

Evaluation of socio- demographic risk factors for asymptomatic bacteriuria in pregnancy

Abstract

Background: Asymptomatic Bacteriuria in pregnancy though common often goes undiagnosed till overt U.T.I. occurs. It leads to various maternal and fetal complications. Many factors influence its occurrence. The aim of the study was to evaluate socio-demographic risk factors of asymptomatic bacteriuria.

Methods: A hospital based observational study done over one year in the antenatal clinic of a tertiary care hospital. Urine of all the pregnant women was sent for complete microscopy and culture & sensitivity. Socio-demographic profile of all women was noted and data analysed.

Results: Of the 450 women included in study, 8.22% had asymptomatic bacteriuria. It was significantly more in the less educated, in those residing in rural and semi-urban areas or belonging to socioeconomic group IV.

Conclusion: All pregnant women must be universally screened for asymptomatic bacteriuria. In case it is not feasible, women with high risk factors should be identified and selectively screened.

Keywords: asymptomatic bacteriuria, risk factors, urine culture

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Introduction

Urinary tract infection (UTI) affects the pregnant women two times more commonly than age matched non pregnant women.¹ Asymptomatic bacteriuria (ASB) in pregnancy ranges from 4% to 23.9% in various studies.² In India, it has been found to be 5% to 12%. Though studies have been done to estimate the magnitude of ASB, they have not addressed risk factors associated with urinary tract infections. The aim of the present study was to assess associated risk factors of asymptomatic bacteriuria among pregnant women attending antenatal outpatient in a tertiary care hospital of the state.

Material and method

This was a Hospital Based Prospective Observational Study conducted in a tertiary care hospital over one year. Prior Institutional Review Board and ethical committee clearance was taken. To estimate incidence of asymptomatic bacteriuria among pregnant women with 95% confidence interval and 10% relative precision, a minimum of 385 pregnant women were required. It was further enhanced & rounded off to 450 patients assuming 10% attrition/contamination of sample, assuming the incidence of asymptomatic bacteriuria to be 10% of pregnant woman [according to the study of Chandel LR].¹ The study universe included women attending the antenatal clinic of the hospital, of which women with period of gestation less than 20 weeks were selected randomly as the study population. Women with symptoms of urinary tract infections like lower abdominal pain, fever, burning micturition, frequency of micturition, dysuria, vaginitis were excluded. After counseling, written informed consent was taken of all participants. Complete history, socio-demographic and obstetric data was recorded in detail. The socio- demographic risk factors assessed were age, socio-economic status, type of residence, literacy level, religion, occupation, gravidity, and trimester of pregnancy besides anemia and blood pressure. Women were divided in different

age groups (from divided into rural, semiurban and urban based on their geographical area and housing quality. Socioeconomic status (I to V) was based on revised modified B.G.Prasad socioeconomic scale, January, 2014.³ Literacy level was based on their education qualifications (illiterate to postgraduation). All women were either hindus or muslims. Gestational age included only first and second trimester since our study group included women less than 20 weeks only. Medical diseases assessed were anemia and hypertensive disease of pregnancy. Urine for complete examination, microscopy and culture and sensitivity was collected of all. Women were instructed about giving mid stream urine sample by clean catch method. The samples were processed within one hour of collection. Gross examination was done to note the colour, transparency, suspended particles and gross deposits. Microscopy was done for presence of epithelial cells, red blood cells, casts, crystals, pus cells and bacterial flora. Count of 10 or more pus cells per high power field was considered as an indication of urinary tract infection. Culture was done on 5% sheep blood agar plate and Mac Conkey agar plate. Both plates were incubated overnight at 37 degree C temperature for 24 hours. Colonies were examined and counted on both plates. Total counts were estimated from both plates. 1,00,000 bacteria per ml were considered as significant bacteriuria.⁴ Antibiotic sensitivity was tested for the isolates by the Kirby-Bauer method (Disc diffusion) with 0.5 MC Farland Standard turbidity of the inoculum on Mueller-Hinton agar. The antibiogram against commonly used antibiotics/chemotherapeutic agents recommended in pregnancy were used. Data analysis and processing all data thus collected was entered in Microsoft excel sheet and was subjected for statistical analysis. Quantitative data was summarized as mean and SD whereas qualitative data as percentage. 95% confidence interval was kept for the outcome variable. Paired and unpaired "t" test was used for comparison of quantitative data. While 'Chi-square,' test was used for qualitative data. A p value less or equal to 0.05 was taken as a significant factor effect.

Results

450 asymptomatic pregnant females were screened. Significant bacteriuria was found in 8%. The mean age of women with asymptomatic bacteriuria was 23.89±3.02 years. 15.38% in 31-35 years age group and 9.91% in age group has ASB, though this difference between different age groups was not statistically significant (Table 1). In our study, we observed that 89% belonged to rural and semiurban areas. This reflects the population attending the hospital. However, the percentage of the pregnant women with asymptomatic bacteriuria was as high as 13.83% in rural women while it was 10.16% in semi-urban women and only 2.37% among urban women. This difference was statistically significant (Table 2). Women with ASB belonged to all socioeconomic groups in our study population. But were more in classes III, IV, V. Asymptomatic bacteriuria was maximum in class IV. This difference across the various classes was statistically significant (Table 3).

Table 1 Association of age of pregnant women with asymptomatic bacteriuria

Age group (Yrs.)	Total Pregnant women n=450		Positive for asymptomatic bacteriuria n=36	
	No.	%	No.	%
≤20	62	13.78	2	3.23
21 to 25	212	47.11	21	9.91
26 to 30	163	36.22	11	6.75
31 to 35	13	2.89	2	15.38

Chi-square = 4.276 with 3 degrees of freedom; P = 0.312 NS

Table 2 Association of residential area of pregnant women with asymptomatic bacteriuria

Residence	Total Pregnant women n=450		Positive for asymptomatic bacteriuria n=36	
	No.	%	No.	%
Rural	94	20.89	13	13.83
Semi Urban	187	41.56	19	10.16
Urban	169	37.56	4	2.37

Chi-square, 2.813 with 2 degrees of freedom; P, 0.002 S

Table 3 Association of socioeconomic status of pregnant women with asymptomatic bacteriuria

Socio-economic status	Total pregnant women n=450		Positive for asymptomatic bacteriuria n=36	
	No.	%	No.	%
I	32	7.11	1	3.13
II	111	24.67	3	2.7
III	156	34.67	13	8.33
IV	110	24.44	16	14.55
V	41	9.11	3	7.32

Chi-square, 11.718 with 4 degrees of freedom; P, 0.020 S

Literacy had a direct correlation with ASB. 17.33% women who were illiterate had asymptomatic bacteriuria. Similarly it was higher in women who were educated till class 8th (15.94%). This difference was also statistically significant (Table 4). No statistically significant difference was observed with respect to religion, gravidity, occupation and between the first and second trimester of pregnancy in our study. In our study, 41(9.11%) pregnant women were anemic, of which 8 (19.51%) had asymptomatic bacteriuria. Hypertensive disorders of pregnancy, HDP (gestational hypertension and Preeclampsia) was present in 57 pregnant women and 14.03% of them had asymptomatic bacteriuria (Table 5).

Table 4 Association of literacy status of pregnant women with asymptomatic bacteriuria

Literacy status	Total Pregnant women n=450		Positive for asymptomatic bacteriuria n=36	
	No.	%	No.	%
Illiterate	75	16.67	13	17.33
5th	58	12.89	5	8.62
8th	41	9.11	3	7.32
10th	68	15.11	1	1.47
12th	130	28.89	9	6.92
Graduate	72	16	5	6.94
Postgraduate	6	1.33	0	0

Chi-square, 13.708 with 6 degrees of freedom; P, 0.033 S

Table 5 Association of medical diseases with asymptomatic bacteriuria

Medical Diseases	Total	Positive for Asymptomatic Bacteriuria		P value	
		No.	%		
Anaemia	41	9.11	8	19.51	0.01S
HDP Hypertension	41	9.11	6	14.63	0.18NS
Pre-eclampsia	16	3.56	2	12.5	0.83NS

Discussion

Asymptomatic bacteriuria is common in pregnancy due to the hormonal, anatomical and physiological changes occurring in pregnancy. Renal pelvis dilatation with occurs due to decreased smooth muscle tone. This causes decreased urethral peristalsis due to increased levels of circulating progesterone and compression of ureters by the growing uterus. In addition, glycosuria and aminoaciduria in pregnancy provide an excellent culture medium for bacteria in areas of urine stasis.⁵ The close proximity of the urethral orifice to the rectum, and poor hygiene are also responsible for the perineal microbes reaching to urinary tract.⁶ However, certain risk factors may predispose and thus increase asymptomatic bacteriuria in these groups.

Socioeconomic status had a direct bearing on ASB in pregnancy. The difference in the socioeconomic classes could be due to differences in the environment, social habits of the community, the standard of personal hygiene and difference in access to health care.⁷ Women in age group 21-25 years had a maximum number of women with ASB. It is believed that women in the age group 21-25 years

are more sexually active and therefore more prone to develop urinary tract infection.⁸ In our study, asymptomatic bacteriuria was lower in the urban population. This may be due to their access to cleaner environment, toilets with clean water, good sanitation, good personal and perineal hygiene. This study was conducted in Rajasthan where the female literacy rate is only 52.12%.⁹ 38.6% women in our study also were educated only upto 8th standard or less. ASB was highest in these women. In their study, Demilie T et al too found that 18% of the women who were unable to read had asymptomatic bacteriuria while it was 5.1% in participants who had higher educational level.¹⁰ AL-Mulla A Y et al similarly found asymptomatic bacteriuria more in pregnant women who were primary educated (70%) and less in women with higher education (17.9%).¹¹ The reason attributed to this difference could be better health education and good personal hygiene that educated women may be maintaining as compared to the less educated.¹² We observed higher asymptomatic bacteriuria in anaemic women and those with hypertension, similar to that reported by Jain V et al., who reported 5.2% in women with preeclampsia and 22.4% in women with anaemia.¹³ Fatima N et al also found ASB to be associated with maternal anemia. It is suggested that pyelonephritis causes bone marrow suppression, increased erythrocyte destruction and decreased red cell production.¹⁴ Though pregnancy-induced hypertension rises in pregnant women with urinary tract infections, but which is the cause and which the effect is not clear.¹⁵

Conclusion

Asymptomatic bacteriuria was 8% in the present study. Infection was more in women from lower socioeconomic group, those from rural and semi-urban areas and poor literacy status. Ideally universal screening for the asymptomatic bacteriuria in pregnancy should be done. However, where it is not feasible, women with the high risk factors responsible for asymptomatic bacteriuria should be identified and screened.

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Conflict of interest

The authors declare that they have no competing interests.

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