



Prevalence and Risk Factors of Urinary Tract Infection among Pregnant Women in Shahrekord, Iran

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Abstract

Background and aims: This study aimed to determine the prevalence of urinary tract infection (UTI) among the pregnant women and the risk factors related to it in Shahrekord, Iran.

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

Results: According to the results of this study, out of 832 pregnant women, 109 were diagnosed with UTI; hence the prevalence of UTI was recorded to be 13.1% in this study. Moreover, there was a significant relationship between UTI and variables of delivery, severe nausea and vomiting during pregnancy (known as morning sickness), genitourinary disorders, infertility, and blood group.

Conclusion: According to the study results, it seems that screening and treatment of UTIs have been done appropriately and in the right time, in health systems of the city of Shahrekord which have led to the reduction of disorders in infants, as well as maternal diseases. Even in the absence of any UTI-related symptoms, screening tests for UTI are recommended.

Keywords: Urinary tract infection, Risk factor, Pregnancy, 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 every three women of childbearing age are diagnosed with UTI.² Pregnant women are susceptible to UTI due to the normal physiologic changes occurring during pregnancy.

UTI is diagnosed by the presence of pathogens in uncontaminated urine samples. These pathogens are able to attack the urinary tract tissues and its related structures.³ Infection may be limited to the growth of bacteria in the urine, most of which are asymptomatic. However, in some cases, it can also cause several syndromes because of an inflammatory response to the bacterial invasion. In fact, UTI has a vast range of presentations 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 estimated the 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 to maternal-neonatal health

sectors.²

Several studies have shown the relationship of the UTI during pregnancy with maternal and prenatal adverse consequences. Some other studies, however, could not show such 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 discussed¹⁰. A number of studies have found that antimicrobial treatment of UTIs does not lead to a reduction in maternal and neonatal complications, in addition to imposing a heavy cost to the society.¹⁰⁻¹²

Considering that prevention of any disorder requires understanding effective factors in its development, and since few studies have been 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.

Methods

This cross-sectional study was conducted in health centers of Shahrekord, Iran, and the data were collected and

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recorded since the beginning of the study, and provided for the researchers. The study population consisted of all pregnant women who had been referred to health centers across Shahrekord during the first 6 months of 2011 and their medical records were completed (n: 1027). The inclusion criteria in this study were: no history of gestational diabetes, no drug consumption, having no chronic diseases like asthma and thyroid, being under the supervision of physician,¹³⁻¹⁵ knowing recorded pre-pregnancy BMI, being visited at 6-10 weeks of gestation for doing their routine urine test at the first visit, and regular BMI measurements. Those with incomplete data on the variables were excluded from the study. Therefore, in this study, 832 patients were examined during 26 to 30 weeks of pregnancy and their UTIs were studied.

According to the Ministerial Instructions on 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, restoration hardware, and BMI), current pregnancy status (multi-fetal condition, 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, hypertension, and history of pregnancy (either abortion or delivery).

In this study, the individuals with UTI were assigned to the case group. UTI was diagnosed by growth of at least 100,000 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 UTI were considered controls.

All statistical analyses were performed in SPSS (Version 23.0, SPSS Inc., Chicago, IL, USA) using descriptive statistics (mean \pm 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

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

The mean age of patients with UTI was 28.4 ± 5.12 , and that of those without UTI was 27.97 ± 4.84 ; the age difference, therefore, was not statistically significant (*P* = 0.481).

In addition, the mean BMI for women with and without UTI were respectively 25.31 ± 3.8 and 24.69 ± 3.8 . This difference was not statistically significant (*P* = 0.121).

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

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

Discussion

This study was conducted to determine the prevalence of

Table 1. Demographic Characteristics of Pregnant Women With and Without UTI

Characteristics	Cases (n=109)		Controls (n=723)		P Value ^a
		With UTI (%)		Without UTI (%)	
Age (mean \pm SD)		27.97 \pm 4.84		28.34 \pm 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)	
Restoration hardware	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)	
Educational level	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)	
	Obesity	11 (9.5)		105 (90.5)	

Note: Values are presented as number (%).

SD: standard deviation; UTI: urinary tract infection; BMI, body mass index.

^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 in Pregnant Women With and Without UTI

Characteristics		Cases (n=109)	Controls (n=723)	P Value ^a
		With UTI (%)	Without UTI (%)	
Delivery (mean ± SD)		0.68 ±0.804	0.47±0.68	0.008
Multi-fetal condition	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 (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)	
Preeclampsia	Yes	2 (25)	6 (75)	0.282
	No	107 (13)	717 (87)	

Note: Values are presented as number (%).

SD: standard deviation; UTI: urinary tract infection.

^a Comparison of cases with controls (t test, chi-square test).

UTI and associated risk factors in pregnant women. Based on the results, the UTI prevalence among the pregnant women in our study was found 13.1%. The incidence of UTI 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 Consistent with de Vasconcelos-Pereira et al study,¹⁴ 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 ($P = 0.011$). Berad et al reported an insignificant difference in these symptoms between two groups.¹⁹

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

Moreover, in this study, severe vomiting of pregnancy was significantly associated with UTI ($P=0.005$). However, this factor was not significant in the study of Alijahan et

al.²¹ Severe vomiting can lead to a decreased fluid intake by the mother during pregnancy and therefore the urinary tract function is affected. Thus, any decrease in urinary output leads to the accumulation of urine in the urinary tract in the long term and hence the ground for infection is provided.²³

Parity is significantly associated with UTI in pregnancy, as it has been frequently reported to be a factor for significantly increasing 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's study on UTI in Sudan,²⁷ Masinde et al's study in Tanzania,²⁸ Turpin et al's study in Ghana,²⁹ and Hazhir's investigation on asymptomatic UTI among pregnant women in Iran.³⁰ However, it is in agreement with the study conducted by Okonko et al in Nigeria,¹⁷ Enayat et al's study on asymptomatic UTI in pregnant women,³¹ and Haider et al's study in Pakistan.³²

Furthermore, in this study, the distance less than 3 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 providing essential nutrients and therefore, lack of mothers' resistance to infections.³³

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In many cases with a distance less than 3 years between pregnancies, pregnancy care begins with delay due to the 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.³³ Alijahan et al reported a relationship between UTI and 3-year interval between pregnancies.²¹

During screening the women for UTI in 6-10 weeks of gestation, they did not receive any proper care or receive only preliminary care which might increase the risk of UTI in these women. However, there was no statistically significant association 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,³² Okonko et al,¹⁷ Sescon et al,²⁴ and Alijahan et al.²¹ While, the correlation was significant in Vessey et al's study.³⁴

Conclusion

According to the results of this study, it seems the screening and treatment of UTI have been done appropriately and in the right time, in health systems of the city of Shahrekord; this has led to the reduction of disorders in infants and maternal diseases. Even in the absence of UTI-associated symptoms, screening tests for UTI is therefore recommended.

Ethical Approval

The Ethics Committee of the Isfahan University of Medical Sciences approved the study.

Conflict of Interest Disclosures

None.

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