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**Dr. Alpana Wagh**

Assistant Professor,  
 Department of Microbiology,  
 Seth G.S. Medical College and  
 KEM Hospital, Parel,  
 Mumbai, Maharashtra, India

**Dr. Sarita Kothadia**

Ex-HOD, Department of  
 Microbiology, Dr. V.M.  
 Government Medical College,  
 Solapur, Maharashtra, India

**Corresponding Author:****Dr. Alpana Wagh**

Assistant Professor,  
 Department of Microbiology,  
 Seth G.S. Medical College and  
 KEM Hospital, Parel,  
 Mumbai, Maharashtra, India

## Asymptomatic cases of bacteriuria in high risk group of pregnant women

**Dr. Alpana Wagh and Dr. Sarita Kothadia**

**Abstract**

Asymptomatic Bacteriuria (ASB) as a condition characterized by absence of symptoms of acute urinary infection when true bacteriuria exists. Association of ASB with high-risk pregnancy is a matter of controversy. A high-risk pregnancy threatens the health or life of the mother or her fetus. In this study we have documented the high risk pregnancy and ASB cases in pregnant women. Study was carried out in Dr. V.M. Government Medical College, Solapur, in Department of Microbiology. 300 married pregnant and 300 married non-pregnant women were included in the study. Detailed data of health from the patients were recorded in a specially formulated structured proforma. Continuous follow-up of subjects was done up to delivery. In high risk group, total 33.3% cases were in symptomatic category and 66.6% in asymptomatic category. 33.3% cases showed significant bacteriuria in symptomatic category, while 16.66% cases showed significant bacteriuria in asymptomatic category. Pregnancy induced hypertension was highest (41.67%) followed by bad obstetric history (16.67%), while least was sickle cell anemia cases (8.33%). The significant bacteriuria was highest in high risk group (50%) and was showed statistically significant values ( $P < 0.005$ ) while comparing to study group (11.33%), follow up group (5.14%) and control group (3%). The relatively high prevalence of ASB during pregnancy, the significant consequence for the pregnancy, plus the ability to avoid sequel with treatment, justify screening pregnant women for bacteriuria.

**Keywords:** Asymptomatic bacteriuria, UTI, high risk pregnancy, high blood pressure, diabetes

**1. Introduction**

Bacteriuria refers to presence of actively multiplying bacteria in urine [1]. A bacteriuria may occur as a result of infection or contamination of urine specimen at the time of collection. The term 'significant bacteriuria' (SB) was coined with a view of differentiating bacteriuria of true infection from contamination. Kass *et al.* [2] observed that presence of  $10^{3.0}$  or more than that indicates SB. Kass *et al.* stated that contamination of urine at time of collection results in lower number of bacteriuria in urine, whereas infection is associated with large numbers. The threshold accepted for defining SB is  $10^{5.0}$  or more colony forming units (CFU) of bacteria per ml of voided urine. Urinary Tract Infection (UTI) have three principle presentation as, asymptomatic bacteriuria (ASB), acute cystitis and pyelonephritis. UTI may occur with or without symptoms and latter is known as ASB. ASB is often a dynamic process and is defined as  $10^{5.0}$  bacteria per ml of one or more on two clean-catch cultures taken on separate days [3]. Marchant *et al.* [4] had quoted ASB as a condition characterized by absence of symptoms of acute urinary infection when true bacteriuria exists. ASB is often a dynamic process that is it may wax and wane in particular women.

Women identified with bacteriuria in early pregnancy have a 20–30-fold increased risk of developing pyelonephritis, compared with women without it [5]. In India the incidence is estimated to be 5 to 12.5% [6, 7]. Two decades ago, the importance of UTI during pregnancy took a new direction when Kass *et al.* [2] described an association between ASB and adverse obstetric outcome. He also reported that bacteriuria caused an increase in premature delivery and this could be almost abolished with antimicrobials. Although some have affirmed an association of maternal bacteriuria with increased preterm delivery others have not. Zimmerman *et al.* [8] also stated association of ASB with toxemia of pregnancy, whether hypertensive disorders of pregnancy are associated with ASB or ASB predisposes to hypertensive disorder is still as matter of controversy.

A high-risk pregnancy threatens the health or life of the mother or her fetus. It often requires specialized care from specially trained providers. Some pregnancies become high risk as they progress, while some women are at increased risk for complications even before they get pregnant for a variety of reasons. Risk factors for a high-risk pregnancy can include, existing health conditions, such as high blood pressure, diabetes, or being HIV-positive [9]. Obesity increases the risk for high blood pressure, preeclampsia, gestational diabetes, stillbirth, neural tube defects, and cesarean delivery. The risk of complications is higher in women carrying more than one fetus (twins and higher-order multiples). Here common complications include preeclampsia, premature labor, and preterm birth. More than one-half of all twins and as many as 93% of triplets are born at less than 37 weeks' gestation [10]. Pregnancy in teens and women age 35 or older increases the risk for preeclampsia and gestational high blood pressure [11]. Women with high-risk pregnancies should receive care from a special team of health care providers to ensure the best possible outcomes.

Associations have been documented between ante partum UTI and a variety of maternal complications including hypertension, sickle cell anaemia, diabetes mellitus etc. [12]. The causal nature of these associations is questionable, because it is not always clear whether an episode of infections preceded the particular outcome of interest specially in regard to maternal hypertension. The relatively high prevalence of ASB during pregnancy, the significant consequence for the pregnancy, plus the ability to avoid sequel with treatment, justify screening pregnant women for bacteriuria [13]. Hence, in this study we have documented the high risk pregnancy and ASB cases in pregnant women

## 2. Material and Methods

### 2.1 Place of work

Study was carried out over a period of one year, from January to December, 2005 after taking the permission from

Institutional Ethics committee of Dr. V.M. Government Medical College, Solapur, in Department of Microbiology in association with Department of Obstetrics and Gynecology. Part of the major study is presented in this paper.

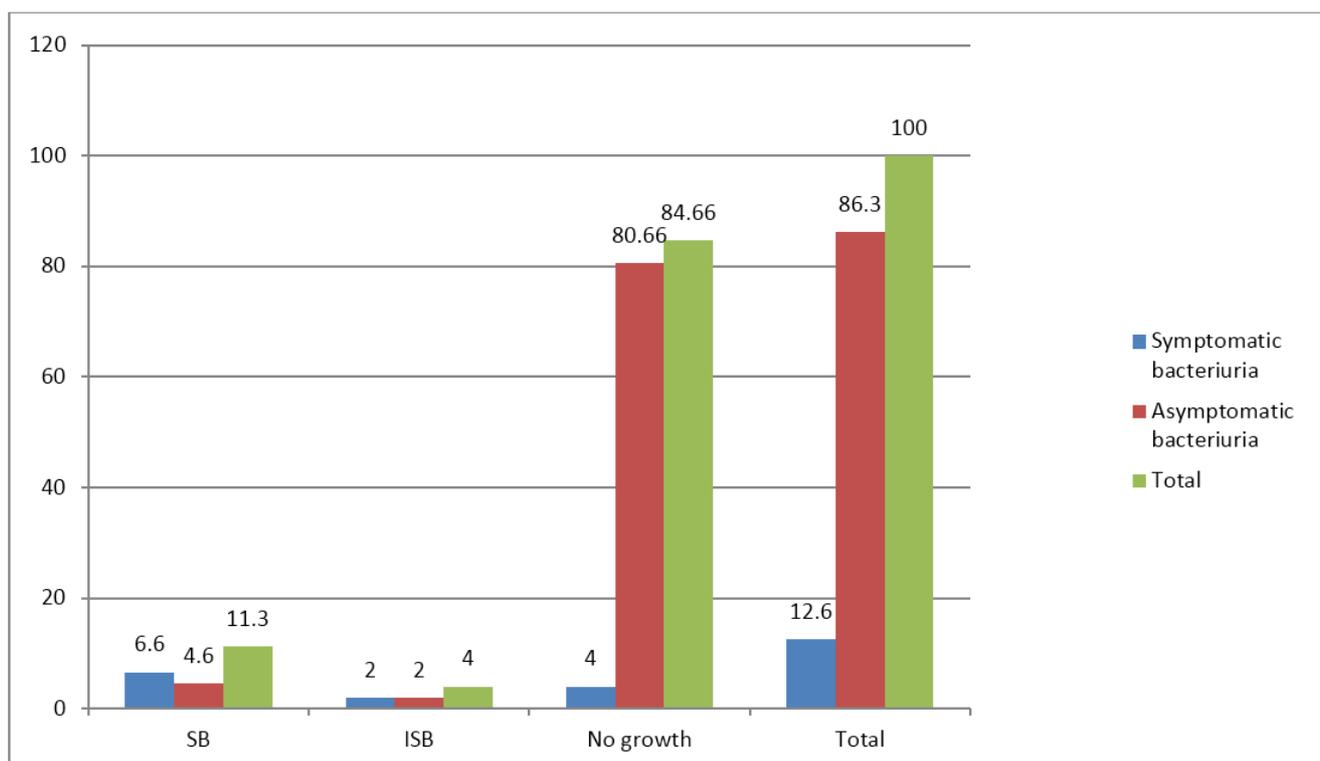
### 2.2 Participants

Patients from Gynecology department, attending Ante Natal Checkup (ANC) OPD, at Shri. Chatrapati Shivaji Maharaj Sarvopchar Rughalaya, Solapur which were recruited for bacteriologic evidence of ASB, was included in study. 300 married pregnant (study group) and 300 married non-pregnant women (control group) were included in the study. Of the study group, 100 women belonged to first trimester, while 200 women belonged to the second trimester of pregnancy. Counseling of subjects for enrollment procedure was done. Detailed data from the patients were recorded in a specially formulated structured proforma. Information regarding her age, parity, past history of abortion, any UTI, any medical or surgical problems, history of hypertension, diabetes mellitus (DM), heart disease, abnormality of the vesico-urethral tract etc. was noted. The patient's Blood Pressure and systemic examination findings were noted by the residents in the proforma at the ANC OPD. The urine albumin status or any concurrent medical problems were also noted. Continuous follow-up of subjects was done up to delivery.

### 2.3 Collection and microbiological analysis

Collection and transportation of urine was carried out by standard procedures. Microscopic examination was done by Wet film examination [15] and Gram staining using Hucker's modification [16]. Identification of isolates was done on basis of morphological, cultural characteristics and biochemical tests [17].

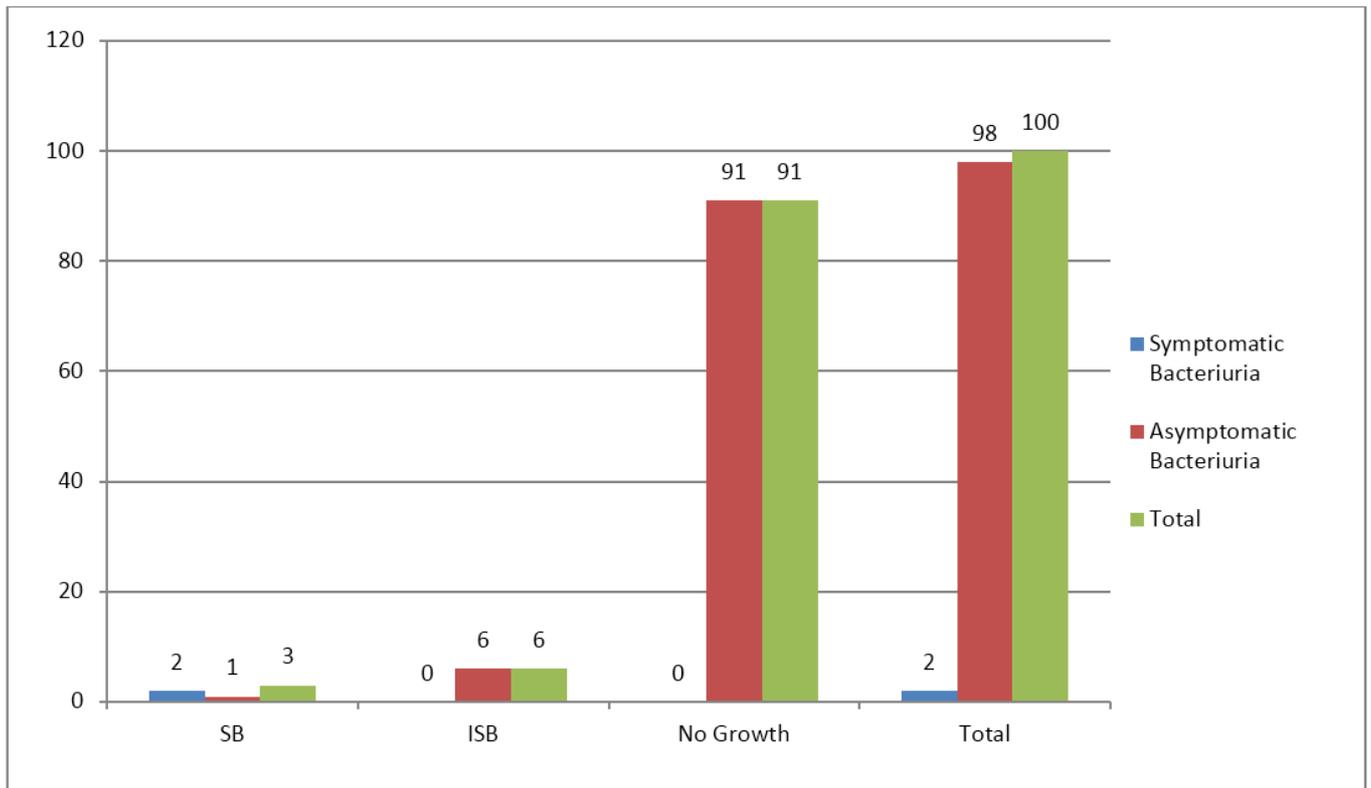
## 3. Results



**Graph 1:** Frequency distribution of culture status of urine of pregnant women in study group (%). n=300

Total 12.6% cases were in symptomatic category and 86.3% in asymptomatic category. 6.6% cases showed significant bacteriuria in symptomatic category, while 4.6% cases

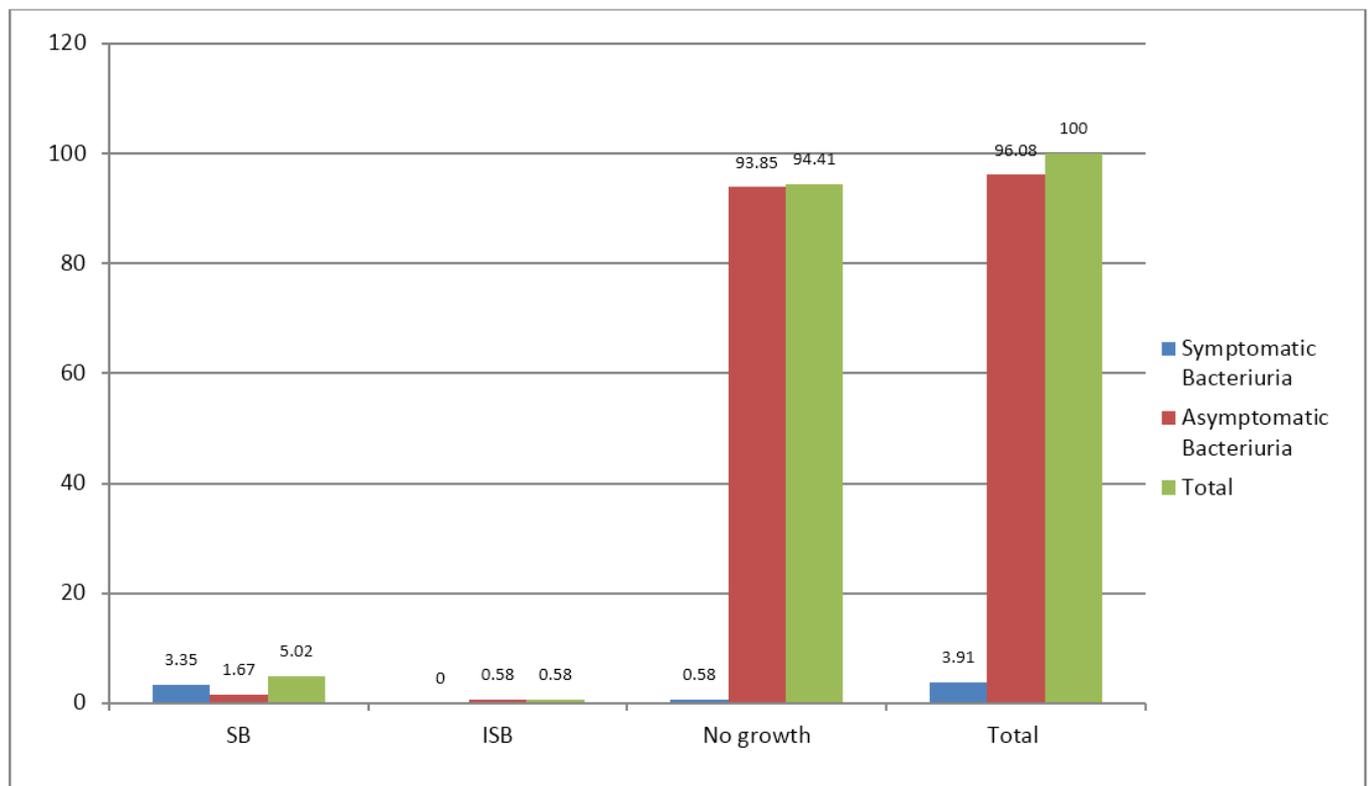
showed significant bacteriuria in asymptomatic category in study group.



**Graph 2:** Frequency distribution of culture status of pregnant women in Control group (%). n= 300

Total 2.0% cases were in symptomatic category and 98.0% in asymptomatic category. 2.0% cases showed significant bacteriuria in symptomatic category, while 1.0% cases

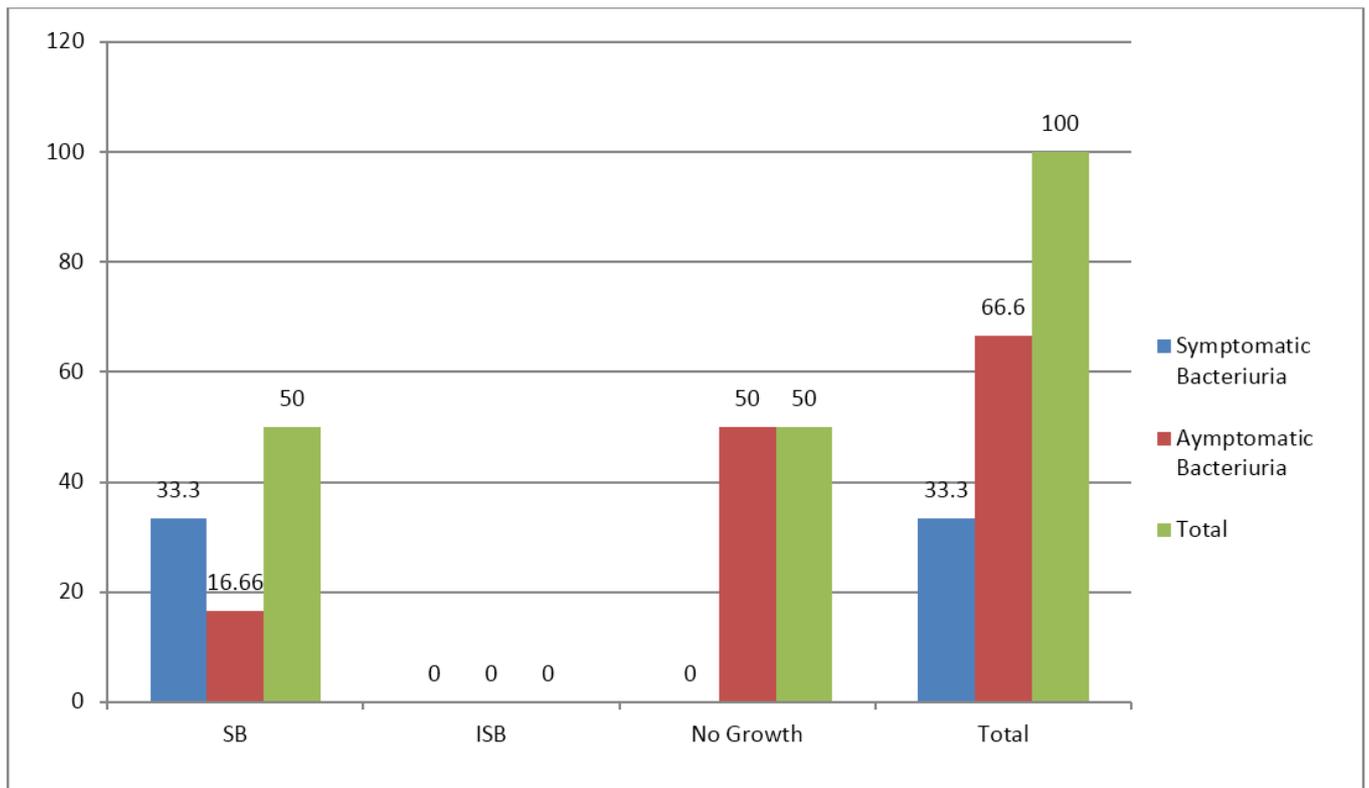
showed significant bacteriuria in asymptomatic category in control group.



**Graph 3:** Frequency distribution of culture status of pregnant women in follow up group (%). n=179

Total 3.91% cases were in symptomatic category and 96.09% in asymptomatic category. 3.35% cases showed significant bacteriuria in symptomatic category, while

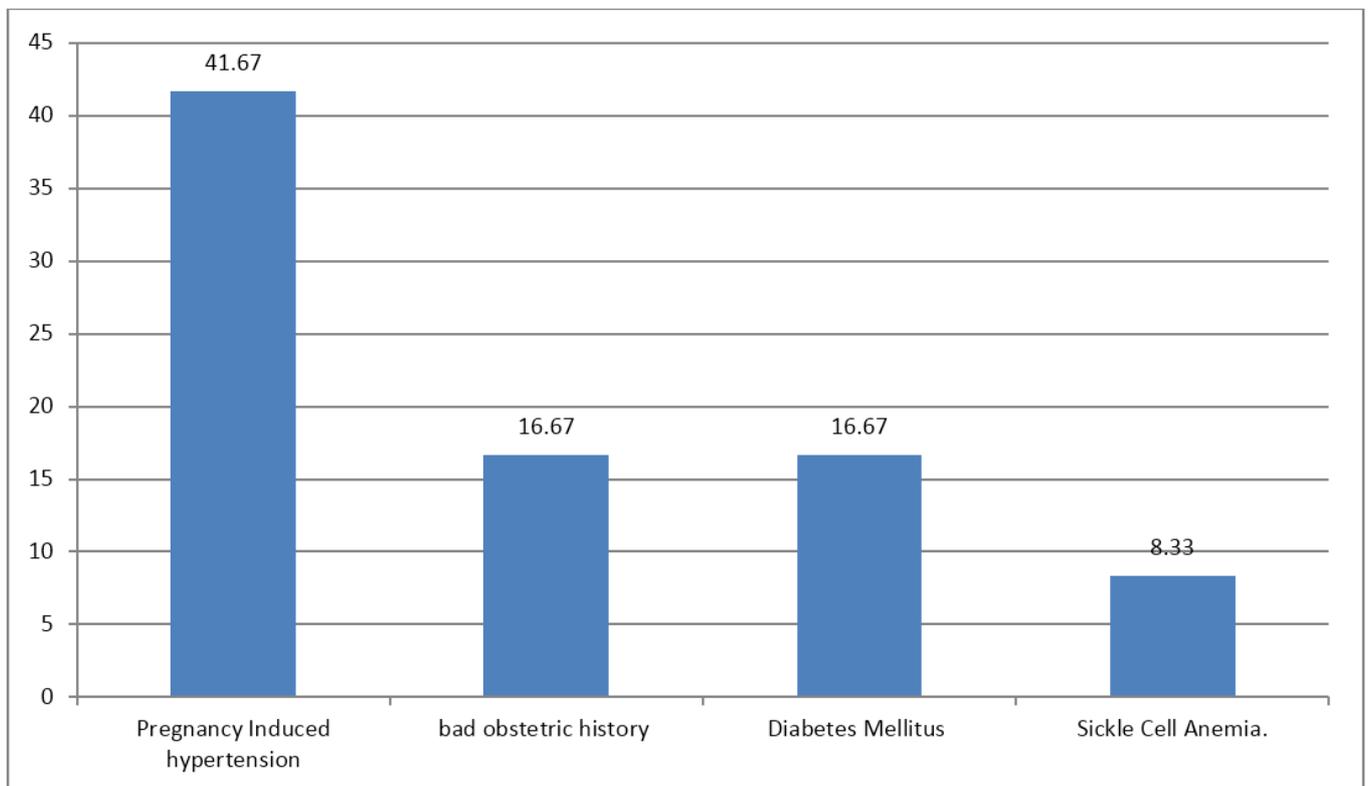
1.67% cases showed significant bacteriuria in asymptomatic category in follow up group.



**Graph 4:** Frequency distribution of culture status of urine of women in the high risk group (%). n=12

Total 33.3% cases were in symptomatic category and 66.6% in asymptomatic category. 33.3% cases showed significant bacteriuria in symptomatic category, while 16.66% cases

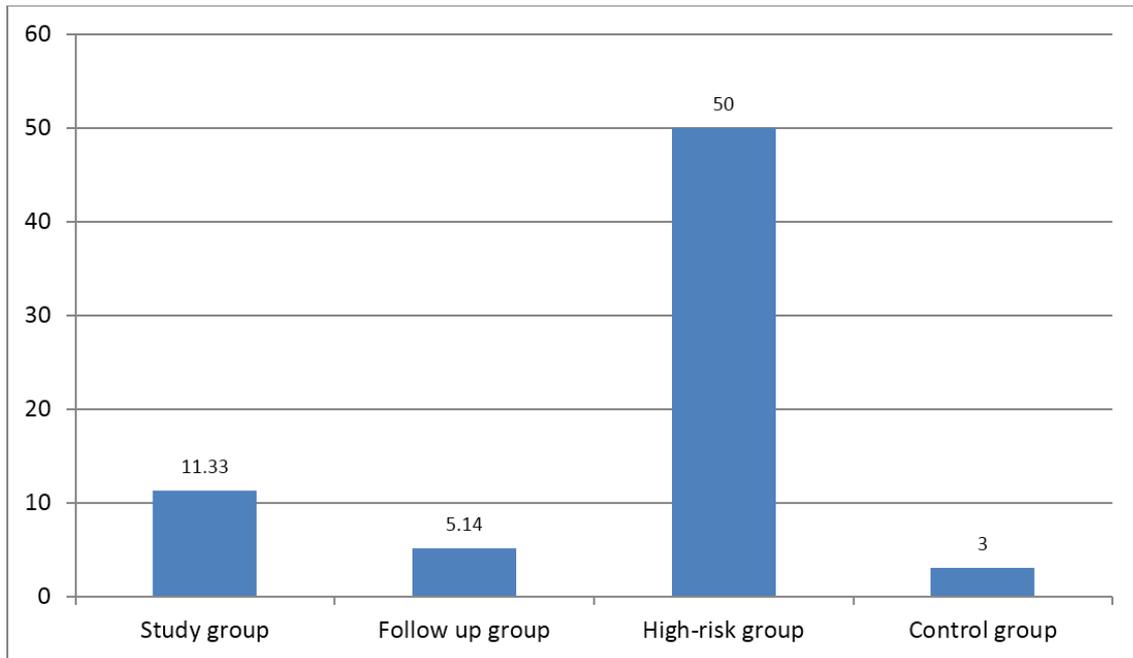
showed significant bacteriuria in asymptomatic category in high risk group.



**Graph 5:** High-risk cases in pregnant women (%) n=12

Pregnancy induced hypertension was highest (41.67%) followed by bad obstetric history (16.67%), while least was

sickle cell anemia cases (8.33%).



**Graph 6:** Comparison of significant bacteriuria seen in different groups. n=600

The significant bacteriuria was highest in high risk group (50%) and was showed statistically significant values ( $P<0.005$ ) while comparing to study group (11.33%), follow up group (5.14%) and control group (3%).

#### 4. Discussion

Ever since Kass *et al.* [2] opened doors to the topic of UTI in pregnancy, many pioneering workers have toiled hard to establish their reports of UTI with adverse obstetric outcome. It was since then that UTI in pregnancy has been always a subject of research. He has established that in the presence of active infection in the urinary tract, urine will contain  $10^{13}$  bacteria or more per ml. The initial work of Kass *et al.* and others demonstrated that about 20 to 40% women with ASB that is detected early in pregnancy and not treated will develop acute symptomatic infection later in pregnancy [18]. According to Andriole *et al.* [13], although the risk of pregnant women with ASB developing a symptomatic UTI is well established, the relationship of ASB and symptomatic UTI to obstetric complications remains an area of continued debate. According to studies by Lavanya *et al.* [19] from Andhra Medical College, UTI during pregnancy leads to low birth weight babies, increased perinatal mortality and premature births along with acute and chronic sequelae in mothers. Importantly, rates of prematurity in the range of 20-50% have been observed in pregnant women with symptomatic UTI. Kunin *et al.* [20] *et al.* has shown the relationship between pyelonephritis and an increased rate of preterm labour and that successful treatment of bacteriuria prevents the development of pyelonephritis. According to Martin *et al.* [21], symptoms and manifestations of the urinary tract are variable and depend largely on acuity of the process, bacterial virulence, urinary and general resistance of the host and presence or absence of any underlying uropathy or predisposing diseases.

In the present study pregnant women from first and second trimester were screened provisionally for bacteriuria and

subjected to bacteriological processing. In the study group, out of 300 pregnant women, in first trimester 12.67% cases and in second trimester 87.33% cases were observed. In first trimester, 13% cases were symptomatic one, while 87% were asymptomatic. In second trimester 12.5% cases were symptomatic, while 87.5% were asymptomatic. In control group, 2% were symptomatic, while 98% were asymptomatic. In total, 7.4% were symptomatic cases, while 92.6 were asymptomatic cases. Culture positive were 5% in first trimester with SB and 1% positive with ASB. In second trimester 7.5% were culture positive with SB and 6.5% positive with ASB. In control group, culture positive were 2% with SB and 1% positive with ASB.

The follow up study could be possible among 179 cases of the total 300 study group cases. Culture positive cases were 2% with SB in symptomatic category, while 1% was in asymptomatic category. Out of 179 follow up cases, of which the history of foetal outcome could be traced only in 160 cases. Amongst them 126 were non-bacteriuric and 34 were bacteriuric. Amongst the bacteriuric group, 27 had normal full term deliveries; however 7 women had either low birth weight babies or premature births as compared to 11 women in non-bacteriuric group who gave history of bad foetal outcome.

Associations have been documented between ante partum UTI and a variety of maternal complications including hypertension, sickle cell anaemia, diabetes mellitus etc [22]. The causal nature of these associations is questionable, because it is not always clear whether an episode of infections preceded the particular outcome of interest specially in regard to maternal hypertension. We observed total 12 high-risk cases in the study. Out of which, 5 cases of Pregnancy Induced hypertension (PIH), 2 cases of Rheumatic Heart Disease (RHD), 2 cases of bad obstetric history (BOH) and 2 cases of DM and 1 case of Sickle Cell Anemia. Out of these 12 cases studied, SB cases were found out to be 50%, of which 33.33% was in symptomatic and

16.66% was in asymptomatic. PIH in this group was the most important. In 1936 some authors first claimed the relationship to exist, when they noticed high incidence of pyelonephritis (13%) in patients of toxemia of pregnancy [8].

Stuart *et al.* [23] reported that hypertensive disorders were definitely more common in bacteriuric women. Similar findings were also reported by some authors 24. Finnerty *et al.* [25] expressed another view, UTI may masquerade as toxemia of pregnancy. In their study, out of 102 pregnant women with hypertensive disorders, 25% ASB cases were found. Scheive *et al.* [22] showed that patients with ante partum UTI were generally seen to have pre-eclampsia sooner or later. Whether UTI is associated with toxemia or toxemia aggravates UTI is still a matter of controversy. In a study in 2001, [26] done at Florida, UTI was found to be common more in pregnant females with PIH (28.7%) than normal pregnant women and controls. Kincaid *et al.* [24] demonstrated bacteriuria in pregnancy with PIH but also showed that eradication of bacteriuria did not reduce the increased incidence of toxemia in pregnancy. In the present study bacteriuria with PIH was seen in three cases, out of five cases, while two of them were symptomatic. Association between PIH and bacteriuria was observed in the study.

Marchant *et al.* [4] stated an association of Group B Streptococcal infections with DM. Bacteriuria was increased many fold owing to the glycosuric state of diabetes. Antidiabetics, antimicrobials and correction of hyperglycemia form the mainstay of treatment in DM. However in the present study we were not able to detect bacteriuria in patients with DM. Martin *et al.* [21] quoted that sickling of red blood cells could cause vascular thrombosis and further ischemic insults to the renal parenchyma paving its path for tropism and detrimental effects by the uropathogens. Marchant *et al.* [4] also recognized it as an important risk factor demanding proper scrutiny and management. In this study one asymptomatic case of sickle cell anemia was studied and she turned out to be culture positive.

## 5. Conclusion

A high-risk pregnancy is one of greater risk to the mother or her fetus than an uncomplicated pregnancy. In this study we came across Pregnancy Induced hypertension, bad obstetric history, Diabetes Mellitus, Sickle Cell Anemia cases. Pregnancy places additional physical and emotional stress on a woman's body. Health problems that occur before a woman becomes pregnant or during pregnancy may also increase the likelihood for a high-risk pregnancy. Factors that put a pregnancy at risk are High blood pressure, Polycystic ovary syndrome, Diabetes, Kidney disease, Autoimmune disease, Thyroid disease, Recreational Drugs, Obesity, HIV/AIDS, Age, First-time pregnancy after age 35 and, Lifestyle Factors like Alcohol use and Cigarette smoking [27].

## 6. Recommendations

Pregnancy associated UTI is not so uncommon. Symptomatic UTI cases get consulted and treated timely. However asymptomatic UTI, that too having SB is a problem of major concern, as it has been reported that bacteriuria in pregnancy is thought to be associated with complications during late pregnancy and even the purperial

period. Untreated ASB is a risk factor for acute cystitis (40%) and pyelonephritis (25-30%) in pregnancy. This usually occurs in early pregnancy. Risk factors include prior UTIs, pre-existing diabetes, increased parity, and low socioeconomic status. [28] Particularly development of acute pyelonephritis and its sequelae are difficult to manage. Therefore, bacteriological examination of urine of each and every ANC clinic attendee is strongly recommended for avoiding uneventful pregnancy and purperium.

## 7. Acknowledgement

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