

PREVALENCE OF URINARY TRACT INFECTION AND POSSIBLE RISK FACTORS AMONG ANTENATAL WOMEN ATTENDING A SEMI-URBAN TERTIARY CARE CENTRE IN CENTRAL TRAVANCORE

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Abstract

Background: UTI is a major health problem, it has been reported among 20% of the pregnant women and is the most common cause of admission in obstetrical ward. The objective of this study is to find the prevalence of UTI in pregnant women and possible risk factors contributing to the development of UTI in pregnant women. **Materials and Methods:** After obtaining informed consent and applying the inclusion and exclusion criteria, 202 antenatal women were included in the study. The study was across sectional study conducted in the antenatal clinic of Department of Obstetrics and Gynaecology, MGM Muthoot Medical Centre, Pathanamthitta. Assessment of age, gravida, trimester and past history was done with the aid of a questionnaire. Centrifuged urine deposits were examined microscopically at high magnification for puscells, red blood cells, epithelial cells, casts, crystals, yeast like cells. **Result:** The prevalence of UTI in pregnant women was 29.7%. There was a high prevalence of UTI in pregnant women in third trimester (34.6%), followed by women in second and first trimesters (27.4%, 25% respectively). Highest prevalence of UTI was seen in primigravida (32.7%). Our study reported a high prevalence of UTI (40.7%) in women who had a previous history of urinary tract infection. There was no statistically significant association between the probable risk factors taken the study which included gravida, maternal age, trimester, past history of abortion, ectopic pregnancy, GDM, PIH. **Conclusion:** Among 202 antenatal women attending the antenatal clinic at MGM Muthoot Medical Centre, Pathanamthitta, 60 women had UTI. Prevalence of UTI was high and was 29.7%. Prevalence was higher in age group less than 30 years, in primigravida, in women in third trimester. Health education about personal hygiene should be emphasized by the antenatal care physician to all pregnant women.

INTRODUCTION

Urinary Tract Infection (UTI) is an infection caused by the presence and growth of micro organism anywhere in the urinary tract and is perhaps the single commonest bacterial infection of mankind.^[1] Various microorganisms are able to invade the urinary tract and can be involved in the pathogenesis of urinary tract infection (UTI).^[2] Urinary tract infection affects people of all ages, but women, especially pregnant

women, are more vulnerable than men because of their short urethra and easy contamination of the urinary tract with faecal flora.^[3]

The current UTI guidelines use the concept of uncomplicated UTI and complicated UTIs. Uncomplicated UTI can be a acute, sporadic, recurrent lower (uncomplicated cystitis) and/or upper (uncomplicated pyelonephritis) UTI, limited to non pregnant women with no known relevant anatomical or functional abnormalities within the urinary tract or

comorbidities. UTI in a patient with an increased chance of a complicated course pregnant women, all men, patients with relevant anatomical or functional abnormalities of the urinary tract, in dwelling catheters, renal diseases, and/ or other comorbidities, are defined as complicated UTIs.^[4] Hence, UTI's in antenatal women are classified as complicated UTIs. In pregnant women, UTIs can present as a symptomatic bacteriuria (ASB), where the infection is limited to bacterial growth in urine, or symptomatic infection (acute cystitis, acute pyelonephritis), where there is bacterial invasion of the urinary tract tissues, inducing an inflammatory response.^[5]

Asymptomatic Bacteriuria is defined as significant bacterial colonization of the lower urinary tract without symptoms. Traditional diagnostic criteria of significant bacteriuria include culture of 10⁵ colony forming units (CFUs)/ ml of a single uropathogen on two consecutive clean catch urine specimens.^[6]

Acute cystitis is symptomatic infection of the bladder and include symptoms such as sudden onset of dysuria, suprapubic pain, urinary urgency, frequency and dribbling. Haematuria and pyuria are frequently seen on urinalysis. High fever and systemic symptoms are uncommon in patients with acute cystitis.^[7]

Urinary tract infection during pregnancy contributes significantly to maternal and perinatal morbidity. Abortion, small birth size, maternal anaemia, hypertension, preterm labour, phlebitis, thrombosis and chronic pyelonephritis are related to urinary tract infection during pregnancy.^[8] Thus, the prevention, early detection and prompt treatment of UTI in pregnancy have become essential components of prenatal care.^[9]

This study was undertaken to assess the prevalence of urinary tract infection and possible risk factors such as age, parity, past history of abortion, past history of UTI, history of GDM or PIH in the past or present pregnancy among pregnant women attending an antenatal clinic.

MATERIALS AND METHODS

It was a Hospital based cross-sectional study done at MGM Muthoot Medical Centre, Pathanamthitta. Pregnant women attending the antenatal clinic at the Department of Obstetrics and Gynaecology of MGM Muthoot Medical Centre, Pathanamthitta, The study was carried out from January 2020 to January 2021. Who fulfilled the inclusion criteria were included.

Inclusion Criteria

All pregnant women with varying gravida, irrespective of trimesters.

Age group of 18 to 40 years.

Pregnant women who are willing to participate.

Exclusion Criteria

Pregnant women who are not willing to participate.

Pregnant women with comorbidities including T2DM, S.HTN, known renal disease or urogenital abnormality.

Pregnant women who were on antibiotic treatment 2 weeks prior to the time of study.

Sample Size and Sampling

Assuming the prevalence of UTI among antenatal women (p) as 32.2% from previous study (10), confidence level as 95% and relative precision (d) as 20% of (p), the sample size was calculated as 202 using the following formula:

$$n = \left(Z_{1-\frac{\alpha}{2}} \right)^2 \frac{p(1-p)}{d^2}$$

Where, n is the sample size,

(1- α /2) is confidence level.

(Z_{1- α /2}) is 1.96 at 5% level of significance.

p is prevalence.

d is relative precision.

Methodology

After obtaining clearance of the ethical committee, 202 pregnant women attending the antenatal clinic at the Department of Obstetrics and Gynaecology of MGM Muthoot Medical Centre, Pathanamthitta, who fulfilled the inclusion criteria were included as the study subjects. After obtaining written informed consent, the antenatal women were interviewed using a questionnaire. Once filled, it was collected and entered into Microsoft Excel by the investigator.

Statistical Analysis

Data was entered in Microsoft Excel 2019 and analysed using SPSS Version 20 for Windows. Categorical variables such as age, gravida, trimester, menstrual history, history of PIH, GDM, ectopic pregnancy, abortion was expressed as frequency and percentages. Mean and standard deviation were expressed for continuous variables. Association between risk factors and UTI was done using Chi-square test. Odds Ratio with 95% CI was calculated and reported. Ap-value of less than 0.05 was considered statistically significant. The study was approved by the Institute Ethics Committee of MGM Muthoot Medical Centre, Pathanamthitta.

RESULTS

The number of participants belonging to the first, second and third trimester were 48 (23.8%), 73 (36.1%) and 81 (40.1%) respectively. Mean age 28.47 \pm 4.07. The number of pregnant women who were primigravida and multigravida were 101 (50%) and 101 (50%) respectively.

Table 1: Frequency and Percentage distribution of Trimester (N=202)

Trimester	Frequency	Percent
First	48	23.8
Second	73	36.1
Third	81	40.1

Total	202	100.0
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Table 2: Frequency and Percentage of risk factors

Risk factors		Frequency	Percent
Abortion	No	158	78.2
	Yes	44	21.8
	Total	202	100.0
Ectopic	No	198	98.0
	Yes	4	2.0
	Total	202	100.0
GDM	No	191	94.6
	Yes	11	5.4
	Total	202	100.0
PIH	No	193	95.5
	Yes	9	4.5
	Total	202	100.0
H/oUTI	No	165	81.7
	Yes	37	18.3
	Total	202	100.0
Puscells	1-5	79	39.1
	5-10	48	23.8
	10-20	41	20.3
	>20	34	16.8
	Total	202	100.0
Symptoms	No	174	86.1
	Yes	28	13.9
	Total	202	100.0

As per [Table 2] the most common risk factor was abortion followed by history of UTI.

Table 3: Prevalence rate of UTI in pregnant women

Prevalence	Cases	Percentage
UTI	60	29.7
NON-UTI	142	70.3
Total	202	100

Of the 202 antenatal women who were enrolled in the study, 60 women had UTI. Thus, the prevalence of UTI was calculated to be 29.7% in this study.

Table 4: Prevalence of UTI in pregnant women in relation to trimester

Trimester	No. examined	No. positive	Percentage
First	48	12	25.0
Second	73	20	27.4
Third	81	28	34.6

P value is 0.49; result is not significant. Along with trimester, gravida, history of abortion, ectopic pregnancy, GDM, UTI were found to be non- significant ($p > 0.05$)

Table 5: Association between study variables and UTI

Risk factor		Total	Sign. Bacteruria		OR(95%CI) p-value
			Yes	No	
Age group	Less than 30years	144 (71.3%)	45 (75.0%)	99 (69.7%)	1.30 (0.65-2.58)
	More than 30years	58 (28.7%)	15 (25.0%)	43 (30.3%)	0.49
Trimester	First	48 (23.8%)	12 (20.0%)	36 (25.4%)	0.447
	Second	73 (36.1%)	20 (33.3%)	53 (37.3%)	
	Third	81 (40.1%)	28 (46.7%)	53 (37.3%)	
Gravida	Primi	101 (50.0%)	33 (55.0%)	68 (47.9%)	1.33 (0.72-2.43)
	Multi	101 (50.0%)	27 (45.0%)	74 (52.1%)	0.442
Abortion	Yes	44 (21.8%)	13 (21.7%)	31 (21.8%)	0.99 (0.47-2.05)
	No	158 (78.2%)	47 (78.3%)	111 (78.2%)	1.00
Ectopic	Yes	4 (2.0%)	2 (3.3%)	2 (1.4%)	2.41 (0.33-17.54)
	No	198 (98.0%)	58 (96.7%)	140 (98.6%)	0.37
GDM	Yes	11 (5.4%)	1 (1.7%)	10 (7.0%)	0.22 (0.02-1.78)
	No	191 (94.6%)	59 (98.3%)	132 (93.0%)	0.124
PIH	Yes	9 (4.5%)	3 (5.0%)	6 (4.2%)	1.19 (0.28-4.93)
	No	193 (95.5%)	57 (95.0%)	136 (95.8%)	0.807
H/oUTI	Yes	37 (18.3%)	15 (25.0%)	22 (15.5%)	1.81 (0.86-3.81)
	No	165 (81.7%)	45 (75.0%)	120 (84.5%)	0.110
Symptoms	Yes	28 (13.9%)	24 (40.0%)	4 (2.8%)	23.0 (7.5-70.5)
	No	174 (86.1%)	36 (60.0%)	138 (97.2%)	<0.001*
Puscells/HPF	1-5	79 (39.1%)	12 (20.0%)	67 (47.2%)	0.002*

	5-10	48 (23.8%)	21 (35.0%)	27 (19.0%)
	10-20	41 (20.3%)	13 (21.7%)	28 (19.7%)
	>20	34 (16.8%)	14 (23.3%)	20 (14.1%)

As per [Table 5] There was no significant association between UTI and the above-mentioned risk factors. However, there was a significant association between UTI and symptoms and Pus cells/HPF.

Table 6: Organism Isolated

Organism isolated	Frequency	Percent
E.COLI	39	19.3
ENTEROCOCCUS	4	2.0
KLEBSIELLA	17	8.4

As per [Table 6] the most common organism isolated was E.coli in 19.3% subjects followed by Klebsiella in 8.4%.

DISCUSSION

Bacteriuria, either symptomatic or asymptomatic, is common in pregnancy. If left untreated; 20%-30% of asymptomatic bacteriuria will lead to acute pyelonephritis. This may result in low birth weight of infants, premature delivery cases and occasionally, stillbirth, so it is a serious threat for the mother and fetus.^[11]

The present study assesses the prevalence of UTI in antenatal women and also the possible risk factors that contribute to the development of UTI in antenatal women. We also tried to find the association between the risk factors and UTI, prevalence of UTI based on risk factors and the most common organisms isolated from the urine cultures of these women.

In this study, out of 202 antenatal women who were enrolled, 60 women i.e, 29.7% were UTI positive and 144 women i.e, 70.3% were UTI negative. Hence the prevalence of UTI among pregnant women in this study was found to be 29.7% which indicates that prevalence rate is very high. This is comparable with studies conducted by Bandyopadhyay et al. and Sabharwal which reported higher proportion of women (25.2% and 24%, respectively) having UTI.^[12,13] Ayoyietal reported a higher prevalence (21.5%) in Kenya similar to this study.^[14] Kantetal, have reported a lower prevalence rate as opposed to our study.^[15]

Considering the effect of maternal age of participants on pregnancy in UTI, this study did not establish any significant relationship on UTI in pregnancy and maternal age ($p=0.49$; $p<0.05$); as the highest frequency and prevalence of the bacteriuria occur in patients of age group 18-30 years (75%, 31.3% respectively) which is different from the report of Amadietal which reported a higher prevalence of UTI in patients of age group 35-39 years.^[16] In this study, there was a higher prevalence of UTI in pregnant women in third trimester (34.6%), followed by women in second and first trimesters (27.4%, 25% respectively). This finding is similar to the results obtained by the study conducted by Ranjanetal.^[17] The increased incidence during third

trimester may relate to increased mechanical obstruction due to gravid uterus. The risk of UTI is partly due to the pressure of gravid uterus on the ureters causing stasis of urine flow and is also attributed to the humoral and immunological changes during normal pregnancy.^[17] Kantetal,^[15] also reported a similar finding in their study. However, the relation between trimester and UTI in this study is not statistically significant.

In this study, there was no statistically significant association between UTI and GDM. This is similar to the study done by Shahrakietal,^[18] where prevalence of asymptomatic bacteriuria was studied in pregnant women with and without gestational diabetes mellitus. A prospective cohort study conducted by RizkDetal concluded that GDM was not associated with increased risk of UTI or of maternal and perinatal morbidity as a result of infection.^[19]

Our study reported a higher prevalence of UTI (40.7%) in women who had a previous history of urinary tract infection. This is comparable to the results observed by Shaheenetal.^[20] Our study also reported a higher prevalence (85.7%) of symptomatic UTI. The most common organism isolated from the urine cultures of pregnant women with UTI was found to be E.coli (19.3%), and second most common being Klebsiella (8.4%). This finding is similar to the study done by Manjulaetal,^[21] and least common organism isolated belonged to the Enterococcus species (2%), probably due to contamination of the urine sample.

CONCLUSION

Among 202 antenatal women attending the antenatal clinic at MGM Muthoot Medical Centre, Pathanamthitta, 60 women had UTI. Prevalence of UTI was high and was 29.7%. Prevalence was higher in age group less than 30 years, in primi gravida, in women in third trimester. Health education about personal hygiene should be emphasized by the antenatal care physician to all pregnant women.

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