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Prevalence And Risk Factors Associated With Urinary Tract Infection: A Study Of Schools Children, Dir Lower, Khyber Pakhtunkhwa, Pakistan

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Abstract

The current study aims to analyse the prevalence and risk factors of urinary tract infection among primary school children in Dir Lower, Khyber Pakhtunkhwa, Pakistan. The study was delimited to ten primary schools hence children and parents of the selected schools constituted the population of the study. The questionnaires were distributed among 600 parents through their children enrolled in the selected schools. Furthermore, the urine sample of 384 children collected for laboratory tests who were allowed by their parents for the subject medical diagnosis. The data obtained through urine test results and questionnaires were analysed quantitatively through a chi-square test using SPSS 22. The results indicate a high incidence of urinary tract infections, the majority of which were female students. There was a significant ($p=0.005$) relationship between UTI and other risk factors such as frequency of attending the bathroom, delaying of urine/pee because of playing etc. Several risk factors were found responsible for the prevalence of UTI. The study recommends that awareness should be created regarding the necessity of a hygienic environment at home as well as in schools.

Keywords: urinary tract infection; children; school, prevalence; risk factors

1. Introduction

Urinary tract infection (UTI) is a serious and most common bacterial infection that causes illness in Children (Hannula, 2012; NICE, 2007; Hellstrom et al., 1991; Winberg et al., 1974). In developing countries, it is considered one of the most common bacterial infections encountered by medical experts (Tessema, 2007). UTI is a serious health problem that each year it affects millions of people. A study conducted by Ojo and Anibijuwon (2010) that it is the second most common type of infection in the body, accounting for nearly 8 million hospital visits each year.

Compared with men, the higher prevalence in women is due to the shorter urinary tract in the later which makes them more susceptible to contamination during sexual intercourse. It is estimated that the UTI noted in boys is 1%, and in girls it is 3-8% (Roberts & Akintemi, 1999; Schalger, 2001). While, in the first year of life, UTI has a higher proportion of boys (2.7%) than girls (0.7%) (Elo, 1979; Larcombe, 1999; Riccabona, 2003).

According to the researchers Roberts & Akintemi 1999; Wiswell, (2000), uncircumcised boys are more vulnerable to UTI. Unfortunately, the typical symptoms of UTI in adults and children are not present or easily discernible in young children or toddler and might be difficult to be diagnosed in infants or young children because of common symptoms. Symptoms, includes; vomiting, fever, irritability screaming and anorexia may indicate a urinary tract infection, but these symptoms are also common in other diseases in childhood (Voort et al., 1997; Lisdonk & Verstraeten, 2000). However, fever is the most common sign of UTI in infants (Ginsburg & McCracken, 1982).

Furthermore, UTI are not serious, however, unrecognized UTI may become a serious problem (Ramadan, 2003). It can cause a chronic kidney infection-recurrence or infection that lasts for a long time - may cause permanent damage. This damage can include poor kidney function, high blood pressure, kidney scars and other medical problems. Some severe kidneys infection (suddenly develop infections) can be life-threatening, particularly if the bacteria pass in the bloodstream (Winberg et al., 1974). The prevalence of UTI in childhood is not only affected by age but also by gender. It is necessary to pinpoint children with UTI and treat them as soon as possible to prevent them from any long-term complications and minimize the risk of any major morbidity (Ramadan, 2003).

This paper presents the results of prevalence of UTI among primary schools children in Dir Lower, Khyber Pakhtunkhwa, Pakistan to test the association of several hypothesized risk factors and UTI. Mostly the students were suffering with UTI which in turn affects their health. It is a common statement that a sound body has a sound mind, but unfortunately the parent and teachers of the area are unaware of the problem. Therefore, this study aims to analyse the prevalence and associated risk factors of UTI in the students as well as to create awareness among parents and their children.

2. Material and Methods

In this research, a multistage cluster sampling strategy was applied and the data was collected from the 10 selected schools. The data was collected through a questionnaire and got validated

through an expert opinion by sending the questionnaire to two experts having medical a degree. Furthermore, the reliability of the instrument was established through Cronbach alpha which stood at 8.2. A total of 600 questionnaires were distributed among the children (both male and female) with an age range between 6 to 12 years. A permission letter was sent to the parents asking for permission to collect a urine samples from their children and to fill the questionnaire among a total of 600 distributed questionnaires, 410 questionnaires were returned along with a permission letter signed by the parents/guardians. Furthermore, sterilized urine cups were given to those students who brought their parental/guardian permission and had not used antibiotics at least for three days. Thus, samples of midstream fresh urine were collected from 384 students and shifted to laboratories using appropriate protocols to prevent any bacterial multiplication. In the laboratory, the sample is tested by a urinalysis by a specialist in the field. In addition, the mean prevalence of UTI was calculated by dividing the number of positive samples by the number of children considered in our calculations. Similarly, the prevalence of UTI was calculated for both the genders males and females separately. A chi-square test was used to determine the association between UTI and different risk factors using Statistical Package for Social Sciences (SPSS-22).

3. Results

3.1. Demographic characteristics and UTI positivity of the children

The prevalence of UTI was found in both male and female children to be (37.5%) among 384 samples. Similarly, results indicated that gender was significantly (p=.034) associated with UTI prevalence (38.9%) in males and (61.1%) in females, which shows high prevalence of UTI in female than male children. Besides, the highest susceptible age group of the child, residency, father and mother education level were found statistically significant with p values (p=.006), (p=.000), and (p=.000) respectively.

3.2. Association between risk factors and UTI in Children.

To evaluate the relationship between risk factors and UTI, such risk factors were presented in the form of statements and the results are as follow:

The results showed that frequency of attending bathroom by the children and Urinary Tract Infection (UTI) has a highly significant (P=0.000) relationship. It is clear that the frequency of going to bathroom increase his/her internal/external disorder. Similarly, delaying of urine for a long period of time was highly significant (P = 0.000) with UTI, likewise not completely evacuation of child bladder also has a highly significant (P = 0.000) association with UTI. The delaying of urine for long time and keeping of some urine in bladder after using washroom is more common in school going children, it may be due to hurry for playing, pressure of teachers, insufficiency of washrooms etc. Another serious phenomena that a child cannot clean her/himself properly and materials using for cleaning which also has a highly significant (P = 0.000) association with UTI in school going children. Most of the children not clean themselves properly or cannot use the cleaning materials accordingly such like water,

toilet paper and other hard materials through which they injured themselves or mix stool (faeces) with urine which, is one of the major external causes of UTI in children.

Moreover, child daily water intake was found significant (P = 0.003), while the use of a tight trouser had a non-significant (P = 0.074) relationships with UTI in school going children. The water intake decreasing in children affect filtration process, which takes more time than normal. Besides, child bedwetting relationship with UTI was highly significant (P = 0.000) and also found a significant association (P = 0.002) of constipation in children and UTI. Another serious issue is the washroom combination with bathroom, which was found significant (P=.016) with UTI. Washroom combination with bathroom is one of the sources which increase the chance of mixing stool (faeces) with urine especially in females. Similarly, child daytime wetting relationship with UTI was also found significant (P=.002) because the continuous wetting is one of the symptom of infection in children as well as in elders.

4. Discussion

This study demonstrated the prevalence and risk factors associated with UTI among primary school children. Although, differences in the approaches are various the findings of this study are broadly similar. The data reveals that the prevalence of UTI in both male and female children were found but female children were found to be predominantly exposed to UTI as compared to males. Such findings have been supported by the work of different authors (Ojo & Anibijuwon, 2010; Kolawole et al., 2009; Ebie et al., 2001). These stated studies have declared that the higher prevalence in females as compared to males is due to the shortness of the female urethra. This study also demonstrated that comparatively more cases of UTI were observed in female children than in male children in all age groups. As it was stated earlier that most boy's infections occurred in the first three months after birth, but by school age, the boy's infection rate decreased and the girl's infection rate increased (Riccabona, 2003; Schalger 2001; Roberts & Akintemi, 1999).

Furthermore, a significant association was found between the frequency of children attending the bathroom and delaying of urine because of playing or attending class with UTI. Other studies have also found that poor toilet habits in children who delay the extraction of urine can cause UTI (Riccabona 2003). Many 3 to 5-year-olds children tend to delay urination due to their high concentration on playing or watching TV, electronic toys etc. are at more risk of UTI. Furthermore, children who intentionally hold their urine for a long time will gradually present decreased sensation (Burgers et al., 2010; Chase, 2004; Santos, 2014).

This study also found a positive relation between UTI and hurry while attending the washroom or non-evacuation of his/her bladder during extraction of urine and the use of inappropriate cleaning material cause UTI. The researcher Hellstrom, (1991) also claimed that due to inadequate emptying of the urinary bladder may accelerate bacterial growth in the urine bladder which cause UTI. According to NIH (2011) findings that poor toilet hygiene is a risk factor for UTI, moreover, females should always wipe front to back to avoid the introduction of bacteria to the urethral opening because they are more susceptible due to their shorter urethral structure closeness to the anus. The uncircumcised males, mild and gentle traction of the foreskin fully

retracts the urine and the best medium for bacterial growth which causes infection from the external side.

Moreover, the current study also found a significant association between child's daily water intake and constipation with UTI. The report (NIH, 2011) has stated that children who do not drink enough liquids (i.e. water, soft drinks) may not make sufficient urine to flush away microbes. Additionally, the use of tight paints can trap moisture, which lets the bacteria grow (Santos et.al, 2014). Santos et.al, (2014) and Kirk (2005) have found that constipation is a secondary source of UTI if the child suffered from fewer than two times bowel movements in a week. Stools could be dry, hard, small, and difficult to pass which may press the urinary tract and block or slow down the flow of urine, allowing bacteria to grow which leads to constipation. Children who suffer from constipation are also at risk for developing UTIs. Daytime wetting and bed wetting was significant with UTI in the present study. These results were also revealed by Bloom, et al., (1993) and Meadow, (1990) that both daytime wetting and bedwetting are commonly found in children who have UTI problems. In some cases, health conditions can lead to wetting/leaking urine into clothes or bedwetting in older children giving more chances and creating favourable conditions for bacteria growth.

5. Conclusions

UTI is a serious bacterial infection which affects children and causes illness. The purpose of the current study was to find out the prevalence and risk factors associated with UTI. After the analysis of data, this study researched to the conclusion that various risk factors are responsible for the prevalence of UTI in the research area rather than a single one. Therefore, this study suggested a number of preventive strategies including; enough taking of water for drinking, wearing loose-fitting clothes, guiding the children that normal urination leads to relaxing the sphincters, permitting the muscles of the bladder to expel the urine and do not forced to voiding the abdominal muscles. Government should arrange meetings/seminars in schools to make their washroom clean and its free access to children.

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Table 3.1. Demographic characteristics and UTI positivity of the children

Demographic Characteristics	UTI (+) N=144 No. (%)	UTI (-) N=240 No. (%)	Chi-square value	P-value
Gender				
Male	56 (38.9)	120 (50)	4.476	.034
Female	88 (61.1)	120 (50)		
Age (years)				
5-7	59 (41)	72 (30)	10.376	.006
8-10	69 (47.9)	112 (46.7)		
11-12	16 (11.1)	56 (23.3)		
Residency				
Rural	120 (83.3)	232 (96.7)	20.945	.000
Urban	24 (16.7)	8 (3.3)		
Mother Education				
Illiterate	160 (62.5)	96 (37.5)	29.013	.000
Primary	24 (75)	8 (25)		
Secondary	16 (33.3)	32 (66.6)		
Graduate	12 (25)	36 (75)		
Father Education				
Illiterate	106 (86.8)	16 (13.1)	43.899	.000
Primary	44 (57.9)	32(42.1)		
Secondary	24(15.7)	128 (84.2)		
Graduate	10 (29.4)	24 (70.6)		

Table 3.2. Association between UTI and risk factors of the child (n=384)					
Independent variables/ Statements	**Dependent variable (UTI Results)**				**Chi-square and P value**
	Response	**Positive**	**Normal**	**Total**	
Frequency of attending bathroom	>2	68 (54.8%)	56 (45.2%)	124 (100%)	33.740[a] (.000)
	3-4	58 (29.2%)	140 (70.8%)	198 (100%)	
	5<	18 (29.0%)	44 (71.0%)	62 (100%)	
Delaying of urine because of playing or attending class.	Yes	80 (52.6%)	72 (47.4%)	152 (100%)	24.578[a] (.000)
	No	64 (27.6%)	168 (72.4%)	232 (100%)	
Making hurry while attending washroom non evacuation of his/her bladder	Yes	104 (54.2%)	88 (45.8%)	192 (100%)	45.511[a] (.000)
	No	40 (20.8%)	152 (79.2%)	192 (100%)	
Using of appropriate cleaning material cause UTI	Water	10 (4.7%)	204 (95.3%)	214 (100%)	22.2232[a] (.000)
	Toilet paper	134 (78.8%)	36 (21.2%)	170 (100%)	
Child daily water intake (glasses)	<3	40 (62.5%	24 (37.5%)	64 (100%)	8.435[a] (.003)
	4-6	92 (44.2%	116 (55.7%)	208 (100%)	
	7<	12 (10.7%)	100 (89.3%)	112 (100%)	
Wearing of slight/ tight trouser	Yes	56 (43.8%)	72 (56.2%)	128 (100%)	3.200[a] (.074)
	No	88 (34.4%)	168 (65.6%	256 (100%)	
Child Bedwetting	Yes	0 (.0%)	32 (100.0%)	32 (100%)	20.945[a] (.000)
	No	144 (40.9%)	208 (59.1%)	352 (100%)	
Child Constipation	Yes	40 (41.7%)	56 (58.3%)	96 (100%)	23.475[a] (.002)
	No	104 (36.1%)	184 (63.9%)	288 (100%)	

Washroom is combine with bathroom	Yes	136 (39.5%)	208 (60.5%)	344 (100%)	5.834[a] (.016)
	No	8 (20.0%)	32 (80.0%)	40 (100%)	
Child daytime wetting	Yes	24 (60.0%)	16 (40.0%)	40 (100%)	9.645[a] (.002)
	No	120 (34.9%)	224 (65.1%)	344 (100%)	
	Total	144 (37.5%)	240 (63.5%)	384 (100%)	