ASYMPTOMATIC BACTERIURIA IN WOMEN PRESENTING TO ANTENATAL CLINIC AT A TERTIARY CARE HOSPITAL IN KARACHI, PAKISTAN

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ABSTRACT

Objective: To determine the frequency, risk factors, and common causative agents of asymptomatic bacteriuria in pregnant women attending antenatal clinic at JPMC Karachi.

Study Design: Cross sectional study.

Place and Duration of Study: Jinnah Postgraduate Medical Center Karachi, from Jul 2014 to Sep 2015.

Material and Methods: One hundred seventy seven women participated according to pre-determined inclusion criteria. All of them underwent urine examination on midstream urine and urine was cultured in case of a positive test (>10 leukocytes per microliter of urine).

Results: Incidence of asymptomatic bacteriuria was 12.4% of the 177 women. Low socioeconomic status was found to be the only statistically significant risk factor associated. The most common causative agent was *E. coli*.

Conclusion: Pregnant women belonging to lower socioeconomic status are more likely to have asymptomatic bacteriuria. The recommendations stemming out of the study include complete examination of urine of all pregnant women to be carried out at first antenatal visit and culture of urine to follow if indicated.

Keywords: Asymptomatic infections, Bacteriuria, Pregnancy, Urinary tract infections.

INTRODUCTION

Campbell-Walsh Urology defines UTI as" an inflammatory response of the urothelium to bacterial invasion that is usually associated with bacteriuria and pyuria[1]."

All age groups are equally susceptible to this infection but women are at increased risk due to shorter length of urethra, absence of prostatic secretions and hence easy contamination of the urinary tract with fecal flora. Pregnancy is an additional risk factor[2].

A sample of normal urine is sterile. If bacteria are found in urine this is called bacteriuria[1]. Incidence of bacteriuria in pregnancy is same as in non-pregnant women but that of acute pyelonephritis, a complication of UTI, increases[3].

Bacteriuria can be both symptomatic and asymptomatic[1]. If bacteria are detected in urine

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in a concentration that signifies infection but clinical signs and symptoms are absent, the condition is called asymptomatic bacteriuria[4]. Amongst infectious complications of pregnancy, asymptomatic bacteriuria is one of the most common[1].

UTIs have significant morbidity and mortality associated with them[1]. Complications of pregnancy attributed to UTI include low birth weight, preterm labor and intra-uterine growth restriction; anemia, hypertension and maternal renal problems are known to have a less certain association[5]. Greater likelihood of pyelonephritis following UTI in pregnancy is believed to arise from anatomic and physiological changes during pregnancy[3]. Diagnosis and treatment of asymptomatic bacteriuria plays a key role in reducing the risk of pyelonephritis[6].

A number of factors have been known to increase the likelihood of UTI during pregnancy. They include advancing age, increasing parity and more frequent sexual activity and sickle cell trait.

In addition low socioeconomic status, history of recurrent UTI, diabetes mellitus and urinary tract abnormalities have also been shown to have a positive association[4,5].

Causative organisms and the resistance to antibiotic therapy varies a lot; with different areas of the same country harboring different pathogens. Even resistant strains can cause asymptomatic infections among pregnant women. Monitoring of common pathogens is thus essential[7].

This study was performed to ascertain the risk factors associated with the development of asymptomatic bacteriuria during pregnancy in the population attending antenatal clinic at JPMC Karachi so that high risk groups can be screened in time for a possible urinary tract infection and treated accordingly. Another objective was to discover the common causative agents of asymptomatic bacteriuria in our population so that appropriate empirical therapy may be initiated even when test results are unavailable.

MATERIAL AND METHODS

A cross-sectional study was carried out at the antenatal clinic of the Jinnah Postgraduate Medical Centre Karachi for a period of 15 months. Total 177 women were selected to ascertain the frequency and risk factors of UTI including age, gestational age, parity, educational level, anemia, socioeconomic status, sexual activity and past history of UTI. Eight women were lost to follow up.

Sample size was calculated using a population of 1000,000, an estimated prevalence of 2.5-8.7%[8] and a confidence level of 95%. Required sample size came out to be 123. One hundred and eighty five participants were enrolled to cater for loss to follow up and 177 participants completed the study requirements. A systematic sampling method was used. Every tenth pregnant women registering for the antenatal clinic at JPMC was evaluated using the inclusion criteria and included in the study if she met the criteria.

All pregnant women irrespective of age, gestational age and parity were included while women with urinary symptoms, chronic renal disease, past history of immunosuppressive therapy, history of antibiotic intake in the last 7 days, renal transplant and diabetes were excluded.

Informed consent was taken and data collected using a self-designed proforma. All women underwent complete examination of urine on midstream urine. The test was
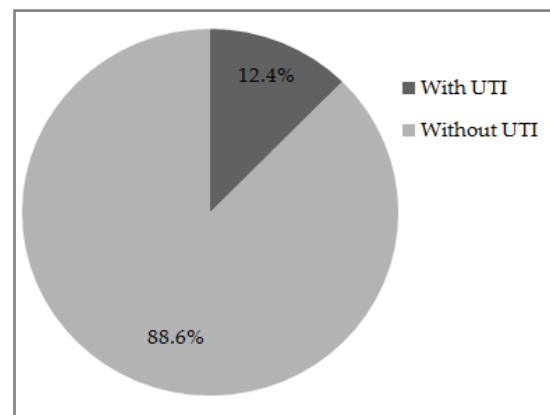

Figure: Percentage of urinary tract infections in the study population.

considered positive if more than 10 leukocytes were detected per micro liter of urine. In all positive cases, urine was cultured.

Data was analyzed using SPSS version 22. Age and trimester wise association with UTI was calculated using the chi-square test. The rest of the variables were 2x2 contingency tables and were tabulated using chi-square test. Odds ratios were also calculated. A p-value less than 0.05 was considered significant.

RESULTS

Of the 177 women in the study population, 22 (12.4%) had asymptomatic bacteriuria. 155 (87.6%) did not have asymptomatic bacteriuria (figure).

Eighteen (10.17%) women were less than 20 years of age, 144 (81.36%) were between 20-30 years of age, fourteen (7.91%) were between 30 to 40 years of age and only one (0.56%) woman was above 40 years. The data was analyzed using the

Chi-square test (*p*-value 0.57) and no statistical significance was found between age and the incidence of urinary tract infection (table-I).

Five women (2.8%) presented in the first trimester of pregnancy. None (0.00%) of them had UTI. Sixty-five women (36.72%) presented in the second trimester with nine (13.85%) of them being diagnosed with UTI (table-II). One hundred seven women (60.45%) visited the antenatal clinic in the 3rd trimester with 13 (12.15%) of them being eventually diagnosed with urinary tract infection. The data was analyzed using chi-square test (*p*-value=0.66) and no association was seen between the gestational age and the incidence of urinary tract

Imade *et al*[11] found high incidences of 30% and 45% respectively.

Low socioeconomic status was found to be the only statistically significant risk factor in our study. Most of the patients in the study belonged to the low socioeconomic group. This finding, of low socioeconomic status being a significant risk factor is in agreement with Haider *et al*[8], Dimetry[12] but in contrast to Perera *et al*[13]. Other factors were probably insignificant in our study because of the small number of women who tested positive for asymptomatic bacteriuria. Consequently, further studies are needed to investigate this link drawing participants from selective groups which are at a greater risk for

Table-I: Demographics and characteristics of patients enrolled.

	With UTI (n=22)	Without UTI (n=155)	Total (100%)	Chi-Square	*p*-value
Age					
<20	4 (22.2%)	14 (77.8%)	18 (100%)		
20-30	16 (11.1%)	128 (88.9%)	144 (100%)		
31-40	2 (14.3%)	12 (85.7%)	14 (100%)	2.002	0.572
>40	0 (0.00%)	1 (100.0%)	1 (100%)		
	22 (12.4%)	155 (87.6%)	177 (100%)		
Trimester					
1st	0 (0.00%)	5 (100.0%)	5 (100%)		
2nd	9 (13.8%)	56 (86.2%)	65 (100%)	0.837	0.658
3rd	13 (12.1%)	94 (87.9%)	107 (100%)		
	22 (12.4%)	155 (87.6%)	177 (100%)		

infection.

The commonest causative agent of bacteriuria in our study was *Escherichia Coli*, with an incidence of 45.45% followed by Klebseilla pneumonia at 22.73% and staphylococcus aureus at 18.18% (table-III).

DISCUSSION

In the study under discussion, the incidence for asymptomatic bacteriuria was 12.4%. Different studies carried out in the past have shown variable incidences of asymptomatic bacteriuria in pregnant women. For instance, Haider *et al*[8], found a low incidence of 4.3%, Fatima *et al*[9] found 4.8%, while Haddad *et al*[10] and

developing urinary tract infection during pregnancy. A greater number of positive women would then help to correlate the factors which are contributing to their infection with the risk factors associated with them.

Low socioeconomic status is probably the most significant risk factor in this study because economic status defines a lot of other variables including (but not limited to) hygiene, sexual practices, diet (leading to anemia), educational level and parity. These other variables can lead to infection which was not evident in our study but was reported in other studies. The difference in the rates of infection between low and high income countries may therefore be attributed to

the socioeconomic status of the majority of the population.

Maternal age was found to have no association with development of asymptomatic bacteriuria during pregnancy. This is in agreement with Haider et al[8] but in disagreement with

was found in our study. This is in line with Perera et al[13] and Masinde et al[14].

History of sexual activity was not a risk factor in our study contrary to the findings of Haider et al[8] and Amiri et al[15], both of whom found a strong association.

Table-II: Cross tabs of urinary tract infections status with possible risk factors among patients.

Risk Factors	With UTI n=22 (12.4%)	Without UTI n=155 (87.6%)	Total	Odds ratio	Chi-sq. test p-value	Statistical Sign.
Parity						
Primigravida	13 (14.4%)	77 (85.6%)	90 (100%)	1.46	0.409	No
Multipara	9 (10.3%)	78 (89.7%)	87 (100%)			
Educational Level						
Literate	16 (13.3%)	104 (86.7%)	120 (100%)	1.31	0.597	No
illiterate	6 (10.5%)	51 (89.5%)	57 (100%)			
Anemia						
Yes	17 (14.9%)	97 (85.1%)	114 (100%)	2.03	0.178	No
No	5 (7.9%)	58 (92.1%)	63 (100%)			
Low income group						
Yes	12 (9.2%)	119 (90.8%)	131 (100%)	0.36	0.026	Yes
No	10 (21.7%)	36 (78.3%)	46 (100%)			
Sexual Activity						
Frequent	12 (13.2%)	79 (86.8%)	91 (100%)	1.15	0.753	No
Infrequent	10 (11.6%)	79 (88.4%)	89 (100%)			
Past history of UTI						
Yes	10 (17.5%)	47 (82.5%)	57 (100%)	1.91	0.155	No
No	12 (10.0%)	108 (90.0%)	120 (100%)			

Table-III: Causes of urinary tract infections ascertained by urine culture.

Organism	No.	Percentage (%)
E. coli	10	45.45
Klebsiella pneumonia	5	22.73
Staphylococcus aureus	4	18.18
Streptococcus aglactiae	3	13.64
Total	22	100

Dimetry[12] who found an association. In literature, only a significant increasing risk of 1-2% is reported per decade of age[8] which was not apparent in our study, probably due to the small sample size.

Other factors reported in the literature which were found to be associated with asymptomatic bacteriuria include gestational age, parity and level of education[12]. However no such association

Past history of UTI was found to be an important predisposing factor to asymptomatic bacteriuria during pregnancy by Haider et al[8] and Fatima et al[9].

Finally, anemia was not a strong enough risk factor in our study in agreement with the findings of Fatima et al[10].

The dominant causative agent in this study was E. coli which had an incidence of 45.45%

in the women who were found positive for asymptomatic bacteriuria. These findings are consistent with other studies conducted previously[11,14,16,17-19]. It can therefore be said that *E. coli* is probably the major causative agent of urinary tract infection in pregnant women and is the first thing that should come to mind when asymptomatic bacteriuria is suspected.

CONCLUSION

This study revealed 12.4% incidence of asymptomatic bacteriuria among pregnant women. Pregnant women belonging to lower socioeconomic status are more likely to have asymptomatic bacteriuria and it was found to be the only statistically significant risk factor in our study. Age, trimester, parity, educational level, anemia, sexual activity, and past history of UTI were not found to have effect on the prevalence of asymptomatic bacteriuria. The recommendations stemming out of the study include complete examination of urine to be carried out at first antenatal visit and culture of urine to follow if indicated. Organisms recovered in order of frequency were *E. coli*, *klebsiella pneumonia*, *staphylococcus aureus* and *streptococcus aglactiae*.

Author's Contributions

SP was involved in designing the project, data collection and drafting the manuscript. AM did literature search, data entry, analysis and drafted the manuscript. SS helped design the project, supervised the study and helped write the manuscript.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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