

# Study on Urinary Tract Infection Among Females of Reproductive Age Group in Tertiary Care Teaching Hospital, Dhaka, Bangladesh

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## ABSTRACT

**Introduction:** Among all the bacterial infections encounter in primary care, urinary tract infection (UTI) has considered as one of the most frequent bacterial infection. UTI can be defined as the presence of an infection in any part of our urinary system-kidneys, ureters, urinary bladder and urethra. Majority of the infections involve the lower urinary tract – the urinary bladder and the urethra. Women of reproductive age group (15-44 years) are the most vulnerable of developing UTI than men. The objective of this study is to determine the prevalence rate of UTI among females of reproductive age group and to ascertain the association between socio demographic factors among study population.

**Material and Methods:** This is a cross sectional observational study executed in a tertiary care teaching hospital, Dhanmondi, Dhaka. 250 women of reproductive age group were encountered as the study group here. Data collection was done by using a structured interview schedule followed by collection of urine sample for microscopic examination and culture. Analysis of data was done by using SPSS 15 software. Prevalence of UTI among study population was calculated by using percentage and the strength of association between socio demographic factors were evaluated in our study.

**Results:** Prevalence of UTI among study population was found to be 41.20%. A strong association of statistical significance was observed among marital status (p values <0.05), the level of education of the study population (p value <0.05) and the urine culture reports among UTI patients (p value 0.001)

**Conclusion:** Now a days UTI can be considered as one the most serious public health problem if it is remaining untreated. To prevent the possibilities of evolving further complexity of UTI early detection and prompt treatment is very much crucial. We should promote more educational programming about UTI prevention not only to reduce the sufferings of the patients and their hospital stay but also to compensate for the economical loss.

**Keywords:** Urinary tract infection, Women.

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## I. INTRODUCTION

Worldwide women of all ages frequently encounter with urinary tract infection as the most popular non-intestinal disease [1]. UTI can be defined as the presence of microorganism in the urinary system [2], [3]. It can be categorized as the lower urinary tract infections, which involve the urinary bladder (cystitis), urethra (urethritis) and in case of male prostate (prostatitis), and upper urinary tract infections involving the kidneys (pyelonephritis) and ureter. UTI can be divided on the basis of the factors that trigger the infection as complicated or uncomplicated, depending on the nature of manifestations as recurrent or primary and along the clinical presentations as symptomatic or asymptomatic [4].

The spectrum of UTI symptoms ranges from a mild self-limiting illness i.e., burning sensation during micturition, bacteremia to severe sepsis with a mortality rate of 20-40% [5]-[7]. Typical symptoms of UTI include the triad of

urgency (the enhanced desire to void the bladder), frequency (increased frequency of urination) and dysuria (painful urination). UTI is a wide term that encircles both asymptomatic bacteriuria and symptomatic infection with microbial invasion and inflammation of the urinary tract. While majority of the patients with UTI complain of urinary tract symptoms but around one third or more of the patients with these symptoms may not have any evidence of UTI in their routine urine analysis [8]. Asymptomatic bacteriuria, or asymptomatic urinary tract infection can be defined as a person without symptoms or signs of UTI but a specified quantitative count of bacteria that has been found in an appropriately collected urine specimen [9]. Globally around 2-10% prevalence of asymptomatic UTI has been observed among various researches [10]. Subsequently, symptomatic UTI are more frequently to come across among these particular group of asymptomatic patients [11]. If remain

untreated or undertreated, then UTI can result into potentially serious life-threatening sequelae.

UTI infects both males and females equally although women of reproductive age group (15-44 years) remain mostly at risk. Various anatomical and physiological factors play a key role for developing UTI in women such as shorter length of urethra than males, absence of prostatic secretion, incomplete bladder emptying (either due to pregnancy or bladder, uterine or any other pelvic organ prolapse), sexually active females, easy contamination of urinary tract by the fecal flora, delay in micturition as a behavioral cause, use of diaphragm and condoms with spermicidal foams as contraceptives and due to loss of estrogen at the time of menopause [12]. The incidence of UTI has been recorded among 1% of school going girls and around 4% among women with child bearing age. Various studies revealed that by considering several factors almost 25-30% women of reproductive age group usually get UTI [3], [13].

Across the globe the microorganisms responsible for UTI remain constant. Among the all bacterial pathogens *Escherichia coli* has become the most prevailing organism (80-85%) in charge of UTI. Other bacterial etiologies imply *Staphylococcus saprophyticus* (5-10%), *Proteus*, *Pseudomonas*, *Klebsiella*, *Enterobacter spp.*, *Enterococcus* Etc. [2], [14]. Virus executes a vital role in the pathophysiology of hemorrhagic cystitis although both viruses and parasites are not usually contemplated as urinary microbes [15].

Next to respiratory tract infections UTI has secured the second most popular bacterial disease encounter in the primary care settings [2], [3]. Global statistics revealed that 8.3 million outpatient clinic visits are due to UTI, annually emergency department deals with 1 million UTI cases and around 100,000 patients got admitted to the hospitals due to complicated UTI [16]. UTI are likely to be more common in lower income countries like Bangladesh than other developed nations. The majority of the reports in the literature pertaining to urinary tract infections globally have measured asymptomatic or symptomatic UTI in pregnant women in comparison to the women of reproductive age group. With this background, this study was planned to find out the prevalence of UTI and its association with socio-demographic factors among females of the reproductive age group in tertiary care hospital, Bangladesh.

## II. MATERIALS AND METHODS

### A. Study Design & Area

This a population based cross sectional observational study carried out in both Medicine and Gynecology departments of Bangladesh Medical College Hospital (BMCH) and International Medical College Hospital (IMCH) located at Dhanmondi and Gazipur area respectively in Bangladesh.

### B. Study Period

This study was carried out from January 2020 – December 2020.

### C. Sample Size

In this study we have used the formula  $4PQ/D^2$  for calculating the sample size [17]. Here, P = Prevalence (previous studies), Q = 100 – P, D = allowable error (5-20% of P). In one study of Nicolle et al, has revealed 10% prevalence of UTI in non-pregnant women which has chosen here for calculating prevalence as previous study source. By using this formula here, we found the sample size was 225 with 4% of absolute precision. Finally, the sample size was calculated to be 248 which was rounded off to 250 by adding 10% refusal rate.

### D. Inclusion Criteria

Females with reproductive age group (15-44 years) visited to BMCH & IMCH.

Patients who were apparently healthy and willing to participate in this study.

### E. Exclusion Criteria

Females on any antibiotic medications.

Females on menstruation phase of the menstrual cycle.

Pregnant women.

Females with congenital urinary tract abnormalities.

Patients not willing to participate in the study.

Critically ill patients.

### F. Data Collection:

Systematic random sampling technique was used to identify the study subjects. All the subjects underwent medical history assessment, general clinical examination, before enrollment. Patients gave informed consent before they participated in the study. Once informed consent was obtained, all participants were asked to complete a questionnaire to collect basic demographic information such as age, gender, place of living, marital status, clinical features. About 5 ml of midstream urine was collected for microscopic analysis and cultured for finding presence of any microbes, by clean catch method in a sterile bottle. The sample processing was carried out within 2 hours of specimen collection. Microscopic examination of urine was done for pus cells. All samples were cultured on MacConkey agar plates. Incubation was done at 37 °C aerobically for 12-24 hours.

### G. Operational Definition

Asymptomatic UTI was defined as a patient without fever or clinical manifestations of UTI but there is presence of more than  $1 \times 10^5$  colony forming unit (CFU) per milliliter of one organism in a culture of clean voided midstream urine [18].

Symptomatic UTI can be defined when any clinical features of UTI were present, and the colony count in a single culture was  $10^3$  or more [19].

UTI should be considered when either of asymptomatic UTI or symptomatic bacteriuria was present [20].

Pure growth less than  $1 \times 10^3$  CFU/ml was taken as growth of no significance [21].

### H. Data Analysis

Data was recorded into semi-structured pre-tested pro forma. It was entered into Microsoft Excel and analyzed using SPSS v 16.0. Summarization of data was done

according to data types and appropriate statistical tests were done. The various modes of clinical presentation were expressed as the total number of patients presenting with a particular presenting feature and then calculated as a percentage of the total number of patients. P-value of <0.05 was considered to be statically significant. Informed consent was taken in all the cases and the records were kept confidentially.

### I. Ethical Clearance and Informed Consent

The study was carried out after obtaining approval from the Institutional Ethical Committee. The participants were briefed about the purpose of the study and informed consent was obtained prior to the data collection.

## III. RESULTS

### A. Prevalence of UTI (Both Symptomatic and Asymptomatic) among the Study Population

Among the females of reproductive age group, the prevalence of UTI was found to be 103(41.20%) out of 250 patients (Fig. 1). 67 (65%) UTI patients were symptomatic and 36(35%) were asymptomatic UTI cases (Fig. 2).

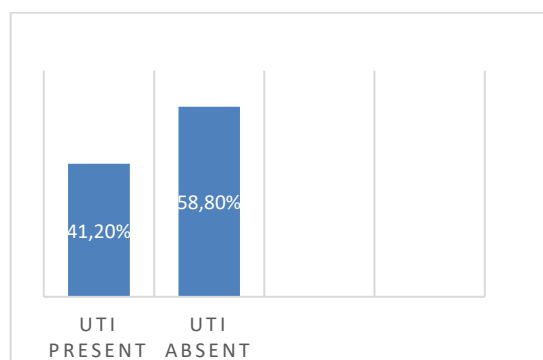


Fig. 1. Prevalence of UTI among study population (n=250).

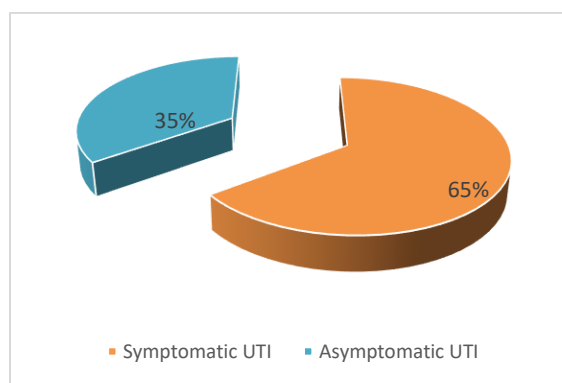


Fig. 2. Symptomatic and Asymptomatic UTI prevalence among study group.

### B. Age Wise Distribution of the Study Population

In the study population majority of UTI patients belonged to the age group 30-44 years (57.28%) (Table 1).

TABLE 1: AGE WISE DISTRIBUTION OF STUDY POPULATION

AGE	Frequency (n=250)	UTI Present (n=103)	UTI Present (%)	p-value
15-29 years	117	44	42.72	0.418
30-44 years	133	59	57.28	

### C. Distribution of Study Population according to Religion

Majority (55.33%) UTI patients in our study were Muslim along with amalgamation of other religions have been observed (Table 2).

TABLE 2: RELIGION WISE DISTRIBUTION OF STUDY POPULATION

Religion	Frequency (n=250)	UTI Present (n=103)	UTI Present (%)	p-value
Muslim	133	57	55.33%	0.264
Hindu	67	31	30.09%	
Christian	27	8	7.78%	
Others	23	7	6.8%	

### D. Distribution of UTI Patients according to Educational Qualifications

In our study mainly literate patients were found to be suffering from UTI which has also revealed statistically significant (p value <0.01) (Table 3).

TABLE 3: EDUCATIONAL STATUS AMONG STUDY POPULATION

Educational Status	Frequency (n=250)	UTI Present (n=103)	UTI Present (%)	p-value
Literate	179	77	74.76	0.01
Illiterate	71	26	25.24	

### E. Marital Status among Study Population

Mostly married females of reproductive age group were found to be suffering from UTI rather than unmarried females [Table 4] which has proven statically significant in our study (p value <0.01).

TABLE 4: MARITAL STATUS AMONG STUDY POPULATION

Marital status	Frequency (n=250)	UTI Present (n=103)	UTI Present (%)	p-value
Married	137	63	61.16	0.01
Unmarried	113	40	38.33	

### F. Distribution of Clinical Features of UTI among Study Group

Fig. 3 has revealed various clinical manifestations of UTI in our study population where 77% females were suffering from increased frequency of micturition, fever 63% and 59% with painful micturition. Although 35% females were asymptomatic during diagnosis.

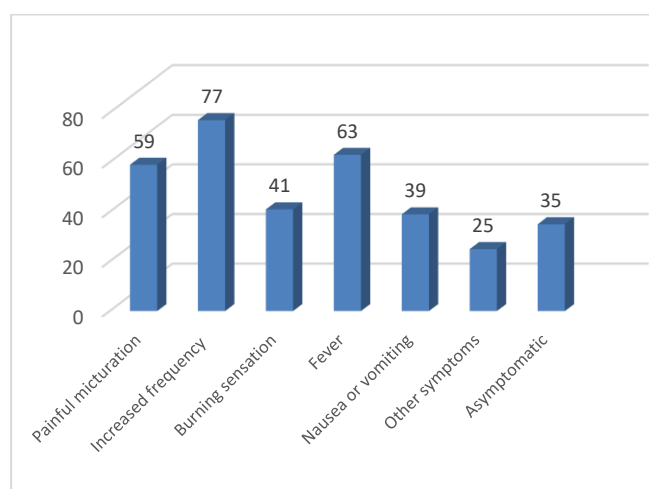


Fig. 3. Distribution of various clinical manifestations among UTI patients.

### G. Urine Culture Results among Study Group

The relationship between the presence of UTI symptoms and urine culture has revealed in Table 5. Positive urine culture has found among 43 symptomatic and 16 asymptomatic UTI patients which has shown statistical significance ( $p$  value  $< 0.001$ ).

TABLE 5: RELATIONSHIP BETWEEN UTI SYMPTOMS AND URINE CULTURE

	Culture Positive	Culture Negative	P value
Symptomatic UTI (67)	43	24	0.001
Asymptomatic UTI (36)	16	20	

Majority of the positive urine culture has shown growth of *E. coli* (64%) infection and *Staphylococcus* spp. (19%) (Fig. 4).

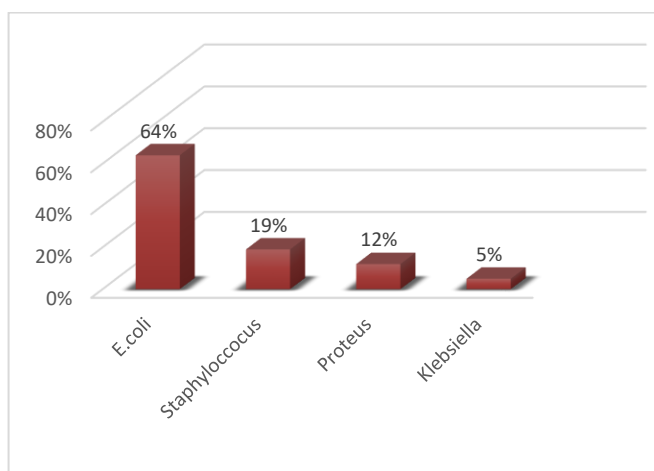


Fig. 4. Distribution of microorganisms causing UTI among study group.

## IV. DISCUSSION

In hospital settings UTI has considered the most frequent infection and in the general population it has secured the second position among all community acquired diseases. Around the globe every third women experience UTI at some point in their lifetime. Untreated and partially treated UTI may turn into a lot of complications and can create a great threat to the quality of life. It implies the major significance of early detection and appropriate treatment of UTI among patients at any age. In our study we tried to find out the prevalence of UTI among females of reproductive age group to provide the new vision regarding its early detection and management of this burning problem.

The socio demographic parameters highlighted in our study were found to be nearly comparable to the findings of other researches done elsewhere [22], [23]. Here we found around 58% UTI patients belonged to the age group 30-44 years and 42.72% in 15-29 years. Among which majority (55.33%) were Muslims in religion.

In the study population the prevalence of UTI was found to be 41.20% which has got a lot of similarities to the prevalence rate of another study done by Shaiful et al where the mentioned it was around 44.53%. Other study done by Kolawole et al where they mentioned 60% prevalence rate among their UTI patients [24], [25]. These studies had got similarities in the prevalence rate of UTI because the selection of the study population which was hospital based

and either the patients visited there with UTI symptoms or they acquired it through nosocomial infection.

Out of 41.20% patients who had UTI 65% were symptomatic and 35% were asymptomatic. In comparison this with another study where they found symptomatic UTI 76% and asymptomatic was 24% but their selection of study population was community based [26].

Medino-Bombardo et al. mentioned dysuria as the principle clinical manifestation of their study population in comparison to ours where it is 59% [27]. In another study they found 73.4% burning sensation during micturition, 43.9% had increased frequency and 20.1% had painful micturition [24] whereas in here we found increased frequency 77% and burning sensation 43%. Some other studies also mentioned various clinical manifestations like fever, nausea, vomiting, groin pain, nocturnal incontinence, cloudy or bloody urine, fatigue and confusion [22], [24]. Their study population belonged from the tertiary care hospital like ours where the chances of various infections are more common.

In this study majority of the (43) symptomatic patients had culture positive in comparison to asymptomatic ones where it was only 16 culture positive cases. We found statistical significance between education and marital status of the patients. In one cohort study they found marital status as statistically significant among their UTI patients [23].

Here we found 64% *E. coli*, 19% *Staphylococcus* sp., 12% *Proteus* and 5% *Klebsiella* growth from urine cultures with some similarities to another study where they found 61% *E. coli*, 12% *Staphylococcus* sp., 25% *Proteus* and 2% *Klebsiella* [26]. Different results have also demonstrated in another study where they found 33.1% *E. coli*, 7.9% *Klebsiella*, 2.2% *Staphylococcus* sp. and 0.7% *Proteus* [24].

## V. CONCLUSION

Untreated and partially treated UTI can turn into a major public health problem with a lot of complications. We should provide emphasis regarding its early detection and appropriate treatment protocol. Females of reproductive age group should provide more information to create awareness and acquiring knowledge regarding its prevention as well. Efficient management of UTI can help us to bring a healthy and economically productive life in the community.

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