;60(1):55-9.
12. Aydin A, Ahmed K, Zaman I, Khan MS, Dasgupta P. Recurrent urinary tract infections in women. Int Urogynecol J. 2015;26(6):795-804. doi:10.1007/s00192-014-2569-5
13. Al-Badr A, Al-Shaikh G. Recurrent urinary tract infections: Management in women. Sultan Qaboos Univ Med J. 2013;13(3):359-67.
14. Guglietta A. Recurrent urinary tract infections in women: Risk factors, etiology, pathogenesis and prophylaxis. Future Microbiol. 2017;12(3):239-46. doi:10.2217/fmb-2016-0145
15. Raz R, Gennesin Y, Wasser J, Stoler Z, Rosenfeld S, Rottensterich E, Stamm WE. Recurrent urinary tract infections in postmenopausal women. Clin Infect Dis. 2000;30(1):152-6. doi:10.1086/313596
16. Ke QS, Lee CL, Kuo HC. Recurrent urinary tract infection in women and overactive bladder—Is there a

Copyright Author (s) 2026. Distributed under Creative Commons CC-BY 4.0
Received: 22-03-2026 - Accepted: 25-05-2026 - Published: 30-06-2026

relationship? Tzu Chi Med J. 2021;33(1):13-21. doi:10.4103/tcmj.tcmj_38_20
17. Akgül T, Karakan T. The role of probiotics in women with recurrent urinary tract infections. Turk J Urol. 2018;44(5):377-83. doi:10.5152/tud.2018.48742
18. Nosseir SB, et al. Recurrent uncomplicated urinary tract infections in women: A review. J Womens Health (Larchmt). 2012;21(3):347-54.
19. Cai T, Mazzoli S, Mondaini N, Meacci F, Nesi G, D'Elia C, Malossini G, Boddi V, Bartoletti R. The role of asymptomatic bacteriuria in young women with recurrent urinary tract infections. Clin Infect Dis. 2012;55(6):771-7. doi:10.1093/cid/cis534
20. Akgül T, Karakan T. The role of probiotics in women with recurrent urinary tract infections. Turk J Urol. 2018;44(5):377-83.
21. Aydin A, et al. Recurrent urinary tract infections in women. Int Urogynecol J. 2015;26(6):795-804.
22. Gupta K, Hooton TM, Roberts PL, Stamm WE. Patient-initiated treatment of recurrent urinary tract infections. Ann Intern Med. 2001;135(1):9-16. doi:10.7326/0003-4819-135-1-200107030-00004

Copyright Author (s) 2026. Distributed under Creative Commons CC-BY 4.0
Received: 22-03-2026 - **Accepted**: 25-05-2026 - **Published**: 30-06-2026