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Awareness And Prevalence Of Urinary Tract Infections Among Patients Attending Hospital Of Jammu District: A Cross-Sectional Survey

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Abstracts: **Background**: Urinary tract infections (UTIs) remain a significant health concern worldwide, influenced by a combination of biological, medical, lifestyle, and socioeconomic factors. All of these elements work together to influence the frequency and treatment of UTIs. This study aimed to assess the demographic profile, clinical symptoms, medical history, awareness, and lifestyle practices associated with UTIs among patients visiting the outpatient departments (OPDs) of Government Hospital in the Jammu district.

Materials and methods: A cross-sectional survey was conducted from November 2021 to April 2022 among UTI patients (n = 308) and healthy controls (n = 317). All individuals visiting the OPDs of Government Hospital were evaluated on socio-demographic characteristics, clinical symptoms, health history, awareness, and lifestyle-related behaviors. The collected data were analyzed using chi-square tests to determine significant associations.

Results: UTIs were more prevalent among middle-aged and elderly individuals, with females reporting more pain-related and secondary symptoms, whereas males showed a higher prevalence of systemic symptoms such as fever. Recurrent infections (25.3%), family history (43%), kidney stones (38%), and diabetes (34%) were significantly associated with UTI occurrence ($p < 0.00001$). Awareness about UTIs was higher among patients (98.1%) compared to controls (64.7%), yet lifestyle risk factors persisted, including inadequate water intake (61.7% in patients vs. 37.5% in controls) and frequent antibiotic use (64% vs. 24%). Controls demonstrated more misconceptions regarding causation and susceptibility.

Conclusions: UTIs were more prevalent among women, especially those from lower socioeconomic backgrounds, and showed significant links with diabetes, kidney stones, and recurrent infections. Dysuria was the most common symptom,

with gender-based variations in presentation. Frequent antibiotic usage, dehydration, and ongoing knowledge gaps underscore the necessity of awareness campaigns, prudent antibiotic use, and preventive measures to lower the burden of UTIs.

Keywords: Urinary tract infection, Symptoms, Risk factors, Awareness, Lifestyle, Antibiotic use

BACKGROUND

Urinary tract infections (UTIs) are a common and significant health concern affecting individuals of all ages. It is among the most common infectious diseases, ranking second only to upper respiratory tract infections (Al Lawati et al., 2024; Yang et al., 2022). It is believed that UTIs affect more than 400 million people globally each year and cost billions of dollars annually (Yang et al., 2022). UTIs occur when pathogenic microorganisms, most commonly bacteria, invade and multiply in any part of the urinary system, which includes the kidneys, ureters, bladder and urethra**.** Both Gram-negative (such as *Escherichia coli*, *Klebsiella pneumoniae*) and Gram-positive (such as *Staphylococcus saprophyticus*, *Enterococcus faecalis*) bacteria as well as a few fungi (such as *Candida* spp.), are well-known causative agents of UTIs (Khoshnood et al., 2017; Gajdács et al., 2019; Gajdács et al., 2020).

The symptoms of UTIs often include frequent and urgent need to urinate, a burning sensation during urination, and cloudy or strong-smelling urine. In more severe cases, individuals may experience lower abdominal pain, fever, and even nausea. UTIs can range from mild and easily treatable to severe and potentially life-threatening, depending on the extent of the infection and the overall health of individual (Johny et al., 2025**)**. Clinically, UTIs are categorized as uncomplicated or complicated. Uncomplicated UTIs generally occur in healthy individuals without structural urinary issues and are classified as lower (cystitis) or upper (pyelonephritis) UTIs. Risk factors for cystitis include being female, having a prior UTI, sexual activity, diabetes, obesity, and genetic factors (Al Lawati et al., 2024; Yang et al., 2022). Complicated UTIs involve conditions that impair the urinary tract or immune system, such as urinary obstructions, immunosuppression, renal issues, or pregnancy (Melekos and Naber 2000).

Antibiotics are commonly prescribed for UTIs without proper urine culture or susceptibility testing, contributing to rising antibiotic resistance. This misuse has led to an increase in antibiotic-resistant microorganisms, which is a significant global concern. Awareness about UTIs, their symptoms, risk factors, and treatment options is essential for preventing complications and achieving optimal health outcomes (Almaghlouth et al., 2023; Yang et al., 2022). Prevalence study aids in resource allocation and addressing healthcare disparities to guide stewardship programs. These insights support the development of region-specific public health policies, focusing on education, screening and prevention initiatives. To the best of our knowledge, there are very few studies reporting the awareness and prevalence of UTIs in India, particularly in the northern states (Muthulakshmi and Gopalakrishnan, 2017; Bhargava et al., 2022; Johny et al., 2025). In light of this, the present study investigated the awareness and prevalence of UTIs among patients visiting the outpatient department (OPD) of Government hospitals of the Jammu district.

METHODS

Study design and setting

This was an analytical cross-sectional study conducted at Jammu Government hospital located within district of Jammu. The study site choice was motivated by the scarcity of data regarding awareness and prevalence of UTIs among patients visiting the Government hospital of the Jammu district.

Inclusion and exclusion criteria

Inclusion criteria were as follows: Indian citizens residing in district of Jammu, aged between 5 years to 80 years, cases of UTI (as per history and clinical evaluation) and those who consented after being informed. Exclusion criteria included patients currently taking antibiotics, previous surgery of bladder or urethra, inability to provide a urine sample and urinary tract anomalies. Outpatients admitted to hospital were also not considered for the present study.

Patient recruitment and data collection

The study targeted all patients attending OPD. Patients showing clinical symptoms of UTI were considered for the study. Symptoms considered were dysuria, urination frequency, urgency, fever, hematuria and suprapubic pain (Al Lawati et al., 2024; Johny et al., 2025). A standard pilot-tested questionnaire was designed specifically for this study to assess the level of awareness and prevalence of UTIs among the targeted patients visiting OPD of the Government hospitals of the Jammu district. Patients who met the inclusion criteria were conveniently recruited for this study. The questions were formulated using insights from existing literature, established guidelines, and expert perspectives in the field. At enrollment, socio-demographic factors such as age, sex, level of education, occupation and living style were recorded. The next part inquired about the level of awareness regarding UTIs among participants. Outpatients with symptoms unrelated to UTI were considered non-UTI patients.

Data and statistical analysis

The data collected through questionnaire wer tabulated into a Microsoft Excel sheet an statistically analyzed by Epi Info reporting softwar version 7.2.3.0 developed by the Centers fo Disease Control and Prevention (CDC) in Atlanta Georgia (US). Results of continuous measuremen were expressed in terms of mean ± SD. The result of categorical measurement were presented a numbers and percentages. The tests of significanc were performed using Pearson's Chi-square test $P < 0.05$ was considered statistically significant.

Ethical consideration

The study was approved by the Government Medical College, Jammu, before the commencement of research work. Permission to conduct the study was requested from the Institutional Research and Ethics Committee on Human Research (IEC/GMCJ/2023/1631). The final approval was obtained with registration no. C-479. Written consent was obtained from all participants before enrollment.

RESULTS

Social and demographic distribution of patients

The demographic profile of the participants provides important insights into the social background of the targeted population. The present study screened 1066 OPD patients for inclusion. Out of these, 711 patients did not meet the inclusion criteria and 47 patients with UTI chose not to participate in the study. The remaining 308 patients enrolled in the study were between 5 years to 80 years old. Table 1 shows social and demographic distribution of patients with UTI. Among them, the majority, 194 (63.0%) were female, while 114 (37.0%) were male. The age distribution of patients was as follows: 10.40 % belonged to 5-20 age group, 24.0% belonged to the 21–40 age group, 42.9% were in the 41–60 age group, and 22.70 % fell within the 61–80 age group. The median age of participants was 36.05 ± 13.44 years.

In terms of marital status, 206 (66.90 %) were married, 100 (32.50%) were single, 1 (0.3%) were divorced, and 1 (0.3%) were widowed. Male participants showed a higher proportion of unmarried individuals compared to females, suggesting gender-based differences in marital status distribution among UTI patients. Concerning educational accomplishment, 293 (95.13%) were educated and 15 (4.87%) were illiterate. Male literacy (98.25%) was slightly higher than female literacy (93.3%), although both rates were encouragingly high. This suggests good access to education in the study setting, though the presence of 4.9% illiteracy, predominantly among women, points toward residual gender disparities. Income distribution highlighted notable gender differences. Over half of the total UTI patients (53.9%) reported earning less than ₹1.25 lakhs annually. Interestingly, this category was disproportionately represented among women (73.2%) compared to men (21.05%), suggesting that women in the study were economically disadvantaged. In contrast, higher income brackets (>₹30 lakhs) were dominated by male patients (38.6%), while only 4.1% of female patients reported such earnings. These findings emphasize a significant gender gap in economic status, which may further intersect with access to healthcare, education, and overall quality of lif

Table 1: Social and demographic information of the UTI patients

Variables	Categories	Overall Frequency (Percent)	Frequency (Percent)	
			Male (n=114)	Female (n=194)
Marital status (n=308)	Divorced	1 (0.3)	0 (0.0)	1 (0.52)
	Married	206 (66.9)	70(61.40)	136(70.1)
	Unmarried	100 (32.5)	44(38.60)	55(28.35)
	Widow	1 (0.3)	0 (0.0)	1 (0.52)
Age Distribution (n=308)	5- 20 age group	32 (10.4)	14(12.28)	18 (9.28)
	21–40 age group	74 (24.0)	30(26.32)	44(22.68)
	41–60 age group	132 (42.9)	42(36.84)	90(46.39)
	61–80 age group	70 (22.7)	28(24.56)	42(21.64)
Education level (n=308)	Literate	293 (95.13)	112(98.25)	181(93.30)
	Illiterate	15 (4.87)	2(1.75)	13 (6.70)
Residence (n=308)	Urban	125 (40.6)	40(35.09)	87(44.85)
	Rural	183 (59.4)	76(64.91)	107(55.15)
Annual income (n=308)	< Rs. 1.25 lakhs	166 (53.9)	24 (21.05)	142(73.20)
	Rs. 5-30 lakhs	90 (29.2)	46(40.35)	44(22.68)
	> Rs. 30 lakhs	52 (16.8)	44(38.60)	8(4.12)

Common symptoms experienced by participants

As evident from the survey of UTI patients, the symptoms experienced within the past month included painful urination (dysuria), frequent urination, urgency to urinate, blood in the urine (hematuria), cloudy or foul-smelling urine, lower abdominal or back pain, fever, constipation, and nausea or vomiting (Table 2). The most commonly reported symptom was dysuria, affecting 222 participants (72.0%), followed by abdominal/back pain in 132 (42.9%), frequent urination in 114 (37.0%), urgency in 105 (34.1%), cloudy or foul-smelling urine in 68 (22.1%), fever in 43 (14.0%), constipation in 40 (13.0%), and nausea or vomiting in 25 (8.1%). Hematuria was less common, reported by only 12 participants (3.9%).

Dysuria was the most prevalent symptom, with a slightly higher proportion among males (76%) compared to females (69%), consistent with the typical clinical presentation of urinary tract–related conditions. Frequent urination and urgency were also common, and both were more frequently reported by men than women, suggesting potential gender-related differences in symptom perception or reporting.

Notably, abdominal or back pain was much more prevalent among females (57%) than males (19%), indicating a significant gender variation. Similarly, cloudy or foul-smelling urine was reported predominantly by females (31%) compared to only 7% of males. These findings suggest that women are more susceptible to UTIs and often present with additional systemic or secondary symptoms alongside dysuria.

Less common symptoms included fever, constipation, and nausea/vomiting. Fever was more frequently reported by males (21%) compared to females (10%), suggesting a higher likelihood of systemic involvement or complications among men. Conversely, constipation and gastrointestinal complaints were more common in women, possibly

reflecting overlapping pelvic or abdominal conditions.

Table 2: Common symptoms experienced by participants

Symptoms	Overall Frequency (Percent)	Frequency (Percent)	
		Male (n=114)	Female (n=194)
Dysuria	222 (72)	87 (76)	135 (69)
Frequent urination	114 (37)	46 (40)	68 (35)
Urgency for urination	105 (34)	44 (39)	61 (31)
Red urine	12 (4)	2 (2)	10 (5)
Abdominal pain / Back pain	132 (43)	22 (19)	110 (57)
Cloudy or foul-smelling urine	68 (22)	8 (7)	60 (31)
Fever	43 (14)	24 (21)	19 (10)
Constipation	40 (12.98)	10 (8.77)	30 (15.46)
Nausea or vomiting	25(8)	8 (7)	17 (9)

Health condition and medical history

A comprehensive profile of the participants was developed by assessing their personal and family medical history, with a focus on recurrent infections and associated comorbidities (Table 3), which represents the distribution of health and medical history variables among UTI patients (n = 308) and controls (n = 317), along with their statistical associations with the incidence of urinary tract infections. A significant disparity was noted in the number of recurrent infections: 78 of 308 patients (25.32%) had three or more UTIs in the previous 12 months and just 6 of 317 non-UTI patients (1.89%). This disparity was extremely significant ($\chi^2 = 73.73$, $p < 0.00001$), overwhelmingly suggesting that recurrence is closely associated with UTI status and is an identifying clinical feature of the patient population. When history of UTI during childhood was evaluated, 7 patients (2%) and 4 controls (1.26%) had a history of UTIs in childhood, but this difference was not statistically significant ($\chi^2 = 1.74$, $p = 0.1864$), indicating that infection in childhood itself does not seem to affect the risk of belonging to the patient group in adulthood. Family history, however, showed a remarkable contrast: 133 of 308 patients (43%) had a positive family history for UTI as compared to 12 of 317 controls (3.79%), and this was extremely significant ($\chi^2 = 136.08$, $p < 0.00001$). This indicates that genetic susceptibility, common environmental exposure, or familial lifestyle could all play an important role in increasing the susceptibility.

Kidney stones were also prominently linked with UTI incidence. 117 patients (38%) had a kidney stone history, whereas just 7 controls (2.21%) had the same history, and this is extremely significant ($\chi^2 = 125.74$, $p < 0.00001$). This finding confirms the long-known association between urinary calculi and infection, as stones may impede urine flow, yield surfaces for bacterial colonization, and sustain an infection-stone-nidation cycle. By contrast, hypertension did not correlate with UTI, being noted by 14 patients (4%) and 21 controls (6.62%) ($\chi^2 = 1.27$, $p = 0.258$). In a similar way, obesity was seen in 9 patients (3%) versus 32 controls (10.09%), with chi-square analysis showing borderline significance ($\chi^2 = 3.44$, $p = 0.063$). While not statistically significant, this would imply that in this group, obesity does not directly predispose to UTI and the increased prevalence among the controls might represent its greater association with other metabolic or cardiovascular diseases than with infectious risk. Diabetes was another significant factor that emerged, as 104 patients (34%) had a history of diabetes in comparison to 54 controls (17.03%). This correlation was extremely significant ($\chi^2 = 23.15$, $p < 0.00001$), as supported by the available literature that diabetes weakens host defense mechanisms, blunts urinary tract physiology, and encourages bacterial proliferation

via glycosuria, hence making patients more susceptible to UTI. All these variables analysis showed that UTI occurrence is strongly and significantly related to results, highlighting the multifactorial etiology of UTI risk, with both genetic/heritability components (family history) and medical comorbidities (kidney stones, diabetes) contributing significantly.

Table 3: Health and medical history questions

Variables	Categories	Frequency (Percentage)	Frequency (Percentage)	Chi square	*P-value*
		UTI patients (n=308)	Control (n=317)		
You have experienced ≥ 3 UTI within in last 12 months	Yes	78 (25.32)	6 (1.89)	73.7275.	< .00001.
	No	230 (74.68)	311 (98.1)		
UTI as a child	Yes	7 (2)	4 (1.26)	1.74	0.1864
	No	301 (98)	313 (98.74)		
Family history	Yes	133 (43)	12 (3.79)	136.0794	< .00001
	No	175 (57)	305 (96.21)		
Kidney stone	Yes	117 (38)	7 (2.21)	125.7426	< .00001
	No	191 (62)	310 (97.79)		
Hypertension	Yes	14 (4)	21(6.62)	1.2774	0.258375
	No	294 (95)	296 (93.38)		
Obesity	Yes	9 (3)	32(10.09)	3.4442.	0.063473
	No	299 (97)	298(89.91)		
Diabetes	Yes	104 (34)	54(17.03)	23.1519	< .00001
	No	204 (66)	263(82.97)		

Awareness and lifestyle-related questions

The results demonstrate notable differences in awareness and lifestyle practices between UTI patients and controls (Table 4). Almost all UTI patients (302; 98.0%) reported prior awareness of UTI compared to only 205 (66.6%) in the control group ($p < 0.00001$). This high awareness among patients likely reflects prior personal experience with the condition, medical consultations, and repeated exposure to health information, whereas the control group's limited awareness indicates gaps in general community-level knowledge.

A significant proportion of UTI patients (64%) had used antibiotics recently compared with only 24% of controls ($p = 0.0009$), suggesting frequent antibiotic exposure among affected individuals. This may be due to recurrent infections or self-medication, raising concerns about inappropriate antibiotic use and the potential risk of antimicrobial resistance, a trend well-documented in UTI epidemiology.

Water-related practices also showed important associations. While the type of water source (tap water vs. hand pump) did not differ significantly ($p = 0.20$), daily water intake was noticeably lower

among UTI patients; 61.7% consumed less than 1.5 L/day compared with only 37.5% of controls ($p < 0.00001$). Suggesting that inadequate hydration is a modifiable risk factor for UTI, as it reduces urine output and bacterial clearance.

Perceptions of susceptibility varied, as UTI patients more often identified as adults (37%) and the elderly (42.5%) as vulnerable groups, whereas controls were more likely to believe UTIs affect all ages (34.1%) ($p < 0.00001$). Similarly, patients were more frequently recognized as females (44.2%) as the most susceptible gender compared to controls (31.9%), reflecting a more accurate understanding consistent with established epidemiological evidence.

Knowledge of UTI causation was significantly different between groups. Almost half of patients (47.4%) correctly identified bacteria as the primary cause, compared with only 27.4% of controls, while nearly one-third of controls reported "don't know". Hygiene was reported as a cause by similar proportions across groups (~36%), highlighting persistent misconceptions and the need for targeted health education to improve scientific understanding of UTI etiology.

Regarding risk factors, UTI patients more often cited poor personal hygiene (41.6%) and sexual activity (21.1%) as contributors, whereas controls emphasized behaviors such as holding urine for too long (41.6%) and dehydration (21.1%) ($p < 0.00001$). These differences suggest that direct experience with the disease shapes patients' recognition of clinically relevant risk factors, whereas controls rely more on general beliefs or assumptions.

The survey also explored common beliefs surrounding UTI causes. Analysis of fluid consumption patterns revealed significant differences ($p = 0.021$). While alcohol consumption was common in both groups (50.6% of patients and 52.1% of controls), controls more frequently reported non-alcoholic fluid intake (40.4% vs. 35.1%). This imbalance may contribute to increased vulnerability among patients, as non-alcoholic fluids (such as water, non-alcoholic drinks) play a protective role against UTI development.

Table 4: Awareness and lifestyle-related questions

Variables	**Categories**	**Frequency (Percentage)**	**Frequency (Percentage)**	**Chi square**	***P-value***
		UTI patients (n=308)	Control (n=317)		
Did you know about UTI earlier	Yes	302 (98.05)	205(64.67)	113.6725	< .00001
	No	6 (1.95)	112(35.33)		
Antibiotics recently used	Yes	197 (64)	76 (23.97)	10.8435.	0.000991
	No	111 (36)	241(76.03)		
Water sources	Tap water	171 (55.52)	192 (60.57)	1.6352	0.200981
	Hand pumps	137 (44.48)	125 (39.43)		
Daily water intake	> 1.5 L/day	118 (38.3)	198 (62.5)	36.445	< 0.00001
	< 1.5 L/day.	190 (61.7)	119 (37.5)		
Age group susceptible	Children (0 -14)	34 (11.0)	23 (7.3)	55.7144	< 0.00001
	Adult (15-64)	114 (37.0)	84 (26.5)		

	Elderly (More than 64)	131 (42.5)	102 (32.2)		
	All ages	29 (9.4)	108 (34.1)		
Gender susceptible	Male	90 (29.2)	119 (37.5)	15.5347	0.001412
	Female	136 (44.2)	101(31.9)		
	Both	78 (25.3)	82 (25.9)		
	Don't Know	4(1.3)	15 (4.7)		
Most common cause of UTI	Bacteria	146(47.4)	87(27.4)	64.3429	< 0.00001
	Fungi	22 (7.12)	12(3.8)		
	Hygiene	112 (36.4)	116(36.59)		
	Virus	8 (2.597)	10 (3.15)		
	Don't Know	20 (6.5)	92 (29)		
Factors that increase risk for UTI	Holding urine for too long	58 (18.83)	132 (41.64)	60.6603.	< 0.00001
	Dehydration	46 (14.94)	67 (21.14)		
	Poor personal hygiene	128 (41.56)	89 (28.08)		
	Sexual activity	65 (21.1)	25 (7.89)		
	Pregnancy	11 (3.57)	4 (1.26)		
Drink fluids	Alcoholic Drink	156 (50.6)	165 (52.1)	7.7016	0.021263
	Non-alcoholic	108 (35.1)	128 (40.4)		
	Don't Know	44 (14.3)	24 (7.6)		

DISCUSSION

UTIs are common bacterial infections that affect the urinary system, including the bladder, kidneys, and urethra. Symptoms often include painful urination, frequent urge to urinate, and lower abdominal discomfort. UTIs impose a significant disease burden, particularly in developing countries like India, due to antimicrobial resistance, healthcare limitations, and costs (Mavi et al, 2024). Risk factors for UTIs in developing countries are influenced by a complex interplay of community-acquired and healthcare-associated factors (Halboup et al., 2023).

The present study assessed the prevalence of urinary tract infections (UTIs) among patients attending the OPD of a government hospital in Jammu district. It also evaluated the level of awareness regarding UTIs among these patients. Jammu is the most populous district in the Indian union territory of Jammu and Kashmir. The primary occupation of the people in Jammu and Kashmir is agriculture and related activities. The rural and urban populations of Jammu district are approximately 50.0% each (https://jammu.nic.in/demography/).

The study revealed that the prevalence of UTIs was higher among females than among males. The greater prevalence of UTIs in females is associated with anatomical factors, such as the proximity of the female urethral meatus to the anus and the relatively shorter length of the female urethra (Sujith et al., 2024). Regardless of gender, the incidence of clinically diagnosed UTIs was higher in the older age group compared to younger patients. This trend can be attributed to a combination of factors, including age-related physiological changes, menopause, and the presence of comorbid health conditions, which collectively contribute to the heightened susceptibility of older women to UTIs (Rowe &

Juthani-Mehta, 2013; Rodriguez-Mañas, 2022). In older men, conditions such as prostatic enlargement can obstruct the urethra, resulting in urinary retention, which in turn provides a favourable environment for bacterial proliferation and increases the risk of infection (Rowe & Juthani-Mehta, 2013). The study also observed a higher prevalence of UTI among married individuals. Earlier studies have found that frequent sexual intercourse, use of oral contraceptive pills, and intrauterine contraceptive devices increase the risk of UTIs (Lo et al., 2023; Hsiao et al., 1986). UTIs are a common health concern that can affect individuals across all demographic areas; however, their prevalence is notably higher in rural populations. This disparity is primarily attributed to factors such as lower socioeconomic status, inadequate hygiene practices, and limited access to quality healthcare services in rural areas compared to their urban counterparts (Amiri et al., 2025). Studies suggest that individuals with higher educational qualifications may have better knowledge about UTIs, leading to improved hygiene practices and potentially lower incidence of UTIs. Conversely, lower educational levels are associated with higher UTI prevalence and poorer knowledge about the condition (Alhaj et al., 2025). However, in the present study, no similar observation was made. The study further revealed that most UTI patients visiting the government hospital OPD had lower annual incomes. Although UTIs can affect individuals across all income groups, those with limited financial resources may be at greater risk due to socioeconomic factors that impact their access to healthcare, hygiene practices, and overall living conditions (Jansåker et al., 2021). Furthermore, families with higher annual incomes may prefer private hospitals over government facilities.

UTIs commonly cause burning during urination, frequent urges to urinate, and cloudy or foul-smelling urine; these are the common signs of UTIs in both males and females, resulting from the presence of bacteria, white blood cells, and infection-related by-products. Lower abdominal or pelvic pain is typically experienced, especially in women (Bono and Leslie, 2025). The study observed that a major percentage of female patients reported abdominal pain compared to male patients. Red urine in UTI patients is usually due to haematuria caused by inflammation of the urinary tract lining. In cases where the infection spreads to the upper urinary tract, such as the kidneys, symptoms can escalate to include fever, chills, nausea, vomiting, and lower back or flank pain (Alhaj et al., 2025).

A recurrent UTI is defined as two or more episodes of UTI within six months or three or more episodes within one year. It occurs when a person experiences repeated infection after previous ones have been successfully treated. One of the earlier studies by Mondal et al., (2022) had reported that 20 to 30% of UTI patients have recurring UTIs. UTIs are less common in children than in adults. Furthermore, a urinary tract infection experienced during childhood does not always recur later in adult life. A study by Shaikh et al., (2008) reported that 7.8% of children experience UTI.

Family history has been identified as a potential risk factor for UTIs, particularly recurrent infections. Genetic predispositions affecting immune responses, urogenital tract anatomy, or mucosal defences may contribute to increased susceptibility within families. Studies suggest that first-degree female relatives of individuals with recurrent UTIs are at higher risk, indicating a possible hereditary component (Scholes et al., 2010; Storme et al., 2019). Additionally, inherited conditions such as vesicoureteral reflux or structural urinary abnormalities may cluster in families, further elevating infection risk. While environmental and behavioural factors also play a significant role, a positive family history is recognized as an important consideration in UTI risk assessment (Bono and Leslie, 2025; Godaly et al., 2015).

Kidney stones and UTIs are closely associated, with each condition potentially predisposing to the other. Kidney stones may impede urinary flow, present sites for bacterial attachment, and prevent complete bladder emptying, all of which increase the potential for infection. Certain stone types, particularly struvite stones, form in the presence of urease-producing bacteria such as *Proteus*, *Klebsiella*, and *Pseudomonas*, so infection is a critical factor in their pathogenesis (Ripa et al., 2022). Conversely, recurrent UTIs, especially those caused by these organisms, can lead to the development of infection-induced stones. This bidirectional relationship highlights the importance of managing both conditions simultaneously to prevent recurrent infections and further stone growth (Bono and Leslie 2025; Wiegley 2022; Ripa et al., 2022).

While hypertension does not directly cause UTIs, an indirect association exists through shared risk factors and complications. Individuals with hypertension often present with comorbidities such

as diabetes and chronic kidney disease, which independently increase UTI risk. Conversely, recurrent or complicated UTIs involving the kidneys can contribute to secondary hypertension due to renal impairment. Thus, the relationship between hypertension and UTIs is complex, often mediated by overlapping clinical conditions (Pacurari et al., 2010).

Obesity does not directly cause UTIs, but it increases the risk by impacting immunity, adding comorbidities, modifying anatomy, and contributing to hygiene problems. Nevertheless, a study conducted by Nassaji et al. (2014) showed no significant correlation between Body Mass Index and UTI.

People with diabetes, especially uncontrolled diabetes, are at a higher risk of developing UTIs. Elevated blood sugar levels can create an environment that promotes bacterial growth in the urinary tract. Additionally, diabetes can impair the immune system, reducing the ability of body to fight infections effectively (Papp and Zimmern 2023; Salari et al., 2022).

Lifestyle factors significantly influence the risk of UTIs, both in terms of occurrence and recurrence. Poor personal hygiene, inadequate fluid intake, and infrequent urination can promote bacterial colonization and urinary stasis, increasing the risk of infection (Mititelu et al., 2024). Sexual activity, particularly without proper pre- and post-coital hygiene, is a well-documented UTI risk factor, especially in women (Storme et al., 2019). Dietary habits that influence urine pH and microbiota balance can also modulate the risk of UTIs, highlighting the importance of lifestyle modifications as preventive strategies.

In one study, Hooton et al. (2018) demonstrated a link between daily water intake and UTIs. An earlier study found that individuals with a daily water intake of more than 1.5 liters per day are less likely to get UTIs. Drinking more water increases urine volume and frequency, which helps flush out bacteria from the urinary tract. Increasing water intake can reduce the need for antibiotics to treat or prevent UTIs (Perrier et al., 2021; Plüddemann, 2019).

Both alcoholic and non-alcoholic drinks have various effects, potentially influencing the severity of symptoms or the likelihood of developing a UTI. Both of these beverages can affect UTI symptoms and development. Coffee, a diuretic, increases urine production, which may irritate the bladder, worsen UTI symptoms like urgency and discomfort, and potentially lead to dehydration if over consumed, hindering the body's ability to flush out bacteria (Miller et al., 2016). Reducing caffeine is often advised for those with sensitive bladders or recurrent UTIs. The effect of tea on UTIs varies: caffeinated types, such as black and green tea, may irritate the bladder similarly to coffee. However, green tea, due to its antioxidants, supports immunity. In contrast, herbal teas (e.g., chamomile, peppermint) are gentler and less irritating. Alcohol, another diuretic, promotes dehydration and frequent urination, potentially worsening UTI symptoms and bladder irritation. It also weakens the immune system and may increase the risk of UTIs with chronic use, as dehydration and concentrated urine impair bacterial clearance (Miller et al., 2016; Cameron et al., 2023).

Awareness and knowledge regarding urinary tract infections (UTIs) play a critical role in their prevention, early recognition, and effective management. Educating individuals about personal hygiene, adequate hydration, regular bladder evacuation, and safe sexual practices can significantly reduce UTI incidence, particularly among high-risk groups such as women, the elderly, and individuals with chronic health conditions (Sundas et al., 2024; Alhaj et al., 2025). Public health initiatives and patient education programs addressing risk factors, symptoms, and preventive strategies can empower communities to adopt healthier behaviours and seek timely medical care (Almaghlouth et al., 2023). Furthermore, awareness contributes to minimizing inappropriate antibiotic use, reducing the burden of recurrent infections and antimicrobial resistance. Therefore, promoting UTI-related health literacy is crucial for enhancing individual outcomes and improving public health standards.

CONCLUSION

In conclusion, the present study underscores that UTIs are strongly influenced by demographic, clinical, and lifestyle factors, with women more commonly affected than men, particularly those of lower socioeconomic status, being disproportionately affected. Dysuria, abdominal/back pain, and urinary frequency emerged as the most common presenting symptoms, with notable gender-related differences in symptom patterns. Recurrent infections, family history of UTI, kidney stones, and diabetes were significantly associated with higher susceptibility, underscoring the multifactorial nature of the

disease. Despite high reported awareness among UTI patients, knowledge gaps and misconceptions persist in the general population, particularly regarding causation and risk factors. Lifestyle practices such as inadequate hydration and frequent antibiotic use further exacerbate vulnerability and raise concerns about antimicrobial resistance. Collectively, these findings emphasize the need for targeted awareness programs, promotion of healthy hydration habits, rational antibiotic stewardship, and gender-sensitive preventive strategies to reduce UTI burden and improve community health outcomes. Addressing these gaps through targeted interventions (such as improving access to clean water, promoting adequate hydration, and delivering community-based educational programs) can contribute significantly to reducing the burden of UTIs. Future research should focus on longitudinal and microbiological analyses to better understand the underlying determinants and to support the development of effective prevention and management strategies.

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Data Availability

All data generated or analyzed during this study are included in this manuscript.

DECLARATIONS

Competing interests

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