

Original Research Article

Prevalence of urinary tract infection among school going adolescent girls in rural part of Chennai

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Abstract

Background: A urinary tract infection (UTI) is a common infection that can affect any part of the urinary system, including the kidneys, bladder, and urethra (the tube through which urine exits the body). The most common cause of UTIs is the transfer of bacteria from the rectum or vagina to the urethra. Around 80 percent are caused by *E. coli* bacteria commonly found in the gut or feces. Others, like *Staphylococcus saprophyticus*, are naturally found in the vagina and can be transferred to the urethra.

The aim of the study: The study objectives were to assess the knowledge of adolescent girls regarding urinary tract infection and determine the association between knowledge regarding urinary tract infection and selected demographic variables.

Materials and methods: This observational study was done in 2017-2018 at Department of Urogynecology, Institute Of Social Obstetrics, Government Kasturba Gandhi Hospital, Chennai. 200 female adolescents were included in the study. BMI was calculated from height and weight. Height, weight, and BMI were considered for assessing malnutrition in adolescent girls. Urine samples were collected from 23 girls for microscopic examination for pus cells. The faculty members followed the investigators and guided them during the survey. The survey was completed within two days. Any girl complaining of three criteria of the case definition of UTI viz: increased frequency of micturition with; burning during micturition and pus cells in the urine were considered as a case of UTI for the purpose of the study.

Results: There was a significant association between prevalence of UTI and improper perineal washing technique (CI = 95%, p< 0.001), malnutrition (CI = 95%, p< 0.001), presence of vaginal discharge (CI = 95%, p< 0.001) and use of unsanitary pads during menses (CI = 95%, p< 0.001).

Misconception included not taking bath during periods and not eating certain foods. Low socioeconomic status was chiefly responsible for frequent use of the same piece of cloth as sanitary pads during menstrual bleeding leading to urinary tract infection. UTI was more (7.7%) in malnourished girls than in those with normal nutritional status. Significantly more (7.7%) girls having symptoms of vaginal discharge were suffering from a urinary infection.

Conclusion: For the short term, the need is to give immediate health education about the causes, prevention, and treatment of UTI among adolescent girls of both the villages and treatment of the identified cases with the urinary antibiotics etc. Long term measures include a periodical screening of the adolescent girls for UTI.

Key words

Urinary Tract Infection, Vaginal Discharge, Microorganism, Socioeconomic Status.

Introduction

Urinary tract infection is the leading cause of morbidity and health care expenditures in persons of all the ages. Symptoms of urinary tract infection include frequent feeling or need to urinate, pain during urination, fever, pelvic pain, and cloudy urine [1]. The most common cause for the infection is unhygienic toilets where the bacteria are usually found. *Escherichia coli* (*E.coli*) (80-85%) which is normally present in the cell lining of the urinary tract and gastrointestinal tract, which is the commonest causative organism [2]. Other gram-negative colonic bacteria have been gaining prominence in India over the last two decades (Acharya and Jadan 1980). The long range consequences of ignoring urinary tract infection can lead to kidney failure, septicemia, bacterial endocarditis, prostatitis, and infertility [3]. Approximately, 60% of all women experience at least one UTI within their lifetime and roughly 20–30% of women suffer from repeated infections [4]. In post-menopausal women, UTI risk factors may also comprise urinary incontinence. Bacterial virulence properties may affect the risk of recurrence of infection as well. UTI is commonly caused by *Escherichia coli*, *Proteus*, *Klebsiella*, *Enterococcus*, and *Enterobacter* spp [5].

However, *Pseudomonas*, *Staphylococcus aureus*, Group B *Streptococcus* are usually reported with increased rates in patients with urological disorders and following repetitive courses with antibiotic treatments. Anti-microbial resistance

among uropathogenic *E. coli* may be increased with temporal and geographic fluctuations which may introduce multidrug resistant *E. coli* into the community [6]. In recent years, an increased number of Extended-Spectrum-Beta-Lactamases (ESBL) producing pathogens have been observed in outpatient settings, especially related to urinary tract infections (UTI), narrowing the treatment option with antibiotics [7].

Materials and methods

This observational study was done in 2017-2018 at Department of Urogynecology, Institute of Social Obstetrics, Government Kasturba Gandhi Hospital, Chennai. 200 female adolescents were included in the study. BMI was calculated from height and weight. Height, weight, and BMI were considered for assessing malnutrition in adolescent girls. Urine samples were collected from 23 girls for microscopic examination for pus cells. The faculty members followed the investigators and guided them during the survey. The survey was completed within two days. Any girl complaining of three criteria of the case definition of UTI viz.: increased frequency of micturition with; burning during micturition and pus cells in the urine were considered as a case of UTI for the purpose of the study. A urine sample was collected from Individuals were requested to fill out a questionnaire regarding their consent, morbidity and recent history of medication. Subjects receiving antimicrobial treatment for existing complications were excluded from this study. One midstream-urine sample per female

subject was collected and examined by standard quantitative culture methods. Positive culture was defined as the culture of a single microorganism at a concentration of $>10^5$ colony-forming units (CFU) /ml. In cases of delay in processing, the samples were stored at 4°C.

Identification of the uropathogens: Nutrient agar plates were used for a total bacterial count of the urine samples and uropathogens were isolated on Blood agar and MacConkey agar media. All the plates were incubated aerobically at 37°C for 24–48 hours and the colonies were enumerated. For confirmation of specific bacterial spp., standard biochemical tests were performed.

Results

Totally 200 adolescent girls were included in the study. The age group of the girls was between 16-20 years. Demographic data were analyzed by a proforma which contains, selective questions regarding the daily activities related to urinary tract infection.

UTI was more (7.7%) in malnourished girls than in those with normal nutritional status as shown, which favored the presence and persistence of infection of the urinary tract. $\chi^2=7.13$, df1, CI= 95%, $p<0.001$, (HS) as per **Table – 1**.

Table - 1: Distribution of UTI according to nutritional status.

Nutritional status	UTI				Total	%
	Present	%	Absent	%		
Normal	9	5.0	107	59.1	116	64.1
Malnutrition	14	7.7	51	28.2	84	35.9
Total	23	12.7	158	87.3	181	100

Table – 2: Distribution of UTI according to perineal washing technique.

Perineal washing technique	UTI				Total	%
	Present	%	Absent	%		
Proper	8	4.4	24	13.3	51	17.7
Improper	15	8.3	134	74.0	149	82.3
Total	23	12.7	158	87.3	200	100

Table - 3: Distribution of UTI in the presence of vaginal discharge.

Vaginal discharge	UTI				Total	%
	Present	%	Absent	%		
Present	14	7.7	8	4.4	22	12.2
Absent	9	4.4	150	82.9	159	87.8
Total	23	12.7	158	87.3	181	100

Table - 4: Distribution of UTI according to pin worms in stool.

UTI	Worms in stool				Total	%
	Present	%	Absent	%		
Present	7	3.87	16	8.84	23	12.7
Absent	6	3.31	152	83.98	158	87.3
Total	13	7.18	168	92.8	181	100

Girls practicing improper perineal washing technique suffered more (8.3%) from urinary infection than those who didn't (4.4%). $2=5.3$, $df1$, $CI=95\%$, $p<0.05$, (S) as per **Table – 2**.

Significantly more (7.7%) girls having symptoms of vaginal discharge were suffering from urinary infection than those who didn't. $2=58.6$, $df1$, $CI=95\%$, $p<0.001$, (HS) as per **Table – 3**.

More girls (3.87%) having pinworms in stool complained of symptoms of urinary infection than those who hadn't. $2=21.4$, $df1$, $CI=95\%$, $p<0.001$, (HS) as per **Table - 4**.

Discussion

Escherichia coli and *Staphylococcus saprophyticus* account for about 80% of community-acquired uncomplicated urinary infections (UTI), particularly in women under 50 years of age. *E. coli* is a Gram-negative commensal of the distal colon which also harbors other anaerobic bacteria, including *Bacteroides* and *Bifidobacteria*. Uropathogenic *E. coli* differs from intestinal pathogenic *E. coli* with regard to the presence of specific virulence factors [8]. Among the various serotypes of *E. coli*, 01, 02, 04, 06, 07, 08, 016, 018, 025, and 075 are commonly recovered from patients with UTI [9]. About 80% of uropathogenic *E. coli* express P fimbriae which anchor to the glycolipid of the outer membranes of urothelial cells localized in the kidney [9]. They are comprised of several subunits, the most important of which is an adhesion protein known as FimH which plays a principal role in the pathogenic mechanism of *E. coli* at the level of the urinary tract [10]. It mediates both cellular invasions of *E. coli* and adhesion to mannose-containing glycoproteins [11]. Prevention and management of genitourinary tract infection which includes; improving knowledge of genitourinary tract physiology, reasons for genitourinary infections, complications and proper health habits like good personal hygiene, drinking plenty of water which flush out the bacteria out of the urinary tract, emptying bladder completely soon as feel the

urge, wear cotton undergarments, changing sanitary pads frequently during menstruation [12]. The commonest presenting complaint of UTI in adolescent girls is dysuria and coupled with an initial reaction of fear/apprehension at menarche in a majority of girls there would be a general false belief regarding the causes of UTI and its prevention [13]. This study was conducted particularly among rural adolescent girls to find out reasons for it and to initiate an early educational intervention to mitigate UTI problems among adolescent girls and also later in their lives. UTI is significantly present in the girls who had attained menarche but not practicing proper perineal hygiene. Similar results are also observed in another south Indian study by Singh A J [14]. This study revealed strong association between UTI and improper perineal washing technique, use of unsanitary pads during menses, malnutrition, vaginal discharge, and pinworm infestation. This study also showed that associated preventable diseases like fungal infections (vaginal discharge) and pinworms infestation can cause UTI among adolescents. To conclude, though this study is not an uncommon study, it yielded enough and very useful information to initiate health intervention measures for the prevention and control of UTI among females [15].

Conclusion

For the short term, the need is to give immediate health education about the causes, prevention, and treatment of UTI among adolescent girls of both the villages and treatment of the identified cases with the urinary antibiotics etc. Long term measures include a periodical screening of the adolescent girls for UTI.

Acknowledgments

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