

Recurrent urinary tract infection in girls: Risk factor

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Abstract: Background: rUTIs in young girls is a major healthcare concern and there are possible differences in socioeconomic conditions, cultural beliefs and personal behaviors in different countries. **Objective:** Define the host related risk factors; demographics, behavioral, anatomical and pathological factors; associated with an increased risk of rUTI in healthy, young girls. **Patient and Methods:** The study included 40 girls presented to the urology Department, Faculty of Medicine, Al-Azhar University and the Urology Department, EL Seka El Haded Hospital, Cairo, Egypt after application of inclusion and exclusion criteria and after ethical approval and informed consent. Diagnosis and severity of rUTI was based on if they had experienced either ≥ 3 episodes of UTI in the previous 12 months or ≥ 2 episodes in the previous six months (confirmed by urine cultures). **Results:** The study included 40 girls with rUTI ranged from 14 to 24 years old (median: 20 years; mean: 19.53 ± 1.74 years). Most of patients were above the age of 15 years, the most common predominant symptoms were burning of micturation (31 cases; 77.5%), followed by suprapubic pain (6 cases; 15.0%), urgency (2 cases; 5.0%) and abdominal pain (1 case; 2.5%), the isolated uropathogens were *E. coli* in 23 cases (57.5%), *Enterococci* in 8 cases (20.0%). 13 cases (20.0%) reported their mother had a history of rUTI and 7 cases (17.5%) had 2nd/3rd degree female relatives' history of rUTI. Twenty seven cases (67.5%) had a history of at least one attack of vaginitis and/or vulvo-vaginitis. However, only 6 cases (15.0%) reported a repeated vaginitis and/or vulvo-vaginitis (recurrent attacks). **Conclusion:** our findings indicate that burning micturation and suprapubic pain, represents the predominant symptoms at time of UTI. *E. Coli* is the predominant isolated pathogens, followed by *Enterococci*. Low education level and low fluid intake represent the risk factors of rUTI. **Recommendations:** Additional experimental and clinical studies to determine the risk factors mainly personal hygiene for rUTI in girls mainly.

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Keyword: Recurrent urinary tract infection

1. Introduction

Most UTIs are less severe. Nevertheless, UTI causes significant distress to the individual and is associated with high healthcare and social costs. In the USA UTIs are responsible for 7 million clinic visits annually, with a cost exceeding \$1.6 billion (*Sheerin, 2011*). The etiology of rUTI is multi-factorial including host behavior, host characteristics and bacterial characteristics. Several host factors have been identified that are associated with an increased risk of rUTI. All of these factors predispose to UTI by facilitating vaginal colonization with uropathogens or by facilitating entry of colonizing uropathogens into the bladder (*Hooton and Hillier, 1996*). In premenopausal women, there are behavioural risk factors at play. These include increased frequency of sexual intercourse, diaphragm-spermicide exposure and new sexual partners (*Scholes et al., 2000; Ahmed et al., 2016*). There are also some non-behavioural risk factors for recurrent UTI in premenopausal women.

These include a history of UTI before age 15 and a maternal history of UTI (*Car and Sheikh, 2003*).

2. Patient and Methods

The study included 40 girls presented to the urology Department, Faculty of Medicine, Al-Azhar University and the Urology Department, EL Seka El Haded Hospital, Cairo, Egypt after application of inclusion and exclusion criteria and after ethical approval and informed consent.

Inclusion criteria:

We evaluated all girls above the age of 8 years experiencing symptoms of cystitis (dysuria, urgency, frequency, suprapubic pain, or hematuria).

Exclusion criteria:

Married women, Chronic medical, diseasesImmuno-compromized status e.g immunosuppressant therapy, HIV infection...etc., Urinary catheters, Urologic and gynecologic abnormalities.

They were subjected to:

Full medical history taking, Complete physical examination, Complete urine analysis, Urine culture and sensitivity.

The results were as follows:

Risk factors as Education level, Family history, Bowel habit, Personal hygiene practice, Beverage consumption and Urine voiding characteristics, have main effects on rUTI.

3. Results

Figure (1) shows that, 40 girls with rUTI ranged from 14 to 24 years old (median: 20 years; mean: 19.53 ± 1.74 years).

Table (2) show the symptoms of the disease were different among studied patients. The most common presenting symptoms were burning of micturition (100%) and increased frequency of micturition (90.0%), followed by urgency (55.0%) and suprapubic

pain (40.0%) (Table 3). All patients had more than one symptom.

As shown in Fig. 2, the isolated uropathogens were *E. coli* in 23 cases (57.5%), *Enterococci* in 8 cases (20.0%), *Staphylococcus aureus* in 6 cases (15.0%), *Citrobacter* in 2 cases (5.0%), *Proteus* in 2 cases (5.0%) and *Pseudomonas spp* in 2 cases (5.0%). Three cases had mixed infection.

Table 1. The presenting symptoms of the studied 40 girls with rUTI.

Symptoms	Number	%
Burning of micturition	40	100
Increased frequency of micturition	36	90.0
Urgency	22	55.0
Suprapubic pain	16	40.0
Urge incontinence	9	22.5
Gross hematuria	8	20.0
Abdominal pain	4	10.0

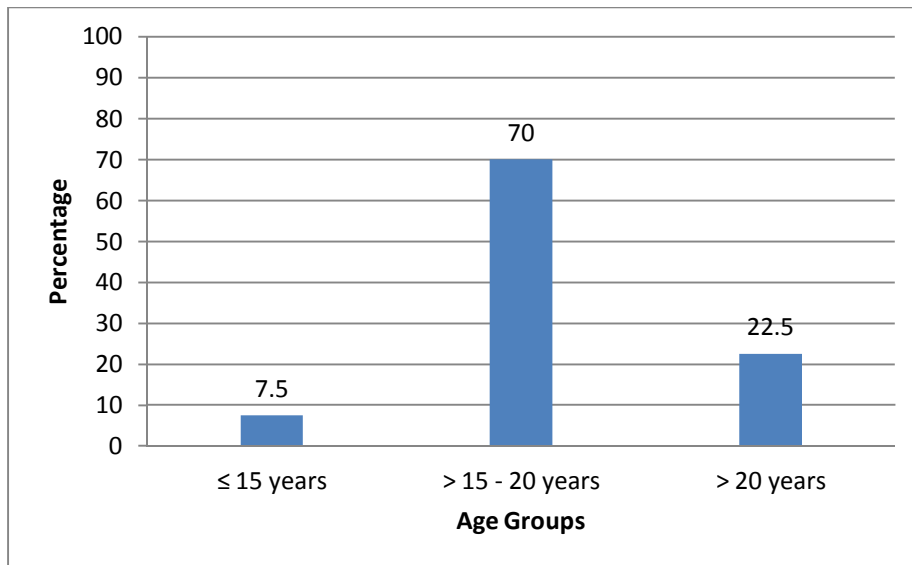


Fig.1. Patients' distribution in different age groups.

Table 2: Fluid intake in the studied 40 girls with rUTI.

Fluid intake	Number	%
Water		
≥2000 mL/day	28	70.0
< 2000 mL/day	12	30.0
Caffeinated fluid		
≥150 ml/day	13	32.5
<150 ml/day	27	67.5
Cranberry juice		
≥ 100 mL/week	0	0.0
< 100 mL/week	40	100

We found that most of studied girls [28 (70.0%)] had adequate daily water intake (≥5 glasses) and 13 (32.5%) had daily caffeinated fluid intake >150 ml. None of studied girls had regular Cranberry juice consumption.

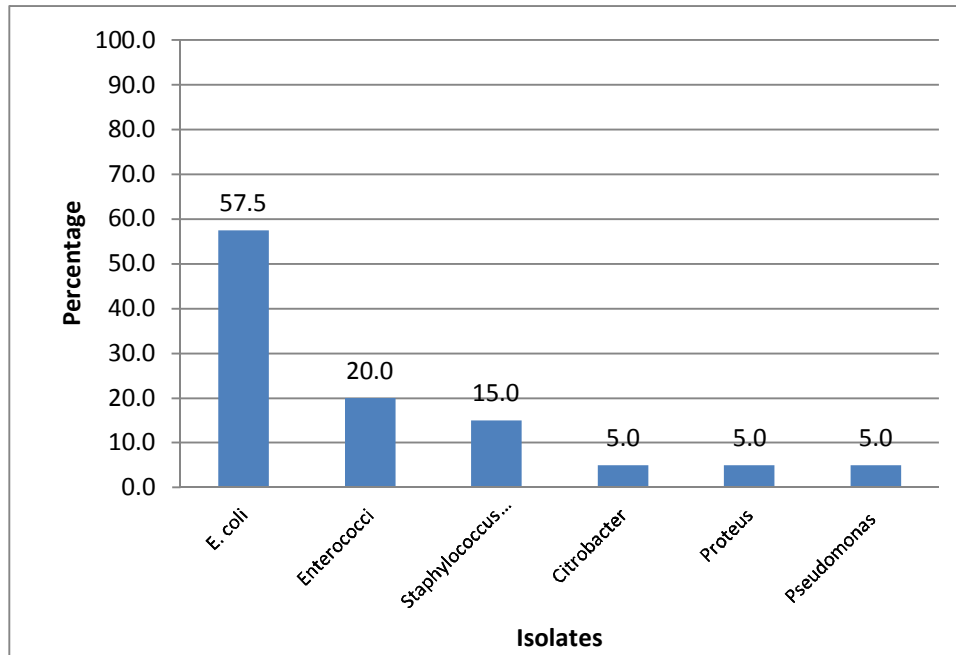


Fig. 2. Isolated uropathogens in the studied 80 girls with rUTI.

Table 3: Family history of rUTI in the studied 40 girls with rUTI.

Family history of rUTI	Number	%
Mother		
Yes	13	20.0
No	21	52.5
Unknown	11	27.5
2 nd /3 rd degree female relatives		
Yes	7	17.5
No	6	16.2
Unknown	27	66.2

From the studied 40 girls with rUTI, 13 cases (20.0%) reported their mother had a history of rUTI and 7 cases (17.5%) had 2nd/3rd degree female relatives' history of rUTI.

Table 4: The voiding characteristics of the studied 40 girls with rUTI

Voiding habits:	Number	%
Frequency of daytime urination		
≤ 3 times	22	55.0
> 3 times	18	45.0
Nocturia (≥ 2 voids/night)		
No	29	72.5
Yes	11	27.5
Delayed voiding		
Never/rare	7	17.5
Sometimes	23	57.5
Always/frequent	10	25.0

The voiding characteristics of the studied 40 girls with rUTI are demonstrated in Table – and Figure –. Forty five percent of studied girls had diurnal frequency, 27.5% had nocturia and 25% had a habit of delaying micturation.

4. Discussion

The presence of infection in the sterile posterior urethra, bladder, ureters, renal pelvis or renal

parenchyma indicates Urinary Tract Infection. (Jonathan, 2006)

Epidemiological studies of UTI are based on the presence of a positive urine culture. The classical diagnosis of urinary tract infection (100,000 cfu/ml) is applied in the childhood diagnosis of urinary tract infection, in addition to pyuria (more than 5 white cells per high powered field on microscopy) and bacteriuria. The presence of both pyuria and bacteriuria from a fresh urine sample are highly indicative for UTI. Urine dipsticks that detect the presence of white blood cells (leukocyte esterase), or the production of nitrite are highly recommended in the preliminary diagnosis of UTI with high specificity and low rate of false positive results. **(Watson,2004)**

Recurrent urinary tract infection (RUTI) is defined as three episodes of urinary tract infection (UTI) with 3 positive urine cultures in the previous 12 months or two episodes in the last six months **(Griebing TL 2005)**.

Urinary tract infections (UTIs) are a common problem among girls. It has been estimated that 10-13% of girls experience a UTI annually with a lifetime risk of UTI of greater than 50%. **(Schneeberger C etal, 2008)**

The Incidence of UTI is bimodal; highest during the first year of life and peaking again during adolescence **(Heffner, Gorelick, 2008)**. In our study will assess 40 girls cases with recurrent UTI between the age 17 to 23 girls.

Another study assess the incidence rates and management of urinary tract infection among 82,053 children aged 0-18 year's shows that 1.15% were diagnosed as having recurrent urinary tract infection and the incidence rates were 19 episodes per 1000 persons per year. **(Kowk,2006)**

Another study showed no significant relation between the UTI infection with urgency and the frequency of urination with P values 0.106, 0.099 respectively. **(Raya, Adham, 2009)**

Another study It has been shown that constipation with a dilated rectum, causes the same pattern of voiding dysfunction as that encountered in children with persistence of an unstable bladder. Effective treatment of the constipation results in normalization of bladder function and cessation of UTIs. **(Lynch, 2004)**

Another study Hopkins et al found that 65.5% of mothers, 61% of daughters and 49% of sisters of 41 adult women with RUTI had similar recurrence histories **(Hooton, 2001)**.

A cohort study by Semins et al. indicated that obesity was a risk factor for UTI. Obese patients were more likely to have an UTI especially in males; furthermore the obese females were at particularly higher risk for pyelonephritis. **(Semins etal,2012)**

In a prospective study undertaken over a 14-month period in northwest Iran a 5136 urine samples were collected from outpatients in the age group 1.5-65 years (mean age 28.2) to explore the causative agents responsible for UTI and their antimicrobial susceptibility, the causative agents in the age groups belonging to our study were as follows: *Escherichia coli* 80%, **(Farajnia, S., Alikhani,2008)**

A cross-sectional comparative study was conducted to determine the perception and practices regarding menstruation among 94 girls from urban schools and 74 from rural school aged 10-19 years. Data collected by using questionnaire revealed that the adolescent girls who are not practice taboos more in rural areas (21%) as compared to urban areas (4.3%). Restriction of physical activities during menstruation (20.3%) and restriction in type of clothing (35.1%) during menstruation found to be more in rural girls than in urban girls (10.6%) and (23.4%) respectively **(Deo DS, Ghattargi, 2005)**.

References

1. Ahmed A-F, Kamal SM and Solyman AA. Potential host-related risk factors for recurrent urinary tract infection in Saudi women of childbearing age. *Int Urogynecol J* 2016; 27:1245–1253.
2. Car J and Sheikh A. Recurrent urinary tract infection in women. *BMJ* 2003;327:1204.
3. Deo DS, Ghattargi CH. Perception and practices regarding menstruation: a comparative study in urban and rural adolescent girls. *Indian Journal of community medicine* 2005 March; 30(1).
4. Farajnia, S., Alikhani, MY et al. Causative agents and antimicrobial susceptibilities of Urinary Tract Infections in the northwest of Iran 2008. *International Journal of infectious diseases*.
5. Griebing TL. Urologic diseases in America project: trends in resource use for urinary tract infections in girls. *J Urol.* Apr 2005;173(4):1281-1287.
6. Hooton. Recurrent urinary tract infection in women. *Int J Antimicrobial Agents* 2001;17:259–268.
7. Hooton TM. and Hillier WE. The vaginal flora and UTIs. In urinary tract infections: molecular pathogenesis and Clinical management (Mobley H. L. T. and warren J. W. eds) 1996, pp. 67-94. ASM press, Washington, DC.
8. Heffner, V., Gorelick, M. Pediatric Urinary Tract Infection. *Clin Ped Emerg Med.* 2008; 9: 233-237.
9. Jonathan, H.C.Evan. Investigation of urinary tract infection in children. *Current paediatrics.* 2006;16:248-253.

10. Kowk YW. Incidence rates and management of urinary tract infections among children in Dutch general practice: result from a nation –wide registration study. *BMC Paediatrics* 2006; 6(10):12-18.
11. Lynch MD. Cranberry for prevention of urinary tract infections. *Journal of American family physician* 2004 December; 1: 1-7.
12. Raya M.H.S, Adham A.T., Prevalence of Urinary Tract Infection among Children of Primary Schools in Nablus, 2009.
13. Sheerin NS. Urinary tract infection. *Med* 2011; 39 (7): 384-389.
14. Scholes D, Hooton TM, Roberts PL, et al. Risk factors for recurrent urinary tract infection in young women. *J Infect Dis* 2000;182:1177–82.
15. Semins MJ, Shore AD, Makary MA, Weiner J, Matlaga BR. The impact of obesity on urinary tract infection risk. *Urology*. 2012;79(2):266–9. doi: 10.1016/j.urology.2011.09.040. [[PubMed](#)] [[Cross Ref](#)]
16. Schneeberger C, Stolk RP, Devries JH, et al: Differences in the pattern of antibiotic prescription profile and recurrence rate for possible urinary tract infections in girls with and without diabetes. *Diabetes Care* 2008; 31: 1380 – 1385.
17. Watson, A. Pediatric Urinary Tract Infection. *EAU Update Series* 2.2004; 94-100.

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