

Risk factors during pregnancy for asymptomatic bacteriuria

Abstract:

Introduction: Asymptomatic bacteriuria in pregnancy (ABU) is poorly understood and neglected in developing countries. It causes certain lethal maternal and fetal consequences if left untreated including low weighted births, premature delivery, full-blown urinary tract infection and pyelonephritis.

Objective: It is important to identify risk factors which expose pregnant females at risky outcome. Our aim was to explore such factors having bad impact on pregnancy associated with asymptomatic bacteriuria and aware our community about these unspoken perils so that ABU likelihood may be reduced. Prevalence varies country to country. Developing and low economic countries are suffered more than developed so thereby upgrading and providing basic amenities of life the risk factors may be reduced.

Material and methods: This was a cross sectional study carried out in department of pathology PUMHSW. Sample size was 377, all selected were 18yrs and above. All urinary samples were collected in sterile container and labeled and immediately transported to microbiology laboratory. Dipstick test, wet mount microscopy and Gram's staining were done. Blood, MacConkey's agar was inoculated and streaked with inoculi.

Results: Samples found unlabeled (02) and contaminated (03) were dropped from study. A total of 372 were study samples. The most of patients were Gram negative 65(90.20%) predominantly Enterobacteriaceae. When cultured, 72 were found growth positive (mixed plus pure) while 300 were negative. Risk factors were assayed in culture positive patients (ABU). A large number of patients (74%) belonged to lower economic class. Most common age group varied from 26-30 years (43%). Third trimester was the most common found in 37 patients ((49.3%). Gravid (G₃ or more) were strong risk factors and were 55(73.3%). Most of patients were illiterate 65 (90.27%). The past history of UTI was a significant risk 46(63.88%) while anemia was found statistically insignificant 17(23.61).

Conclusion: Asymptomatic bacteriuria is frequent in pregnant females and significantly increased when compounded by past history of UTI and low socioeconomic status. Therefore, it is necessary for mothers to be screened for ABU. There is a need of rapid and reliable screening methods so that upcoming disease burden can be reduced.

Key words: Asymptomatic bacteriuria (ABU), Gravidity, midstream urine (MSU)

INTRODUCTION:

The Infections of urogenital tract (UTIs) are the most frequent prokaryotic infections around the world inflicting 150 million people each year.¹ Urinary tract infections occur preferentially in females however can affect a substantial male population.² Even though men and women both are affected, these infections are conventionally thought as a disease of women.³ These infections are comparatively usual issues in pregnancy. Urinary tract infection (UTI) may be symptomatic or asymptomatic. Asymptomatic UTI is termed as asymptomatic bacteriuria (ABU).⁴ Asymptomatic bacteriuria is characterized as the absence of clinical symptoms and signs in a patient, although mid-stream clean catch urine contains bacterial growth of $\geq 10^5$ colony forming units(cfu) per ml.⁴ Symptomless bacteriuria is more common in females than males.⁵ ABU occurs in both pregnant and non- pregnant females, however it is more common in pregnancy.⁶ Overall prevalence rate is 3-14% and it is 2-9% in pregnancy.⁷

There are different risk factors in pregnant females that predispose them to asymptomatic bacteriuria. These factors may be anatomical or physiological.[8] Additionally, other well established risk factors for asymptomatic bacteriuria in pregnancy have been identified as gestational diabetes, past urinary tract infection, multiparity, advanced maternal age, lower level of education, advanced gestational age and lower socioeconomic status.^{9,10} Anemia in pregnancy is a known risk for ABU.

MATERIAL AND METHODS:

A Cross-Sectional study conducted in the Pathology Department, Peoples University of Medical & Health Sciences for Women Shaheed Benazirabad (SBA). The sample size 377 was calculated by using Raosoft calculator. Pregnant women without genitourinary signs and symptoms were included in the study while those on antibiotic treatment were excluded from the study. After achieving informed consent, all subjects were instructed to collect their urine samples aseptically. A clean catch midstream urine (MSU) samples were obtained into sterile uricol container¹¹ from all pregnant women visiting the out-patient department of the Gynecology and Obstetrics of Government tertiary Hospital (PMCH) and private prenatal clinics Chandaka Polyclinic and Shoaib Medical Center NawabShah. The research was conducted from 18-11-2015 to 18-5-2016, after an approval of synopsis. The samples were processed in the laboratory within 1-2 hours of collection. Dipstick analysis was performed. All samples were examined physically and Gram's stained smears¹² were observed under microscope. Dipstick urine analysis was followed by culture method. Although antibiotic sensitivity is essential however it was not performed in this study because of irrelevance to the title. Standardized microbiological methods were used for isolation of pure growth. Positive pure culture was defined as colonies of one type of bacteria for more than 10^5 /ml of urine sample.¹³ surface streaking culture method was used on sheep blood agar, MacConkey's agar followed by biochemical reactions by TSI agar¹³.

Results:

Sample size was 377 and the mean age was 29.32 ± 5.74 years. The mean gestational age and parity were 25.84 ± 11.80 weeks and 2.66 ± 2.42 respectively. The most of patients (74%) belonged to low socioeconomic class (Table. 1).

Out of 377 samples, 02 were unsterile and unlabeled so excluded from the study. On the basis of culture, 03 samples were identified as contaminants so dropped from this study. Hence 72 samples were exactly positive and identical. Out of 72 positive cultures 70 and 02 were found pure and mixed growths consecutively. (Table.2).

Most of the isolated bacteria 65(90.28%) belonged to Enterobacteriaceae and were Gram negative, while 7(9.720%) were Gram positive (Table.3).

Among the risk factors associated with asymptomatic bacteriuria with significant growth, the most common age groups were 26-30 years (43%) followed by 31-35 years (14.9%). Third

trimester was the most common found in 37 patients ((49.3%). Gravid (G₃ or more) were strong risk factors and were 55(73.3%). Most of the patients 64 (85.3%) belonged to lower socioeconomic class. Most of patients were illiterate 65 (90.27% Table. 4). The past history of UTI was a significant risk 46(63.88%) while anemia was found statistically insignificant 17(23.61).

Table 1.

Demographic variables of patients (n=377)

Variables	Mean ±SD
Age (yrs.):	29.32± 5.74
Gestational age(wks.):	25.84± 11.80(3 rd trimester)
Parity:	2.66 ±2.42
Socioeconomic status (SES):	Frequency n (%)
Lower	279(74.0)
Middle	92(24.4)
Higher	6(1.6)

Table. 2

Bacterial growth-based results of patients (n=375).

Growth	Number	Frequency (%)
Culture positive		
Significant Pure culture:	70	18.66
Mixed growth	2	0.54
Contamination	3	0.80
Culture negative (sterile)	300	80.0
Total	375	100

Table. 3: Distribution of culture positive patients (72)

	Number	Frequency (%)
Gram positive	7	9.72
Gram negative	65	90.28
Total	70	100

Table. 4

Risk factors associated with significant pure culture positive asymptomatic patients (n=72)

Risk factors	Asymptomatic bacteriurian (%)	P value
Age(Years)		
17-25years	15 (20%)	0.001
26-30years	33 (44%)	
31-35years	08 (10.6%)	
36-40years	14 (18.6%)	
41-45years	05 (6.6%)	
Gestational age		
First trimester	22 (29.3%)	0.078
Second trimester	16 (21.3%)	
Third trimester	37 (49.3%)	
Gravidity		
Gravida(G ₁ P ₀)	08 (10.6%)	0.022
Gravida (G ₂ P ₁)	12 (16%)	
Gravida (G ₃ or more)	55 (73.3%)	
Socioeconomic status(SES)		
Lower	64 (85.3%)	0.034
Middle	11 (14.6%)	
Higher	00 (00%)	
Literacy		
Illiterate	65 (90.27%)	0.073
Primary	02 (2.7%)	
Middle	00 (00%)	
Matric(SSC)	01 (1.38%)	
Intermediate (HSC)	03 (4.16%)	
Graduate	01 (1.38%)	
Previous H/O UTI:		
Yes	32(45.0)	<0.05
Anemia(<11g/dl):		
Yes	7 (10.0)	>0.05

Discussion:

Prevalence of ABU in pregnancy varies (4% to 23.9%) across the world¹⁴. It is higher in developing (1-30%) countries than developed (2-7%).¹⁵ In this study the prevalence of ABU in pregnant females was found as 19.20% (72/377), this is in agreement with most of studies conducted in developing countries.¹⁵ However in Iran and Egypt it was 8.9%, 10% respectively.^{16,17} This variation may be due to differences in sample size, study type population geographical, socioeconomic and educational status.¹⁵ The mean age was 29.32 ± 5.74 years closely found in a study conducted by Goruntla et al.¹⁸

The most common gestational age was the 3rd trimester with or without ABU accounting for 37 (49.3%), while non-gestational age with mean was 29.32 ± 5.74 years. These age variables are close with a study by Tadesse et al.^{19,20}

While speaking of all study patients 74% (279/377) related to lower SES class, whereas frequency further increased to 85.3% (64/72) when associated with ABU. This rise in frequency shows an association with socio-economic level.²¹

Gravida (G3 or more) was the most common observed in the current study collaborating with a study by Roy et al. depicted the incidence to be higher in multigravida.²²

Our study reveals that 65 (90.27%) were illiterate and same was reported by Haider et al.²³

Past history of UTI is an important predictor of asymptomatic bacteriuria, it was seen in 32 (45.0%) with a strong statistical significance ($p < .05$) similar finding was conveyed by Rajaratnam et al.³ and Aalia Tayyba, Gul-E-Raana.⁸

Anemia was detected in 7 (10.0%) patients showing statistically insignificance corroborates with Indian study^{18,24}

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