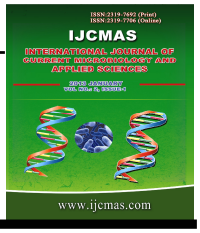
*Int.J.Curr.Microbiol.App.Sci* (2013) 2(1): 80-85

*International Journal of Current Microbiology and Applied Sciences*
***ISSN: 2319-7706*** **Volume 2 Number 1 (2013) pp. 80-85**




## Original Research Article

# Prevalence of asymptomatic bacteriuria among antenatal women in rural tertiary care hospital, Tamilnadu, India

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**Keywords**

Antenatal, Asymptomatic; Bacteriuria; Pregnant women; Prevalence; Tertiary care hospital.

**A B S T R A C T**

The present work was carried out to study the prevalence of asymptomatic bacteriuria (ABU) among pregnant women attending the antenatal clinic of our rural tertiary care hospital Chennai Medical College Hospital and Research Centre and to correlate the culture positive cases with age, gravid status, trimester and sexual activities, to find out the bacteriological profile of ABU prevalent in the rural antenatal women. Out of 100 samples collected for ABU among the rural pregnant women, Pus cells were found significantly in 32, but bacterial isolates were grown significantly in 13 of the samples studied, hence the prevalence of ABU was 13%. In this study the commonest isolates were *Escherichia coli* (69%) followed by *Staphylococcus saprophyticus* (15%) and *Enterobacter* species (2%). ABU was observed more among women belonging to the age group of 30 years and above and it was significant statistically ($p<0.01$). Statistical analysis of ABU among trimester of women did not reveal any significance. ABU was independent of gravid status of pregnant women.

## Introduction

Urinary tract infection is a common problem encountered in pregnancy due to the morphological and physiological changes that takes place in the genitourinary tract during pregnancy. It is of two types, symptomatic and asymptomatic. Asymptomatic bacteriuria (ABU) refers to a condition in which urine culture reveals a significant growth of pathogens greater than $10^5$ bacteria per ml, in the absence of urinary symptoms (Lavanya and Jogalakashmi, 2002). ABU is more common in elderly women, residents of long-term care facilities and in patients with diabetes, prolonged bladder catheterization and spinal cord injuries. Patients with a long-term Foley catheter invariably show bacteriuria.

ABU accounts for 2 to 10% pregnancies in affluent countries (Whalley and Cunningham,

1977) and up to 86.6% in developing and under- developed countries (Akerele, 2001). Pregnant women with ABU are at high risk for maternal and foetal complications (Hamdan *et al.,* 2011). Maternal complications include overt UTI in 30-40% of antenatal women as pregnancy progresses. The foetus is at high risk for prematurity (Gomez, 1997; Goldenberg, 2000), low birth weight (Romero *et al.,* 1989), IUGR and perinatal mortality. Bacteriuria during pregnancy has a greater tendency to progress to pyelonephritis than in non-pregnant women.

Prevalence of ABU is more in rural population and those belonging to low social economic status (Truck, 1962; Whalley and Cunnninghan, 1977; Eminyat, 2008) due to poor sanitation, lack of general hygienic and failure to attend ante natal clinic. ABU continues to be a socio-medical problem in a view of consequences, but has not received due attention. More over screening for ABU has not been included in antenatal programs. So, early survey for asymptomatic bacteriuria is necessary for pregnant women irrespective of the socio-economic status.

It is better to know the etiological agents responsible for AUB in rural antenatal women, so as to decide on safe antimicrobial agents for the pregnant women. It is proved that the commonest pathogen causing ABU is *E. coli* followed by other Gram negative organisms like *Proteus* and *Klebsiella*, Gram positive organisms like group B *Streptococcus* and *Staphylococcus* (Abdullah and Al-Moslin, 2005). In randomized control trials, treatment of ABU in pregnancy decreases incidence of preterm birth and low birth weight infants. This condition is detectable and treatable, if early diagnosis is attempted. So it is essential to diagnose and treat ABU in order to reduce maternal and fetal complications.

Pertaining to this background, number of studies regarding ABU in pregnant women has been carried out worldwide. Only few studies (Lavanya and Jogalakshmi, 2002) were performed in India among the rural population. Since not much reference were made available on studies in rural population, there is a need to conduct this study in order to understand the prevalence and resistance pattern of etiological agents causing ABU among antenatal women residing in rural areas and to sensitize the rural practioners towards diagnosis of ABU and provide appropriate treatment.

## Materials and Methods

### Study site

This observational prospective study was carried out, after an approval from institutional ethics committee in a tertiary teaching hospital Chennai Medical College Hospital and Research Centre, Irungalur, Tiruchirappalli, Tamil Nadu situated in a rural village which caters to a rural population.

### Study population

About 100 pregnant women without any signs and symptoms of urinary tract infection (UTI), living with single partner and had active sexual life attending the antenatal clinic of our tertiary teaching hospital were considered for this study.

### Study period

Urine samples were collected from pregnant women who attended antenatal clinic in the period of July to October 2011 in our hospital.

**Exclusion criteria**

Pregnant women who had signs and symptoms of UTI, diabetes mellitus or other co-morbid illnesses or immunosuppressed status, history of previous catheterization of bladder and antibiotic consumption for any ailment with in past 4 weeks were excluded from the study. Those women who had sexual relations with multiple partners were dropped out.

**Sample collection**

The patients were explained about the study and a written consent was obtained. They were also asked to complete a questionnaire which had details about their age, parity, demographic data, literacy status, sexual practice, hygiene, last menstrual period, expected date of delivery, personal habits, antibiotic history etc.

Prior to sample collection each patient was instructed to clean their vulva with a piece of sterile gauze socked in saline starting from the front and going backwards thrice and to catch the midstream urine in a sterile container. The samples were transported to the laboratory immediately and processed.

**Processing of sample**

*Wet mount*

The urine sample was shaken well and a drop was kept on a clean slide and covered with a cover slip and examined under low power and high power objectives, for counting of pus cells. If pus cells were more than 5 per High power field these were noted in actual numbers. As pus cells beyond 15 could not be counted, it was noted as more than 15.

*Culture and Sensitivity*

All samples were cultured on blood agar, nutrient agar and MacConkey agar plates using a calibrated loop and incubated at 37°C overnight the culture plates were examined the next day.

Colony count yielding bacterial growth of $10^5$ /ml or more of pure isolates were processed further for identification. The isolates were identified by standard biochemical tests. The data were analyzed statistically using SPSS software.

## Results

Out of 100 samples collected for ABU among the rural pregnant women, Pus cells were found significantly in 32, but bacterial isolates were grown significantly in 13 of the samples studied (Tables 1 & 2). Hence, the prevalence of ABU was 13%. Statistical analysis of ABU and age revealed that two women were below the age of twenty (15.4%), four between the age group of 20-29 (30.7%) and seven above the age of thirty (53.5%) had ABU (Table 3). ABU was observed more among women belonging to 30 years and above and it was significant statistically ($p<0.01$). Among those studied 70 were illiterates and 30 were literates. Of the culture positive antenatal women, eleven were illiterate (84.6%) and two were literate and the difference was significant statistically. None of them were aware of sexual hygiene or safe sexual practices.

**Table. 1** ABU and bacterial isolates.

| Name of the Isolates | Present study (2011) (N=100) | Daniyan (2010) (N=200) | Hamdan (2011) (N=235) |
|---|---|---|---|
| *E. coli* (n=9) | 69% | 57.6% | 42.4% |
| *S.saphrophyticus* n=2) | 15% | NIL | NIL |
| *Enterobacter* (n=1) | 2% | NIL | NIL |
| *Citrobacter* + *E. coli* (n=1) | 14% | NIL | NIL |
| *Klebseilla* species | NIL | 30.6% | 9% |
| *Pseudomonas* species | NIL | 12.6% | 3% |
| *Staphylococcus aurues* | NIL | 4.8% | 39.3% |

**Table. 2** Relationship between wet mount and culture results

| Bacteriological status of urine | Pus cells > 5 cells / hpf | | Total |
|---|---|---|---|
| | Present | Absent | |
| ABU Positive cases | 13 | Nil | 13 |
| Abu Negative Cases | 19 | 68 | 87 |
| Total | 32 | 68 | 100 |

**Table 3.** Distribution of ABU and age of pregnant women

| Age Group | No of cases | No positive for ABU (%) |
|---|---|---|
| Below 20 years | 28 | 2 (15.4%) |
| 20-29 | 42 | 4 (30.7%) |
| ≥ 30 | 30 | 7 (53.8%) |

Of the total 31 samples were from first trimester, 22 from second trimester and 47 from third trimester. Four of the ABU women were in the first trimester (12.9%), three in second trimester (13.04%) and six in third trimester (12.7%) (Table.4). Statistical analysis of ABU among trimester of women did not reveal any significance.

**Table. 4** ABU and Trimester

| Status of pregnancy | No. screened | No. positive for ABU (%) |
|---|---|---|
| First Trimester | 31 | 4 (12.9) |
| Second Trimester | 23 | 3 (13.04) |
| Third Trimester | 47 | 6 (12.74) |

According to the gravid status, 14 pertained to primi, 18 to second and 68 to third gravid respectively. Of the culture positive patients, two were primi gravida (14.2%), three were second gravida (16.7%) and eight were third gravid (11.76%). ABU was independent of gravid status of pregnant women.

In this study the commonest isolates were *E. coli* (69%) followed by *Staphylococcus saprophyticus* (15%) *Enterobacter* species (2%) (Table 1) and one patient had dual infection (*Citrobacter* and *E. coli*), Over all gram positive organism were isolated only in one case (15%). whereas gram negative isolates from 12 cases (85%).

## Discussion

In our study, we had a prevalence of 13% of ABU and prevalence in different studies varied between 8.4 to 18.2% (Lavanya and Jogalakashmi, 2002; Oli *et al.*, 2010, Turpin *et al.*, 2005; Enayat *et al.*, 2008). In our study, ABU was significantly (p=0.21) more among in women who were in their 30years and above (62%) when compare to those twenty years of age (16%). In some of the studies (Turpine *et al.*, 2005) ABU was recorded more in women of older age. The reasons for higher incidence in older age group are furnished below.

In young females, due to the action of hormones, there is an increased deposition of glycogen. This attracts lactobacillus which is a glycogenphilic. Colonization of the vaginal epithelium by lactobacillus makes the environment acidic and hence prevents colonization by other pathogens. Decreasing glycogen deposition, and reduction in the lactobacillus colonies as a part of ageing process enhance bacterial adherence and invasion by pathogens and make them more susceptible to UTI.

Also, the occurrence of ABU was independent of trimester in this study. However, Oli *et al.* (2010) noticed higher incidence of ABU in third trimester, probably because of anatomical and physiological

changes related to month of pregnancy. Gayathree *et al.* (2010) suggested that screening for ASB in all the three trimester is necessary to prevent the dangerous complications.

The limitations of our study are lack of control group, no follow up of the women with ABU during subsequent trimester, single center study and comparison with pregnant women who have multiple risk factors. In this study there were no observe any statistical differences for the occurrence of ABU among those gravid statuses. ABU was more in third Gravida (11%) than in the second Gravida (16%) or the first Gravida (14%). Lavanya *et al.* (2007) observed a high prevalence in primi Gravida than others. The variation may be due to small number of cases selected.

In our study area, parents took care of their daughter's during first pregnancy in order to overcome fear and anxiety that prevails during first pregnancy. As the pregnant women's parents provided care of first pregnancy in a meticulous manner. These primi received nutritious food and regular antenatal care during her first pregnancy.

Causative organisms may vary from person to person but the sensitivity matters a lot as an appropriate anti microbial agent for ASB cannot be given in view of its toxicity and mothers and baby. However on the subsequent pregnancies, she invariably lives with her husband and have sexual activity which might have lead to colonization of the urinary tract by pathogens. Hence the occurrence of ABU is higher in the subsequent pregnancies, as revealed in different studies but not in ours (Turpin *et al.,* 2007)

The incidence in our study was more among illiterate. Oli *et al.* (2010) has recorded a higher prevalence in illiterate people in their studies which varied from 27.5 to 90% respectively. Illiteracy leads to ignorance and lack of awareness to personal hygiene, significance of periodic ante-natal medical checkups, safe and hygienic sexual practices which will prevent the invasion of the urinary tract by pathogens. Hence routine urine cultural test should be carried out on all antenatal patients in order to identify the ASB (Grishbabu *et al*., 2011). However, future studies are needed including non-pregnant women in the reproductive age group with active sexual life.

This prevalence of ABU among pregnant women in the rural population was found to be 13%. It was independent of gravid status and trimester but significantly more in women above the age of 30years. The most predominant organism was *E.coli* (9/13). Norfloxacin and ampicillin were effective against most of the organisms. Hence screening of all antenatal women to detect ABU should be enforced. Health education on personal and sexual hygiene should be included in the antenatal clinic.

Survey of ABU is thus justifiable so as to formulate specific action plan to be enforced among clinicians who serve in the rural areas and to provide guidelines to primary care clinicians so as they can provide specialised care for antenatal women. At present, an urine examination for albumin sugar deposits is done as a routine procedure along with estimating body weight blood pressure, Hemoglobin and blood sugar foe all pregnant women in the antenatal clinic. Urine examination for pus cell should be made mandatory for screening ABU.

## References

Abdullah, A.A., and Al-Moslin, M.I. 2005. Prevalence of asymptomatic bacteriuria in

pregnant women in Sharjah, United Arab Emirates. East. Mediter. Health J, 11: 5-6.

Akerele, P., F.Abhuliren, and Okonofua, J. 2001. Prevalence of asymptomatic bacteriuria among pregnant women in Benin city. Nigeria J. Obstruct. Gynaecol. 21(2): 141-144.

Enayat, K., F.Fariba, and Bahram, N. 2008. Asymptomatic bacteriuria among pregnant women referred to outpatient clinics in Sanandaj, Iran. Int. Brazilian J. Urol.34 (6): 699-707.

Gayathree, L., S.Shetty, S.R.Deshpande, and Venkatesha, D.T. 2010. Screening for asymptomatic bacteriuria in pregnancy: An evaluation of various screening tests in Hassan District hospital, India. J. Clin. Diagn. Res. 4(4): 2702-2706.

Girishbabu, R. J., R.Srikrishna, and Ramesh, S.T. 2011. Asymptomatic bacteriuria in pregnancy. Int. J. Biol. Med. Res.2(3): 740 - 742.

Goldenberg, R.L., J.C.Hauth, and Andrews, W.W. 2000. Intrauterine infection and preterm delivery. New Eng. J. Med.342: 1500-1507.

Gomez, R., R.Romero, S.S.Edwin, and David, C. 1997. Pathogenesis of preterm labor and preterm premature rupture of membrances associated with intraamniotic infections. Infect. Dis. Clin. North America, 11: 135-76.

Hamdan, Z., H.A.Haliem, M.Ziad, S.K.Ali, and Adam, I. 2011. Epidemiology of urinary tract infections and antibiotics sensitivity among pregnant women at Khartoum North Hospital. Ann. Clin. Microbiol. Antimicrob. 10: 2.

Lavanya, S.V., and Jogalakshmi, D. 2008. Asymptomatic bacteriuria in antenatal women. Indian J. Med. Microbiol. 20 (2): 105-106.

Oli, A.N., C.I.Okafor, E.C.Ibezim, C.N.Akujiobi, and Onwunzo, M.C. 2010.The prevalence and bacteriology of asymptomatic bacteriuria among antenatal patients in Nnamdi Azikiwe University Teaching Hospital Nnewi; South Eastern Nigeria. Nigerian J. Clin. Pract.13 (4): 409-12.

Turck, M., B.S.Goffe, and Petersdorf, R.G. 1962. Bacteriuria of pregnancy. Relation to socioeconomic factors. New Eng. J. Med. 266: 857-860.

Turpin, C.A., B.Minkah, K.A.Danso, and Frimpong, E.H. 2007. Asymptomatic Bacteriuria in Pregnant Women Attending Antenatal Clinic at Komfo Anokye Teaching Hospital, Kumasi, Ghana. Kwame Nkrumah University of Science and Technology. Ghana Med. J. 41 (1): 26-29.

Whalley, P.J., and Cunningham, F.G. 1997. Short-term versus continuous antimicrobial therapy for asymptomatic bacteriuria in pregnancy. Obst. Gynecol. 9: 262–265.