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Clinico-pathological study of urinary tract infection during pregnancy

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***Abstract*---**Urinary tract infections (UTI) are the most common bacterial infections during pregnancy. Untreated UTI can be associated with serious obstetric complications. A cross-sectional study was conducted in Gynaecology and Obstetrics Department in our hospital between January 2019 to January 2021. A consecutive 125 pregnant women with or without symptoms of UTI were included in this study. Socio-demographic data including age, parity and duration of gestation were collected. Midstream urine was collected from each women into a container, culturing done and examined microscopically. The highest incidence of UTI is below forty years. The younger age groups having the highest rates was also observed in previous studies. Well socioeconomic (OR= 4.757) versus poor (OR= 9.123) have high statistically significant differences (P= 0.001). Furthermore, educated women (OR= 10.448, 9.988) versus not educated (OR= 11.252) with a high significant difference (P= 0.01). In this study, the frequency of UTI was higher in the second trimester compared to the first and third trimester. In this study, previous UTI was the significant risk factor. Women had past history of UTI have highest rate of re-infected (OR= 7.331, P= 0.05). Sexual activity was also risk factor for development of UTI (OR= 8.541). Functional and physiological changes of pregnancy predispose women to UTI. Association with other factors such as age, sexual activity, multiparity, previous UTI, low education level and low socio-economic conditions is clear.

***Keywords*---**UTI, pregnancy, urine, multiparity, bacterial.

Introduction

Urinary tract infection (UTI), is one of most common infection caused by the presence and growth of microorganisms in the urinary tract, and it is the single commonest bacterial infections of mankind and in pregnancy [1]. It is involve the lower GUT, the bladder, and sometimes upper UT [2]. Approximately, 20% of the pregnant women exposure to UTI and it is the most common cause of admission in obstetrical wards [3]. Clinically, UTI in pregnancy manifested as asymptomatic bacteriuria, acute cystitis and acute pyelonephritis [4]. Laboratory, it is defined as the presence of at least 100,000 organisms /mL of urine in an asymptomatic patient, or as more than 100 organisms/mL of urine with accompanying pyuria (>5 WBCs/mL) in a symptomatic patient [5]. Untreated asymptomatic bacteriuria is a risk factor for acute cystitis (40%) and pyelonephritis (25-30%) in pregnancy, as 70% of all cases of symptomatic UTI among unscreened pregnant females [5]. Globally, symptomatic and asymptomatic bacteriuria have been reported as 17.9% and 13.0% pregnant women, respectively [6]. Child bearing pregnancy increases the risk of UTI, firstly due to dilate the ureters (hydronephrosis of pregnancy), physiologically, peaks at 22-26 weeks and continues to persist until delivery. Secondly, both progesterone and estrogens levels increase during pregnancy and lead to decreased ureteral and bladder tone [7]. Thirdly, increased plasma volume during pregnancy leads to decrease urine concentration causing glucosurea, which encourages bacterial growth in the urine, and increased bladder volume [8]. These factors lead to urinary stasis and uretero-vesical reflux [9]. In adddition, the immunity reduction during pregnancy that encourage the growth of both commensal and non-commensal microorganisms [7]. Female have high risk to develop UTI because of short urethra, its proximity to vagina and anus and their bladder empty incompletely, sexual activity, trauma during sexual intercourse, thin skin and certain contraceptive methods [8]. Also, abnormalities of urinary tract or stones, diabetes mellitus, immunosupression and past history of UTI tend to increase the risk [10]. Abortion, small birth size, maternal anemia, hypertension, preterm labour, phlebitis, thrombosis and chronic pyelonephritis are related to UTI during pregnancy, in addition to perinatal morbidity [11]. *E. coli* remains the predominant organism implicated in UTI in pregnancy, in addition to other pathogens in less extent *Klebsiella* spp., *Staphylococcus aureus*, *Proteus* spp., and *Pseudomonas* spp. [12].

Methods

A cross-sectional study was conducted in Gynaecology and Obstetrics Department in our hospital between January 2019 to January 2021. A consecutive 125 pregnant women with or without symptoms of UTI were included in this study. Pregnant women having renal disease or on antibiotic therapy within 72 hours to the study days were excluded. Verbal informed consent was obtained from each women before the commencement of the research. Socio-demographic data including age, pariety and duration of gestation were collected. Midstream urine was collected from each women into a container, culturing done

and examined microscopically. Pus cells >5/HPF were also considered significant for infection.

Results

One-hundred and twenty-five urine samples were collected and analyzed during the study period. Sixty five (65) samples showed significant growth, which amounted to a prevalence of 26.0 % (Table 5). The prevalence of infection in relation to age, pregnancy trimesters, and parity are shown in table 1. Factors impaction of UTI with OR are shown in table 2.

Table 1: Prevalence of UTI in pregnant women in relation to age, trimester, and parity

		No.	%
Age groups (Years)	<40	76	60.8
	≥40	49	39.2
Gestational age (weeks)	1st trimester	33	26.4
	2nd trimester	58	46.4
	3rd trimester	34	27.2
Parity	0-3	83	66.4
	>3	42	33.6

Table 2: Odd ratio for factors related to UTI

		Odd ratio (OR)	P value
Social	Well	4.757	0.001
	Poor	9.123	
Education	Not	11.252	0.001
	Educated	10.448	
	Higher educated	9.988	
Previous UTI	Yes	7.331	0.05
	No	5.895	
Sexual activity	Active	8.541	0.05
	Not	8.012	

Discussion

In literature, maternal age was found to be a significant risk factor increasing of 1- 2% is reported per decade of age [2, 9]. The highest incidence is below forty years. The younger age groups having the highest rates was also observed in previous studies [12, 14]. The reason could be due to many women within this age group are likely to be sexually active, and multiparty [16]. Sexual activities are increase the risk [13] and women are mostly sexually active at younger age. Leigh [16] and Sharma et al [17] had dissimilar observation regarding the risk of UTI which according to them increases by 37.04% with parity of > 3 as compared to 18.75% in nulliparous.

Furthermore, the findings does not agree with that of Onyemelukwe et al [18] who reported a prevalence of 12.7% and also with Leigh [16], Brook et al [19] who reported a prevalence of 1-10%. This difference may be due to the inclusion of both symptomatic and difference socioeconomic status. Well socioeconomic (OR= 4.757) versas poor (OR= 9.123) have high statistically significant differences (P= 0.001). Furthermore, educated women (OR= 10.448, 9.988) versus not educated (OR= 11.252) with a high significant difference (P= 0.01).

In this study, the frequency of UTI was higher in the second trimester compared to the first and third trimester, dissimilar with Leigh, [16] who reported an increased frequency of UTI in the third trimester. Whereas, Onuh et al, [13] agree with us, who reported a higher prevalence of UTI in the second trimester. This could be explained by change in urinary stasis and vesicoureteral reflux or decrease in urinary progesterones and oestrogens in the various trimester periods.

In this study, previous UTI was the significant risk factor. Women had past history of UTI have highest rate of re-infected (OR= 7.331, P= 0.05). In Pakistan, a study of Haider et al, [15], prevalence of bacteriuria was 100% in women who had previous bouts of UTI.

Sexual activity was also risk factor for development of UTI (OR= 8.541). This has been seen in study of Haider et al [15]. Similarly, study conducted showed that prevalence of UTI increases in women who are sexually active. The anatomical relationship of female's urethra and the vagina makes it liable to trauma during sexual intercourse as well as bacteria been massaged up the urethra into the bladder during pregnancy/child birth, in addition, short female urethra. Other factors like low socio-economic status, not washing genitals before and after coitus, not voiding urine postcoitus and washing genitals from back to front have observed as risk factors for UTI during pregnancy [21].

Conclusion

Functional and physiological changes of pregnancy predispose women to UTI. Association with other factors such as age, sexual activity, multiparity, previous UTI, low education level and low socio-economic conditions is clear.

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