

A Hospital Based Study of Urinary Tract Infection among Visiting Patients: A Case of Selected Hospitals in Nigeria

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Abstract:

Urinary tract infection (UTI) is an infection that affects part of the urinary tract. It is a common source of infection in children and infants and is the most common bacterial infection in children less than 2 years of age living both in the community and hospital settings. UTI also affects both men and women as well as kidney transplant patients. Many people have UTI problem without even noticing, it may have signs like urine leakages and inability to hold a little amount of urine in the bladder. This paper aimed at conducting survey on visiting patients in three (3) selected hospitals in Nigeria consisting of MAUTECH Health Centre Yola, Ni'ima Hospital Bauchi and General Hospital Hadejia. The objectives of the research include identifying sign and symptoms of UTI; people that are exposed most to UTI; effects of UTI on pregnant women. The paper make use of questionnaires for data collection and the data were analyzed using simple percentage. The results were presented in a tabular form. The research shows that women are the most category of people that are exposed to UTI related problems with about 80% of the responses. The paper recommends that proper hygiene and sanitation of the toilets should be observed as well as drinking much water especially during summer periods. The paper

also recommends that marry couples should be able to urinate within 30 minutes of having sex.

Key words: Epidemiology, Etiology, Patient, Pathogens, Urinary Tract Infection

1. INTRODUCTION

Urinary tract infection (UTI) is a collective term that describes any infection involving any part of the urinary tract such as kidneys, ureters, bladder and urethra. It can be divided into upper and lower tracts. The upper tract involves kidneys and ureters while the lower tract involves bladder and urethra [1].

UTIs can progress to renal scarring in early infancy especially when associated with congenital anomalies of the urinary tract. Renal scarring may lead to complication in adulthood including hypertension, proteinuria, renal damage and even chronic renal failure which will require dialysis treatment. A complicated UTI is an infection associated with a condition such as a structural or functional abnormality of the genitourinary tract or the presence of an underlying disease. This increases the risk of the outcome of a UTI being more serious than expected as compared to its occurrence in individuals without any identified risk factors (i.e. uncomplicated UTI) [1].

UTI is the most common of all bacterial infections that affects humans in their life span. 20 – 35% of all women experiences at least one episode of UTI sometimes in their lives. UTI occurs in all populations from the neonate to the geriatric patients but has a particular impact on female of all ages, male of all ages, kidney transplant patients, and anyone with functional or structural abnormalities of the urinary excretory system [2]. Because of the wide of the individuals affected and also UTI is frequently superimposed on other medical problems,

physicians in virtually all specialties are called on to deal with this clinical problem.

UTI is not only common but the widely range of clinical effects it can produce is exceptionally broad from acute pyelonephritis with gram-negative sepsis to asymptomatic bacteriuria and even so-called symptomatic abacteriuria. It is clinically important to classify UTIs by type of infection, presence, or absence of symptoms, tendencies to reoccurrence, and presence or absence of complicating factors [2].

Recurrent infections can be subdivided into reinfections caused by new bacterial strains and relapses caused by the same strains that caused the preceding infections. Complicating factors are host factors facilitating establishment and maintaining of bacteriuria or worsening the prognosis of UTIs engaging the kidneys. Uncomplicated infections occur most commonly in otherwise healthy women when uropathogenic bacteria usually *Escherichia coli* (*E. coli*) ascend from the perineum into the bladder and overcome the host innate immunity. Complicated infections occur in patients with an anatomical or functional abnormality of the urinary tract [3].

UTIs are the leading cause of morbidity and healthcare expenditures in persons of all ages. This may occur either because of the pathogenicity of the organisms, the susceptibility of the host or a combination of both factors.

UTI diagnosis is made on the basis of symptoms and diagnostic precision is improved by urinalysis. Urine culture is improved with severe recurrent or complicated infection and when the diagnosis is unclear. For example, in the case of children and elderly persons. Most women with symptoms that resolve quickly do not require further investigations. But in children, men, and patients with recurrent or severe infection, imaging of the renal tract, functional testing as well as cystoscopy should be considered to exclude an underlying abnormality [3]. However, empirical antibiotic treatment

started on the basis of symptoms and directed by urinalysis is suitable for uncomplicated cystitis but should be altered based on culture results for more severe infections. The long-term or post-coital antibiotics are effective treatments for patients with recurrent infection to whom non-antibiotic strategies have failed. Therefore, the aim of this paper is to conduct survey on visiting patients in three (3) selected hospitals in Nigeria on UTI related problems. This can be achieved with the following objectives:

- i. To identifying sign and symptoms of UTI
- ii. To determine the people that are exposed most to UTI
- iii. To determine the effects of UTI on pregnant women.

2. LITERATURE REVIEW

UTI is defined as the significant bacteriuria in the presence of a constellation of symptoms such as dysuria (painful urination), increased urinary frequency and urgency and discomfort. It is a common cause of infections particularly among young and sexually active women. Report shows that an estimated 1 in 3 women will usually develop UTI before the age of 24 years. UTI infection may involve either only the lower tract or both the upper and the lower tracts [3].

I. ETIOLOGICAL FACTORS OF UTI

The microbiological etiology of UTI depends on several factors and in all types of UTI. *E. coli* is the dominating bacterial species causing up to 85% of all symptomatic UTIs in women community (acquired and uncomplicated infections). In most countries, the second most common species causing such infections is *staphylococcus saprophyticus* (sometimes called micrococci). Calculi in the renal pelvis, ureter, or the bladder

may also be formed as a result of growth of ammonia-producing organisms such as proteus species (spp). Proteus spp are common in the male preputial flora and the finding of such organisms in a voided urine sample from uncircumcised men or young boys should be interpreted with caution [3].

The organisms causing the UTI are derived primarily from the aerobic members of the fecal flora. 95% of the majority of uncomplicated urinary tract infections are caused by a single organism. The most common pathogens that causes UTIs are gram-negative bacteria and some gram-positive bacteria. Examples of these include *E. coli*, proteus mirabilis, klebsiella pneumoniae, Enterobacter serratia and pseudomonas all from gram-negative bacteria, while enterococcus spp and staphylococcus saprophyticus from gram-positive bacteria [3]. In contrast, catheterized patients and individuals with structural abnormalities of the urinary tract (*E. coli*) accounts for 35% of infections and other gram-negative species are more important as well as some gram-positive organism and coagulase-negative staphylococci.

II. EPIDEMIOLOGICAL FACTORS OF UTI

The prevalence of urinary tract infections varies with age and sex. The groups at increases risk for infection includes neonates, prepubertal girls, young women, older men, individuals with structural abnormalities of the urinary tract or immunosuppression (e.g. diabetes and HIV patients). In neonates, the urinary tract infection occurs more often in males, it can also occur more frequently in girls and women. When infections occur in pre-school boys, they are frequently associated with serious congenital abnormalities. It has also been shown that lack of circumcision predisposes young boys and infants to UTIs [3].

It has been calculated that across the world, there are at least 150 million cases of symptomatic UTIs each year because

many UTI patients have recurrent infections. In elderly, both symptomatic and asymptomatic UTIs bacteriuria are common in women that is often the results of atrophic vaginal mucosa, and in men with prostate hyperplasia or prostate cancer. UTI is the most common type of hospital-acquired infection.

III. PATHOGENESIS/POSSIBLE ROUTE OF UTI

The pathogenesis of UTI is the route by which microorganisms especially bacteria that reach the urinary tract. In humans, blood-borne infection of the kidneys and urinary tracts accounts for less than 3% of the cases of UTI and pyelonephritis.

There are two important routes by which bacteria can invade and spread within the urinary tract [3]. These are:

- i. Hematogenous Route: Infection of the renal parenchyma by blood-borne organisms which occur in humans but it is less commonly than ascending route. The kidney is frequently the site of abscesses in patients with bacteremia or endocarditis caused by a gram-positive organism, staphylococcus aureus, infections of the kidney with gram-negative bacilli rarely occur by the hematogenous route.
- ii. Ascending Route: UTIs in women develop when uropathogens from fecal flora colonize the vaginal introitus and displace the normal flora. Colonization of the vaginal introitus with *E. coli* seems to be one of the critical initial steps in the pathogenesis of both acute and recurrent UTI. Most uropathogens originate in the rectal flora and enter the bladder via urethra. The female urethra is short and proximal to the vulvar and perineal areas making contamination likely. Abnormalities of the urinary tract which lead to obstructions of the urinary flow are a major factor in the development of urinary infection.

3. METHODOLOGY

This paper is a survey research that make use of primary data. The data were collected using questionnaires. The questionnaires were distributed to selected people in three (3) hospitals from Nigeria which constitutes the target population. The hospitals are Modibbo Adama University of Technology Health Centre Yola, Ni'ima Hospital Bauchi, and General Hospital Hadejia. Seventy-five (75) questionnaires were distributed equally to the three hospitals. The results were analyzed using simple percentage and were presented using tables and graphs.

4. RESULTS AND DISCUSSION

This section presents the results of the finding based on the distributed questionnaires. The questionnaires distributed were seventy-five (75) and fifty (50) were successfully filled and returned. The analysis was done based on the returned questionnaires. The results are presented in the tables and chats below:

Table 1: Response based on Gender

Response	Qty	%
Male	20	40
Female	30	60

The above table shows the distribution of the respondents based on their gender. Out of the 50 responses received, it indicates that 20 respondents are male and that represent 40% of the responses. The table also shows that 30 respondents representing 60% are female.

Table 2: Frequency of Urination in a Day

Response	Qty	%
A	20	40
B	30	60
C	0	0

The above table shows the level of frequency through which people urinate during day hours. This is represented using three variables of A, B and C. A represent 1 to 3 times in a day, B represent 4 to 5 times in a day, and C represent more than 5 times in a day. The result shows that 20 respondents representing 40% usually urinate between 1 to 3 times in a day, while 30 respondents representing 60% usually urinate between 4 to 5 times in a day. However, none of the respondents indicates urinating more than 5 times in a day.

Table 3: Frequency of Urination at Night

Response	Qty	%
A	40	80
B	10	20
C	0	0

The above table shows the level of frequency through which people urinate at night hours. This is represented using three variables of A, B and C. A represent 0 to 1 time in the night, B represent 2 to 3 times in the night, and C represent more than 3 times in the night. The result shows that 40 respondents representing 80% usually urinate between 0 to 1 time at night, while 10 respondents representing 20% usually urinate between 2 to 3 times at night. However, none of the respondents indicates urinating more than 3 times in the night.

Table 4: Previous History of UTI

Response	Qty	%
Yes	30	60
No	20	40

The above table determined among the respondents whether they have previous history of UTI. 30 of the respondents representing 60% responded Yes while 20 respondents representing 40% responded with No.

Table 5: Sign and Symptoms of UTI

Response	Qty	%
A	20	40
B	0	0
C	0	0
D	10	20
E	0	0
F	10	20
G	10	20

The above table gives UTI symptoms experience by the respondents who answer yes in the previous table. The symptoms are represented using letters A to G. A represent desire to urinate when you have small amount of urine in your bladder with 20 responses representing 40% among the respondents. B represent difficulty to feel bladder filling with 0 response representing 0%. C represent weakness of urinary stream with 0 response representing 0%. D represent delay in starting urinary stream with 10 responses representing 20%. E represent feeling of incomplete emptying bladder after you urinate with 0 response representing 0%. F represent pain in the bladder with 10 responses representing 20%. G represent pain in the urethra with 10 responses representing 20%.

Table 6: Duration of the Previous UTI History

Response	Qty	%
A	10	20
B	30	60
C	10	20

The above table shows the duration through which the UTI sign manifest to the respondents based on the symptoms indicated

above. The periods are represented with A, B, and C. A represent less than 2 days, B represent 3 to 7 days, and C represent more than 1 week. The result shows that 10 respondents representing 20% usually discover the symptoms in less than 2 days, 30 respondents representing 60% discover the symptoms within 3 to 7 days, and finally 10 respondents representing 20% discover the symptoms after 1 week of the infection.

Table 7: Previous Medication taken

Response	Qty	%
Yes	30	60
No	20	40

This table shows previous medication taken by those experienced the UTI. All the 30 respondents who indicated that they have previous history of UTI responded that they took some medications previously. Among the medications include Ciprofloxacin, Praziquantel, aprofloxacin with Tinidazole, Penicillin, Amoxicillin, and Ampicillin.

Table 8: Cases of Urination Leakages

Response	Qty	%
A	5	10
B	5	10
C	15	30
D	25	50

The above table indicate responses related to urine leakages experienced by the respondents. It is represented with letters A to D. A represent urine leakage as a result of cough, sneeze or strain with 5 responses representing 10%. B represent urine leakage while you do not even notice with 5 responses representing 10%. C represent urine leakage as a result of not holding the sudden desire to urinate with 15 responses

representing 30%. D represent leakage of urine after you finish urinating with 25 responses representing 50%.

Table 9: Cases of UTI During Pregnancy

Response	Qty	%
Yes	50	100
No	0	0

The above table indicate responses whether pregnant women will be infected with UTI. All the respondents agreed and responded with Yes that pregnant women will experience UTI during pregnancy.

Table 10: Common cases of UTI during Pregnancy

Response	Qty	%
Lack of Proper Hygiene	40	80
Immuno-Compromised	10	20

Among the causes of UTI during pregnancy as indicated by the respondents as shown in the above table include lack of proper hygiene with 40 responses representing 80% and immuno-compromised with 10 responses representing 20%.

Table 11: Effect of Severe UTI on Pregnant Women

Response	Qty	%
Miscarriage	35	70
Low Birth Weight	10	20
Still Birth	5	10

The above table presented some effects that will happen to pregnant women as a result of severe UTI. 35 respondents representing 70% indicate that pregnant women are likely to have miscarriage when there is severe infection of UTI in them. 10 respondents representing 20% also indicate that children that will be given birth by women with severe UTI are likely to have low birth weight. Finally, 5 respondents representing 10%

indicate that cases of still birth may occur to pregnant women with severe UTI case.

Table 12: Prevention of UTI during Pregnancy

Response	Qty	%
Yes	50	100
No	0	0

The above table indicate whether UTI can be prevented during pregnancy. All the 50 respondents have agreed that it can be prevented.

Table 13: Methods of Preventing UTI during Pregnancy

Response	Qty	%
Proper Sanitation/Good Hygiene	30	60
Regular Medical Checkup/Antenatal	15	30
Taking of Pregnancy Safe Antibiotics	5	10

The above table provide suggestions by the respondents on how UTI can be prevented during pregnancy. 30 respondents representing 60% suggests that proper sanitation and good hygiene should be observed by the pregnant women. 15 respondents representing 30% suggests that regular medical checkup and antenatal visit should be observed by the pregnant women. Finally, 5 respondents representing 10% indicate that UTI can be prevented using pregnancy safe antibiotics.

Table 14: Cases of UTI on Children

Response	Qty	%
Yes	40	80
No	10	20

The table above shows that children are likely to experience UTI as well. 40 respondents representing 80% have said yes

children can also become infected, while 10 respondents representing 20% have answered no.

Table 15: Symptoms of UTI on Children

Response	Qty	%
Severe itching in genital area	30	60
Swelling	10	20
Rashes	10	20

The above table shows the kind of symptoms parents can realized that their children are experiencing UTI problem. 30 respondents representing 60% indicates that children will have severe itching in their genital area. 10 respondents representing 20% also indicates that there will be swelling to the children experiencing UTI. Lastly, 10 respondents representing 20% indicate that children with UTI case will have some rashes around their genital area.

Table 16: Category of people mostly exposed to UTI

Response	Qty	%
Children	5	10
Women	40	80
Men	5	10

The above table indicate the category of people that are most likely exposed to the UTI problems. 5 respondents representing 10% indicates that children are the most exposed category of people that can be infected with the UTI easily. 40 respondents representing 80% indicates that women are the category of people that are mostly exposed to UTI problem. 5 respondents representing 10% indicates that men are the category of people that are mostly exposed to UTI cases.

5. CONCLUSION AND RECOMMENDATIONS

Urinary tract infections have becoming a common disease among people nowadays, many people are living with UTI without knowing until it becomes persistence. This paper has conducted hospital survey on the visiting patients regarding UTI cases. About 60% of the respondent experiences UTI cases in their life with majority of them representing 40% having sign of feeling to urinate when there is small amount of urine in their bladder. There are cases of urine leakages especially after finishing urinating, this represent about 50% of the responses. Pregnant women and children are also not exempted from UTI cases. However, women are the most category of people that are exposed to UTI cases or disease. The paper therefore makes the following recommendations:

- i. Drink much water especially during summer periods. This helps in flushing out bacteria that can cause UTIs.
- ii. Keep your toilet urine clean
- iii. Visit your doctor whenever you feel signs of UTI in you.
- iv. For married couples, it is recommended that you urinate within 30 minutes of having sex.

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APPENDIX: QUESTIONNAIRE

SECTION “A” BASIC INFORMATION

Gender: Male Female Rank/Designation:

Unit/Section:

SECTION “B” RESEARCH QUESTIONNAIRE/SCHEDULE

Please Tick “✓” the appropriate option where applicable. Where answers are needed in some questions, kindly provide the required information please. In some questions, you can tick more than one option if required. You can also attach supplementary sheet if necessary.

Q1. How many times do you urinate per day?

- a) 1 – 3 times b) 4 – 5 times c) More than 5 times

Q2. How many times do you wake up and urinate at night?

- a) 0 – 1 time b) 2 – 3 times c) More than 3 times

Q3. Do you have previous Urinary Tract Infection (UTI) problems?

Yes [] No []

Q4. Tick among the following symptoms you experience while urinating

- a. Desire to urinate when you have small amount of urine in your bladder
- b. Difficulty to feel bladder filling
- c. Weakness of urinary stream
- d. Delay in starting urinary stream
- e. Feeling of incomplete emptying bladder after you urinate
- f. Pain in the bladder
- g. Pain in the urethra

Q5. How long do you experience any of the above symptoms?

- a) Less than 2 days b) 3 – 7 days c) More than 1 week

Q6. Have you taken any medication on urinary tract infection? Yes []

No []. If yes, list some of the medication taken.....
.....

Q7. Tick among the following options, cases of urinary leakages applicable to you

- a. Urine leakage as a result of cough, sneeze or strain
- b. Urine leakage while you do not even notice

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- c. Urine leakage as a result of not holding the sudden desire to urinate
- d. Leakage of urine after you finish urinating

Q8. Do pregnant women have UTI cases during pregnancy? Yes [] No []

Q9. If Yes in the above, what makes UTI common during pregnancy?.....

Q10. What will happen to the fetus if the mother has a severe UTI?.....

Q11. Do you think UTI can be prevented during pregnancy? Yes [] No []

Q12. If yes in the above, how?.....

Q13. Can antibiotics be given to the pregnant women who are already infected with the UTIs?.....

Q14. Do children experiences UTI problems? Yes [] No [], if yes, at what ages do they likely exposed to contact UTI?.....

Q15. How can parents notice UTI symptoms in children?.....

Q16. What category of people are most likely exposed to UTI?

- a. Children
- b. Women
- c. Men