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Original Article

Prevalence of Urinary Tract Infection and Associated Effective Factors During Pregnancy in Shahrekord, Iran

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Abstract

Background and aims: This study was conducted to determine the prevalence of urinary tract infection (UTI) in the pregnant women and the associated risk factors in Shahrekord, Iran.

Methods: In this cross-sectional study, 832 pregnant women were examined up to 26 to 30 weeks of pregnancy and their UTIs were studied. The required information was collected by examining the health records of pregnant women and completion of the data registration forms. All statistical analyses were performed in SPSS 23.0 using chi-square and independent *t* test.

Results: According to the results of this study on 832 participants, 109 of them were diagnosed with UTI, and prevalence of UTI was recorded to be 13.1% in this study. There was a significant relationship between urinary infection and variables of delivery, pregnancy severe vomiting, genitourinary problems, infertility, and blood group.

Conclusion: According to the results of this study, screening and treatment of UTIs have been on time and appropriate in health systems of Shahrekord city which have led to the reduction of infant and maternal diseases. Even in the conditions that there is no UTI, continuing the process for screening and treatment is recommended.

Keywords: Urinary tract infection, Risk factor, Cross-sectional study

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Introduction

Urinary tract infection (UTI) is one of the most common medical problems in pregnancy.[1] It is estimated that one in three women in childbearing age will be diagnosed with UTI.[2] Pregnant women are susceptible to UTIs due to the normal physiologic changes which occur during pregnancy.

UTI is diagnosed by the presence of pathogens in uncontaminated urine samples. These pathogens are able to attack to the urinary tract tissues and the related structures.[3] Infection may be limited to the growth of bacteria in the urine (most of them are asymptomatic) and/or can result in several syndromes in relation to an inflammatory response to the bacterial invasion. In fact, UTI has a vast range of situations including asymptomatic UTI, urethritis, cystitis, acute pyelonephritis and pyelonephritis with bacteremia or sepsis.[4]

The prevalence of asymptomatic forms of UTI among countries has remained constant. Many recent observational studies have similarly estimated a prevalence of 2% to 10%, similar to its prevalence in non-pregnant women.[2,5] This infection gets more than 20% of pregnant women in trouble and is the cause of most important acceptances after delivery by maternal-neonatal health sectors.[2]

Several studies have shown the relationship of the UTIs during pregnancy with maternal and prenatal adverse consequences. Some other studies could not show this relationship.[6-8] Instability in the results of these studies could be due to the selection bias, low statistical power, and inadequate controls for the potential confounders.[9]

Today, the issue of whether treatment of UTI can reduce maternal and neonatal complications is discussed.[10] A number of studies have found that antimicrobial treatment of UTIs does not lead to the reduction in maternal and neonatal complications in addition to imposing a heavy cost to the society.[10-12]

Since prevention of any disorder requires understanding of effective factors in its creation, and since few studies are done on risk factors of UTI in Shahrekord city, this study was conducted to determine the prevalence of UTI in the pregnant women and the risk factors related to it in Shahrekord.

Methods

This cross-sectional study intended to investigate the

prevalence of and effective factors on UTI in pregnant women covered by health centers of Shahrekord city.

In this study, the data were collected and recorded since the beginning of the study and provided for the researchers. The controls were selected from the subjects of the study who did not suffer from the UTI. The study population consisted of all pregnant women who had referred to health centers across Shahrekord during the first 6 months of 2011 and their medical records were complete (n: 1027). The inclusion criteria in this study were: no history of gestational diabetes, no drug consumption, chronic diseases like asthma and thyroid, being under the supervision of physicians,[13-15] having recorded pre-pregnancy body mass index (BMI), being visited at 6-10 weeks of gestation for doing their routine urine test at the first visit and regular BMI measurements. The exclusion criteria were: incomplete data on the variables. In this study, 832 patients were examined up to 26 to 30 weeks of pregnancy and their UTIs were studied.

According to the ministerial instruction of integrated care program, all the pregnant women who refer to health centers are routinely referred to the laboratories for urinalysis at 26 to 30 weeks of pregnancy.

The required information was collected by reviewing the health records of pregnant women and completed data recording checklists.

The data included demographic variables (age, education, job, blood group, rhesus factor [RF], and BMI), current pregnancy status (multi-fetal pregnancy, unwanted pregnancy, an interval of less than 3 years between two pregnancies, spotting problems, genitourinary pre-pregnancy care, severe vomiting, and infertility), history or current risk of renal disease, diabetes, and hypertension, and history of pregnancy (either abortion or delivery).

In this study, the individuals with UTIs were assigned to the case group. UTI was diagnosed by growth of at least 100000 colony-forming units of a urinary tract pathogen per 1 mL in a culture of a midstream urine sample.[14,15] The individuals who did not suffer from UTIs were considered as controls.

All statistical analyses were performed in SPSS (version 23.0, SPSS Inc., Chicago, IL, USA) using descriptive statistics (mean±SD). Chi-square test was used to compare qualitative data and independent *t* test was used to compare quantitative data. *P* value < 0.05 was considered statistically significant.

Results

According to the results of this cross-sectional study on 832 individuals, 109 of them were diagnosed with UTI, and prevalence of UTI was recorded to be 13.1% in this study.

The average age of patients with and without UTI were 28.4 ± 5.12 and 27.97 ± 4.84 respectively, and the age difference was not statistically significant ($P=0.481$).

The mean BMI for women with infection was 25.31± 3.8 and for women without urinary infection was 24.69 ± 3.8. This difference was not statistically significant ($P=0.121$).

There were no significant relationships between UTIs and the variables of age, RH, BMI, maternal educational level and job, multi-fetal pregnancy, spotting, unwanted pregnancy, abortions, pre-pregnancy care, genitourinary problems, the interval of less than 3 years between two pregnancies, renal disease, infertility, preeclampsia, and diabetes.

There were significant differences in delivery, pregnancy severe vomiting, genitourinary problems, infertility, and blood group between the two groups (Tables 1 and 2).

Discussion

This study was conducted to determine the prevalence of UTIs and associated risk factors in pregnant women. UTIs in the pregnant women in our study was 13.1%. Incidence of UTIs during pregnancy has been reported to be 28.5% in Pakistan,[16] 48.5% in Nigeria,[17] and 30% in Yemen.[18]

Dysuria, urinary frequency, and pain in lower abdomen are the clinical signs of UTI.[14] Consistently, in this study, 28.6% of women in the group with UTI and 71.4% of women in the group without UTI presented these symptoms with a statistically significant difference ($P=0.011$). One study reported a difference in these symptoms between two groups, which was not statistically significant.[19]

Some of the studies have reported the correlation between UTIs and preeclampsia.[12,13,20] The direct impact of destruction of vascular endothelium which leads to the dysfunction and hardness of blood vessels and microorganisms on the walls of blood vessels is mechanism of development of preeclampsia in women suffering from UTI.[21] However, there was no statistically significant difference in the development of preeclampsia between infected and non-infected cohorts ($P=1$), which is consistent with the studies of Aalijahan et al and Gilstrap & Ramin.[19,22]

In this study, severe vomiting in pregnancy was significantly associated with UTI ($P=0.005$). However, this factor was not derived significant in the study of Aalijahan et al.[19] Severe vomiting can lead to decreased fluid intake by the mother during pregnancy and therefore the urinary tract function is affected. Thus, decrease in urination leads to the accumulation of urine in the urinary tract in the long term and paves the way

Table 1. Evaluation of Demographic Variables on the Incidence of Urinary Tract Infection

Characteristics of Mothers		Cases (n = 109)	Controls (n = 723)	*P* Value[a]
		UTI	NO UTI	
Age (mean±SD)		27.97 ± 4.84	28.34 ± 5.12	0.481
Blood group	A	34 (12.4)	240 (87.6)	0.008
	B	24 (15.5)	131 (84.5)	
	AB	5 (11.6)	38 (88.4)	
	O	46 (12.8)	314 (87.2)	
RH	Positive	102 (13.2)	670 (86.8)	0.845
	Negative	7 (11.7)	53 (88.3)	
Job	Housewife	86 (13)	578 (87)	0.798
	Employee	23 (13.7)	145 (86.3)	
Education	Guidance	19 (13.4)	123 (86.6)	0.64
	Secondary	38 (11.8)	285 (88.2)	
	Collegiate	52 (14.2)	315 (85.8)	
BMI	Thin	7 (21.9)	25 (78.1)	0.316
	Normal	53 (13.4)	342 (86.6)	
	Over weight	38 (13.1)	251 (86.9)	
	Obese	11 (9.5)	105 (90.5)	

Abbreviation: SD, standard deviation; UTI, Urinary tract infection.
Values are presented as number (%).
[a] Comparison of cases with controls (*t* test, chi-square test).

Table 2. Evaluation of Current Pregnancy Status, History of Previous Pregnancies, and History or Current Risk of Illnesses on the Incidence of Urinary Tract Infection

Characteristics		Cases (n = 109)	Controls (n = 723)	*P* Value[a]
		UTI	NO UTI	
Delivery (mean ± SD)		0.68 ±0.804	0.47±0.68	0.008
Multi-fetal pregnancy	Yes	1 (11.1)	8 (88.9)	0.666
	No	108 (13.1)	715 (86.9)	
Unwanted pregnancy	Yes	3 (12)	2288)	0.581
	No	106 (13.1)	701 (86.9)	
Previous pregnancy (an interval of less than 3 years)	Yes	7 (12.5)	49 (87.5)	1.00
	No	102 (13.1)	674 (86.9)	
Spotting problems	Yes	3 (23.1)	10 (76.9)	0.236
	No	106 (12.9)	713 (87.1)	
Genitourinary problems (burning, itching and discharge pus)	Yes	10 (28.6)	25 (71.4)	0.011
	No	99 (12.4)	698 (87.6)	
Severe vomiting	Yes	10 (34.5)	19 (65.5)	0.002
	No	99 (12.3)	704 (87.7)	
Pre-pregnancy care	Yes	18 (10.5)	153 (89.5)	0.263
	No	91 (13.8)	570 (86.2)	
Infertility	Yes	5 (25)	15 (75)	0.108
	No	104 (12.8)	708 (87.2)	
Abortion	Yes	17 (11.3)	133 (88.7)	0.288
	No	92 (13.5)	590 (86.5)	
Renal disease	Yes	1 (20)	4 (80)	0.505
	No	108 (13.1)	719 (86.9)	
Diabetes	Yes	0 (0)	5 (100)	0.495
	No	109 (13.2)	718 (86.8)	
Eclampsia	Yes	2 (25)	6 (75)	0.282
	No	107 (13)	717 (87)	

Abbreviation: SD, standard deviation; UTI, Urinary tract infection.
Values are presented as number (%).
[a] Comparison of cases with controls (*t* test, chi-square test).

for infection.[23]

Parity is significantly associated with UTI in pregnancy, as it has been frequently reported to be a factor for significant increase of UTIs.[24,25] The relationship between UTI and parity is due to the physiological changes that occur in the UTI during pregnancy.[26] In this study, delivery had a significant relationship with UTI. Therefore, the results of this study are inconsistent with the results of Hamdan et al on UTI in Sudan,[27] or Masinde et al in Tanzania,[28] Turpin et al in Ghana,[29] and Hazhir on asymptomatic UTIs among pregnant women in Iran.[30] However, it is in agreement with the studies conducted by Okonko in Nigeria,[17] Kalantar et al on asymptomatic UTI in pregnant women,[31] and Haider et al in Pakistan.[8]

In this study, the interval less than three years had no significant correlation with UTI ($P=1$). Undermining food supplies of pregnant women due to pregnancy and not having adequate time for reconstructing body supplies lead to lack of essential nutrients and therefore, lack of mothers' resistance to infections.[32] In many cases with the interval less than three years between two pregnancies, pregnancy care begins with delay due to unplanned pregnancy, high maternal engagement in taking care of previous children, and lack of awareness of menstrual arrears due to irregularities or amenorrhea in the first few months after childbirth.[32] In the study of Aalijahan et al, a relationship between UTI and 3-year interval between pregnancies was reported.[19]

Because of screening the women for UTIs in 6-10 weeks before pregnancy, they do not receive any proper care or receive only preliminary care before pregnancy, which might increase the risk of UTI in these women. However, there was no statistically significant difference between pre-pregnancy care and acquisition of UTI in this study ($P=0.263$).

In addition, no significant correlation was observed between the age of pregnant women and acquisition of UTI. Similar findings were obtained in the studies of Haider et al,[8] Okonko et al,[17] Sescon et al,[24] and Aalijahan et al.[19] However, there was a significant correlation between age and UTI in ths study of Vessey et al.[33]

Conclusion

According to the results of this study, screening and treatment of UTIs have been on time and appropriate in health systems of Shahrekord city which have led to the reduction of infant and maternal diseases. Even in the conditions that there is no UTI, continuing the process for screening and treatment is recommended.

Conflict of Interest Disclosures

None.

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