



ORIGINAL ARTICLE

Prevalence of urinary tract infection with asymptomatic bacteriuria among gravid females: A Pakistani multicenter cross-sectional study.

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ABSTRACT... Objective: To determine the prevalence of urinary tract infection with asymptomatic bacteriuria among pregnant females. **Study Design:** Multi-center, Cross-sectional study. **Setting:** Department of Obstetrics and Gynecology, Jinnah Postgraduate Medical Center, Karachi, Sheikh Zayed Medical College and Hospital, Rahim Yar Khan, and Hayatabad Medical Complex, Peshawar, Pakistan. **Period:** January 2023 to June 2023. **Material & Methods:** A total of 260 pregnant females aged between 18 to 45 years and visiting outpatient department for antenatal check-up were analyzed. Enrolled females were interviewed and demographical and clinical data were noted. All women had their urine analysis done as a routine antenatal test. Urine culture analysis was also done at the same time. Asymptomatic bacteriuria was labeled when urine culture revealed the presence of more than 10^5 bacteria per milliliter of urine but without showing symptoms of urinary tract infections. **Results:** In a total of 260 pregnant females, the mean age was 28.6 ± 5.3 years (ranging between 18-45 years). There were 125 (48.1%) females who reported during 3rd trimester of pregnancy. Residential status of 209 (80.4%) females was urban. There were 65 (25.0) females who were illiterate. Family monthly income of 198 (76.2%) females was below 30,000 Pakistani Rupees. Asymptomatic bacteriuria was revealed in 69 (26.5%) pregnant females. The most common urinary bacterial isolates were E. coli and Klebsiella found in 36 (52.2%) and 10 (14.5%) respectively. **Conclusion:** The prevalence of asymptomatic bacteriuria among pregnant females was high (26.5%). The most common urinary isolates found among asymptomatic bacteriuria cases were E.coli.

Key words: Asymptomatic Bacteriuria, E. coli, Gravidity, Klebsiella, Parity.

INTRODUCTION

The development of urinary tract infections during pregnancy is seen as more common than other types of infections.¹ It may result in issues like pyelonephritis, chronic renal failure, preterm delivery, low birth weight, and augmented fetal death rates. Because the gravid uterus exerts pressure on the ureters, which results in stagnation of urine flow, as well as the hormonal and immunological changes occurring during pregnancy, women are at an increased risk of UTI at this stage.² Regional data shows that in pregnancy, asymptomatic bacteriuria (ASB) prevails between 6.1 and 10.9%.³⁻⁵ If not treated, ASB may lead to obstetrical, fetal, and maternal complications.^{6,7}

The urinary tract's upper urethra is the site of infection that strikes most often, but if one of the components is contaminated, microbes might propagate across the entire system. Bacteriuria is the presence of bacteria in urine, and if the bacteria in 1 ml of urine exceed 10^5 colony forming units, then irrespective of the presence of symptoms, bacteriuria is considered to be significant.⁸ The bacteria that cause urinary tract infections in gravid females are the same as in non-gravid females. Among them, 80-90% of infections are caused by escherichia coli (a gram negative bacillus).⁹

This study aims to determine the prevalence of UTI among gravid females with asymptomatic

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bacteriuria receiving antenatal care at different antenatal clinics in Pakistan, and it is hoped that the results of this study will help us in formulate strategies and programs for the control of UTIs in pregnant females and associated multiple complications. The objective of this study was to determine the prevalence of urinary tract infections with ASB among pregnant females.

MATERIAL & METHODS

This multi-center, cross-sectional study was conducted in 3 different tertiary care hospitals. Study sites were department of obstetrics and gynecology, Jinnah Postgraduate Medical Center, Karachi, Sheikh Zayed Medical College and Hospital, Rahim Yar Khan, and Hayatabad Medical Complex, Peshawar, Pakistan. The study period was from January 2023 to June 2023. A minimum sample size of 234 women taking the prevalence of ASB in pregnant ladies to be 10.9% with 95% confidence level and 4% margin of error. Non-probability convenient sampling technique was adopted. Inclusion criteria were pregnant females aged between 18 to 45 years and visiting outpatient department for antenatal check-up. Any participants with history of antibiotics usage in the last 5 days or those who had signs and symptoms of urinary tract infection were excluded. Females having history of urologic and kidney diseases were also not included.

Informed and written consents were obtained from all ladies ensuring the privacy of their data. Approval from respective Institutional ethical committees (752/IRB/SZMC/SZH) was acquired. Enrolled females were interviewed and demographical and clinical data including age, gestational age, body mass index (BMI), residential status, educational background, occupation, monthly family income, parity and gravidity status were noted on a predesigned proforma. All women had their urine analysis done as a routine antenatal test. Urine culture analysis was also done at the same time to see presence of significant bacterial colonies. ASB was labeled when urine culture revealed the presence of more than 10^5 bacteria per milliliter of urine but without showing symptoms of urinary tract infections.

All study participants were guided about the collection of mid-stream urine sample in a sterile 100ml container with a covering lid. The samples were submitted to the laboratory within one hour of collection of sample. Urine samples were analyzed on automation machine using Reflected photometry technique to see physical, chemical and microscopic characteristics of urine sample. Urine culture examination was performed using CLED (Cysteine Lactose Electrolytes deficient Differentiation) media at 37°C temperature and inoculated for 24 hours and sensitivity of antibiotics was checked on M.H.A (Mueller Hinton Agar) for another 24 hours.

Data was analyzed on “Statistical Package for Social Sciences (SPSS)”, version 26.0. Mean and standard deviation (SD) were calculated for age, BMI and gestational age. Frequency and percentage were calculated for the qualitative variables like residence status, parity, gravida, family monthly income status, educational status, occupational status and ASB (Yes/No). Effect modifier like age, residence status, parity, gravida, family monthly income, educational status and occupational status were controlled through stratification to see the effect of these on the outcome (ASB). Post-stratification chi-square test was applied taking p-value <0.05 as significant.

RESULTS

In a total of 260 pregnant females, the mean age was 28.6 ± 5.3 years (ranging between 18-45 years). There were 125 (48.1%) females who reported during 3rd trimester of pregnancy. Residential status of 209 (80.4%) females was urban. There were 65 (25.0) females who were illiterate. Family monthly income of 198 (76.2%) females was below 30,000 Pakistani Rupees (Table-I).

ASB was revealed in 69 (26.5%) pregnant females. The most common urinary bacterial isolates were *E. coli* and *Klebsiella* found in 36 (52.2%) and 10 (14.5%) respectively. The details of distribution of urinary isolates in all 69 positive ASB cases are shown in Figure-1.

Parity status ($p < 0.001$), BMI ($p < 0.001$), and

monthly family income ($p=0.013$) were found to be significantly associated with ASB among pregnant females (Table-II).

Characteristics		Number (%)
Age (years)	18-25	111 (42.7%)
	26-35	107 (41.2%)
	36-45	42 (16.2%)
Pregnancy (trimester)	1 st	19 (7.3%)
	2 nd	116 (44.6%)
	3 rd	125 (48.1%)
Parity	Nulliparous	61 (23.5%)
	Primiparous	123 (47.3%)
	Multiparous	76 (29.2%)
Gravida	Primigravida	161 (61.9%)
	Multigravida	99 (38.1%)
BMI (kg/m ²)	Underweight	8 (3.1%)
	Normal	80 (30.8%)
	Overweight	152 (58.5%)
	Obese	20 (7.7%)
Residence	Rural	51 (19.6%)
	Urban	209 (80.4%)
Education	Illiterate	65 (25.0%)
	Primary	58 (22.3%)
	Secondary to matriculation	87 (33.5%)
	Intermediate or above	50 (19.2%)
Occupation	Employed	55 (21.2%)
	Unemployed	205 (78.8%)
Monthly family income (Pakistani Rupees)	<30,000	198 (76.2%)
	≥30,000	62 (23.8%)

Table-I. Demographical and clinical characteristics (n=260)

DISCUSSION

This study revealed the prevalence of ASB to be 26.5% which seems very high. A local study by Abbas et al showed the prevalence of ASB in pregnancy to be 8.9% which is lower than what we noted (26.5%).¹⁰ A study from Indian reported the prevalence of ASB among pregnant females to be 25.3% which is very close to what we observed in this study.¹¹ Radha et al¹² noted the prevalence of ASB as 8.2% while Abdel-Aziz Elzayat et al¹³ noted this proportion to be 10%. Studies from Nigeria have shown the burden of ASB to be ranging between 25-45.3%.^{8,14} All these studies show that there is a difference in the burden of ASB during pregnancy and these variations might be credited to variances in geographical location, ethnicity, hygienic, cultural and religious norms. Our findings emphasize that pregnant women should be subjected to a routine urine analysis in pregnancy to assist timely identification and treatment of underlying bacterial infections so that potential complications can be avoided.¹⁵

Different causative agents are perceived to be behind ASB in pregnant ladies. In the present research, the commonest isolates causing ASB was *E. coli* (52.2%). These findings are consistent with a study conducted by Agarwal A et al where they noted *E. coli* to be the commonest causative agent responsible for 39.2% of ASB cases.¹⁶ Abbas et al in a local study also found *E.coli* to be present in 43.8% ASB pregnant females.¹⁰ During pregnancy, maintaining personal hygiene is challenging whereas fecal contaminations to the urethra may assist the motile bacteria to access urinary tract.^{17,18} We also noted 10.1% ASB were due to mixed culture growth. These findings are consistent with what has been reported by others in the literatue.^{10,19}

In the present study, we found that higher parity status, relatively lower BMI and poor socio-economic status were found to have significant association with ASB. Local data has shown that ASB is a common observation during pregnancy and has a strong linkage wit multiparity, poor socio-economic status and illiteracy so our findings are pretty consistent with what has been described before.²⁰

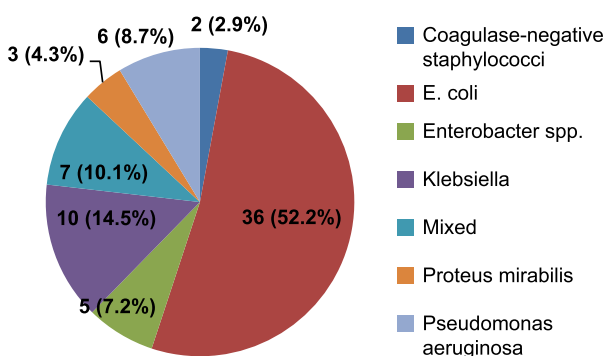


Figure-1. Distribution of urinary isolates (n=69)

Characteristics		Asymptomatic Bacteriuria		P-Value
		Yes (n=69)	No (n=191)	
Age (years)	18-25	29 (42.0%)	82 (42.9%)	0.948
	26-35	28 (40.6%)	76 (41.4%)	
	36-45	12 (17.4%)	30 (15.7%)	
Pregnancy (trimester)	1 st	5 (7.2%)	14 (7.3%)	0.074
	2 nd	23 (33.3%)	93 (48.7%)	
	3 rd	41 (59.4%)	84 (44.0%)	
Parity	Nulliparous	7 (10.1%)	54 (28.3%)	<0.001
	Primiparous	46 (66.7%)	77 (40.3%)	
	Multiparous	16 (23.2%)	60 (31.4%)	
Gravida	Primigravida	40 (58.0%)	121 (63.4%)	0.430
	Multigravida	29 (42.0%)	70 (36.6%)	
BMI (kg/m ²)	Underweight	4 (5.8%)	4 (2.1%)	<0.001
	Normal	34 (49.3%)	46 (24.1%)	
	Overweight	24 (34.8%)	128 (67.0%)	
	Obese	7 (10.1%)	13 (6.8%)	
Residence	Rural	15 (21.7%)	36 (18.8%)	0.604
	Urban	54 (78.3%)	155 (81.2%)	
Education	Illiterate	12 (17.4%)	53 (27.7%)	0.334
	Primary	15 (21.7%)	43 (22.5%)	
	Secondary to matriculation	27 (39.1%)	60 (31.4%)	
	Intermediate or above	15 (21.7%)	35 (18.3%)	
Occupation	Employed	10 (14.5%)	45 (23.6%)	0.114
	Unemployed	59 (85.5%)	146 (76.4%)	
Monthly family income (Pakistani Rupees)	<30,000	45 (65.2%)	153 (80.1%)	0.013
	≥30,000	24 (34.8%)	38 (19.9%)	

Table-II. Stratification of demographical and clinical characteristics of women with respect to asymptomatic bacteriuria

Pregnant women may have an increased likelihood of developing bacteriuria due to various contributing factors, including advanced maternal age, lower socioeconomic status, multiple pregnancies, previous UTI episodes, history of catheterization, aminoaciduria, anemia, and diabetes mellitus.²¹⁻²³

According to the World Health Organization, low birth weight and perinatal causes are the causes of adverse outcomes among newborns. It is the need of the hour that screening for the possible diagnosis of ASB be done in all pregnant females visiting antenatal clinics for routine check-ups, so that, time diagnosis and management of ASB be made to avoid any further complications. High prevalence of ASB in this study also points out that there is a need to arrange community bases awareness programs to improve personal and environmental hygiene affecting pregnancy

ladies.

This study had some limitations as well. We were unable to record antimicrobial sensitivity and resistance patterns among positive ASB cases. We were unable to record treatment outcomes among current sent of pregnant females as well.

CONCLUSION

The prevalence of asymptomatic bacteriuria among pregnant females was high (26.5%). The most common urinary isolates found among ASB cases were E.coli. High prevalence of bacteriuria in pregnant ladies warrants that there is a need to perform routine screening for the early diagnosis and management of ASB among pregnant females.





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2	Waqar Azim Niaz	Methodology, Discussion.	
3	Sadia Zahoor	Data collection, Data analysis, Proof Reading.	
4	Saadia Shamsher	Data collection, Literature review.	
5	Masood Shaikh	Data collection, Literature review.	