

Symptomatic and Asymptomatic Urinary Tract Infections During Pregnancy

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Abstract: Pregnancy acts as a risk factor for urinary tract infections (UTIs). During pregnancy symptomatic and asymptomatic urinary tract infections can trigger the development of serious complications affecting both mother and fetus. The pregnant women with urinary tract infection have a greater chance of delivering their babies prematurely with low birth weight. In view of this, the present study was undertaken to determine the prevalence of symptomatic and asymptomatic urinary tract infections among pregnant women. It was noted that symptomatic and asymptomatic urinary tract infections were more common in pregnant women as compared to non-pregnant women. *E. coli* was found with the highest incidence from both pregnant (58.7 vs. 35.5%, $P < 0.046$) and non-pregnant females (53.8 vs. 52.3%, $P > 0.317$). However, the incidences differ significantly in pregnant subjects.

Key words: Symptomatic urinary tract infections • Asymptomatic urinary tract infections • Pregnancy • *Escherichia coli*

INTRODUCTION

Pregnancy acts as a risk factor for urinary tract infection (UTI) as it causes anatomic and hormonal changes which favour development of UTI [1]. A history of current UTI, diabetes mellitus, analgesic nephropathy, hyperuricaemia and Fanconi's syndrome are predisposing factors for UTI during pregnancy [2]. Dietary habits seem to be an important risk factor for UTI recurrence in fertile women and dietary guidance could be a first step towards prevention [3]. The physiological changes associated with pregnancy are the relaxation of ureter under the effect of hormones and increase urinary output. The chemical composition of urine is also affected and results in increased urinary substances e.g. glucose and amino acids, which may facilitate bacterial growth [4]. The pregnant women with kidney infection have a greater chance of delivering their babies prematurely with low weight [5]. Sometimes, it results in fetal and maternal morbidity [6].

During pregnancy symptomatic and asymptomatic UTI can trigger the development of serious complications affecting both the mother and the fetus. Thus, proper screening and treatment of bacteriuria is necessary to prevent complications during pregnancy. All women should be screened for bacteriuria in the first trimester.

Women with a history of recurrent UTIs or urinary tract abnormalities should have repeated screening for bacteriuria during pregnancy [7]. In view of this, the prevalence of symptomatic and asymptomatic UTIs among pregnant women was studied.

MATERIALS AND METHODS

Subjects: The study comprised seven hundred and sixteen (716) subjects, include one hundred and fifty three (153) pregnant women visiting APWA Hospital and Maternity Home, Karachi and five hundred sixty three (563) non-pregnant married women residing in different localities of Karachi (Table 1). The subjects were further categorized into two groups, symptomatic and asymptomatic (Table 1), on the basis of symptoms suggesting urinary tract infection at the time of collection of urine specimen like urgency, frequency, dysuria, nocturia, flank pain and a foul odor of urine etc.

Collection of Specimen: Freshly voided midstream urine specimen was collected in a wide-mouthed sterile container and processed within 1 hour of collection. If delay was suspected, boric acid (0.1g/10ml of urine) was added.

Table 1: Distribution of symptomatic and asymptomatic subjects with respect to pregnancy

Subjects	Symptomatic		Asymptomatic		Total	
	No.	%	No.	%	No.	%
Pregnant	62	19.8	91	22.6	153	21.4
Non-pregnant	251	80.2	312	77.4	563	78.6
Total	313	100	403	100	716	100

Analysis of Specimen: All the urine specimens were subjected to culture for quantitation and qualitative assessment of bacteria. MacConkey's agar and Blood agar media were used for quantitation and primary isolation of microorganisms. Quantitation was performed by standard calibrated loop method [8]. Different types of colonies were picked and transferred to nutrient agar or blood agar slants to get pure cultures. All pure cultures were subjected to characterization by using different test conforming to requires standard diagnostic criteria [8,9].

Statistical Analysis: Chi-square test [10] was applied for the comparison of predominant organism isolate from symptomatic and asymptomatic urinary tract infections.

RESULTS AND DISCUSSION

UTI is also a common problem in pregnancy due to the increase in sex hormones and the anatomical and physiological changes during pregnancy. The pregnant women are at high risk of UTI. During pregnancy, the chemical composition of urine is also affected and results in increased urinary substances e.g. glucose and amino acids which may facilitate bacterial growth in urine [4]. However, this seemingly benign condition may have serious consequences and, if left untreated, could lead to pyelonephritis, hypertension, preterm labor, low birth weight, Group B streptococcal infection in the newborn, septicemia and maternal death [11]. Approximately 20-40% of women with asymptomatic UTI develop pyelonephritis during pregnancy [2]. Thus, the prevention, early detection and prompt treatment of UTIs in pregnancy have become essential components of prenatal care [12].

Only married subjects were included in the study. The predominance of symptomatic and asymptomatic UTIs among pregnant women (33.3 vs. 13.7%) was also noted in the present study as compared to non-pregnant women (31.4 vs. 9.8%) (Table 2). It is evident from literature that incidence of UTI during pregnancy among Pakistani women, was slightly low in pregnant women (28.5%) as compared to non-pregnant control subjects (30%). However, the difference was not significant. Symptomatic UTI was found in 22.4% pregnant and 20.0% non-pregnant subjects [4]. In a study conducted in Peshawar, Pakistan, the prevalence of UTI was 29.57% in pregnant while, it was 14% in non-pregnant control subjects [13]. In another study performed in Pakistan, 130 muslim women of child bearing age attending the outpatients clinic were interviewed in order to determine the frequency of cystitis and its associated risk factors including personal hygiene practices. Of these, 27% of the women experienced cystitis once in the past. About 63% women reported first UTI during pregnancy. A significant relationship was observed between parity and cystitis ($P < 0.001$). However, personal hygiene practices had no significant association with cystitis [14].

It is also evident from a study that among tested pregnant women, 16.7% developed symptomatic UTI and 25% had at least one UTI during four month follow-up [15]. Symptomatic and asymptomatic UTIs are also significant risk factors for developing pyelonephritis in pregnant women [7]. Approximately 20-40% women with asymptomatic UTIs develop pyelonephritis during pregnancy [2]. During pregnancy, the patients may also develop kidney abscess which is an extremely rare condition. In this connection, Santose *et al.* [16] reported

Table 2: Incidence of symptomatic and asymptomatic urinary tract infections

Subjects	Number	Symptomatic urinary tract infections		Asymptomatic urinary tract infections		Control	
		No.	%	No.	%	No.	%
Pregnant	153	51	33.3	21	13.7	81	53.0
Non-pregnant	563	177	31.4	55	9.8	331	58.8
Total	716	328	-	76	-	412	-

Table 3: Bacterial profile of symptomatic and asymptomatic urinary tract infections with respect to pregnancy

Organisms	Pregnant females						Non-pregnant females					
	Symptomatic UTI		Asymptomatic UTI		Total		Symptomatic UTI		Asymptomatic UTI		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<i>Escherichia coli</i>	34	58.7	11	35.5	45	50.7	117	53.8	33	52.3	150	53.5
<i>Klebsiella pneumoniae</i>	3	5.2	3	9.7	6	6.7	27	12.4	1	1.6	28	10.0
<i>Klebsiella ozaenae</i>	0	0	0	0	0	0	2	0.9	1	1.6	3	1.1
<i>Pseudomonas aeruginosa</i>	0	0	1	3.2	1	1.1	6	2.8	3	4.8	9	3.2
<i>Proteus mirabilis</i>	0	0	0	0	0	0	3	1.4	0	0	3	1.1
<i>Serratia marcescens</i>	0	0	0	0	0	0	2	0.9	0	0	2	0.7
<i>Salmonella typhi</i>	0	0	0	0	0	0	1	0.5	0	0	1	0.4
<i>Salmonella paratyphi A</i>	1	1.7	0	0	1	1.1	1	0.5	0	0	1	0.4
<i>Salmonella paratyphi B</i>	0	0	0	0	0	0	1	0.5	0	0	1	0.4
<i>Staphylococcus aureus</i>	10	17.3	11	35.5	21	23.7	28	12.9	9	14.3	37	13.1
<i>Staphylococcus saprophyticus</i>	5	8.6	5	16.1	10	11.2	14	6.5	10	15.8	24	8.6
<i>Staphylococcus haemolyticus</i>	1	1.7	0	0	1	1.1	4	1.8	1	1.6	5	1.8
<i>Streptococcus faecalis</i>	0	0	0	0	0	0	1	0.5	1	1.6	2	0.7
<i>Micrococcus varians</i>	2	3.4	0	0	2	2.2	4	1.8	3	4.8	7	2.5
<i>Micrococcus lylae</i>	1	1.7	0	0	1	1.1	3	1.4	1	1.6	4	1.4
<i>Micrococcus roseus</i>	1	1.7	0	0	1	1.1	2	0.9	0	0	2	0.7
<i>Micrococcus sedentarius</i>	0	0	0	0	0	0	1	0.5	0	0	1	0.4
Total	58	100	31	100	89	100	217	100	63	100	280	100

the case of a 35 years old pregnant woman with fever, nausea, vomits, right lumbar tenderness who was admitted in the urgency room. Clinical and diagnostic tests led to the development of kidney abscess [16].

In the present study, bacterial profile of symptomatic and asymptomatic UTI was also compared with respect to pregnancy (Table 3). *E. coli* was found with the highest incidence from both pregnant (58.7 vs. 35.5%, $P < 0.046$) and non-pregnant females (53.8 vs. 52.3%, $P > 0.317$). However, the incidences differ significantly in pregnant females while differ insignificantly in case of non-pregnant subjects. In pregnant women *S. aureus* was isolated with the second highest incidence from both symptomatic and asymptomatic UTI (17.3 vs. 35.5%, $P < 0.157$). While in non-pregnant subjects from symptomatic and asymptomatic UTI, the second predominant organisms were *S. aureus* and *S. saprophyticus* respectively.

In a study, it was observed that out of 1000 pregnant women, 42.6% complained one or more symptoms of UTI. The urine culture of symptomatic patients showed growth in only 8.69% cases [17]. In another study carried out by Nath *et al.* (1996), 542 women were screened for UTI. Out of them, 9.04% had UTI. Of these, 35% had asymptomatic while remaining 65% had symptomatic UTI. Age-wise incidence of UTI in pregnancy was observed in the age groups of < 25 years, 25-29 years and ≥ 30 years as 5.26, 10.36 and 12.43%, respectively. Moreover, third trimester

was associated with highest number of UTI cases (11.9%), followed by second (7.5%) and first (5.7%) trimester [18]. Prevalence of asymptomatic UTI was 6.2% in pregnant women and 2.85% in non-pregnant women. However, it remained same statistically ($P > 0.05$ by χ^2 test) [19]. Recently, the relationship of maternal UTIs in pregnancy with the rate of preterm birth was evaluated [20]. It was found that of 38,151 newborn infants, 5.7% had mothers with UTIs with pregnancy. Women with pregnancy also had somewhat shorter gestational age and a higher proportion of preterm birth. This preterm inducing effect of maternal UTI was preventable by antimicrobial therapy. In this connection, Hazir [11] evaluated the frequency of asymptomatic UTI in pregnant women. Eleven hundred apparently healthy pregnant women were screened for significant bacteriuria. The prevalence of asymptomatic UTI was found to be 6.1%. However, asymptomatic UTI had no relationship with gestational age, parity, level of education and body mass index [11]. In a study, 500 pregnant women were screened for asymptomatic UTI in their first and second trimester. Out of them 8.4% were positive for culture. A control group of non-pregnant women was also screened for asymptomatic UTI. The control group yielded 3% positive cultures. The frequency of UTI in pregnant women was observed 30% of the women suffered from UTI. Of these infected women, 53.7% were in the age group of 15-24 years and 48.8% were in the third trimester [21].

It was concluded that UTIs are more common in pregnant women as compared to non-pregnant in Karachi, Pakistan. *E. coli* was found to be the most common urinary pathogen in both subjects.

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