

Prevalence of Asymptomatic Bacteriuria in Preterm Labour and Maternal and Perinatal Outcome

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Study was conducted at the Department of Obstetrics and Gynaecology, Petlaburz hospital, Hyderabad and Government General Hospital, Siddipet. The publication is done in collaboration.

The study period is from Jan 2019 to June 2019.

50 cases at each hospital

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I. Introduction

Preterm labour is defined by the World Health Organisation as the onset of labour prior to the completion of 37 weeks of gestation in a pregnancy beyond 20 weeks of gestation¹. Preterm birth is the leading cause of neonatal morbidity and mortality worldwide and accounts for 75% of neonatal deaths and 50% of long term morbidity, including respiratory disease and neurodevelopmental impairment².

Infection is implicated as the aetiological factor in 40-50% cases of preterm labour at early gestation (<30 weeks). Asymptomatic bacteriuria and systemic infections like pyelonephritis, pneumonia, acute appendicitis often lead to increased uterine activity and preterm labour³. Urinary tract infection is one of the most frequent bacterial infections⁴. It is the second most common bacterial infection seen during pregnancy⁵.

The asymptomatic UTI is a persistent, actively multiplying bacteria within the urinary tract without any symptoms of infection⁶. A clean voided specimen containing more than 1,00,000 organisms/ml is diagnostic⁷. Prevalence in pregnancy is 2-7%. If not treated, about 25% of women will subsequently develop acute infection during pregnancy. ASB is an entity with possible serious consequences in the form of fetal and maternal morbidity⁸. As ASB is a risk factor for preterm labour, the present study is undertaken to emphasize the need for its early diagnosis and treatment and thus reducing preterm deliveries.

II. Aims And Objectives

AIMS:

To study the prevalence of asymptomatic bacteriuria in preterm labour and maternal and perinatal outcome

OBJECTIVES:

To find out the number of women in preterm labour who are positive for ASB. To find out the commonest pathogenic organism in these women with ASB. To find out the maternal and perinatal morbidity of these women with ASB

DEFINITION:

Asymptomatic bacteriuria is defined as the finding of greater than 1,00,000 colony forming units per ml of urine of a single pathogen in two consecutive midstream, clean catch urine specimens or one catheterisation specimen. Lower colony count in asymptomatic women usually represents contamination⁹.

RISK FACTORS FOR PRETERM DELIVERY

- **Maternal characteristics :** Black race, Interpregnancy interval of less than six months, physically strenuous work, prepregnancy BMI $\leq 19\text{kg/m}^2$
- **Pregnancy history :** Previous preterm delivery
- **Pregnancy characteristics :** Bacterial vaginosis, chlamydia infection, cocaine/heroin use, h/o cervical cone biopsy/ LEEP, intrauterine infection, maternal abdominal surgery, multiple gestation, periodontal disease, UTI and non-genital tract infection¹⁰.

PHYSIOLOGICAL CHANGES IN PREGNANCY PREDISPOSING TO UTI

1. CHANGES IN KIDNEYS:

Renal blood flow and GFR increase early in pregnancy¹¹. Increased bladder volume and decreased bladder and ureteral tone, contribute to increased urinary stasis and ureterovesical reflux¹².

2. URETHRA:

The female urethra is relatively short and is anatomically proximal to the vagina, which is colonised with organisms from the GIT.

3. CHANGES IN THE BLADDER:

Bladder tone progressively decreases from 12th week onwards¹³. Bladder capacity increases. Incomplete emptying of bladder during pregnancy leads to increasing volumes of residual urine. Presence of residual urine $>5\text{ml}$ is risk factor for UTI¹⁴.

4. URETER:

Ureters undergo dilatation especially in the upper two-thirds. This is called as “HYDROURETER OF PREGNANCY” can contain upto 200ml of urine. Ureteric tone decreases significantly, even in first trimester¹⁵

ENVIRONMENTAL FACTORS

- Women from lower socioeconomic status are prone for UTI by 5 times than in the general population.¹⁶
- Poor personal hygiene is associated with ASB and UTI¹⁷

VARIOUS TESTS TO DETECT BACTERIURIA :

1. PYURIA :

- It is the presence of increased number of PMN leukocytes in the urine. It is evidence of an inflammatory response in urinary tract to bacteria¹⁸

In a well mixed, uncentrifuged sample <2 hrs old, presence of :

≥ 10 pus cells/ml – Highly suggestive of infection

>5 pus cells - Abnormal

3-5 pus cells – Doubtful significance

<5 pus cells - Less significant¹⁹

2. GRAM STAINING :

Gram staining is not as effective as urine culture to detect significant bacteriuria²⁰

3. DIPSTICK :

- Low sensitivity
- High specificity
- Low positive predictive value
- High negative predictive value

Urine reagent strips are not sufficiently sensitive to be of use in the screening of asymptomatic bacteriuria²¹

URINE CULTURE AND COLONY COUNTING :

- GOLD STANDARD METHOD in screening and diagnosis of ASB.17
- DIAGNOSIS : ASB $\geq 10^5$ CFU/ml in CCSMU – Sensitivity 98% , Specificity 86%.

COMPLICATIONS

MATERNAL COMPLICATIONS:

1. Symptomatic infections : Pregnancy is a provocation for the asymptomatic bacteriuria to become symptomatic bacteriuria.

Detection of all women with asymptomatic bacteriuria is important as 25% to 30% will develop symptomatic UTI while pregnant.

2. Maternal Anemia :

Asymptomatic bacteriuria during pregnancy is associated with anemia of the mother, especially after 32 weeks of gestation. Pyelonephritis causes bone marrow suppression, increased erythrocyte destruction and decreased red cell production.

3. Premature Rupture Of Membranes:

Bacterial enzymes such as collagenase, weaken fetal membranes which can result in PROM. Bacterial endotoxins activate macrophages, which release inflammatory mediators that weaken the membranes.

4. Preterm labour :

The rate of preterm labour in ASB is now accepted to be 20-50%. Maximum risk exists in patients not responding to 1st course of antibiotics.

5. Preeclampsia : ASB is associated with hypertension and preeclampsia. It can occur due to chronic subclinical infection, which increases maternal cytokines, sufficient enough to affect vascular endothelial function and prime individuals for subsequent development of preeclampsia.

6. Pyelonephritis: If bacteriuria is not treated 30-40% of patients develop pyelonephritis.

FETAL COMPLICATIONS

1. Prematurity: Asymptomatic bacteriuria in pregnancy causes prematurity, as it causes preterm delivery.

2. Low birth weight: Women with asymptomatic bacteriuria have a 54% high risk of a low birth weight infant.

3. Perinatal mortality: Asymptomatic bacteriuria can cause stillbirth sudden unexpected infant death of women with urinary infection.

MATERIALS AND METHODS

- PLACE OF STUDY : All pregnant women in preterm labour who are admitted to Obstetrics and Gynaecology

- STUDY DESIGN : Observational study

- PERIOD OF STUDY :

- INCLUSION CRITERIA :

All pregnant women in preterm labour (after 20 weeks of gestation before 37 weeks) who are free from symptoms of UTI.

- EXCLUSION CRITERIA :

1. Patients with symptoms of UTI

2. Patients with h/o UTI during this pregnancy

3. Patients with diabetes, chronic HTN and other pre existing medical disorders

4. Patients who had taken antibiotics in last two weeks

III. Methodology

After obtaining informed consent, total of 100 pregnant women in preterm labour after 20 weeks and before 37 weeks of gestation were randomly selected for the study

CRITERIA TO DOCUMENT PRETERM LABOUR :

- Contraction of 4 in 20 minutes or 8 in 60 minutes plus progressive change in the cervix.
- Cervical dilatation > 1cm
- Cervical effacement of 80% or greater

A DETAILED HISTORY WAS TAKEN REGARDING THE

- Socioeconomic status(kuppuswamy socioeconomic class)
- Menstrual history
- Obstetric history
- Past history
- Family history
- Personal history
- ❖ A thorough general physical examination with reference to PR, BP, RR and TEMPERATURE were noted.
- ❖ Per abdomen and per vaginal examination done and preterm labour confirmed
- ❖ Routine antenatal profile done
- ❖ The patients were instructed to give midstream urine sample by clean catch method for CUE and urine culture.

Urine specimen collected should undergo-

- Routine urine analysis
- Culture and sensitivity

ROUTINE URINE ANALYSIS – It includes physical, chemical and microscopic examination

Physical examination- It includes colour, odour, reaction, volume, specific gravity and clarity of the sample

Chemical methods- Albumin and sugars are tested

Microscopy- The sample is tested for hematuria, WBCs(pus cells), epithelial cells, casts

Unspun urine is examined directly under microscope and pus cells per HPF were calculated. A count of ≥ 10 pus cells/HPF is an indication of UTI²²

CULTURE AND SENSITIVITY – QUANTITATIVE BACTERIOLOGY

- **Calibrated loop direct streak method**

Using a flame sterilised and cooled 4mm platinum loop delivering 0.01ml, one biconvex loop full of well mixed, uncentrifuged urine specimen was deposited on blood agar 11plate and Mac Conkey's agar plate to the lower edge of the plate in a T pattern from inoculum site. Both plates were incubated overnight at 35 degree Celsius and read next morning.

Diagnosis of significant bacteriuria(IDSA Guidelines)

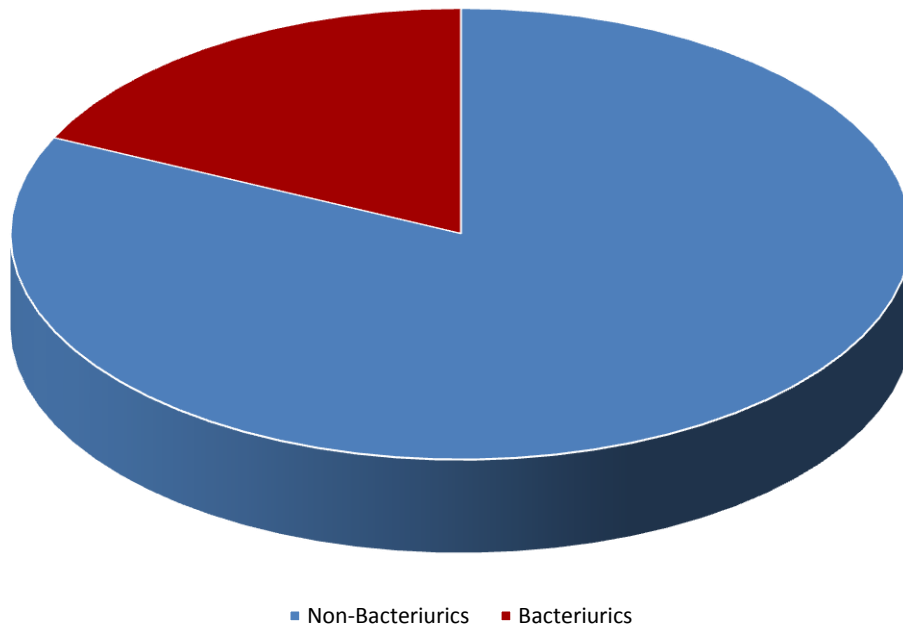
ASB ≥ 100000 CFU/ml in CCMSU

After determining the plate count, organisms present were identified and the susceptibility to antibiotics were determined by Disc Diffusion method. Mixed growth of ≥ 2 organisms was considered as contamination and the sample was repeated. If no growth occurred, specimens were held for another day in incubator, and if still negative, reported as no growth after 48 hours.

IV. Results

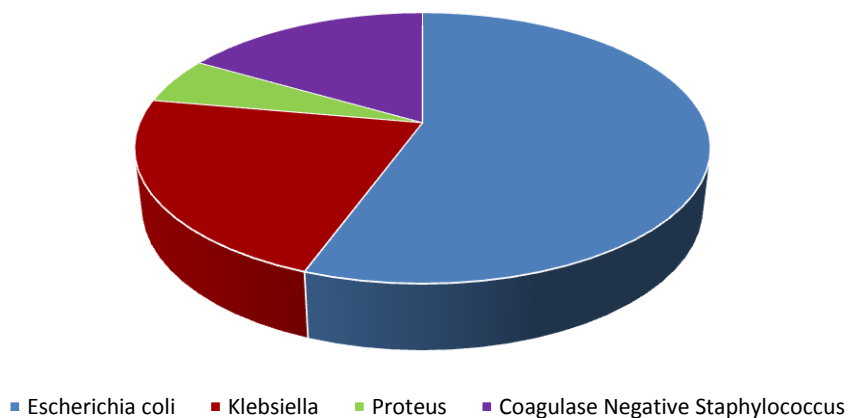
No. of Patients	Non-Bacteriurics	Bacteriurics	Prevalence of ASB in Preterm labour
100	82	18	18%

Number of patients studied for asymptomatic bacteriuria

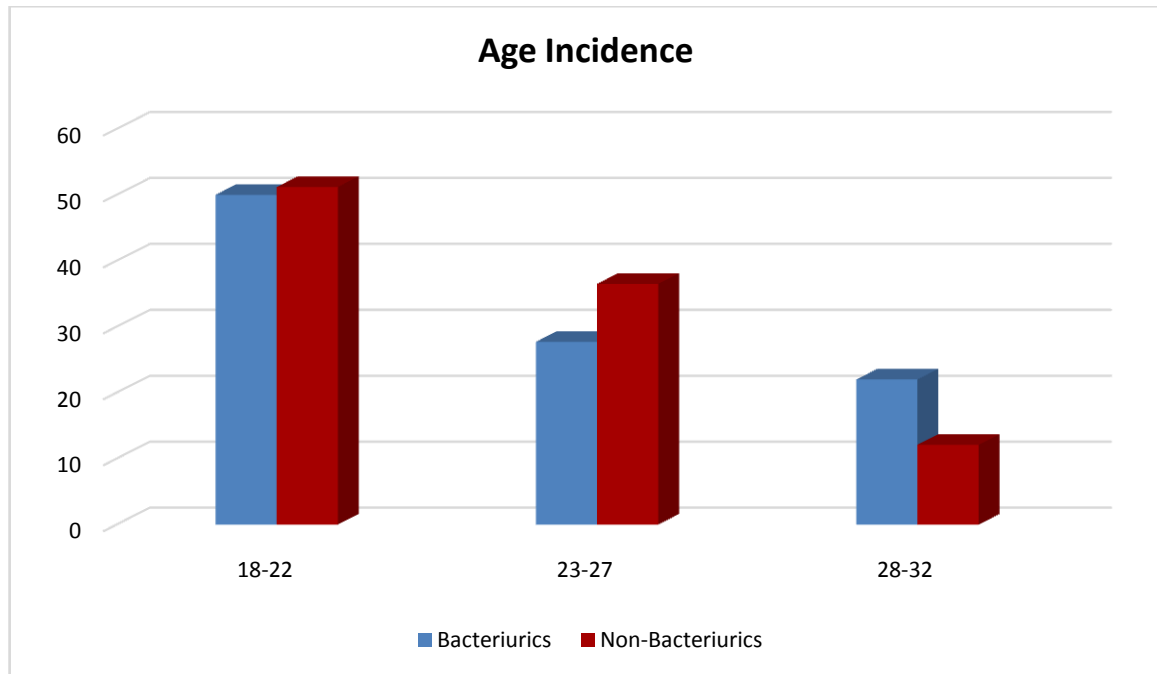


Pathogen	Number	Percentage %
Escherichia coli	10	55.5
Klebsiella	4	22.2
Proteus	1	5.55
Coagulase Negative staphylococcus	3	16.6

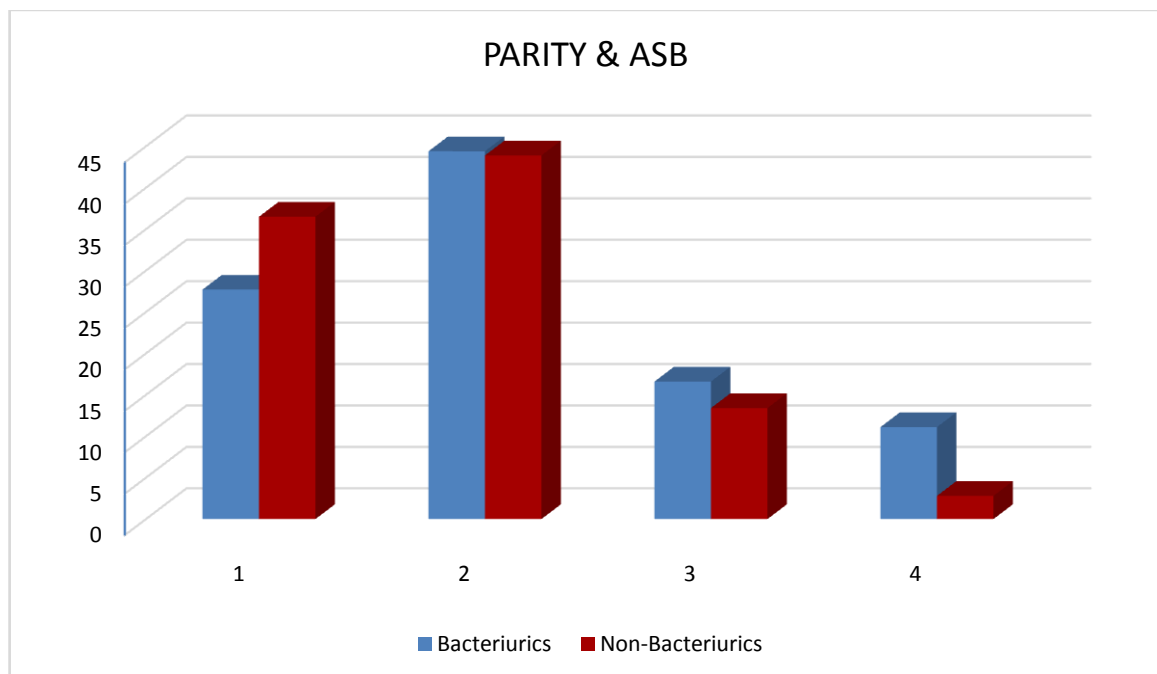
CAUSATIVE ORGANISMS



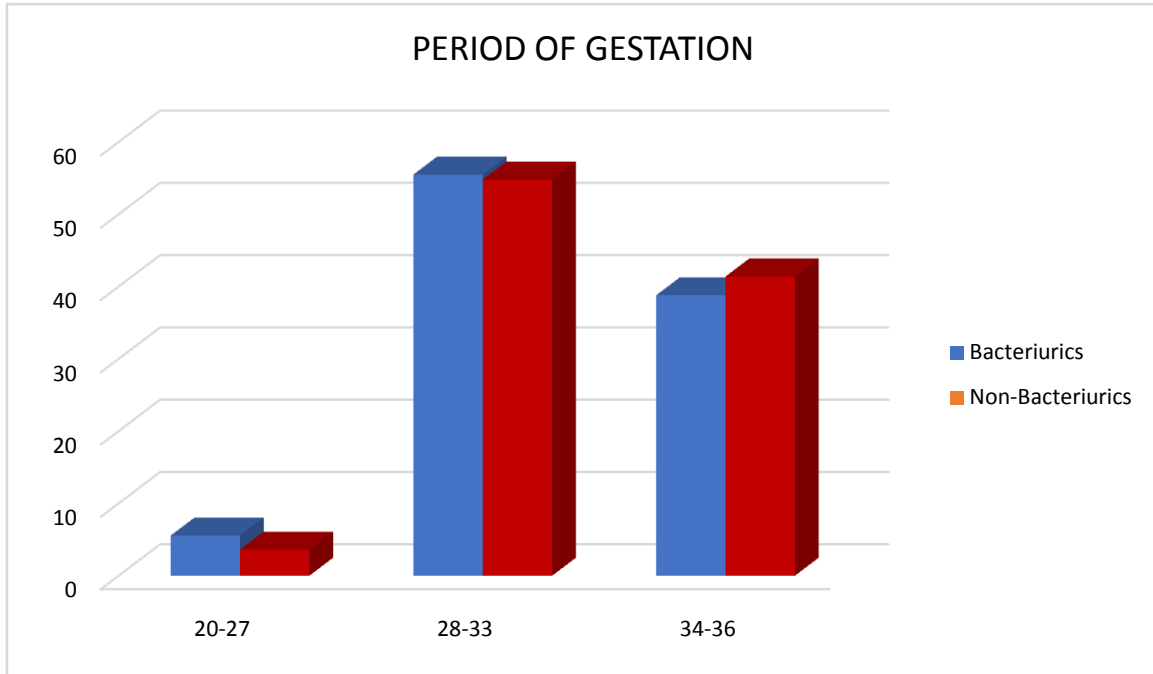
Age group in years	Bacteriurics		Non-Bacteriurics	
	Number	Percentage%	Number	Percentage%
18-22	9	50.0	42	51.2
23-27	5	27.7	30	36.5
28-32	4	22.0	10	12.1
Total	18		82	



Parity	Bacteriurics		Non-Bacteriurics	
	Number	Percentage%	Number	Percentage%
1	5	27.7	30	36.5
2	8	44.4	36	43.9
3	3	16.6	11	13.4
4	2	11.1	5	6.09

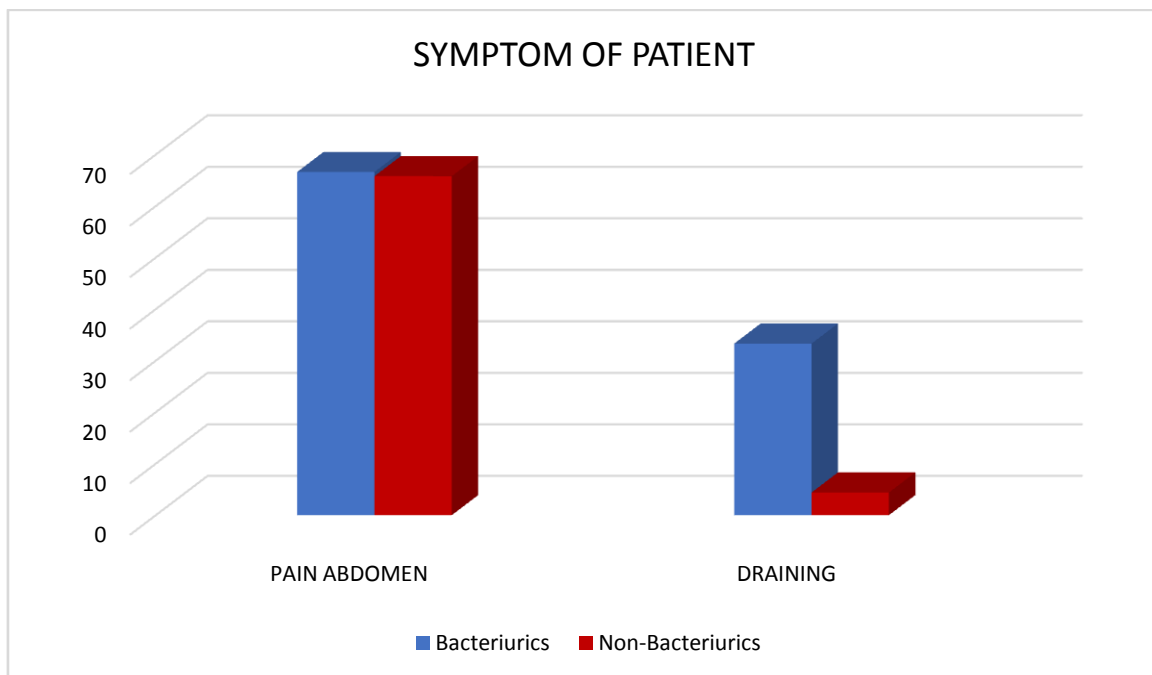


Weeks of Gestation	Bacteriurics		Non-Bacteriurics	
	Number	Percentage%	Number	Percentage%
20-27	1	5.55	3	3.61
28-33	10	55.5	45	54.8
34-36	7	38.8	34	41.4



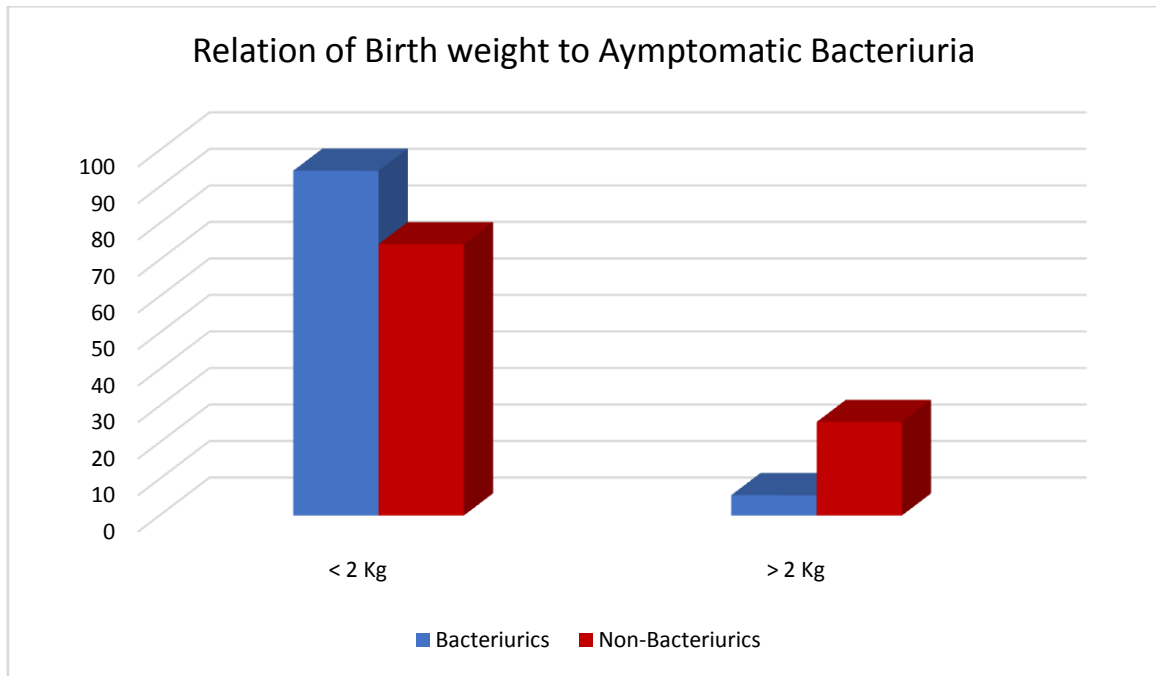
Highest percentage of Bacteriurics are in the 28-33 weeks of Gestation Period.

SYMPTOMS	Bacteriurics		Non-Bacteriurics	
	Number	Percentage%	Number	Percentage%
PAIN ABDOMEN	12	66.6	54	65.8
DRAINING	6	33.3	28	34.1

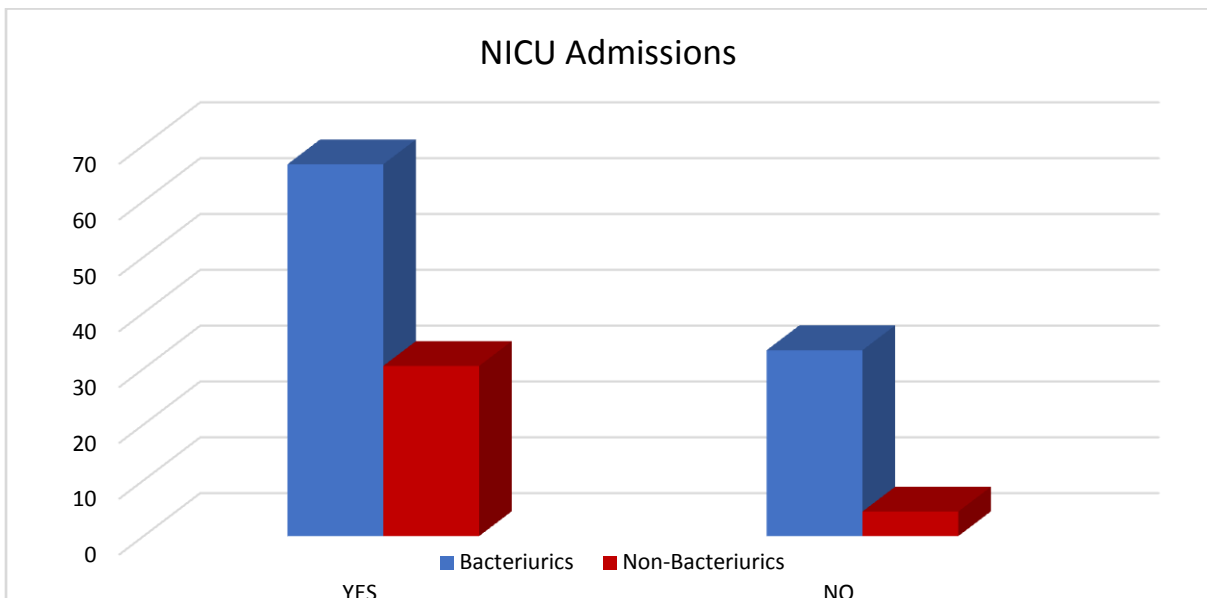


Most of the Patients presented with labourpains(66.6%)

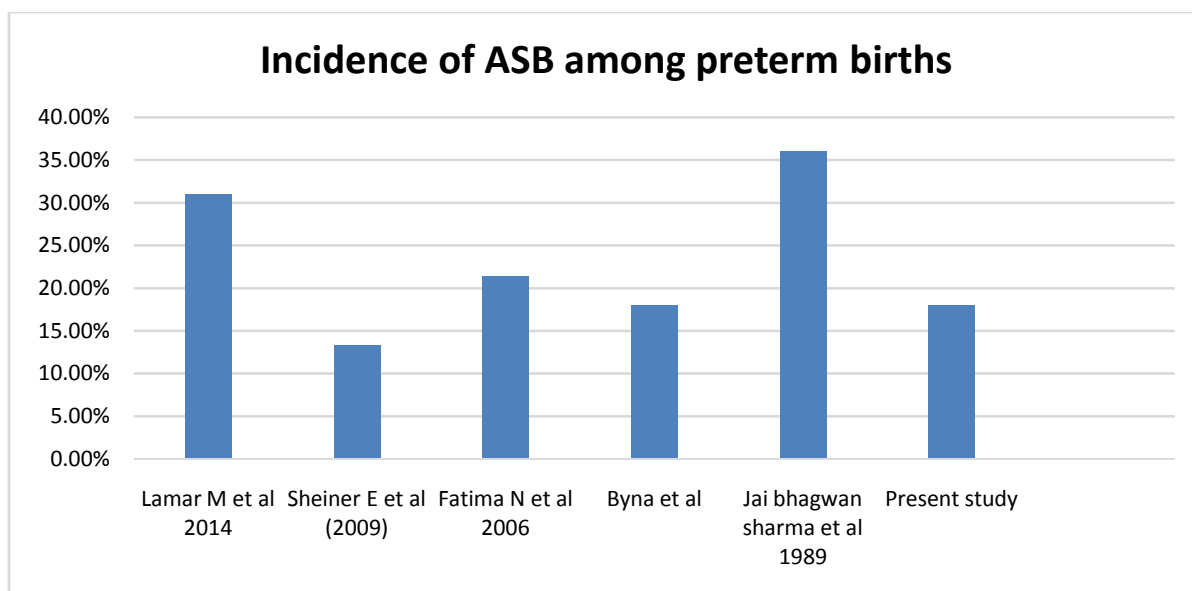
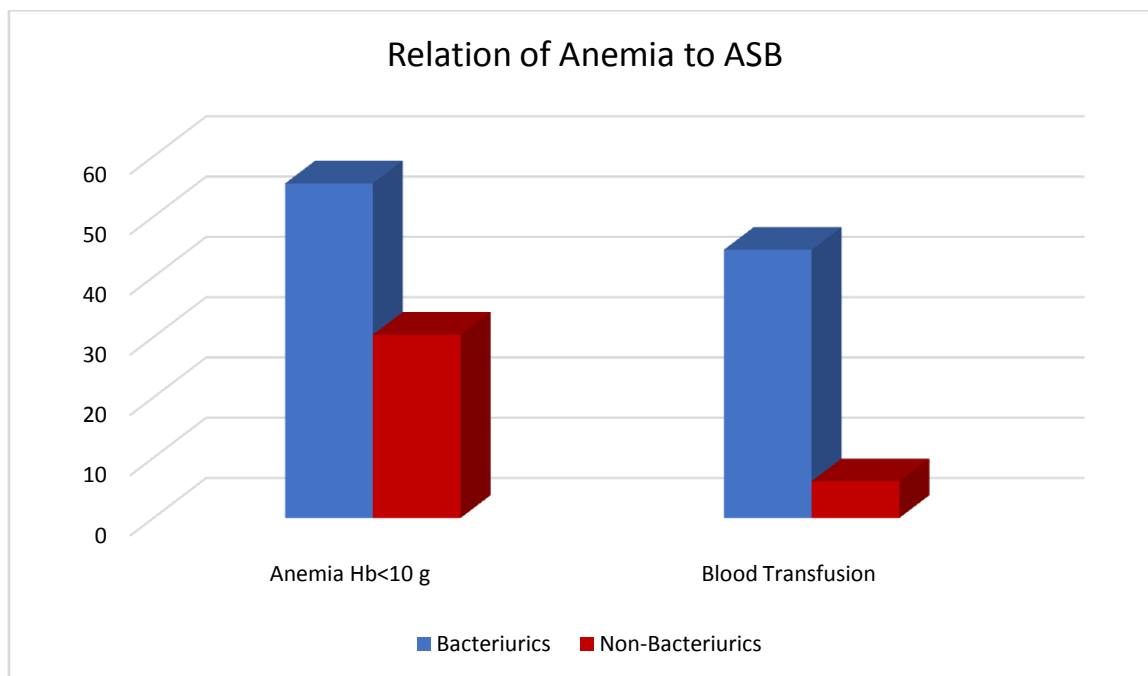
Birth Weight	Bacteriurics		Non-Bacteriurics	
	Number	Percentage%	Number	Percentage%
<2 Kg	17	94.4	61	74.3
>2 Kg	1	5.55	21	25.6



NICU Admission	Bacteriurics		Non-Bacteriurics	
	Number	Percentage%	Number	Percentage%
YES	12	66.6	25	30.48
NO	6	33.3	57	69.5



	Bacteriurics		Non-Bacteriurics	
	Number	Percentage%	Number	Percentage%
Anemia Hb < 10g	10	55.5	25	30.4
Blood Transfusion	8	44.5	5	6.09



V. Discussion:

In the present study the incidence of asymptomatic bacteriuria among preterm labour is found to 18% which is consistent with the study done by Kass²³

In the present study E.coli is the most commonest organism causing ASB with prevalence of 55.5% worldwide. Commonest isolate in 70-90% pregnant women. Klebsiella emerged as the second most common cause of ASB with a prevalence of 22.2%. According to the present study 88.8% of bacteriurics belongs to low socioeconomic group. The present study shows that asymptomatic bacteriuria is commonly seen between the ages of 18 - 22 years (50%), followed by 23 – 27 years (27.7%) indicating that it is common in the reproductive age group and this trend is attributed to the fact that most of the women in India complete their families by 25 years of age. Incidence of ASB in reproductive age group is due to early pregnancy and multiparity in our country, especially in the rural sector. Many studies show advancing age as a risk factor for acquiring ASB in pregnancy because there is glycogen deposition and reduction in the lactobacillus as a part of ageing process which enhances bacterial adherence and invasion by pathogens and make them susceptible.

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