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Asymptomatic bacteriuria among 12 to 16 weeks of gestation and their perinatal outcome

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Abstract
Urinary tract infections (UTIs) is an infection caused by the presence and growth of microorganism anywhere in urinary tract. The prevalence of asymptomatic bacteriuria during pregnancy is 2% to 14% in India. Adverse maternal outcomes include symptomatic cystitis and development of pyelonephritis (in up to 30%) and preterm labor and delivery. Asymptomatic bacteriuria (ASB) is an entity with possibly serious consequences in the form of fetal and maternal morbidity. 200 randomly selected pregnant women, attending outpatient or inpatient department of D Y Patil Hospital kadamwadi, were included in study. Prevalence of asymptomatic bacteriuria in the study population was 19.5%. Common pathogen was *E. coli* occuring in 48.7%. The most sensitive antibiotic was nitrofurantoin. Maternal morbidity was higher in those with asymptomatic bacteriuria 76.9%. Those without asymptomatic bacteriuria had lesser morbidity 31.7%. Maternal morbidity spontaneous were miscarriage 7.7%, preterm labour 13.9%, premature rupture of membrane 13.9%. Fetal morbidity was higher in those whose mothers had asymptomatic bacteriuria. Fetal morbidity were prematurity 11.1%, low birth weight 8.3% were significantly increased. If unrecognized and un-treated, ASB leads to adverse perinatal outcome. We conclude that, all pregnant women are to be screened for ASB, preferably in the pre-conceptional period or at-least in the 1st trimester.

Keywords: Asymptomatic bacteriuria, gestation

Introduction
Urinary tract infections (UTIs) is an infection caused by the presence and growth of microorganism anywhere in urinary tract[1]. UTI is evident when there are 10^5 or more of microorganisms of a single strain of bacterium per millilitre in midstream urine samples [2].
The physiological changes, both hormonal and mechanical that occur in the urogenital tract during pregnancy, increases the potential for colonization by pathogenic bacteria. During pregnancy the bladder volume increases and detrusor tone decreases. Additionally, progesterone relaxes ureteric smooth muscle causing dilatation of ureters which is further aggravated due to pressure from the expanding uterus. All these factors lead to urinary stasis dysfunctional ureteric valves and vesicoureteric reflux which facilitates bacterial colonization and ascending infection[3].
Seventy percent of pregnant women develop glycosuria and this in combination with the physiological lowering of urine osmolality will further facilitate bacterial colonization.
The prevalence of asymptomatic bacteriuria during pregnancy is 2% to 14% in INDIA [4, 5]. Globally asymptomatic bacteriuria affects 2 – 10% of all pregnant women [5]. The incidence increases in circumstances such as poor hygiene, overcrowded places, low socioeconomic status.

Methodology
In this prospective study pregnant women between 12 to 16 weeks of pregnancy or as early as they register in the antenatal clinic of the department of Obstetrics and Gynaecology in D Y Patil hospital, kadamwadi Kolhapur were included in the study from may 2012 to august 2014 and they were divided in two groups.
Group A – Positive for ASB
Group B – Negative for ASB The exclusion criteria were women with symptomatic urinary tract infection like fever, frequency, burning micturition, known congenital anomaly of urinary tract, women with hypertension, anemia, diabetes mellitus, sensitized Rh negative pregnancy and patients who had taken antibiotics in last 6 months. After screening and quantitative bacterial count done, for evidence of asymptomatic bacteriuria, women with bacteriuria were treated with antibiotic according to their antibiotic sensitivity pattern.

Colonies were examined and counted on both plates. Total counts were estimated from blood agar plate and Mac conkeys agar plate. In each case colonies were multiplied by 100, to give an estimate of the number per milliliter of urine. Thousand colonies on Mac conkeys agar plate i.e. 10^5 bacteria per ml and 100 colonies on blood agar plate i.e. 10^4 per ml were taken as significant bacteriuria.

After determining the plate count, organisms present were identified and the susceptibility to antibiotics was determined by Disc-Diffusion method. Mixed growth of two or more organisms was considered as contamination and the sample was repeated. If no growth occured, specimens were held for another day in incubator, and if still negative reported as no growth after 48 hrs. A smear was prepared from the culture selecting a single colony and stained by grams method. In case if gram positive cocci were found in clusters a coagulase test was performed by tube method to differentiate between pathogenic and nonpathogenic staphylococci. When gram positive cocci in pairs were isolated from Mac conkeys agar plate, bile solubility heat resistance and mannitol fermentation tests were carried out to confirm enterococci.

When pink colour ed or pale colonies on Mac conkeys agar plate were seen gram's staining was done, motility was examined similarly a set of biological investigations were carried out to identify various gram negative bacteria. Antibiotic sensitivity was done by Disc-Diffusion method of Kirby Bauer. In case of urinary infection the suitable antibiotic drug was found out by the sensitivity of organisms in vitro. The organisms were grown on nutrient broth for 18 hrs. Mueller Hinton Agar plates were then inoculated uniformly by flooding the surface with 2 ml of broth cultures. The excess removed, discs were then placed at suitable distance from each other and were incubated overnight at 37 degree centigrade. Antibiotic sensitivity zones were read in the zone reader, and compared to a standard chart with specified zone diameters for each antimicrobial disc to determine either sensitivity or resistance of the bacterium in question.

The data was analyzed using Chi Square and proportions were calculated by using statistical software SPSS 16.0 version.

Fig 1: Culture plate showing *E. coli* growth

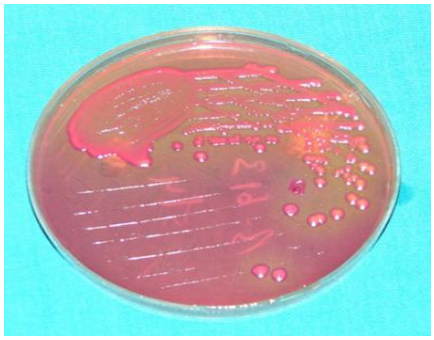

Fig 2: Culture plate showing klebsiella sp. growth

Results

The study conducted on 200 pregnant women attending antenatal clinic in D. Y. Patil medical college Kadamwadi Kolhapur. Urine culture and sensitivity was done as screening for ASB. Asymptomatic bacteriuria in pregnancy leads to adverse maternal and fetal effects. Prevalence of asymptomatic bacteriuria in the study population was 19.5%. Common pathogen was *E. coli* occuring in 48.7%. The most sensitive antibiotic was nitrofurantoin.

Maternal morbidity was higher in those with asymptomatic bacteriuria 76.9%. Those without asymptomatic bacteriuria had lesser morbidity 31.7%. Maternal morbidity spontaneous miscarriage 7.7%, preterm labour 13.9%, premature rupture of membrane 13.9%. Fetal morbidity was higher in those whose mothers had asymptomatic bacteriuria. Fetal morbidity, prematurity 11.1%, low birth weight 8.3% were significantly increased.

The most common maternal morbidity was preterm labor 13.9%. The most common fetal morbidity was prematurity 11.1%. No maternal or fetal mortality was observed.

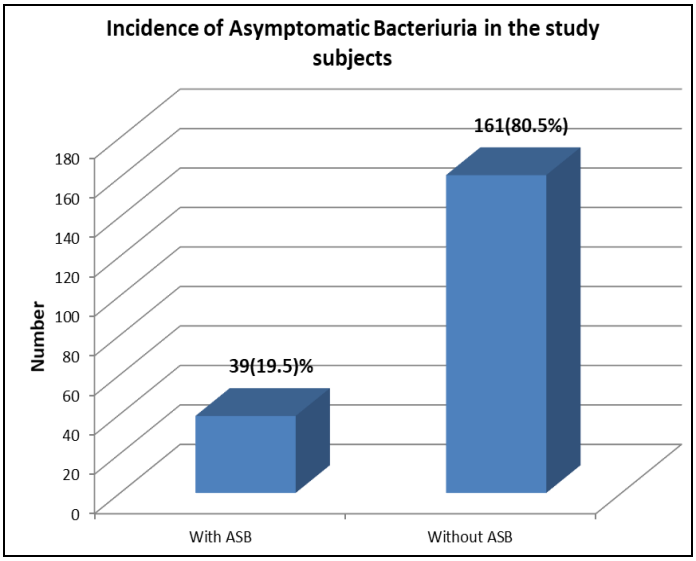

Table 1: Incidence of Asymptomatic Bacteriuria in the study subjects

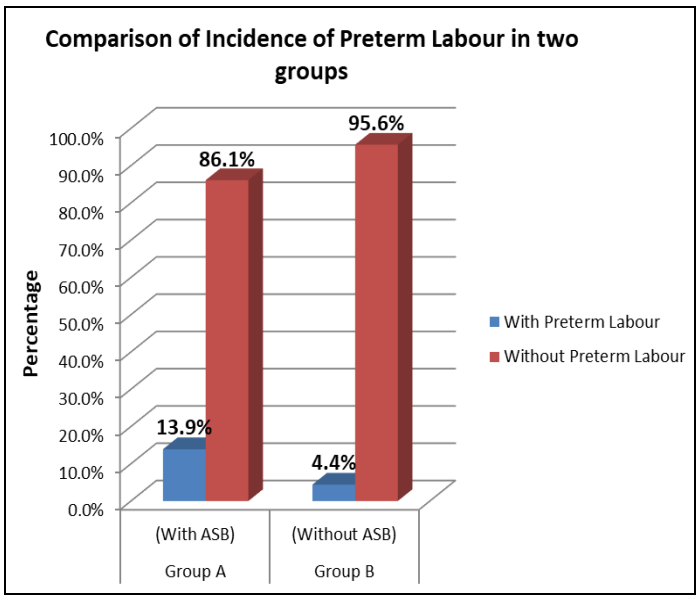

Table 2: Comparison of Incidence of Preterm Labour in two groups

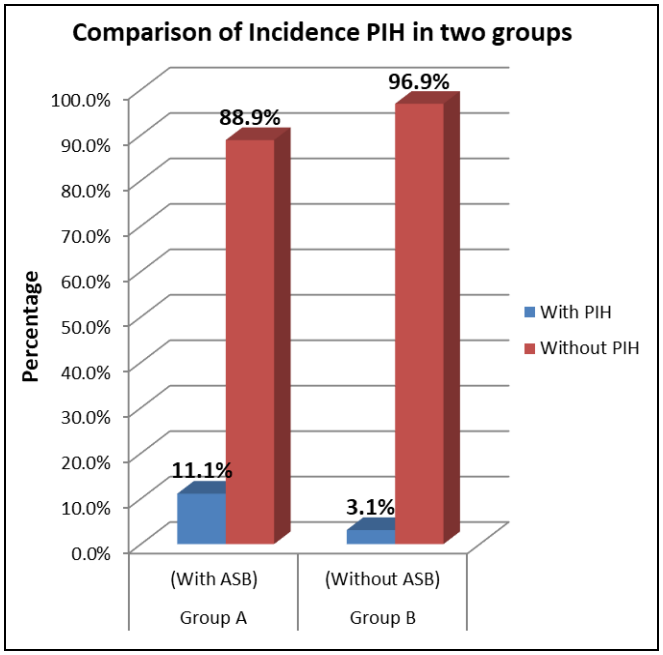

Table 3: Comparison of Incidence PIH in two groups

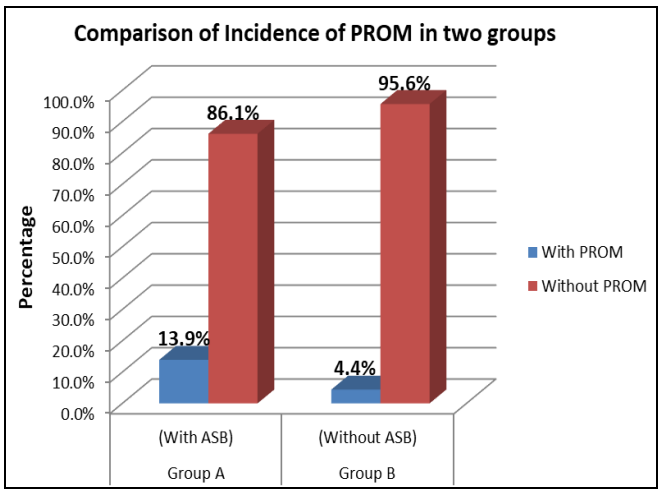

Table 4: Comparison of Incidence of PROM in two groups

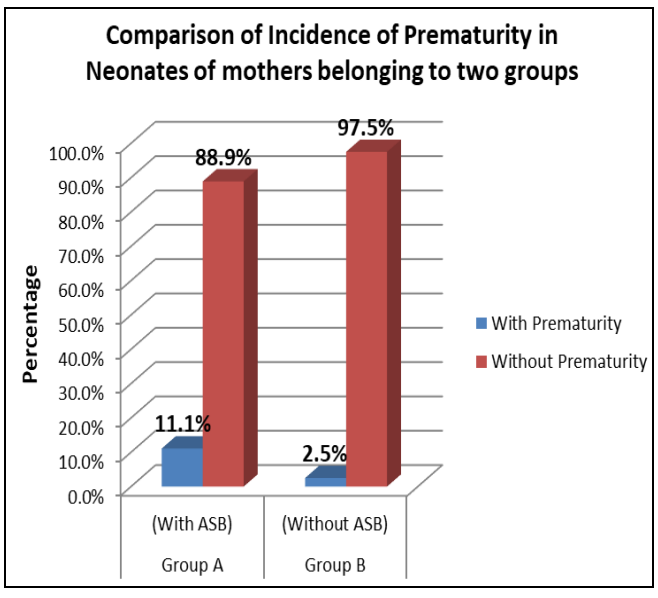

Table 5: Comparison of incidence of prematurity in neonates of two groups

Discussion

In the present study the prevalence of asymtomatic bacteriuria is 19.5%. Different studies have shown varying incidences from 2-30% depending on the group under study like diabetes mellitus complicating pregnancy and methodology, though diabetes mellitus was excluded from the current study. Khatun *et al.* [7] had 30% incidence in his study and Masinde A *et al.* [8] had 14.6%.

The dominant isolates in the study was Escherichia coli which was 48.71%. Others were klebsiella pneumoniae, coagulase negative staphylococcus and alpha hemolytic streptococci which were found in less numbers.

Preterm births in the current study was 13.9% in ASB patients. Our preterm births compared with a meta-analysis of exposure to antenatal UTI that reported relative risk of 1.5 and 2 for association with low birth and prematurity respectively.

This was confirmed by Robert Mittendorf *et al.* [8] by a meta-analysis. Findings from Cardiff birth survey [9] which prospectively studied 25,844 births and reported that ASB is not associated with preterm delivery.

PIH in the current study was 11.1% in ASB patients. The relationship between UTIs during pregnancy and preeclampsia is consistent throughout studies performed over the last years, and is present in diverse settings worldwide Conde- Agudelo *et al.* [10] 2008.

Incidence of PROM in the study group was 13.9% (χ^2 = 4.57 d.f = 1 p= 0.0325 Significant). Similar study was conducted by Anderson BL *et al.* [11] 2007 they found 10.2% had features of chorioamnionitis like PROM (95% confidence interval 2.4 to 21.2).

Conclusion

Asymptomatic bacteriuria is a common infection. Pregnant women with asymptomatic bacteriuria are at an increased risk for adverse maternal and fetal outcomes which could be prevented by antimicrobial treatment of asymptomatic bacteriuria.

If un-recognized and un-treated, ASB leads to adverse maternal outcome like pyelonephritis, anemia, symptomatic UTI, puerperal fever, wound infections and sub-involution of uterus and adverse fetal outcome like threatened pre-term, PROM, pre-term births, decreased mean gestational age at birth, lower APGAR scores, lower average birth weight, LBW, IUGR, neonatal infections, hypoglycemia, hyperbilirubinemia requiring photo-therapy, apnea, birth asphyxia and prolonged NICU stay.

This study suggests prompt and early detection of asymptomatic bacteriuria and its treatment significantly reduces adverse pregnancy outcomes. Thus it is appropriate for all pregnant women to be screened for asymptomatic bacteriuria, as early as possible.

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