# Incidence, Distribution And Management of Community Acquired Urinary Tract Infections Among Patients In Hospitals of Lahore, Pakistan

Asma Manzoor [1*], Nabila Ishaq[2], Ambreen Kanwal[1]

[1]*Institute of Biochemistry and Biotechnology, University of the Punjab, Lahore, Pakistan*
[2]*Department of Zoology, University of the Punjab, Lahore, Pakistan*

[*]***Corresponding Author:*** *Dr. Asma Manzoor*
*Assistant Professor, Institute of Biochemistry and Biotechnology, University of the Punjab, Quaid-i-Azam Campus Lahore-54590 (Pakistan)*

*Abstract*

*Urinary tract infection (UTI) is described as microbe invasion in kidneys, ureter, urethra or urinary bladder causing discomfort, morbidity and mortality ending up to frequent hospital visits. E.coli, Enterobactor, Serratia species, Staphylococcus, and Klebsiella species are few main causes of UTI infections. In order to control the problem of UTI, it is important to understand the causes and distribution patterns of disease. Aim of the current study was to investigate the effect of different factors such as age, gender, and physiological condition on relative abundance of UTI. Semi-structured questionnaire was designed to collect information from UTI patients in local hospitals of Lahore, Pakistan. Data accumulated from current study highlighted the most common symptom of UTI in all age groups and gender was frequency of micturition (38.46%) followed by lower abdominal pain (35%). However, higher rate of UTI was reported in women especially age group 41-60 years. Another significant factor among women with UTI infection was pregnancy which might be due to physiological differences, hormonal effects or behavioral patterns. Careful analysis of life style factors of patients further draw attention to drinking water as a significant reason behind the occurrence of UTI as 58.2% patients were using tap water. In conclusion, data suggest age, gender and lifestyle factors as underlying cause of UTI in Pakistan and needs further research to understand their link and overcome the problem.*

*Keywords - Occurrence, Urinary tract infection (UTI), micturition, morbidity, pregnancy.*

## I. INTRODUCTION

Urinary tract removes nitrogenous wastes and extra water from blood of our body in the form of urine [1]. Urinary Tract Infection (UTI) is attack of bacteria, virus or yeast in the tissues of kidney (pyelonephritis), bladder (cystitis), ureter or urethra (urethritis) [2, 3]. UTI is profoundly caused by Escherichia coli (74.3%) and *Klebsiella pneumonia (20.1%) [4]*. UTI are divided into two broad categories as asymptomatic bacteriuria (ASB) having countable pathogen count causing irritation and symptomatic further classified as uncomplicated or complicated [5]. Uncomplicated symptomatic UTIs are normal genitourinary tract without instrumentation and complicated UTIs are with structural or functional complexities like diabetes mellitus and immune-compromised individuals [6]. Urinary tract infections account for about 25% of all bacterial infections [7] which is more prevalent among females as compared to males due to short urethra and its adherence to vagina and anus [8]. Symptomatic UTI has been found more prevalent (25.1%) than asymptomatic UTI (4.34%). Almost 50% of all women suffer with UTI at some stage of their life but its symptoms are worse in men than in women [9]. A number of symptoms are related with UTI like urination urgency, jaundice, urinary incontinence, back pain, fever, dysuria, poor feeding, dementia and burning during urination [10]. Most prescribed antibiotics for the treatment of UTI infection are Gentamicin, Kanamycin, Streptomycin, Neomycin, Tetracycline and Ciprofloxacin but antibiotic resistance for these has also been seen in a number of UTI patients [11].

UTI associated risk factors include frequent sexual activity, lack of personal hygiene, pregnancy, use of contraceptives, use of urinary catheters and

chronic diseases like renal stones and diabetes mellitus [12]. In Kohat region of Pakistan, $3*10^5$ hospital stays and 6 million outdoor patients' visits per year are reported. Almost 10% of all Pakistanis suffer UTI during some stage of their lives [13].

The purpose of this study is to find out prevalence of UTI and prevailed current practice among patients in fifteen different hospitals of Lahore region, Pakistan. There is no previous screening reported in Lahore region of Pakistan.

## II. METHODS

Ethical approval was taken from Institute of Biochemistry and Biotechnology, University of the Punjab, Lahore, Pakistan. A postal questionnaire was taken to different hospitals and distributed among admitted UTI patients. Respondents who were not able to fill this questionnaire were interviewed personally. Data from 398 UTI patients admitted in Sheikh Zaid Hospital, Jinnah Hospital, Services Hospital, General Hospital, Mayo Hospital, Ganga Ram Hospital, National Hospital, Hameed Latif Hospital, Masood Hospital, Doctors Hospital, Zainab Hospital, Hijaz Hospital, Central Park Hospital, Ittefaq Hospital, and Nawaz Sharif Social Security Hospital were taken from 3, March 2018 to 13, August 2018. Collected data was summarized using SPSS version 20.0 (software package for statistical analysis).

## III. RESULTS

398 completed questionnaires were included in this study. UTI patients who were not able to fill questionnaire independently, oral questions were asked from them. Non-respondents were mostly from rural areas including women mostly.

All respondents were clinically diagnosed as UTI patient due to presence of uropathogens in their urine. Respondents were asked to tell what type of symptoms they have to face during infection. On the prescribed performa, respondents mentioned a number of symptoms like stinging (29.6%), frequent urination (45%), fever (75.8%), change in urine color and smell (80.4%), hematuria (8.7%), dysuria (85.9%), urethral catheterization (35.1%) and burning sensation (19.5%) (Fig 1). These symptoms are found more prevalent among married women.
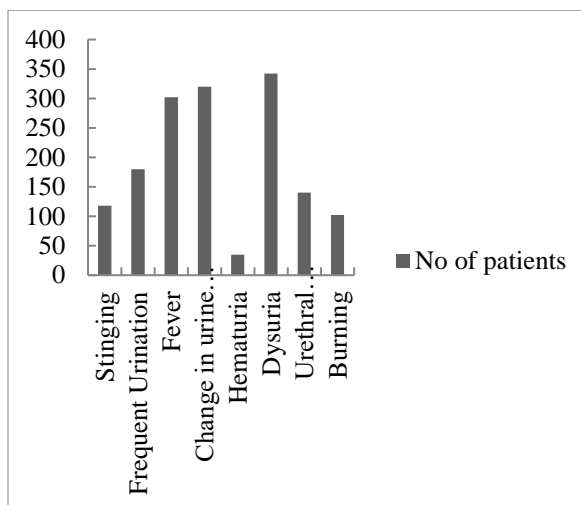


Fig. 1 Prevalent symptoms among UTI patients.

UTI patients were also asked to select from a list of antibiotics the ones which they are using to cope up with this infection and have been found effective. Their orders of preferences are given in Fig 2. Out of 398 patients, 100 patients were using ampicillin, 102 ciprofloxacin, 130 levofloxacin, 50 sulfame, and 18 thoxazole for treating UTI infection. Antibiotics which patients claim that they never use include trimethoprim, cepharadine and erythromycin.
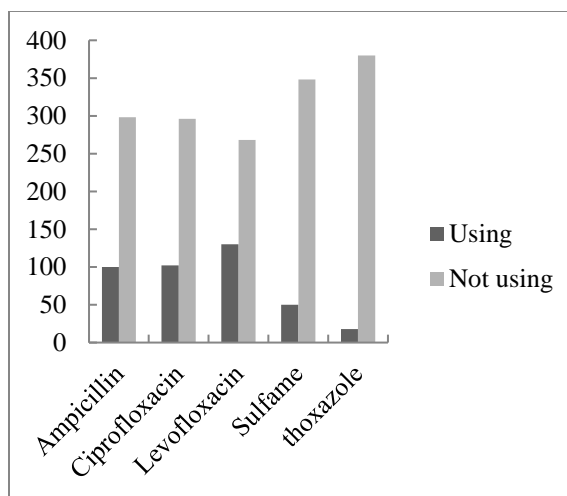


Fig. 2 Percentage of patients using different antibiotics.

Patients from different age groups, and gender were included in this study (Fig 3). UTI infection has been found more prevalent among women and especially above the age of 41 years as depicted in Fig. 3.
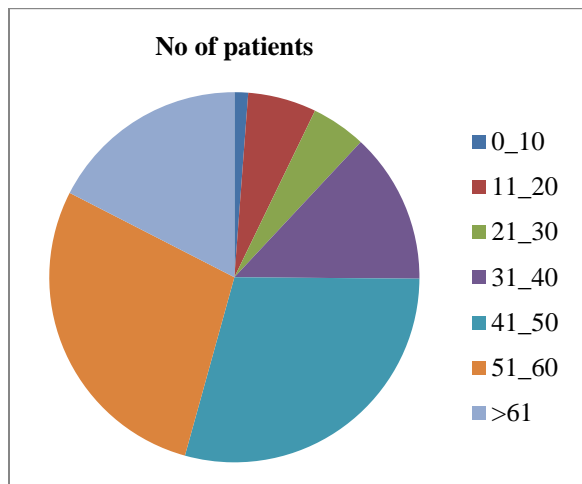
Fig 3: Distribution pattern of UTI patients belonging to different age groups
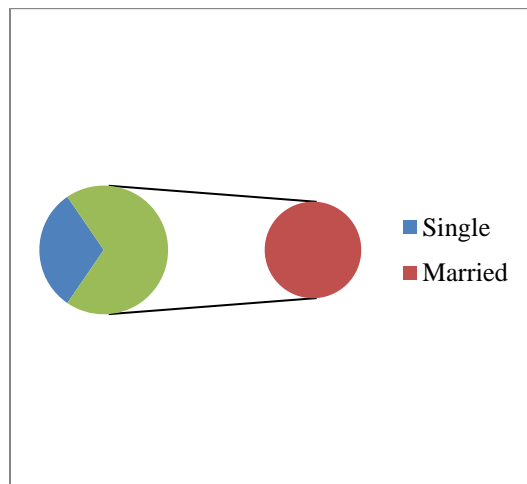


Fig. 5 Number of married and unmarried UTI patients

Out of 398 UTI patients, 278 were females and 120 were males which showed that UTI is more common among females as shown in Fig 4.
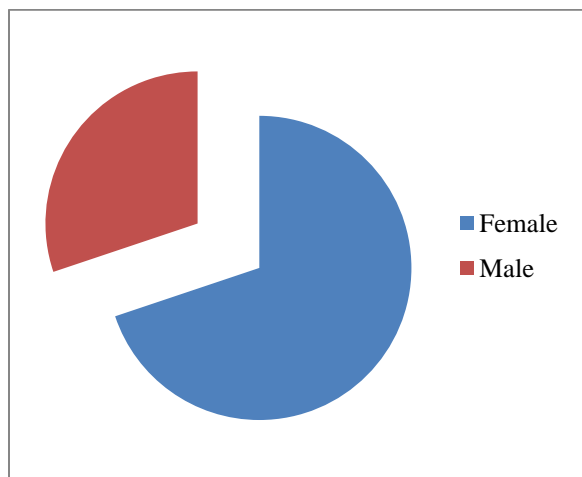
Out of 278 women, 182 were pregnant depicts that UTI is more prevalent among pregnant females.



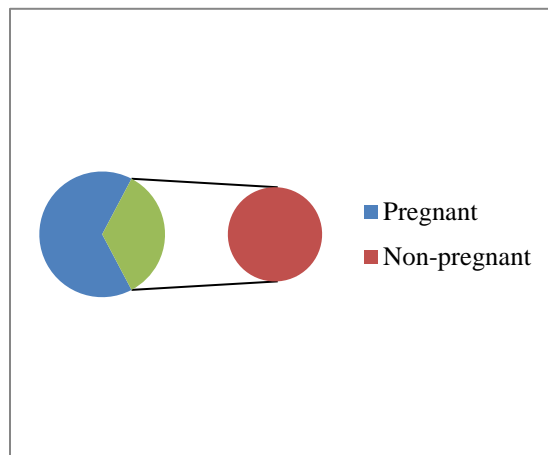Fig. 4 Distribution pattern of UTI patients according to gender



Fig. 6 Number of pregnant females

Among the most significant risk factors, 55.25 % patients were using tape waters, 38.25% mineral water and 6.26% boiled water.

Out of 398 UTI patients, 275 were married whereas 123 were unmarried which showed that UTI is more prevalent among married persons.
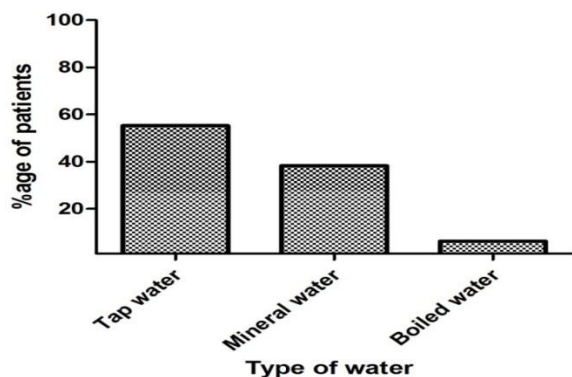
Fig. 7 Distribution pattern of UTI patients drinking different types of water

The most striking finding of this survey is that the UTI infection is most common among pregnant females between age group 41-60 years due to short urethra and its adherence with vagina and anus. Tap water in Lahore region contains a number of harmful chemicals like, carbonates, bicarbonates and phosphates which might degrade Urinary tract weak and more susceptible for infections.

## IV. DISCUSSION

In the direction of our knowledge, this is the first study conducted to identify risk factors for UTI patients of Lahore, Pakistan. After gastrointestinal disorders (GI), UTI is the second most common disorder in the world. In the developed part of the world, UTI is cured quickly because of antibiotic therapy and intimate access to health care departments, so very little patients live with UTI. In our experiences, patients belonging to rural areas report long lasting UTI symptoms due to limited resources and access to hospitals. A potential limitation in this type of study is the reliability of diagnostic criteria for UTI. We based on the standard being established by Healthcare department for UTI diagnosis in Pakistan because we did not perform confirmatory microbial cultures. Medino-Bombardo et al., claimed dysuria as the most dominant UTI symptom [14] whereas in another study from Cholistan and Hazara division, Pakistan in 2008, fever was recognized as the most common UTI symptom (91%), dysuria (65%) and thurst (40%) [15]. Our findings implicate dysuria as the most common symptom in 85.9% patients, change in urine color and smell in 80.4%, whereas fever and frequent urination were claimed by 75.8% and 45% UTI patients respectively.

Antibiotic selection is a significant risk factor for UTI [16]. Our studies suggest levofloxacin, ciprofloxacin and ampicillin as most effective against UTI, as cephalosporin have already been reported as most prescribed antibiotic for treating UTI [17]. Mecillinam, trimethoprim, fosfomycin, ceftibuten, temocillin and cefpodoxamine have also been reported for UTI infection [18]. Recent studies suggest avoidance from fluoroquinolones during first line UTI [19] and suggest usage of cefuroxime during pregnancy [20].

In this survey, UTI infections have been found more prevalent above age of 41 years. In recent years, UTI have been found more prevalent among women more than 25 years of age [21]. Our results have been found coherent with this because UTI among women 278/398 (69.8%) has been found momentous as compared to men 120/398 (30.15%). Prevalence age for women has been found 21-60 years in 73.95% cases. This finding is consistent as demonstrated in Nigeria population [22] and Panamanian Ministry of health [23]. Out of 398 UTI patients, areas in which majority (65.4%) were pregnant females concluding that UTI is more prevalent among married pregnant females [24]. Our results are consistent with previously reported data in which UTI symptoms were claimed to be caused due to pregnancy related changes in Urinary tract [25]. High prevalence of UTI among females is due to short urethra and its adherence to vagina. Furthermore, during pregnancy, hormonal changes and behavioral patterns may increase likelihood of UTI.

In this study, we report that only 6.25% patients were using boiled water and 38.25% patients were using mineral water whereas 55.25% patients were using tap water. Increased water intake of good quality like mineral water or boiled water has been found as effective antimicrobial strategy to decrease incidence and recurrence of UTI [26].

Weather of Lahore city is hot and humid coupled with low living standards, contaminated drinking water and poor sanitation increasing likelihood of UTI. In addition to these, high illiteracy rate also lowers standards of life in which people don't have any knowledge about personal hygiene. Phosphates and carbonates which have been confirmed in water of Lahore region might be contributing factors for UTI so we recommend mineral water instead of tap water for public usage.

Cranberries have been recommended from a number of years for the treatment and management of UTI [27]. Out of 398 respondents suffering with UTI, 87% of the individuals were taking cranberry juices on daily basis. Our results did not find cranberry juice as an affective and complementary treatment which should be prescribed by pedraticians. Despite taking cranberry juice on regular basis, urinary tract infect was not significantly reduced in these patients as reported by Jepson et al. Other cranberry products like tablets and capsules have also not been found affective [27]. Data from recent literature also shows cranberry as important

to cure UTI [28]. Some also consider cranberry as a good treatment for recurrent UTI in women as it reduces growth of E.coli on walls of urinary tract [29]. Reason of this migt is the quality of cranberry juices available in Lahore as increased population has caused inflation and unemployment as some of the patients admit that it was difficult for them to take cranberry juice on daily basis.

## V. CONCLUSION

UTI is the infection of urinary tract which may affect kidney, urethra, ureter and urinary bladder and second most common infection in the world. If left untreated, it may damage whole urinary tract. In conclusion, data suggests that UTI is most common among pregnant females ranging between 41-60 years due to short urethra, adherence with vagina and anus, living habits, sexual activity and use of contraceptives. Usage of tap water which may contain a number of dangerous chemicals has also tremendously increased chances of UTI. As a preventative measure, simple life style adjustments can tremendously reduce UTI prevalence not requiring high standard education or resources as in developing countries. We recommend about the usage of boiled water and good sanitary conditions among married pregnant women. In future, we intend to assess the effectiveness of creating awareness among Pakistani population in reducing UTI rate.

## ACKNOWLEDGEMENTS

## COMPETING INTERESTS

Authors declare that they have no competing interests.

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## SUPPLEMENTARY MATERIAL

**Questionnaire for postal survey. Questionnaire used to find out incidence and management of UTI patients in local hospitals of Lahore region.**

**URINARY TRACT INFECTION**
**Date____/_____/2018**
**Name: _____Age: _____Gender: _____**
**Marital status: _____**
**Hospital/Institute: _____**

**Note: This questionnaire consists of questions that can help to check prevalence of UTI in Pakistan.**
1. Lifestyle?
(a) Urban        (b) Rural
2. You live in populated area?
(a) High density        (b) Less density        (c) Moderate
3. Do you have UTI in family history?
(a) Mother        (b) Father        (c) Both        (d) None
4. What kind of food you often eat?
(a) Protein        (b) Fats        (c) Carbohydrates        (d) vegetarian        (e) non-vegetarians
5. Do you use public toilets often?
(a) Yes        (b) No
6. Do you think UTI can be affected by personal hygiene?
(a) Yes        (b) No
7. How often you do hoteling?
(a) Sometime        (b) often        (c) rarely        (d) daily
8. Which water do you use for drinking purpose?
(a) Tap water        (b) Mineral water        (c) Boiled
9. Do you use feminine hygiene products e.g. perfumed sprays?
(a) Yes        (b) No
10. Are you married?
(a) Yes        (b) No
11. If you are married then do you think UTI are sexually transmitted?
(a) Yes        (b) No
12. If UTI is sexually transmitted, do you think it is transmitted in your children?
(a) Yes        (b) No
13. Are you
(a) Pregnant        (b) Normal women        (c) Male
14. Have you UTI?
(a) Yes        (b) No
15. If you have UTI, When did you first start getting urine infection?
(a) 1-10 years        (b) 11-20 years        (c) 21-30 years        (d) 31-40 years
(e) 41-50 years        (f) 51-60 years        (g) >60 years
16. What symptom do you get in UTI during urination?
(a) Burning        (b) Stinging        (c) passing urine frequently        (d) any other plz specify
17. Have u ever passed blood in your urine?
(a) Yes        (b) No
18. Do you have problem with constipation?
(a) Yes        (b) No
19. Have you had kidney problem before UTI?

(a) Yes          (b) No
20. Do you use urethral catheters use in hospital?
(a) Yes          (b) No
21. Have you ever feel change in urine color or smell?
(a) Yes          (b) No
22. Which of the following symptoms you observed in UTI?
(a) Fever        (b) Chill        (c) Back pain        (d) Blood in urine        (e) All of these
23. Have you ever lost control of urination?
(a) Yes          (b) No
24. If you are UTI patients, then your infection is complicated?
(a) Yes          (b) No
25. For treatment of UTI, which antibiotics you have used?
(a) Ampicillin        (b) Ciprofloxacin        (c) Levofloxacin        (d) Sulfamethoxazole
26. In UTI infection, your doctor firstly increase dose of which antibiotic medicine?
(a) Ciprofloxacin        (b) trimethoprim-sulfame-thoxazole        (c) both        (d) none
27. How soon after antibiotics finish does the infection return?
(a) Less than 1 week    (b) More than 1 week
28. Admitted in hospital or not in private sector or government?
(a) Admitted              (b) not admitted        (c) private hospitals        (d) government hospitals
29. Which diet do they think increase the likelihood of UTI?
(a) Cranberry juice      (b) blueberry juice        (c) coffee        (d) black tea        (e) All of these

## TABLE I. LIST OF HOSPITALS

| Serial No. | Name | Location |
|---|---|---|
| 1 | Shiekh Zaid hospital | New Muslim Town Lahore |
| 2 | Jinnah Hospital | Faisal Town, Usmani Road |
| 3 | Services Hospital | Jail Road, Shadman |
| 4 | General Hospital | Ferozpur Road Near Jail Ismail Nagar |
| 5 | Mayo Hospital | Near Anarkali |
| 6 | Ganga Ram Hospital | Jubilee Town |
| 7 | National Hospital | Defence L Block |
| 8 | Hameed Latif Hospital | Garden Town |
| 9 | Masood Hospital | Near Kalma Chowk Garden Town |
| 10 | Doctors Hospital | Johar Town |
| 11 | Zainab Hospital | Near Kalma Chowk Garden Town |
| 12 | Hijaz Hospital | Gulberg |
| 13 | Central Park Hospital | Near Kahna Ferozpur Road |
| 14 | Ittefaq Hospital | Model Town |
| 15 | Nawaz Sharif Social Security Hospital | Multan Chungi |