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DOI: 10.2174/1874434601812010248, 2018, *12*, 248-254

RESEARCH ARTICLE

Urinary Tract Infection Among Women Aged (18-40) Years Old in Kirkuk City, Iraq

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Received: September 19, 2018 Revised: November 22, 2018 Accepted: November 30, 2018

Abstract:

Aim of the Study:

The aim of this study is to identify the prevalence of urinary tract infection among women in reproductive age who attended a Primary HealthCare Centers at Kirkuk City from February 2017 to September 2017.

Materials and Methods:

This is a cross-sectional descriptive study which was carried out in the outpatient clinics for Obstetrics and Gynecology and Urology at Kirkuk General Hospital over the period of 6 months from 1st of February-1st of September,2017. The sample of the study included 450 women who were randomly selected from the following three groups: pregnant women n=150, married women n=150, and unmarried women n=150. Each woman was interviewed using a Questionnaire containing personal information such as age, occupation, Gravidity, months of pregnancy and educational level. Data were calculated and presented as numbers and percentages

Results:

The study found that 58.4% of participants belonged to 21-30-year age group followed by 26% who belonged to 31-40-year age group. 48.4% of the study participants were illiterate, 27.3% had Secondary school graduates and 24.3% had Diploma or Bachelor degree. The majority of the women 70.2% were housewives. The total prevalence rate of UTI was 27.3%. The higher percentage of UTIs 43% was found among pregnant women. The majority of women with UTIs were housewives 65.9% from rural areas 72.4%, and illiterate 62.6%.

Conclusion:

The study concluded that the prevalence of UTIs in pregnant women was higher than that of non-pregnant and unmarried women and that *Staphylococcus. Saprophyticus* is the most common causative agent of disease.

Keywords: UTI, Gastrointestinal bacteria, Pregnant women, Married women, Cystitis, Asymptomatic bacteria.

1. INTRODUCTION

A urinary tract infection (UTI) is characterized by the presence of more than 100,000 microscopic cells in 1 mL of urine and accompanied by clinical symptoms of cystitis, pyelonephritis and asymptomatic bacteria. [1] UTIs occur 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. [2] UTIs are one of the most common problems among women especially during pregnancy. It is estimated that about 10-20% of women suffer from UTIs. [3] Most cases of UTIs are caused by bacteria, especially gastrointestinal bacteria, which infects the urethra through contaminating the area that surrounds the rectum and spreading to the bladder. [2] UTIs are more common during pregnancy due to changes in the urinary tract. Since the uterus sits directly on the top of the bladder, the increased weight of the uterus, as it grows, can

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block the drainage of urine from the bladder which results in an infection. [4] However, other factors include upper extremities and increased urinary urethral recurrence as well as reduced bladder size due to uterine contraception which increases the filtration rate thus stressing on the kidneys. [5] In addition to the factor of pregnancy, there are other factors pertaining to the host that increases the rate of infection of the urinary tract including sexual factors, urine factors, osmolality of urine, introital factors, vaginal pH, and secretor state. [4] Some of the main and common causes of UTIs are *"Escherichia coli, Staphylococcus spp.,Streptococcus spp.,Proteus spp., Klebsiella spp. Corynebacterium, Neisseria and Pseudomonas spp* ". The severity of a UTI depends both on the virulence of the bacteria and on the susceptibility of the host. [6] The significance of this study is that UTIs can be particularly dangerous in pregnant women among whom it has been shown that up to 50% of those with Asymptomatic Bacteriuria (ABU) go on to develop pyelonephritis. In addition, pregnant women experience higher rates of intrauterine growth restriction and low birth-weight infants. The presence of a UTI has also been shown to increase the risk of preterm labor, preterm birth, pregnancy-induced hypertension, preeclampsia, ammonites and anemia. [4] The objective of the present study is to assess the prevalence of UTI among pregnant women, married and unmarried women.

2. METHODS

2.1. Study Design

This is a cross-sectional descriptive study carried out in the outpatient clinic for Obstetrics and Gynecology and Urology at Kirkuk General Hospital over the period of 6 months (1st of February-1st of September),2017.

2.2. Study Population

The sample of the study included 450 women who were randomly selected from the following three groups: pregnant women 150, married women 150, and unmarried women 150. The sample size for the study was calculated based on a previous study done by Sinan *et al*, which showed a prevalence of 29% UTI in women. [7] Using the formula $4PQ/D^2$, the sample size was calculated to be 425 with an absolute precision of 4%. Adding 10% refusal rate, the sample size was calculated to be 448 which was rounded off to 450.

2.3. Inclusion Criteria

The inclusion criteria for the study were females of the reproductive age group 18-44 years who live in urban and rural areas they were apparently healthy and willing to take part in the study.

2.4. Exclusion Criteria

The exclusion criteria for the study were females on any antibiotic therapy, females on menstruation phase of the menstrual cycle, and females with known urinary tract anomalies.

2.5. Study Tool

A standardized, structured questionnaire was utilized to be conducted in the study. The questionnaire consisted of the socio-demographic particulars such as age, occupation, months of pregnancy, and clinical history for the symptoms of UTI. Data are prepared, organized and entered into a computer; Statistical Package for The Social Science (SPSS, version 20) was used for data analysis. Prevalence of UTI was calculated using percentages. Quantitative data were presented by mean and SD, whereas qualitative data was presented as number and percentages. Chi-Square test was used to compare qualitative variables between groups such as age group, educational level, residency, *etc.P* value > 0.05 is considered insignificant, $P<0.05$ is significant (*) & $P<0.01$ is highly significant (**).

3. RESULTS

3.1. The Socio-Demographic Characteristics

The study sample is presented in Table **1**. 58.4% belonged to 21-30-year age group followed by 26% who belonged to 31-40-year age group. 48.4% of the study subjects were illiterate, 27.3% had secondary school graduates and 24.3% had a diploma or bachelor degree in school education. Almost 66.7% of females were married and 33.4% were unmarried. 33.3% of them were pregnant and more than half of them were in the 3rd trimester. In relation to their occupation, the majority of the women 70.2% were housewives.

Table 1. Distribution of cases according to some risk factors

Age	No. Case =450	%	UTIs	%	chi-square
18-20 year	70	15.6	28	22.8	11.3011*
21-30 year	263	58.4	51	41.5	
31-40 year	117	26	44	35.7	
Marital status	No. Case =450	%	UTIs	%	chi-square
Married women	300	66.7	94	76.4	4.2803*
Unmarried women	150	33.3	29	23.6	
Gravidity	No. Case =150	%	UTIs	%	chi-square
1	66	44	19	20.2	14.59*
2	33	22	27	28.7	
3 and more	51	34	48	51.1	
Gestational age	No. Case=150	%	UTIs	%	chi-square
1st	30	20	15	28.3	5.31
2nd	33	22	17	32.1	
3rd	87	58	21	39.6	
Residency	No. Case =450	%	UTIs	%	chi-square
Rural	225	50	89	72.4	19.49*
Urban	225	50	34	27.6	
Educational level	No. Case =450	%	UTIs	%	chi-square
Illiterate	218	48.4	77	62.6	14.57*
High school level	123	27.3	35	28.5	
Diploma or college level	109	24.3	11	8.9	
Occupation	No. Case =450	%	UTIs	%	chi-square
Housewife	316	70.2	81	65.9	0.8663
Employer	134	29.8	42	34.1	

3.2. The Prevalence of UTIs

The total prevalence rate of UTI was 27.3%. The higher percentage of UTIs was found among pregnant women 43%, in their 3rd trimester 39.6%, aged between 21-30 years, 41.5%. The majority of women with UTIs were housewives 65.9%, from rural areas 72.4%, and illiterate 62.6%

3.3. Causative Agent

In this study, 20.6% of the females with UTIs suffered from *Staphylococcu. Saprophyticus*, followed by 17.3% from *>Klebsiella Pneumoniae*, 14.4% from Proteus mirabilis, and 11.7% from *Escherichia coli, Staph aureus, Staph epidermidis*. The results can be found in Table **2**.

Table 2. Distribution of bacterial isolates among culture positive samples.

Types of bacterial isolate	Pregnant women	Married women	Unmarried women
	%	%	%
Staphylococcus saprophyticus	20.6	2.7	0
Klebsiella Pneumoniae	17.3	33.3	28
Proteus mirabilis	14.4	18	0
Escherichia coli	11.7	21	44
Staphylococcus aureus	11.7	2	0
Staphylococcus epidermidis	11.7	21	30
Candida Albicans	7.9	1	0
Enterobater cloaca	4.7	1	0

4. DISCUSSION

UTI is a health problem that affects women, especially during the pregnancy period, and it is one of the leading causes of miscarriages, premature births, and the underdevelopment of infants. The early treatment of infection reduces the probability of complications which may be very dangerous to mother and the fetus. [6] In this study, the prevalence of UTIs was 27.3% and was higher in pregnant women 43% as well as in married women 33.4%, and was at the lowest among unmarried women 23.6%. These results were similar to the study of Imade *et al* [8] and more than other studies Neupane *et al* [9], Rohini *et al* [10], Sujatha *et al* [11] and Rajaratnam *et al* [12]. This inconsistency and difference in results may be due to variances in the environmental background and social habits of the communities, in addition to the economic situation, awareness and knowledge of the client's hygiene standards. Parity and gestational age significantly affected the prevalence of urinary tract infection. These have been previously reported [13 - 15]. Pregnant women in the 3rd trimester of current pregnancy and those having more than one child were mostly at risk of acquiring urinary tract infection. Several anatomical and hormonal changes in pregnant women lead to urethral dilation and urinary stasis which contribute to increased risk of developing UTI [16]. Concerning the residence of the women, this study shows that a significant association was found between women's UTIs and their residency. A greater percentage of women who lived in urban areas suffered from UTIs, 43.6% in rural areas *versus* 56.4% in urban areas. This may be attributed to the nature of urban sanitation as well as lower concern with personal hygiene. [17] With regard to the level of education variable, the results found that there is a significant association between women's UTIs and their educational level. In contrast, Sheikh *et al.* [18] found no significant effect of education on the incidence rate of UTIs in their study conducted in Pakistan. On the other hand, Gunes *et al.* [19] found that UTI was significantly high among women who had less than secondary level education in their study conducted in Turkey Dimetry *et al.* [20] found that the highest percentage of UTIs among pregnant women was among those who were illiterate 61.5%. Regarding the occupation of women, although there is no association between women's UTIs and their occupation, our study showed that the highest proportion of UTIs was found among housewives. One possible cause is that employed women cannot visit the health unit for antenatal care as often because of work conflicts. This finding contradicts to the finding of Okonko *et al.* [21] in Nigeria, who found that the highest percentage of UTI among pregnant women 77.8% were among civil workers, followed by teachers 70% and businesswomen 53.8%, and the lower percentages were among students 30.4% and housewives 36.4%. The results of the present study showed that *Staphylococcus aprophyticus* was the most pathogenic in the causes of infection among pregnant women, followed by *Klebsiella Pneumoniae*, and *Proteus mirabilis*, and then *Escherichia coli, Staphylococcus aureus, Staphylococcus epidermidis.* The emergence of this high percentage of bacteria may be due to the weakness of defence mechanisms in pregnant women during pregnancy that creates a good opportunity for UTIs. This result was consistent with Al-Rawy's [22] studies about the cause of infection being inconsistent with the rate of incidence. Concerning the married women, the results showed that *Klebsiella Pneumoniae* was the main cause of the infection, followed by *Escherichia coli* and *Staph epidermidis.*, while among unmarried women, the bacteria *Escherichia coli* was the highest recorded cause of infection, followed by bacteria *Staph epidermidis* and bacteria *Klebsiella Pneumoniae*. It may also be due to physiological, functional and structural changes that pregnant women undergo which make them more susceptible to various germs [23]. Additionally, women's urine during pregnancy is a favourable medium for the growth of most pathogens because it contains high amounts of albumin and amino acids. Pregnant women also have weak defence mechanisms throughout their pregnancy which make them more susceptible to pathogens, especially *Staphylococcus saprophyticus.* Several studies have been consistent with the current study, for example, a UK study of 1,000 pregnant women showed that the plasma-negative bacteria had an effect on the rate of UTIs, and record the third rank in the total of bacteria. The bacteria that cause UTIs are the same causes of disease in non-pregnant women. Bacteria *Escherichia coli* (*E. coli*) represents between 80-90% as a cause of infection [24]. Ronald [25] stated that Group B streptococcus, *Staphylococcus saprophyticus* and *Staphylococcus haemolyticus* is less likely to cause UTIs. Enterococci including *Gardnerella vaginalis* and *Ureaplasma ureolyticum* are less common agents in UTIs. Ramalingam K *et al*. [26] found that (50%) of bacteria isolates are *Klebsiella spp*. Muharram *et al*. [27] and Ramalingam *et al*. [26] also reported Klebsiella *spp.* as the most common micro-organism. Garnizov *et al*. [28] reported cases of Asymptomatic Bacteriuria (ASB) due to *klebsiella pneumonia* in a pregnant woman. Two studies from India and Sudan have reported *Escherichia coli* as the most common isolate and there is an increasing trend towards *Klebsiella spp.* as the most potent urinary pathogen. [29, 30] Usually, the causative agents of the non-symptomatic bacteriuria in females are bacteria that coexist in the female reproductive system and intestines. Different determinants of the virus, such as adhesions and inactivity caused by the uterus play a role in UTIs [31 - 34]

CONCLUSION

The study concluded that the prevalence of UTIs in pregnant women was higher than that of non-pregnant and unmarried women and that E coli is the most common causative agent of disease. A significant association was found between the prevalence of UTIs among women and their age, educational level, marital status, gravity and residency.

RECOMMENDATIONS

Since UTIs may be symptomatic and asymptomatic in most cases, it is therefore suggested that routine screening for UTIs among patients with unexplained sources of fever be conducted, and that the appropriate antimicrobials are administered after sensitivity tests have been carried out in order to prevent cases from becoming symptomatic with resultant renal damage.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTEREST

There is no conflict of interest, financial or otherwise.

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to Directory of Health at Kirkuk City who facilitate this research. Also, special thanks to women whose participated in this study.

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