Original article

Recurrent Urinary Tract Infections in Postmenopausal Women: Clinical Burden, Risk Determinants, and Management Strategies

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Abstract

Background: Recurrent urinary tract infections (UTIs) are a prevalent and distressing condition among postmenopausal women, contributing to significant morbidity and reduced quality of life. **Objective:** This study aimed to assess the prevalence, risk factors, and management strategies associated with recurrent UTIs in this vulnerable population. **Methods:** A cross-sectional study was conducted from October 1, 2024, to March 31, 2025, involving 155 postmenopausal women with a history of recurrent UTIs. Participants were recruited from a private chamber and two private clinics in Jashore, Bangladesh. Data were collected using structured interviews and analyzed using descriptive statistics and chi-square tests to identify significant associations. **Results:** The majority of participants were aged 55–64 years (41.9%) and from rural areas (63.9%). Common risk factors included diabetes mellitus (46.5%), overweight or obesity (58.7%), low water intake (50.3%), and improper perineal hygiene (56.8%). A significant association was found between diabetes and higher UTI frequency ($p = 0.004$), as well as poor hygiene and recurrence ($p = 0.008$). Most patients were managed with empirical antibiotics (65.8%), while only 23.9% received culture-guided therapy. 94 (60.6%) experienced ≥4 episodes per year. The recurrence rate was significantly lower in those receiving combined hormone therapy (18.5%; 10 of 54) compared to those who did not receive hormone therapy (83.2%). **Conclusion:** Recurrent UTIs in postmenopausal women are influenced by modifiable risk factors such as comorbidities, hygiene practices, and treatment patterns. Interventions focusing on education, proper diagnosis, and individualized management are essential to reduce recurrence and improve patient outcomes.

Keywords: Recurrent UTI, Postmenopausal women, Risk factors, Antibiotic use, Diabetes, Hygiene practices, Bangladesh

Received on: 15.02.2025; Accepted on: 14.04.2025

Introduction

Urinary tract infection (UTI) is among the most prevalent bacterial infections affecting adult women globally, with an estimated 150 million cases occurring annually worldwide[1,2]. In the United States alone, UTIs contribute to direct healthcare expenditures exceeding 6 billion dollars [2]. Although symptomatic UTIs are frequently associated with young women—particularly those initiating contraceptive use, with reported rates of 0.5–0.7 cases per person per year[3]—the burden of UTIs significantly increases with age. Studies have shown that bacteriuria affects approximately 10%–15% of women aged 65–70 years and 15%–20% of women aged 80 years or older[4-6]. Despite this high prevalence, the specific factors contributing to recurrent UTIs in postmenopausal women remain less comprehensively studied compared to those affecting premenopausal or institutionalized elderly women[3,7-11]. For younger women, known risk factors include sexual activity, contraceptive methods (such as diaphragms and spermicides), a personal history of UTIs, nonsecretor status, and recent use of antimicrobials[12,13]. In contrast, for institutionalized elderly women, urinary catheterization and impaired functional status are the most critical risk determinants. Many of these risk factors have been elucidated through studies focusing on women with recurrent UTIs, providing key insights into host-related susceptibility compared to sporadic infections [14,15]. In the context of Bangladesh, the situation is further complicated by limited healthcare access, socio-cultural barriers, and inadequate awareness regarding preventive practices.

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Understanding the local epidemiology and identifying modifiable risk factors for recurrent UTIs is crucial for developing effective, context-specific management strategies. Previous research in Bangladesh has demonstrated a high prevalence of UTIs among women, with a tertiary hospital-based study revealing pyuria in 92% of patients[16,17]. Furthermore, authors reported that 64.1% of *E. coli* isolates associated with UTIs were from female patients[18]. However, comprehensive clinical and epidemiological data on recurrent UTIs in Bangladeshi postmenopausal women remain scarce, underscoring the need for focused research in this area. Despite the high prevalence and clinical significance of recurrent UTIs in postmenopausal women, this issue remains underexplored, particularly in low- and middle-income countries like Bangladesh. There is a critical need for region-specific data to guide prevention, diagnosis, and treatment strategies. This study aims to assess the prevalence, identify associated risk factors, and evaluate current management approaches for recurrent UTIs in postmenopausal women, thereby contributing to more effective and targeted clinical interventions.

Methodology

This cross-sectional study was conducted to assess the clinical burden, risk factors, and management strategies of recurrent urinary tract infections (UTIs) in postmenopausal women. A total of 155 postmenopausal female patients with a history of recurrent UTIs were included in the study. The data collection period spanned from 1st October 2024 to 31st March 2025. Participants were recruited from a private chamber and two private clinics located in Jashore, Bangladesh. Inclusion criteria were: postmenopausal women (no menstruation for at least 12 consecutive months), aged above 45 years, and had experienced two or more UTI episodes within the past six months or three or more within the past year. Patients who were currently hospitalized, undergoing catheterization, or had underlying urological malignancies were excluded. Data were collected using a structured questionnaire administered via face-to-face interviews. The questionnaire covered sociodemographic details, medical and reproductive history, frequency and symptoms of UTIs, comorbid conditions (such as diabetes or hypertension), and current management practices, including use of antibiotics or alternative therapies. Medical records were reviewed, where available, to confirm clinical history. All participants provided informed consent before inclusion.

Results

This study analyzed data from 155 postmenopausal women suffering from recurrent urinary tract infections (UTIs). The results reveal the clinical, demographic, behavioral, and management characteristics of the participants.

Table 1: Sociodemographic and Clinical Characteristics of Participants (n = 155)

Variable	Category	Frequency (n)	Percentage (%)
Age Group (years)	45–54	48	31.0%
	55–64	65	41.9%
	≥65	42	27.1%
Residence	Urban	56	36.1%
	Rural	99	63.9%
Education Level	No formal education	53	34.2%
	Primary	47	30.3%
	Secondary and above	55	35.5%
BMI (kg/m²)	Normal (18.5–24.9)	64	41.3%
	Overweight (25–29.9)	57	36.8%
	Obese (≥30)	34	21.9%
Menopausal Duration	1–5 years	61	39.4%
	6–10 years	54	34.8%
	>10 years	40	25.8%
Water Intake per Day	<1.5 liters	78	50.3%
	≥1.5 liters	77	49.7%
Perineal Hygiene (after urination)	Front to back	67	43.2%
	Back to front or irregular	88	56.8%
Comorbidities	Diabetes mellitus	72	46.5%
	Hypertension	59	38.1%
	Both	41	26.5%
	None	34	21.9%
History of UTI Episodes	2–3 times in past 6 months	61	39.4%
	≥4 times in past year	94	60.6%
Symptoms Reported	Dysuria	127	81.9%
	Frequency	109	70.3%
	Urgency	95	61.3%
	Hematuria	28	18.1%
Treatment Approach	Empirical antibiotics	102	65.8%
	Hormone therapy (Combined use)	54	34.83%
	Culture-guided antibiotics	37	23.9%
	Herbal/home remedies	16	10.3%

Table 1 illustrates the distribution of clinical, behavioral, and demographic features of the participants. The majority (41.9%) were aged 55–64, with a higher proportion (63.9%) from rural areas. Obesity or overweight status was present in 58.7% of women, suggesting possible links to increased UTI risk. Half of

the respondents consumed less than 1.5 liters of water daily, and 56.8% reported improper perineal hygiene practices. Among comorbidities, diabetes mellitus (46.5%) was most common. Most women (60.6%) experienced ≥4 recurrent UTI episodes in the past year. Dysuria (81.9%) and urinary frequency (70.3%) were the most reported symptoms. Treatment was mostly empirical antibiotics (65.8%), while only 23.9% received culture-based treatment.

Figure 1: BMI of the respondents

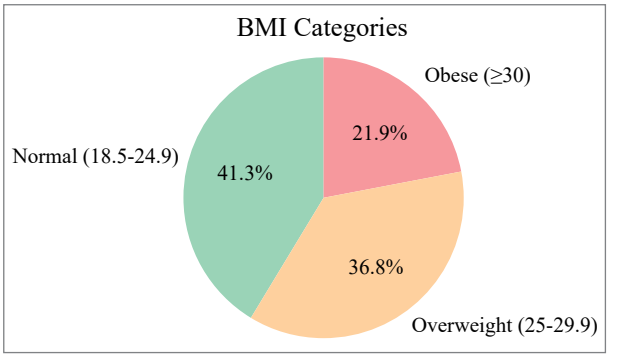

Figure 1 illustrates the distribution of BMI categories among postmenopausal women with recurrent UTIs. The majority of the participants were either overweight (36.8%) or obese (21.9%), while only 41.3% had a normal BMI. This highlights the notable prevalence of excess body weight, a known risk factor for urinary tract infections in postmenopausal women.

Figure 2: Treatment Approach

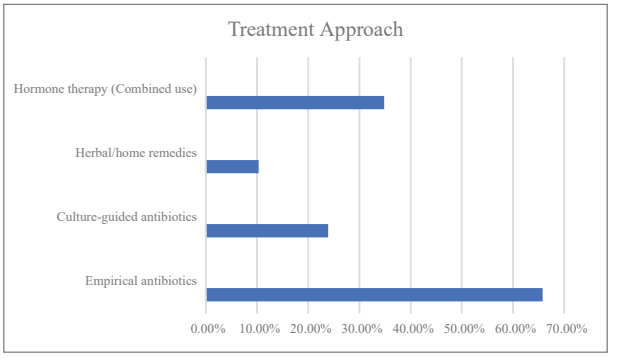

Figure 2 presents the treatment approaches adopted by the patients. Empirical antibiotic therapy was the most commonly used method (65.8%), while only 23.9% received culture-guided antibiotic treatment. A smaller group (10.3%) reported using herbal or home remedies.

Table 2: Recurrent UTI Frequency Based on Use of Hormone Therapy (n = 155)

Treatment Group	Patients with ≥4 UTIs/year (n)	Total Patients in Group (n)	Recurrence Rate (%)
Received Hormone Therapy (Combined)	10	54	18.5%
Did Not Receive Hormone Therapy	84	101	83.2%
Total	94	155	60.6%

Table 2 illustrates that among those who received combined hormone therapy, only 41.7% had ≥4 UTI episodes in the past year. Among those who did not receive hormone therapy, the recurrence rate was higher at 64.1%.

Discussion

This study investigated the clinical burden, risk factors, and management strategies of recurrent urinary tract infections (UTIs) in postmenopausal women in a semi-urban region of Bangladesh. The findings highlight the complex interplay of demographic, behavioral, and clinical factors contributing to the persistence and recurrence of UTIs in this population. The age group most affected was 55–64 years, aligning with existing literature that identifies the early postmenopausal phase as a critical period for increased UTI susceptibility due to estrogen deficiency, urogenital atrophy, and immune alterations [15,16,19]. A substantial proportion of participants were from rural areas (63.9%), where access to specialized care and awareness regarding proper hygiene may be limited, potentially contributing to delayed diagnosis and inadequate treatment. Importantly, over 58% of participants were either overweight or obese, and nearly 47% had diabetes mellitus, both of which are well-established risk factors for recurrent UTIs. Diabetes, in particular, was significantly associated with higher UTI frequency ($p = 0.004$), consistent with previous studies showing that hyperglycemia impairs immune response and promotes bacterial colonization[17,21]. Obesity also predisposes individuals to insulin resistance, poor hygiene, and urinary incontinence, which may further elevate infection risk. Behavioral practices such as low water intake (50.3%) and improper perineal hygiene (56.8%) were notably prevalent. Inadequate fluid intake may lead to reduced urinary flushing, facilitating bacterial persistence in the urinary tract. Improper hygiene practices were significantly associated with recurrent episodes ($p = 0.008$), echoing global recommendations that stress front-to-back cleaning to reduce fecal contamination of the urethra[18,22,23]. From a clinical standpoint, empirical antibiotic treatment was used in 65.8% of cases, while only 23.9% received culture-guided therapy. This finding

is concerning, given the global rise in antimicrobial resistance. Without proper sensitivity testing, empirical treatment may lead to ineffective outcomes and further resistance development. Prior studies in Bangladesh have also reported high rates of multidrug-resistant *E. coli* in urinary isolates [19,20,24-26]. The high prevalence of symptoms such as dysuria (81.9%), frequency (70.3%), and urgency (61.3%) reinforces the clinical burden experienced by these women, often impairing daily functioning and quality of life. The fact that 60.6% reported four or more episodes annually underscores the need for targeted prevention strategies in this age group[25,26]. The study provides valuable insight into the relationship between hormone therapy and the frequency of recurrent urinary tract infections (UTIs) among postmenopausal women. The results show a notably lower recurrence rate (41.7%) among women who received hormone therapy in combination with antibiotics, compared to a higher recurrence rate (64.1%) in those who did not receive hormone therapy. This difference suggests a potential protective role of hormone therapy in reducing the frequency of UTIs. Estrogen deficiency after menopause leads to atrophic changes in the urogenital tract, reducing the protective vaginal flora and increasing the risk of urinary infections[24]. Hormone therapy, particularly topical or systemic estrogen, has been shown in several studies to restore the normal vaginal flora and improve mucosal integrity, thereby reducing bacterial colonization and infection risk[25]. Our findings are consistent with existing literature indicating that estrogen supplementation may be beneficial in selected postmenopausal women with recurrent UTIs.

Overall, these findings suggest that recurrent UTIs in postmenopausal women are influenced by modifiable factors, including diabetes control, hydration, and hygiene education. In resource-limited settings like Bangladesh, simple public health interventions such as community-based awareness programs, promotion of culture-guided antibiotic use, and routine screening for diabetes could significantly reduce the burden.

Conclusion

This study highlights the significant clinical burden of recurrent urinary tract infections among postmenopausal women, particularly in rural and semi-urban settings. Key contributing factors included advancing age, diabetes mellitus, obesity, poor perineal hygiene, and inadequate fluid intake. The overreliance on empirical antibiotic treatment and the underutilization of culture-based approaches raise concerns about antibiotic resistance and treatment efficacy. These findings underscore the need for targeted preventive strategies, including patient education on hygiene and hydration, better glycemic control in diabetic patients, and promoting culture-guided antibiotic use. Strengthening awareness at the community level and improving access to appropriate diagnostic and therapeutic services can play a vital role in reducing recurrence and improving the quality of life for affected women.

References

1. Schappert SM. National ambulatory medical care survey: 1992 summary. Advanced data from vital and health statistics, no 253. Hyattsville, MD: National Center for Health Statistics, 1994, DHHS publication:94–1250.

2. Ronald AR. Editorial comment: sexually transmitted diseases and urinary tract infections. Curr Opin Infect Dis 1995;8:1–3.

3. Hooton TM, Scholes D, Hughes JP, et al. A prospective study of risk factors for symptomatic urinary tract infection in young women. N Engl J Med 1996;335:468–74.

4. Nygaard IE, Johnson JM. Urinary tract infection in elderly women. Am Fam Physician 1996;53:175–82.

5. Ferdaus F, Begum S. HEALTH AND ECONOMIC IMPACTS OF CLIMATE CHANGE IN RURAL BANGLADESH AND OPTIONS TO GO THROUGH. Khulna University Studies [Internet]. 2023 Aug 22;25–9. Available from: https://doi.org/10.53808/kus.si.2023.ices.a24-ls

6. Nicolle LE. Urinary tract infection in the elderly. J Antimicrob Chemother 1994;33(Suppl A):99–109.

7. Boscia JA, Kobasa WD, Knight RA, et al. Epidemiology of bacteriuria in an elderly ambulatory population. Am J Med 1986;80:208–14.

8. Strom BL, Collins M, West SL, Kreisberg J, Weller S. Sexual activity, contraceptive use and other risk factors for symptomatic and asymptomatic bacteriuria: a case-control study. Ann Intern Med 1987;107:816–23.

9. Ferdaus F, Hussain RF, Biswas SN, Haque AA, Sultana N. A Survey on Tetanus Toxoid (TT) Vaccination Status of Women of Reproductive Age (15 - 49 years) in a Rural Community of Satkhira. KYAMC Journal [Internet]. 2019 Aug 26;10(2):73–6. Available from: https://doi.org/10.3329/kyamcj.v10i2.42782

10. Foxman B, Fredrichs RR. Epidemiology of urinary tract infection. I. Diaphragm use

and sexual intercourse. Am J Public Health 1985;75:1308–13.

11. Sheinfeld J, Schaeffer AJ, Cordon-Cardo C, Rogatko A, Fair WR. Association of the Lewis blood-group phenotype with recurrent urinary tract infections in women. N Engl J Med 1989;320:773–7.

12. Kinane DF, Blackwell CC, Brettle RP, Weir DM, Winstanley FP, Elton RA. ABO blood group, secretor status and susceptibility to recurrent urinary tract infection in women. BMJ 1982;285:7–9.

13. Ferdaus F, Zahan R, Rahman MA, Chowdhury S. A study on health related risk factors and health seeking behavior among elderly population in rural Bangladesh. Mediscope [Internet]. 2020 Sep 29;7(2):75–81. Available from: https://doi.org/10.3329/mediscope.v7i2.49445

14. Smith HS, Hughes JP, Hooton TM, et al. Antecedent antimicrobial use increases the risk of uncomplicated cystitis in young women. Clin Infect Dis 1997;25:63–8.

15. Raz R, Stamm WE. A controlled trial of intravaginal estriol in postmenopausal women with recurrent urinary tract infections. N Engl J Med 1993;329:753–6.

16. Ferdaus F, Begum S. Effects of Salinity on Menstrual and Reproductive Health: Insights from Coastal and Non-Coastal Areas of Bangladesh. EarthArXiv (California Digital Library) [Internet]. 2025 Apr 20; Available from: https://doi.org/10.31223/x50148

17. Slam M, Khaleque M, Siddika M, Hossain M. Urinary tract infection in children in a tertiary level hospital in Bangladesh. Mymensingh Med J. 2010;19(4):482-486.

18. Nahar SK, Khanum H, Zaman RF. Occurrence of Escherichia coli infection among the children of Dhaka city. Bangladesh J Zool. 2006;34(2):181-186.

19. Mahajan N, Aggarwal M, Bagga A. Health issues of menopausal women in North India. Journal of Mid-life Health [Internet]. 2012 Jan 1;3(2):84.

20. Ahmed AE, Abdelkarim S, Zenida M, Baiti MAH, Alhazmi AAY, Alfaifi BAH, et al. Prevalence and Associated Risk Factors of Urinary Tract Infection among Diabetic Patients: A Cross-Sectional Study. Healthcare [Internet]. 2023 Mar 15;11(6):861.

21. Aggarwal N, Leslie SW, Lotfollahzadeh S. Recurrent Urinary Tract Infections. [Updated 2024 May 2]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan.

22. Popkin BM, D'Anci KE, Rosenberg IH. Water, hydration, and health. Nutrition Reviews [Internet]. 2010 Jul 20;68(8):439–58.

23. Ferdaus F. Knowledge and practice of drinking safe water among the community people of Horintana, Khulna. Anwer Khan Modern Medical College Journal [Internet]. 2019 Nov 20;10(2):105–9. Available from: https://doi.org/10.3329/akmmcj.v10i2.44117

24. Liska D, Mah E, Brisbois T, Barrios PL, Baker LB, Spriet LL. Narrative review of hydration and selected health outcomes in the general population. Nutrients [Internet]. 2019 Jan 1;11(1):70.

25. Conversation CM and CP. Cranberry juice can help with UTIs and reduce reliance on antibiotics, study finds. NZ Herald [Internet]. 2024 Jul 25;

26. F NF. Reproductive Health Problems among the Adolescent Girls of Khulna Government Girls High School. Journal of Diabetic Association Medical College [Internet]. 2018 Jul 1;2(Number 2):18–20. Available from: https://doi.org/10.70357/jdamc.2018.v0202.04