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Prevalence of asymptomatic Bacteriuria in married women with special reference to their age, education and occupation status

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Abstract

Urinary Tract Infections (UTIs) are most frequent clinical bacterial infections in women. Patients with positive urine cultures who lack symptoms of a UTI have the diagnosis of asymptomatic bacteriuria (ASB). Asymptomatic Bacteriuria is a dynamic process in particular women. The risk of ASB increases with increasing parity, lower socioeconomic status, increasing age, sexual activity, sickle cell trait, diabetes, previous UTI, gestational age and level of education etc. This study aimed at finding out the incidence of ASB in married pregnant (study group) and non-pregnant (control group) women with special reference to their age, education and occupation status. The study was carried out over a period of two years, in the Department of Microbiology in association with the Department of Obstetrics and Gynecology, of T. N. Medical College and B. Y. L. Nair Charitable Hospital. The study included 3000 married pregnant women and 300 married non-pregnant women of age group of 18 to 40 years. A well-structured pretested questionnaire was used to obtain their socio-demographic data which was analyzed statistically to determine the relationship between the variables and their significance. Collection, transportation and microscopic examination of urine were carried out by standard procedures. ASB was highest in age group 36-40 in study group (10%) and control group (7.62%). It was highest in professional category (11.5%) and zero in vendor category in study group. In control group, highest ASB was seen in service category (13.6%), while Commercial sex worker, Business and Vendor category showed surprisingly zero incidences. ASB values were similar in all the categories of education in study group (8 %), while control group showed highest ASB incidence in college goers (7.14%). ASB values were highest in null category (11.49%) in study group, and in control group it was in multi parity category (5.33%). Complicated UTI is more common in extremes age in females with predominant risk factors like diabetes mellitus and recurrent UTI. While use of diaphragm with spermicidal, alteration of vaginal flora and sexual activity are the risk factors in young females. Hence lower socioeconomic status, illiteracy, ignorance about proper hygiene practices, pregnancy and age, fall prey more to the UTI with ASB.

Keywords: Asymptomatic Bacteriuria, UTI, married women, pregnant women, occupation, age and education status

1. Introduction

Urinary Tract Infections (UTIs) are most frequent clinical bacterial infections in women. Patients with positive urine cultures who lack symptoms of a UTI have the diagnosis of asymptomatic Bacteriuria (ASB). ASB is often a dynamic process in particular women. ASB is defined as 10^5 bacteria per ml of one or more on two clean-catch cultures taken on separate days [1]. ASB is identified in 5-10% of women at their initial prenatal visits [2]. While ASB is generally considered not clinically important in women who are not pregnant, during pregnancy it can be associated with a variety of adverse obstetrics outcomes and medical conditions. For a women with ASB, two consecutive positive specimens are necessary. Quantitative analysis of bacteria in urine cultures was developed several decades ago to establish reliable criteria for discriminating between infection and contamination in asymptomatic subjects, with the expectation that asymptomatic infection might be associated with pyelonephritis, hypertension, renal disease, and complications of pregnancy [3]. The prevalence of ASB in healthy women of 18 to 40 years of age is approximately 5 percent and it increases with age to 20 % or more in ambulatory elderly women.

The prevalence of ASB in non-pregnant women rises with age at the rate of 1% for each decade of life. The prevalence of Bacteriuria not only increases with age but also with sexual activity and parity [4]. A number of conditions are associated with an increased prevalence of ASB which includes low socioeconomic status, sickle cell trait, diabetes mellitus, grand multiparity [3]. Even though ASB is common and appears to be associated with adverse outcomes in some groups, such as pyelonephritis in pregnant women, little is known about its pathogenesis, natural history, risk factors, and temporal association with symptomatic urinary tract infection.

In India, work done on this topic is scanty. Studies conducted in India suggest a prevalence of Bacteriuria as 2 to 12% among pregnant women that is slightly higher than that from the west [5]. However, UTI in pregnancy have not been adequately studied in developing countries. The risk of ASB increases with increasing parity, lower socioeconomic status, increasing age, sexual activity, sickle cell trait or disease, diabetes and previous UTI. Others include gestational age and level of education, previous history of catheterization, pains in the loins, personal hygiene, and use of contraceptive and previous use of third generation Cephalosporin [6-9].

This study is therefore aimed at finding out the incidence of Bacteriuria in married pregnant and non-pregnant women with special reference to their age, education and occupation status.

2. Material and methods

This prospective longitudinal study was carried out over a period of two years, from January 2003 to December 2004 after taking the permission from Institutional Ethics committee of T. N. Medical College and B. Y. L. Nair Charitable Hospital, Mumbai. It was conducted in the Department of Microbiology in association with the Department of Obstetrics and Gynecology, of T. N. Medical College and B. Y. L. Nair Charitable Hospital.

Participants

The study included the patients from Out-door and Indoor patients of Gynecology department which were recruited for bacteriologic evidence of ASB by microscopy and culture. Total patients included were randomly selected 3000 subjects in study group which were married pregnant women and 300 non-pregnant married women in control

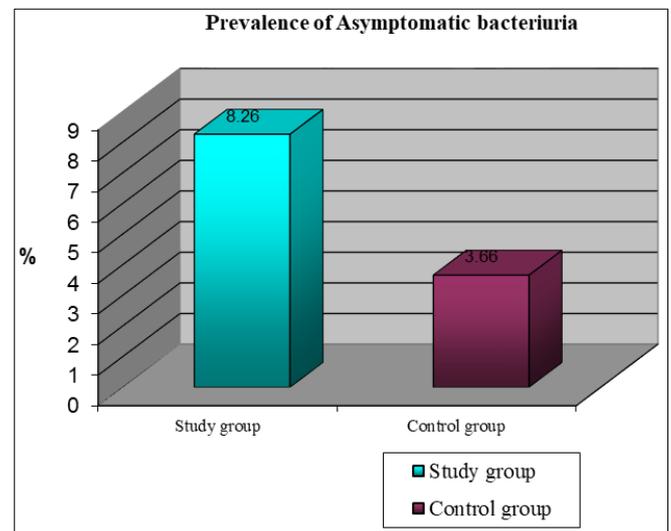
group reporting to ANC clinic of the hospital of age group of 18 to 40 years.

Those subject who were showing sign and symptoms of urinary tract infection, suffering from diabetes, under antibiotic treatment in the past or treatment with steroids for any infection/ indication was excluded from our study. Counseling for enrollment procedure in the study was done. A well-structured pretested questionnaire self-administered or by the aid of an interviewer according the educational level of the participants was used to obtain their socio-demographic data mentioning occupation, age and education status etc. The data obtained was analyzed statistically to determine the relationship between the variables and their significance.

Collection and microbiological analysis

Collection and transportation of urine was carried out by standard procedures [10]. Further microscopic examination of urines was done by Wet film examination [11] and Gram staining using Hucker’s modification [12].

3. Results



Graph 1: Prevalence of ASB in both the groups.

Graph 1 shows prevalence of ASB in study and control groups. Prevalence of ASB was 8.26% and 3.66% in study and control group respectively.

Table 1: Age distribution of population studied for ASB.

S. No.	Age (years)	Study group (married, pregnant women)		Control group (non-pregnant married women)	
		Total no. screened (n _p = 3,000)	Cases with asymptomatic Bacteriuria (n _{pa} = 248)	Total no. screened (n _m = 3,00)	Cases with asymptomatic Bacteriuria (n _{ma} = 11)
1	18-23	55.4 %	8.0%	36.33	0.9
2	24-29	32.9%	8.9%	52.66	3.16
3	30-35	11.36%	7.62%	6.33	15.0
4	36-40	0.33%	10.0%	4.66	14.3

Table1 shows the age distribution of the study and control group. In pregnant women, majority cases were in age group of 18 to 23years (55%), while least of cases belonged to age group 36 to 40years (<1 %). In the non-pregnant women, the majority cases were in age group 24 to 29 year (52.66%) and least were in age group 36 to 40 years (4.66%)

ASB was highest in age group 36-40 in both the groups. In study group (10%) and control group (7.62%). Difference between the two groups was statistically significant. (p value < 0.001).

Table 2: Occupation distribution of the population studied for ASB.

S. No.	Occupation	Study group (Married, pregnant women)		Control group (Married, non-pregnant women)	
		Total no. screened (n _p = 3,000)	Cases with asymptomatic Bacteriuria (n _{pa} = 248)	Total no. screened (n _m = 3,00)	Cases with asymptomatic Bacteriuria (n _{ma} = 11)
1	Service	1.73%	7.7%	7.3%	13.6%
2	Professional	0.8%	11.5%	6.0%	11.11%
3	Labourer	4.86%	6.8%	27%	1.23%
4	Housewife/Unemployed	89.72%	0.8%	53%	3.14%
5	Commercial sex worker	2.0%	8.3%	6.3%	0
6	Business	0.43%	7.69%	0	0
7	Vendor	0.9%	0	0.33%	0

Table 2 shows majority of married women were housewives in both the groups suggestive of same socioeconomic status and least were in the Vendor group.

ASB was highest in professional category (11.5%) and zero in vendor category in study group. In control group, highest

ASB was seen in service category (13.6%), while Commercial sex worker, Business and Vendor category showed surprisingly zero incidences. Difference between the two groups was statistically significant. (p value < 0.001).

Table 3: Education status distribution of the population studied for ASB.

S. No.	Education	Study group (married, pregnant women)		Control group (married, non- pregnant women)	
		Total no. screened (n _p = 3,000)	Cases with asymptomatic Bacteriuria (n _{pa} = 248)	Total no. screened (n _m =300)	Cases with asymptomatic Bacteriuria (n _{ma} = 11)
1	Illiterate	36.8%	8.33%	28.0%	2.38%
2	Primary	35.1%	8.26%	36.33%	3.66%
3	Secondary	22.46%	8.16%	26.33%	3.79%
4	College	5.63%	8.28%	9.33%	7.14%

Table 3 shows highest number of study subjects were in Illiterate category (36.8%) and least were in college going category (5.63%). While in control group, highest number of subjects were in Primary literacy category (36.33%) and least were college goers (9.33%).

ASB values were similar in all the categories in study group (8%), while control group showed highest ASB incidence in college goers (7.14%) and least in illiterate category (2.38%).

Table 4: Parity among the population studied with asymptomatic Bacteriuria

S. No.	Parity	Study group (married, pregnant women)		Control group (married, non-pregnant women)	
		Total no. screened (n _p = 3,000)	Cases with asymptomatic Bacteriuria (n _{pa} = 248.)	Total no. screened (n _m =300)	Cases with asymptomatic Bacteriuria (n _{ma} = 11)
1	Null	36.83%	11.49%	40.0%	4.16%
2	Single	43.83%	6.69%	35.0%	1.90%
3	Multi	19.33%	5.68%	25.0%	5.33%

Table 4 shows highest number of study subjects were in single parity category (43.83%) and least were in multi parity category (19.33%). While in control group, highest number of subjects were in null parity category (40.0%) and least were in multi parity category (25.0%).

ASB values were highest in null category (11.49%) in study group, and in control group it was in multi parity category (5.33%). While ASB values were lowest in multi category (5.68%) in study group, and in control group it was in single parity category (1.90%).

Discussion

According to Wesley *et al* prevalence of UTI is higher among lower socioeconomic classes [13]. Lower socioeconomic class, illiteracy, bad hygiene practices and UTI go hand in hand. Hence this study aimed at investigating the role and relation of age, education level, occupation and parity to the ASB incidence in married pregnant and non-pregnant women. The present study included 3000 pregnant women in the study group and 300 non-pregnant married women in control group. A well-structured pretested questionnaire was used to obtain their socio-demographic data mentioning occupation, age, parity

and education status. The data obtained was analyzed to determine the relationship between the variables and their significance. Urine was examined by standard procedures to determine ASB in the subjects [10, 11, 12].

In pregnant women majority of the cases were in age group, 18-23 years (55%), 24-29 years (33%) and 30-35years (11%). In control group, majority of subjects were in age group 24-29years (53%) followed by 18-23 years (36%). Only 6% belonged to age 30-35years. Among the cases suffering with ASB in study group, the incidence among age group 24-29 years was 8.9% followed by 18-23 years (8.0%) and 30-35years (7.6%). Nath *et al* 1996 [5] reported incidence among 24-29 years as 10.37% followed by 18-23years as 5.26% and >30years age group were 12.43%. In control group, cases of ASB were 11 out 300, the incidence of ASB was higher in 30-35years (15.0%) followed by 36-40years (14.3%).

Occupation is considered as one of the indicators of socioeconomic status. In the total population studied majority of the cases were housewives which were around 90%. While only 5% were laborer and 2% were Commercial Sex worker followed by 1% were in service. About 1% of study group were in small scale business. In control group,

majority of subjects were housewives (53%) followed by laborer (27%), service (7%) and 6% each were commercial sex worker and professional category. Among cases suffering with ASB, study group incidence was 11.5% in professional category followed housewives (8.4%), Commercial Sex Workers (8.3%), service (7%) and laborer (6.8%). In control group, the incidence of ASB was 13.6% in service followed by as professional (11%), housewives (3%) and laborer (1%). Moreover patients in our study mostly belonged to the lower socioeconomic class. There was statistically significant difference between two groups.

The present study showed that among the total population in the study group 37% of pregnant women were illiterate followed by primary educated category (35%) and with secondary studies (22%). Only 6% of them had higher secondary level education. In control group, among the total population 36% non-pregnant married women were primary educated followed by 28% illiterate and 26% had secondary studies. Only 9% of them had Higher Secondary studies. Among cases suffering with ASB, in the study group, incidence was 8.3% in illiterate category followed by primary level education category (8.26%), college level category (8.28%) and secondary studies category (8.1%). In control group, cases with ASB, 7.14% were educated at college level followed by 3.79%, who had undergone secondary studies while 3.66% had undergone primary studies. There was statistically significant difference between two groups.

The present study showed that among the total population in the study group 43% of pregnant women had single parity followed by 36% with null parity and 19% were with multiparity. In control group, among the total population 40% non-pregnant married women had null parity followed by 35% and 25% with single and multiparity. Among cases suffering with ASB, in the study group 11.4% were primigravida followed by single parity (6.7%) and multiparity (6%). In control group, cases with ASB was 5.33% followed by primigravida (4.16%) and single parity (1.9%). There was statistically significant difference between two groups. According to Nath *et al* 1996^[5] incidence of UTI was 11.47% were primigravida than those with multiparous 7.04%.

In study in Tanzania^[14], different factors had been documented to contribute to UTI among pregnant women. These included age, parity, gestation age, level of education. In this study there was no significant association between these factors and Bacteriuria. Using unilabiate analysis there was no association of parity, gestational age, education, age and marital status with Bacteriuria. Similar findings have been reported by Sheikh, M.A., *et al* in 2000^[15]. Study in Tanzania^[14], showed highest Bacteriuria in 15-24 age group and zero in less than 15 and above 45 years, while Parity was 0-1 (17%), 2-3 (15.8%) and more than 4 (8.6%). In this study conducted, they found housewives more in number (14.8%) of the total subjects, while peasants were less in number (6.7%). Secondary education literate subjects were highest (19.1%) and none had taken higher education. In another study, most of the asymptomatic Bacteriuria were found among the well educated population as 83.0% of the significant culture has tertiary education and almost half (48.9%) were civil servants^[16]. Kinningham *et al.*^[3] reported that low socio- economic status, sickle cell trait, diabetes mellitus and grand multi- parity predispose to urinary tract infection, and each is associated with two-fold increase in

the rate of Bacteriuria. In study by Fox man *et al* in 2002,^[17] socio-demographic variables were age, marital status, educational level and occupation. He investigated pregnant women, who were young, presenting average and median age of 25 years, 70% were primiparous women or had only one living child, evidencing low parity. Maternal educational level, an indicator frequently associated with a family's socio-economic level, showed a relatively unfavorable situation, since 44.7% of pregnant women had at most completed their elementary education. Most of them did not perform any paid activity (54.3%). In this study, there was no association between age, educational level and multiparity with UTI. In another study it was found that 30% of women have at least one log increase in bacteria in the bladder immediately following sexual intercourse. Also woman with a new sexual partner also has an increased risk of infection^[18].

Conclusion

ASB is more common in some patient populations and the prevalence increases with advancing age. It is also associated with sexual activity in young women. Patients with impaired urinary voiding or indwelling urinary devices have a much higher prevalence of ASB. Screening for and treating ASB patients should only occur if the Bacteriuria has an associated adverse outcome such as development of a symptomatic urinary tract infection, bacteremia, progression to chronic kidney disease that can be prevented by antimicrobial therapy. There are only two clinical situations where these criteria are clearly met. Pregnant women should be screened and treated for ASB, as they have a significantly increased risk of developing pyelonephritis as well as experiencing a premature delivery and delivering a low birth weight infant. Prior to transurethral resection of the prostate or any other urologic procedure with a risk of mucosal bleeding, patients should be screened for Bacteriuria, as it has been associated with a major increase in the risk for post-procedure bacteremia and sepsis. Treatment of ASB in both these situations has been demonstrated to prevent these complications. Unfortunately many patients with ASB receive treatment which they do not benefit from and in fact are likely harmed by. The unnecessary treatment of ASB can lead to antibiotic resistance, adverse drug effects, *C. difficile* infection, and contribute unnecessarily to the costs of medical care. Hence treatment of ASB though common and results in significant patient harm. Clinicians should be aware of this when making decisions about the treatment of possible UTI. Who to screen and treat for ASB:

To conclude the prevalence rate of uncomplicated UTI and ASB in general practice is high among young females in reproductive age groups. Complicated UTI is more common in extremes age in females. Predominant risk factors to complicated UTI include diabetes mellitus, and recurrent UTI. Use of diaphragm with spermicidal and alteration of vaginal flora and sexual activity are the risk factors in young females. Pregnant women are more prone to the risk of UTI^[18]. Hence lower socioeconomic status, illiteracy, ignorance about proper hygiene practices, pregnancy and older the population fall prey more to the UTI and asymptomatic Bacteriuria.

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