

ORIGINAL RESEARCH

Epidemiology of Urinary Tract Infection in paediatric population: A single institution study

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ABSTRACT

Background & Objectives: Urinary tract infection is one of the most common infectious disease found in adult population and has become a major health problem. The urinary tract infection also affects commonly paediatric population especially in the age group of 0-14 years. Aim and objective: To find out prevalence of UTI in different age groups, and gender and to identify causative agent of UTI in children below 14 years of age. **Methods:** The present study was conducted in Paediatric department of Nalanda medical college and hospital Patna from August 2019 to July 2021. This cross sectional study noted epidemiological parameters like different age groups, sex, and bacterial isolates in paediatric population below 14 years of age. **Result:** Among total 1248 urine samples processed, 618 (49.52%) samples were collected from male children while 630 (50.48%) samples from female children. Of 1248 samples, only 306 (24.51%) samples were culture positive and hence UTI. Of 306 UTI cases, UTIs were higher in female children, i.e. 191 (62.42%) compared to male children, i.e. 115 (37.58%). UTIs were highest in age group 2-5 years 45.42%. Rate of UTIs in inpatients and outpatients were similar with slightly higher rate in IPD patients. Total of six different species/sets of bacteria were isolated. Among them, E.coli, 170(55.56%) was predominant followed by Klebsiella spp 48(15.69%). **Conclusion:** The most common age group affected by UTIs in paediatric population was 1-5 years. UTIs affect females more than males due to variable reasons. In present study E. coli followed by Klebsiella was most common bacterial isolates affecting UTIs in children.

Key words: Urinary Tract Infections (UTIs), Paediatric population, Bacteria, E. coli.

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INTRODUCTION

Urinary tract infection (UTI) is an infection leading to inflammatory response in the epithelium of the urinary tract¹. UTIs affect both males and females of different age groups. The occurrences of UTIs are higher in females than in males, which are likely to be caused by anatomical differences, hormonal effects and behaviors². Urinary tract infections (UTIs) are one of the most common bacterial infections in children. Up to 8% of children experience at least one UTI between the ages of 1 month and 11 years,^{3,4} and up to 30% of infants and children will experience recurrent infections during the first 6 to 12 months after initial UTI^{5,6}. UTIs cause short-term morbidity such as fever, dysuria, and flank pain,

and may also result in long-term renal injury, such as permanent kidneyscarring and bladder dysfunction.⁷ Children with congenital anomalies of the kidney and urinary tract (CAKUT), UTI can be the first sign in 30% of cases^{8,9}. The management of UTIs in the paediatric population remains challenging and controversial despite advances. Diagnosis, treatment, and follow-up of children with UTI are important aspects for general paediatricians and involve multiple decisions.¹⁰ It is consensual that a correct diagnosis, appropriate treatment, and a subsequent selected imaging investigation in children with UTI is still crucial due to association of UTI with underlying urological abnormalities, and its consequences. This study was conducted among

paediatric population below 14 years of age with symptoms of UTI visiting paediatric department in a tertiary healthcare.

The clinical manifestations of the UTIs are correlated with the age of the children and the site of the infection. Smellie et al.¹¹ studied 200 children (3 days to 12 years of age) with UTI and demonstrated that the most common symptoms in the first 2 years of life were failure to thrive, feeding problems, vomiting, and fever. 2- to 5-year-old children were having fever and abdominal pain as the most common symptoms, and after 5 years of age, the classic symptoms and signs of UTI (fever, dysuria, urgency, and costovertebral angle tenderness) predominated. Though history and physical examination represent the corner stone of an accurate diagnosis, in nonverbal children the clinical suspicion of UTI can be troublesome due to the nonspecific nature of symptoms. The classic presentations of dysuria, frequency, and flank pain in adults are not reliable when applied to pediatric UTI, particularly in infants. The presenting complaints in children tend to be complex including fever, irritability, lethargy, poor feeding, failure to thrive, and gastrointestinal complaints. Also, evidence of infection outside the urinary tract does not exclude the possibility of UTI^{11, 12}. Symptoms and signs of respiratory or gastrointestinal infections may often present in febrile infants and in children with documented UTI^{11, 12}.

AIM AND OBJECTIVE

To find out prevalence of UTI in different age groups, and gender and to identify causative agent of UTI in children below 14 years of age.

MATERIALS AND METHODS

The present study was conducted in Paediatric department of Nalanda medical college and hospital Patna from August 2019 to July 2021. This cross-sectional study noted epidemiological parameters like different age groups, sex, and bacterial isolates in paediatric population below 14 years of age. The symptoms included fever along with dysuria and/or loss of bladder control and/or lower back pain and/or cloudy urine. For infants and younger children symptoms included were fever and parental reporting of increased frequency of micturition. The clean catch urine samples were collected in sterile container. In infants and non-toilet trained children, a sterile bottle was placed underneath the genitalia for clean-catch urine collection. If this was not possible, a plastic bag was attached to genitalia in sterile manner for urine collection. In toilet-trained children, a clean-catch voided midstream urine sample was collected. In both cases the genitalia was cleaned beforehand to reduce contamination. Invasive techniques were avoided for urine collection. Children receiving antimicrobial drugs treatment and children undergoing bladder catheterization within 48h were excluded in the study.

RESULT

Among total 1248 urine samples processed, 618 (49.52%) samples were collected from male children while 630 (50.48%) samples from female children. Of 1248 samples, only 306 (24.51%) samples were culture positive and hence UTI. Of 306 UTI cases, UTIs were higher in female children, i.e. 191 (62.42%) compared to male children, i.e. 115 (37.58%). UTIs were highest in age group 2–5 years 45.42%.

Table 1: UTIs in different age groups and sex

AGE GROUP (YEARS)	MALE (%)	FEMALE (%)	TOTAL	PERCENTAGE (of total positive samples)
0-1	26(35.62%)	47(64.38%)	73	23.86%
1<-5	51(36.69%)	88(63.39%)	139	45.42%
5<-9	23(41.82%)	32(58.18%)	55	17.97%
9<-14	17(43.59%)	22(56.41%)	39	12.75%

Rate of UTIs in outpatients (23.65%) were slightly lower than in IPD patients (26.84%) as depicted in table 2 below.

Table 2: Rate UTIs in IPD/OPD patients

TYPE OF PATIENTS	TOTAL PTS.	UTIs	PERCENTAGE
OPD	909	215	23.65
IPD	339	91	26.84
TOTAL	1248	306	24.51

Total of six different sets of bacterial species were isolated. Among them, E.coli, 170(55.56%) was predominant followed by Klebsiella 48(15.69%) as depicted in table 3 below in detail.

Table3. Different bacterial isolates and their percentage

TYPES OF BACTERIAL ISOLATES	MALE	FEMALE	TOTAL (%)
E.coli	58	112	170(55.56%)
Klebsiella	21	27	48(15.69%)

Enterobacter	21	21	42(13.72%)
Pseudomonas	3	6	9(2.94%)
S. aureus	2	4	6(1.96%)
Mixed	10	21	31(10.13%)
TOTAL	115	191	306

DISCUSSION

In present study UTIs were most common in age group of 1-5 years of age. Similar study by Rabina Ganesh et al showed UTIs were most common in 2-5 years of age group. UTIs are more common in girls compared to boys due to shorter length of urethra¹³. This could be due to more likelihood of growth from specimens collected from females. This concurs with other reports^{14, 15, 16, 17}. Majority of UTIs were seen in the ages below 5 years of age. Rates of UTIs were slightly higher in IPD patients than OPD patients. The most common bacterial isolates were E. coli in present study. Rai GK et al showed that E. coli was the most common bacterial isolates among paediatric population below 14 years of age. Other studies also showed the predominance of E. coli in UTIs in paediatric population^{14, 15, 16, 17}.

CONCLUSION

From the present study we conclude that most common age group affected by UTIs in paediatric population was 1-5 years. It was also found that UTIs affect females more than males due to variable reasons. In present study E. coli followed by Klebsiella was most common bacterial isolates affecting UTIs in children.

Conflict of Interest: None to declare.

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