

Bacterial Urinary Tract Infection Prevalence and Associated Risk Factors in Patients

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Abstract

Background: Urinary tract infections (UTIs) are a major source of morbidity and comorbidity in people with underlying illnesses and account for most hospital visits worldwide. Knowing UTI risk factors can help manage the condition quickly.

Method: This study isolated and characterized bacterial etiological agents to assess UTI prevalence and related variables. This cross-sectional study collected and analyzed 100 clean catch midstream urine (MSU) samples aseptically. Questionnaires and laboratory testing for chosen underlying illnesses provided UTI risk factors.

Results: Escherichia coli was the most common bacterial uropathogenic with (41%), followed by Klebsiella pneumonia (6%), Enterococcus faecalis (7%), UTI was associated with age <9 years, female gender, married persons, genitourinary tract abnormalities, diabetes, hospitalization, and indwelling catheter 6 days ($p < 0.05$).

Conclusion: Hospitalized, female, married, genitourinary tract anomalies, indwelling catheter, and diabetic patients should be screened for UTI.

Keywords: Urinary tract infections, Questionnaires, cross-sectional study, associated factors.

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Introduction

Pathogens cause urinary tract infections (UTIs) [1]. Urinary tract infections can induce fever, dysuria, lower abdominal pain (LAP), and kidney scarring [2]. Community-acquired or nosocomial urethritis. Most urinary tract infections are community-acquired. The causal agent, bacterial infection intensity, and immune response determine urinary tract infection symptoms. UTIs cause fever, burn during urination, suprapubic discomfort, and genital blisters and ulcers. Symptoms vary by age and urinary tract location [3]. Gram-

negative and gram-positive bacteria cause UTIs. E. coli causes most UTIs. Klebsiella, Proteus, Citrobacter, Enterobacter, Enterococcus, Pseudomonas, streptococci, and staphylococci were also found [4].

Low socioeconomic level, growing age, multiparty, sexual behavior, urinary tract abnormalities, past UTI therapy, and other medical disorders predispose to Asymptomatic Bacteriuria (ASB). Thus, the study examined patient prevalence of bacterial urinary tract infections and associated factors.

Methods

An April 2021 to March 2022 cross-sectional research was conducted. The trial included UTI-suspected outpatients and inpatients. Only UTI patients or suspects were studied. Menstruating women and terminally ill patients were excluded from the experiment.

Eligible hospital inpatients and outpatients (questionnaires with closed-ended questions with nominal category values like gender and open-ended questions with categorical values like age were distributed). Clinicians collected age, gender, tribe, location, education, and medical history. Capillary blood and MSU samples were obtained after patient selection. 100 patient received morning midstream urine samples in sterile vials. The bacteriology lab examined urine for

uropathogens within three hours and incorporated the results in the questionnaire. SPSS version 20 was used to calculate urinary tract infection prevalence, causative agent frequency, and mean age. UTI cases with and without risk factors were compared to detect connections. Where the significance p value calculated 0.05 was significant.

Results

Patients varied in age from 2 to 85, with a mean of 40.1 ± 15.3 years. Females dominated the research. 60% were married.

The prevalence of UTIs were higher in females with 25(20%) compared to 10/ (10%) in men as shown in table 1.

Table 1: Prevalence of urinary tract infections according to age of patients

Age	Positive UTI (%)		Negative UTI (%)		
	Femalen (%)	Malen (%)	Femalen (%)	Malen (%)	Total (%)
≤ 9	1(1%)	1(1%)	1(1%)	1(1%)	4(4%)
10-19	1(1%)	1(1%)	5(3%)	1(1%)	8(6%)
20-29	4(5%)	1(1%)	5(3%)	2(3%)	12(12%)
30-39	9(7%)	1(1%)	10(12%)	3(7%)	23(27%)
40-49	3(2%)	1(1%)	8(9%)	2(3%)	14(15%)
50-59	2(1%)	2(2%)	8(9%)	3(7%)	15(19%)
60-69	3(2%)	1(1%)	7(4%)	1(1%)	12(8%)
70-79	2(1%)	1(1%)	5(3%)	1(1%)	9(6%)
≥ 80	0(0%)	1(1%)	1(1%)	1(1%)	3(3%)
Total	25(20%)	10(10%)	50(45%)	15(25%)	100(100%)
	35(30%)		65(70%)		

Table 2: Prevalence of bacterial uropathogen isolates from patients

No.	Uropathogens	Female (n, %)	Male (n, %)	Total (n, %)
1	Escherichiacoli	10(35%)	4(6%)	14(41%)
2	Klebsiellapneumoniae	5(20%)	1(1%)	6(21%)
3	Staphylococcus aureus	1(3%)	3(1%)	4(4%)
4	Enterococcus faecalis	3(4%)	1(1%)	4(5%)
5	Enterobacter cloacae	3(4%)	0 (0%)	3(4%)
6	Pseudomonasaeruginosa	1(3%)	1(1%)	2(4%)
7	Proteus mirabilis	1(3%)	0 (0%)	1(3%)
8	Proteus vulgaris	1(3%)	0 (0%)	1(3%)
Total		25(75%)	10(25%)	35(100%)

Table 3: Factors associated with UTI

Factors with UTI	ODD ratio	95% CI	P value
Pregnancy	1.045	0.502-2.012	0.745
Catheters	7.450	2.654-26.015	0.001
Genitourinary abnormalities	2.015	1.356-3.054	0.001
Diabetes mellitus	2.565	1.250-5.432	0.018
HIV	1.093	0.565-2.143	0.655
Hypertension	1.542	0.655-3.045	0.175
Abortions	1.243	0.556-4.441	0.354
UTI symptoms	0.455	0.357-1.159	0.160

Discussion

The near closeness of the urethral to the anus, the broader and shorter urethra, sexual activity, incontinence, the less acidic pH of the vaginal surface, and unsanitary surroundings all contribute to the high occurrence of urinary tract infections in females [5]. The age range 50-59 years showed the highest prevalence for men. When patients reach this age, urinary tract infections are more likely to arise because of the increased prevalence of prostate illnesses and diabetes in men [6]. Gram-positive and gram-negative germs are among the many that may cause UTIs. In the current study, the Enterobacteriaceae family accounted for (9%) of all isolated bacteria and was the most frequently found microorganism in urinary tract infections. *E. coli* was the most prevalent among these bacteria, accounting for (41%) and *Klebsiella pneumonia* (21%). The investigations support the current finding [7,8]. With its own virulence determinant, the p pilus (Gal-Gal receptor), *E. coli* may attach to the glycoconjugate receptor (Gal 1-4 Gal) of the uroepithelial cells of the human urinary tract and start the infection [9].

Additionally, this outcome is consistent with research on UTI in the community conducted in France by Alsamarai *et al* [10], which revealed that *Proteus mirabilis*, *Pseudomonas aeruginosa*, and *Enterobacter* spp. were the least common bacteria found.

In a related research conducted by Kabugo *et al.* [11] in Mulago hospital in Uganda, it was

discovered that age and female gender had a statistically significant connection with UTIs. In diabetic patients, altered immunity includes depressed polymorph nuclear leukocyte functions, altered leukocyte adherence, chemotaxis, phagocytosis, impaired bactericidal activity of the antioxidant system [12], and neuropathic complications, such as impaired bladder emptying. This may explain the statistically significant association between UTIs and diabetes.

Conclusion

These variables may cause UTIs. Hospitalized, genitourinary tract abnormalities, indwelling catheter, diabetic, female, and married patients should be screened for UTIs. If these routine checks are put in place, prevention of UTI can be realized at lower cost.

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