Original Research Article

Prevalence of Urinary Tract Infections among First Grade Primary School Children in Gorgan, Northeast of Iran

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ABSTRACT

Introduction: The prevalence of urinary tract infection (UTI) in different regions of Iran is not clear. The aim of this study was to investigate the prevalence of UTI among first grade primary school children in Gorgan, Northeast of Iran. **Materials and Methods**: This descriptive-analytical and cross-sectional study was performed on 2145 first grade primary school children in the city of Gorgan in 2011. After history taking, all children were physically examined by trained personnel. Those who were suspected with UTI were referred to laboratory for confirmed diagnosis. Collected data were analyzed using SPSS statistical software (version 16) and chi-square test. **Results**: Among 2145 children, 1111 (51.8%) were male and the rest were female. UTI was confirmed in 146 patients (6.8%), 52 of whom were male (4.7%) and 94 were female (9.1%). There was a statistically significant difference in the frequency of UTI between the two genders. **Conclusions**: The results of this study showed that UTI is common in this age group in this region. Therefore, proper healthcare interventions should be considered for control and prevention of UTI complications among primary school children.

KEYWORDS: UTI, Urinary tract infection, First grade, Primary school, Children, Gorgan

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INTRODUCTION

Urinary tract infection (UTI) is confirmed by detection of more than a hundred thousand colony-forming units per ml of culture medium. It is divided into different types that can be referred to complex vs. non-complex, upper vs. lower and symptomatic vs. asymptomatic [1,2]. UTI is the second most common infection among children, and is categorized into primary and recurrent infection, based on the functional objectives [3,4]. Prevalence of asymptomatic UTI varies from 0.01 to 0.07% [3, 5 and 6]. Screening children for detection of asymptomatic bacteriuria is strongly recommended for prevention of pyelonephritis and renal scarring [7].

Due to the adverse complications of asymptomatic UTI such as renal scars as well as the high costs of treatment, screening tests for UTI in children are necessary in terms of cost containment and health promotion. The prevalence of UTI in different regions of Iran is not clear. Given the high prevalence and great importance of UTI in children and its adverse effects, we aimed to study the prevalence of this condition among primary school children in Gorgan, Northeast of Iran.

MATERIALS AND METHODS

This descriptive-analytical and cross-sectional study included 2145 first grade primary school children from city of Gorgan, Iran. Data collection tool included an additional information questionnaire of health records consisting d of 23 questions in three sections; demographic information (8 items), nutritional information (10 items), and disease related information (5 items). Questions regarding UTI included items such as high daily intake of water or tea, wearing tight clothes, urine retention, dysuria, suprapubic pain, and changes in the

color and odor of urine. The physician recorded the demographic characteristics and data obtained from the history taking and physical examination of children in a special form, and those with symptoms of UTI were selected for further investigation. Children were examined by the physician at a health center with respect to content of their health certificates at birth and the presence or absence of clinical signs of UTI. Urine sample of children with clinical signs of developing UTI were referred to a laboratory for confirmed diagnosis. In laboratory evaluation of UTI, children who had positive urine cultures were considered as patients with UTI. All patients diagnosed with UTI were then treated with antibiotics. Exclusion criteria included incomplete questionnaires, inaccurate urine sampling, and lack of parents' consent. Collected data were analyzed using SPSS statistical software (version 16). The prevalence of UTI in each gender was analyzed using chi-square test. P-value less than 0.05 was considered as statistically significant.

RESULTS

In this study, 2145 first grade primary school children (51.7% male and 48.3% female) in Gorgan were studied for UTI. The results showed that 146 children (6.8 %) had positive urinary culture for UTI and 1999 children (93.2%) had negative urinary culture. Of 1111 males, 52 (4.7%) were diagnosed with UTI and 1059 children (95.3%) were without UTI. Moreover, 94 children (9.1%) of 1034 female students had UTI, while 940 female children (90.9%) were without UTI. Data analysis showed a significant difference in the frequency of UTI between the two genders (P=0.0001) (Figure 1).

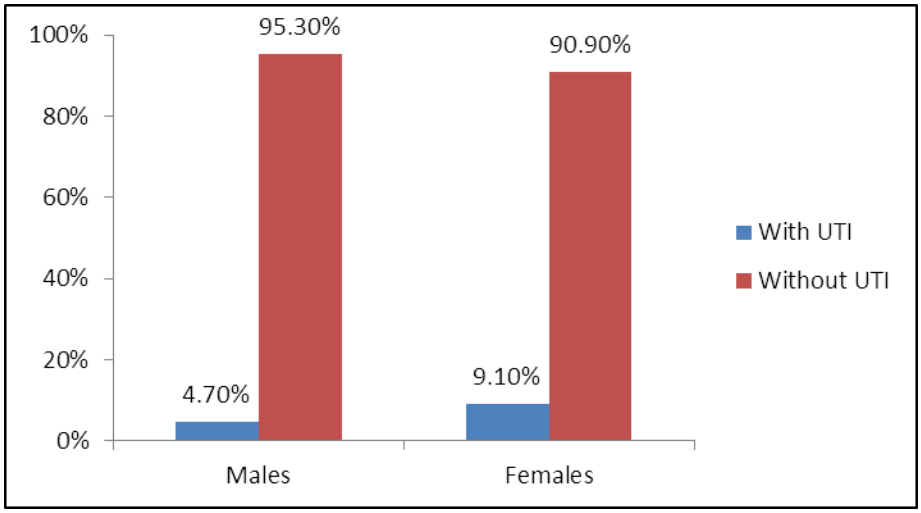

Figure 1 Frequency distribution of UTI among children according to gender

There was a significant difference between the two genders regarding the variables of high water intake, wearing tight clothes, dysuria, suprapubic pain and changes in urine color or odor (P<0.05). However, no significant difference was found between the two genders in terms of urine retention (P>0.05) (Table 1).

Table 1 Frequency distribution of the variables related to UTI in children according to gender

Variables		Frequency	Percentage	P-value
High water intake	Male	1101	99.2	0.005
	Female	1009	97.7	
Wearing tight clothes	Male	117	10.5	0.0001
	Female	260	25.2	
Dysuria	Male	37	3.3	0.007
	Female	60	5.8	
Suprapubic pain	Male	54	4.9	0.0001
	Female	90	8.7	
Changes in color or odor of urine	Male	38	3.4	0.016
	Female	58	5.6	
Urine retention	Male	350	31.5	0.548
	Female	339	32.8	

DISCUSSION

According to the findings of our study on 2145 first grade primary school children in Gorgan, the prevalence of UTI in this age group was high. Among 146 subjects with UTI, 52 patients were male and 94 patients were female, indicating the significant difference in the frequency of UTI between the two genders in this age group (about 2 times). There was also a significant difference between the two genders in terms of the variables associated with UTI. High daily water intake in the male students was significantly more than in females, which may be a contributing factor for lower incidence of UTI in males. Wearing tight clothes can increase the risk of UTI. In this study, wearing tight clothes in female students was 2.5-fold more frequent compared to males. The symptoms of UTI such as dysuria, suprapubic pain, and changes in the urine color/odor were also significantly greater in females compared to males, which indicates a higher prevalence of UTI in female primary school children. Nevertheless, no significant difference was found between the two genders in terms of urine retention.

The prevalence of asymptomatic UTI (AUTI) varies based on age and gender in a way that its prevalence is estimated as 5.2% in infants, 5.8 % in preschool children, 4.5% in primary school children, and 4.8% in high school students [8,9]. AUTIs are usually more common in females than in males [10]. The results of previous studies have been variable. For example, Fesharakinia, et al. (2007) in Birjand showed that the overall prevalence of UTI was 1.1%, with frequency of 1.4 and 0.8 % in males and females, respectively [11]. The prevalence of UTI in our study was approximately six times higher than the mentioned study. In contrast to the mentioned study, the prevalence of UTI in females was significantly higher than in males in the present study (9.1% vs. 4.7%). These differences between the results of the two studies could be attributed to geographic, cultural, health standard and ethnic variations. Study of Rostami (2005) on 470 schoolchildren in Ardabil (Northwest of Iran) reported the prevalence of AUTI as 5.5% in females and 2.8% in males, while only 19 cases (4.2%) had positive urine culture [12]. Farajollahi, et al. (1999) studied 642 primary school female children in Bander-Turkman (a city near Gorgan) and

reported the prevalence of UTI as 2.3% [13]. However, in the present study, the prevalence of UTI among female children was nearly four times higher than the above study (9.1% vs. 2.3%). Although Gorgan is the capital of the province and schoolchildren in Gorgan are expected to have higher health standards, the frequency of UTI in Gorgan was higher than in Bander-Turkman, which is a small city in the province. This could be due to ethnic factors and the way females dress in the two cities. In study of Litaka (1990) on 28,202 Japanese children, the prevalence of bacteriuria was 0.06% in males and 0.52% in females after three screenings. Bacteriuria was still present in 60% of children for 9 months after the third screening [14]. The study of Elo et al. showed that UTI in females aged 10-11 years is mainly asymptomatic; therefore, primary school children are at higher risk of developing such infections [15]. Some studies demonstrated that almost 10% of children with UTI would develop renal scarring [16]. Therefore, proper attention should be given to health-promoting and education programs on personal hygiene in schools in order to prevent or limit the adverse effects of UTIs among these age groups.

Due to insensitivity of microscopic examination and analysis of urine samples (despite being cheap and easy to perform), urine culture was used to assess UTI in the present study. As mentioned in reference books, urine culture is the gold standard test for the diagnosis of UTI [17]. Nevertheless, assessment of the cost-effectiveness and economic aspects of urine culture for testing UTIs requires further studies.

CONCLUSION

The results of this study showed that the prevalence of UTI in primary school children is high in Gorgan. Thus, timely screening and treatment of children should be taken into account before they enter school. Considering the importance of screening children aged less than 7 years for symptoms of UTI, and prevention of its adverse effects, further studies are necessary to identify patients and appropriate treatment options to improve the overall health standards in this city.

LIMITATIONS

Although all children were treated, it was not practically possible to follow up all patients. Nevertheless, their treatment was not one of the objectives of the present study. Therefore, no report of children care and treatment was provided. Due to lack of compliance by the participants in this study, other demographic variables in the questionnaire such as parents' education level, family size, and location have not been reported in the study.

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