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PREVALENCE AND RISK FACTORS OF URINARY TRACT INFECTION AMONG SECONDARY SCHOOL STUDENT GIRLS IN SANA'A CITY

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Abstract:

Objectives: the researchers determined the prevalence and possible risk factors of urinary tract infection among secondary school student girls.

Materials and methods: by conducting a cross-sectional descriptive study, the researchers studied 220participants(females) for the presence of bacterial infections in their urine samples and collected the required data according to the constructed questionnaire.

Results: The prevalence rate was high,where 142 out of 220 (64.5%)were found to have bacterial growth in their urine samples. Staphylococcus aureus was the predominant species followed by *Escherichia coli*. Only using sanitary pads that showed a statistical significant association with the growth or presence of bacterial infection in the urinary tract.Age, marital status, presence of crystals, and pus cells showed no statistical significant association with the growth or presence of bacterial infection in the urinary tract.

Conclusion: The prevalence of urinary tract infection stills high among secondary school girls, and sanitary pads and their abuse by girls remain the most predisposing and risk factor for developing urinary tract infection.

Key words: prevalence, urinary , tract , infection, students, Yemen

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Introduction:

Urinary tract infection is a term applied to a variety of clinical conditions ranging from asymptomatic presence of bacteria in the urine to severe infection of the kidney with resultant sepsis. (1) It is characterized by a combination of clinical features and the presence of bacteria in urine, or it is the presence of more than 100,000 CFU/ml after doing urine culture , regardless of symptoms.(2)

Urinary tract infection can be divided into upper tract infection which involve the kidneys and lower tract infections, which involve the bladder, urethra and prostate. Moreover, infection often spreads from one area to the other. Although urethritis and prostatitis are infections that involve the urinary tract, the term UTI usually refers to pyelonephritis and cystitis. Most cystitis and pyelonephritis are caused by bacteria.(3)

The most common nonbacterial pathogens are fungi (usually candida species), and less commonly, mycobacteria, viruses, and parasitesas*Schistosomahaematobium* and *Trichomonas vaginalis*. Nonbacterial pathogens usually affect patients who are immunocompromised; have diabetes, obstruction, or structural urinary tract abnormalities; or have had recent urinary tract instrumentation.(3)

Urinary tract occurs at different ages and among both sexes, but its incidence in females is higher than that of males, considering the female urethra, its proximity to the anus, and hormonal activity. UTI are one of the most common problems among women especially during pregnancy due to change in the urinary tract.(4) Most cases of UTI are caused by bacteria, especially gastrointestinal bacteria , and other type sash as enterococci; *E.coli* , *Proteus species* ,*pseudomonas aeruginosa, klebsiella strains* , *salmonella* , *Neisseria gonorrhoeae*.(4)

The risk factors that may predispose female infection include; female anatomy, sexual intercourse, diabetes, obesity and family history. (5) Although

sexual intercourse is a risk factor, UTI is not classified as sexually transmitted infections (STIs).[6]UTIs are one of the most common problems among women especially during pregnancy due to change in the urinary tract .

In young sexually active women, sexual activity is the cause of 75–90% of bladder infections, with the risk of infection related to the frequency of sex. The term "honeymoon cystitis" has been applied to this phenomenon of frequent UTIs during early marriage. In post-menopausal women, sexual activity does not affect the risk of developing a UTI. Spermicide use, independent of sexual frequency, increases the risk of UTIs.[7]

It is estimated that about 10-20% of women suffer from UTIs.[8] They are the most common form of bacterial infection and up to 10% of women have a urinary tract infection in a given year, and half of women have at least one infection at some point in their lifetime, and those aged between 16 to 35 years were the most affected.[8]

Subject and methods:

The present study was designed as cross-sectional descriptive study. Secondary student girls were the target participants of this research, and about 220 student girls were the total sample size from 5 secondary school girls in Sana`a city. Volunteer gave a written informed consent and the Ethics Committee of Yemen University, Faculty of medical Sciences approved the clinical protocol and have been performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.Therequired data were collected according to the constructed questionnaire during the interview with the participants (student girls).

In case of sample collection, all precautions of collection were given to the students aswashing the hands well by waterand drying, then collecting the sample from the midstream urine directly into the container, to avoiding contamination of the sample by the natural bacteria in the skin.

After taking all safety measures (Wearing medical double gloves, putting on a mask, sterilizing the entire laboratory and lighting the flame until the end of the work). We started to do the following:-

1- Routine analysis of the collected urine samples

All collected urine samples were firstly examined macroscopically (for detecting any abnormalities and screening of biochemical tests (asUrobilinogen – Glucose – Bilirubin - ketones – S.G – Blood – PH – Protein – Nitrite – Leucocyte) . After that the samples were centrifuged and examined microscopically for the presence of red or white blood cells as well as other presence of abnormal findings.

2- Preparation of culture media

Blood and MacConkey agars were prepared according to the manufacturing instructions, and the samples that gave positivity presence of white blood cells and bacteria were inculcated (cultured) on both media and incubated at 37C for 24 hrs.

3- In the second day; the culture media were checked for bacterial growth. Then, the colony were stained with gram- stain, and screened by biochemical reagents for differentiating and determining the type of bacterial growth. After that, the culture- positive bacteria were inoculated on Muller- Hinton agar and incubated at 37C for 24 hrs for determining the sensitivity or susceptibility of bacteria to certain antibiotics.

4- In the third day, the sensitivity of bacteria to antibiotics was checked and reported accordingly.

Results:

According to the main aim of the study, the result will be illustrated in three directions; the first one will be dealing with the distribution and descriptive statistics of data among the studied variables. The second direction will be dealing with prevalence of urinary tract infection, and the third one will be dealing with the association of risk factors with the occurrence of urinary

tract infection.

1- The distribution and descriptive statistics of data among demographicvariables

Table (2) shows the distribution of data in relation to the district, where, Alsab`ain district was the highest (72, 32.7 %) of having the participating cases, while Alsafia district was the lowest (20, 9.1%).

Table (2): The distribution of data in relation to the target districts

District	Frequency	Percentage (%)
Old Sana'a	32	14.5
Alsafiah	20	9.1
Alwahda	32	14.5
Azal	64	29.1
Alsba'ain	72	32.7
Total	220	100

Table (3) shows the distribution of data in relation to the target schools, where,AlshaheedAlhamdischool was the highest (72, 32.7 %) of having the participating cases, while Ma'ain school was the lowest (20, 9.1%).

Table (3):The distribution of data in relation to the target schools

School	Frequency	Percentage (%)
Alkhansa'a	32	14.5
Ma'ain	20	9.1
Arwa	32	14.5
Ammar ben yaser	64	29.1
AlshaheedAlhamdi	72	32.7
Total	220	100

Table (4) shows the distribution of data in relation to the age group, where,the age group (15 -19) was the highest (179, 81.4 %) in which the cases were participated, while the age group (25 – 29) was the lowest (1, 0.5 %).

Table (4): The distribution of data in relation to the age group

Age group(Years)	Frequency	Percentage (%)
15-19	179	81.4
20-24	14	6.4
25-29	1	.5
>30	26	11.8
Total	220	100

Table (5) shows the distribution of data in relation to the marital status, where,the majority of participating girls were single (191, 86.8 %), while the widows (2, 0.9 %) were the lowest participating girls.

Table (5): The distribution of data in relation to the marital status

Marital status	Frequency	Percentage (%)
Married	27	12.3
Single	191	86.8
Widow	2	.9
Total	220	100

Table (6) shows the distribution of data in relation to the grown bacterial species, where, the *staphylococcus aureus* was the most prevalent species (75, 52.8 %) of the grown bacteria, while *Klebsiellaspp*, and*Pseudomonasspp*(1, 0.7 %) were the least prevalent species.

Table (6): The distribution of data in relation to the grown bacterial species

Type of bacterial growth	Frequency	Percentage (%)
Culture yielded *Staphylococcus aureus*	75	52.8
Culture yielded other *Staphylococci spp*	20	14.1
Culture yielded *Escherichia coli*	32	22.5
Culture yielded *Escherichia coli* and *staphylococci*	12	8.5
Culture yielded *Klebsiellaspp*	1	0.7
Culture yielded*Staphylococcus aureus* and *Pseudomonas spp*	1	0.7
Culture yielded *Pseudomonasspp*	1	0.7
Total	142	100

2- The prevalence of urinary tract infection among secondary student girls

Table (7) shows the prevalence of urinary tract infection among secondary student girls, where,one hundred forty two out of two hundred twenty two sample were found to have a bacterial growth(142, 64.5 %), while the rest of samples (78, 35.5 %) were with no bacterial growth.

Table (7): The prevalence of urinary tract infection among secondary student girls

Variable	Frequency	Percentage (%)
Bacterial growth	**142**	**64.5**
No bacterial growth	78	35.5
Total	220	100

3- The association of possible risk factors with the occurrence of urinary tract infection

Table (8) shows the association of age with the occurrence or the presence of urinary tract infection, where, there was no statistical significant association (*P*= 1.000) between the age and growth of bacteria.

Table (8): The association of age with the occurrence of bacterial growth

	Age group (Years)					*P. value**
	15-19	**20-24**	**25-29**	**>30**	**Total**	
Bacterial growth	115	9	1	17	142	1.000
No bacterial growth	64	5	0	9	78	
Total	179	14	1	26	220	

**P. value* was significant at <0.05 and calculated by Exact Fisher test.

Table (9) shows the association of marital status with the occurrence or the presence of urinary tract infection, where, there was no statistical significant association (*P*= 0.466) between the marital status and growth of bacteria.

Table (9): The association of marital status with the occurrence of bacterial growth

	Marital status				*P. value**
	Married	**Single**	**Widow**	**Total**	
Bacterial growth	20	121	1	142	0.466
No bacterial growth	7	70	1	78	
Total	27	191	2	220	

**P. value* was significant at <0.05 and calculated by Exact Fisher test.

Table (10) shows the association of using sanitary pads with the occurrence or the presence of urinary tract infection, where, there was a statistical significant association (*P*= 0.008) between the use of sanitary pads and growth of bacteria.

Table (10):The association of using sanitary pads with the occurrence of bacterial growth

	The use of sanitary pads			*P. value**
	No	**Yes**	**Total**	
Bacterial growth	8	134	142	**0.008**
No bacterial growth	13	65	78	
Total	21	199	220	

**P. value* was significant at <0.05 and calculated by Chi-square test.

Table (11) shows the association of pyuria with the occurrence or presence of urinary tract infection, where, there was no a statistical significant association (*P*= 0.224) between pyuria and growth of bacteria.

Table (11):The association of pyuria with the occurrence of bacterial growth

	No. WBC (Pus cells)/HPF						*P. value**
	0-1 /HPF	**2-4 /HPF**	**6-8 /HPF**	**Numerous**	**Many**	**Total**	
Bacterial growth	1	118	21	1	1	142	0.224
No bacterial growth	4	64	10	0	0	78	
Total	5	182	31	1	1	220	

**P. value* was significant at <0.05 and calculated by Exact Fisher test.

Discussion:

The annual global incidence of urinary tract infections (UTI) is estimated to be greater than 250 million UTI per year.[9]UTIis one of the most common community-acquired infections in Yemen. As UTI primarily a disease of young healthy women, we tried in this study to determine the prevalence rate and risk factor of UTI among secondary school student girls.

In the present study, the prevalence of UTI among secondary student girls was high (64.5 %). Similar findings,were observed in a study conducted in England among secondary school boys and girls,[10].The study revealed a higher prevalence of UTI among girls than boys,but the prevalence findings were not as high as the prevalence of UTI in this study. They attributed those findings to the age of girls (16 years) at which adolescence and sexual activity are reached.

Regarding the risk factors of UTI, both genetic and behavioral factors play a role in the development of UTI. Women witha family history of recurrent UTI are more likely to experience recurrent UTI themselves.[11] In the current study, only the use of sanitary pads that revealed significant association with the growth of bacteria in cultured samples. Other contrasting studies,[12,13] revealed other factors as a recentsexual activity and the use of diaphragms and certain types of spermicides are stronglyassociated with an increased risk of UTI in

premenopausal women. This contrast could be attributed to the difference of traditions in societies.

In this study, no statistical significant association was found between the age and marital status with the occurrence of UTI. Similar findings of a study conducted in Nablus, Palestine,[14] who observed no association of age with the presence of UTI.

With regard to the type of bacterial growth, the present study showed high predominance of *Staphylococcus aureus* followed by *Escherichia coli*. In relatively similar study,[51] very close but opposite findings showed a high prepredominance of *Escherichia coli* followed by *Staphylococcus aureus*. The similarity of findings prove the predominance of the two species regard less of the order, open further studies to deal with control and management of UTI.

Conclusion:

Urinary tract infection is primarily a disease of young healthy women, and amongsecondary student girls stills high. *Staphylococcus aureus* was the predominance species followed by *Escherichia coli*.The sue of sanitary pads showed a statistical significant association with the occurrence of UTI.

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