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Effect of Asymptomatic Bacteriuria During Pregnancy on Maternal and Fetal Outcome

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ABSTRACT
Untreated bacteriuria has been linked to a higher likelihood of preterm birth, low birth weight and perinatal mortality in the majority of studies, although not all. In a meta-analysis of 19 studies, it was found that among women who did not have bacteriuria, the chances of experiencing preterm delivery and having a low-birth-weight infant were 50% and 66% lower, respectively, compared to women with asymptomatic bacteriuria. Pregnant women with asymptomatic bacteriuria were followed longitudinally for certain maternal and fetal outcome. The sample size is required to follow up pregnant women with asymptomatic bacteriuria to observe the fetal outcome of LBW and preterm birth is 50. the confidence level is 90% and relative precision specified is 0.23. Fetal outcomes like Preterm birth and low birth weight were more among Bacteriurics which was 25% and 16.6% respectively compared to non Bacteriurics. There was almost similar proportion of anaemic mothers in both Bacteriuria and non-bacteriuria groups which was 75% and 77.2% respectively.

INTRODUCTION

Several studies have established a link between maternal urinary tract infection, namely asymptomatic bacteriuria and negative pregnancy outcomes. Research has also indicated that acute pyelonephritis is also linked to this linkage. However, there are other factors that could potentially complicate this relationship, such as socioeconomic status and prior premature delivery[1]. Untreated bacteriuria has been linked to a higher likelihood of preterm birth, low birth weight and perinatal mortality in the majority of studies, although not all. In a meta-analysis of 19 studies, it was found that among women who did not have bacteriuria, the chances of experiencing preterm delivery and having a low-birth-weight infant were 50% and 66% lower, respectively, compared to women with asymptomatic bacteriuria[2]. Bacteriuria has also been linked to other issues during pregnancy. For instance, case-control research including >15,000 pregnant women discovered a heightened likelihood of pre-eclampsia when either asymptomatic bacteriuria or symptomatic urinary tract infection (UTI) was present[3]. There is no definitive evidence to suggest a direct link between acute cystitis during pregnancy and an elevated likelihood of low birth weight, premature delivery, or pyelonephritis. This may be due to the fact that pregnant women experiencing symptoms of lower urinary tract infection typically obtain treatment[4]. Nevertheless, pyelonephritis has been linked to unfavorable pregnancy results. During an 18-year study of >500,000 pregnancies with only one fetus, conducted at a major healthcare system in the United States, it was found that the rate of giving birth prematurely, specifically between weeks 33 and 36, was higher among the 2894 women who experienced pyelonephritis during pregnancy. The rate was 10.3 percent for these women, compared to 7.9 percent for those who did not have pyelonephritis. The odds ratio (OR) was 1.3, with a 95% confidence interval (CI) of 1.2-1.5 7. There were no disparities observed in terms of stillbirth or neonatal mortality. Additional complications of pyelonephritis encompass anemia, sepsis and respiratory distress. There is no significant difference in maternal morbidity and obstetric outcomes associated with pyelonephritis throughout different trimesters of pregnancy. Asymptomatic bacteriuria represents only a small portion of the overall presence of bacteria in the urine. Pregnancy triggers the transition of asymptomatic infections into symptomatic infections. Approximately 10% of individuals with asymptomatic bacteriuria experience the development of symptomatic bacteriuria while pregnant. The diagnosis and treatment of symptomatic bacteriuria is straightforward because of its obvious signs. However, diagnosing asymptomatic bacteriuria is challenging and it is more prevalent in pregnant women compared to non-pregnant women. If left untreated, approximately 25% of pregnant women with bacteriuria will develop symptomatic urinary tract infections. When the risk is treated, it is diminished to a range of 80-90%. Consequently, it is necessary to regularly evaluate and treat all pregnant women for asymptomatic bacteriuria (ASB). Therefore, this study aims to investigate the impact of screening and treating Asymptomatic bacteriuria on the outcomes for both the mother and the fetus[5,6].

MATERIALS AND METHODS

Study Design: Hospital based Observational study.

Study Population: Pregnant women attending to antenatal op of unit 1 at DHH and who doesn't have any symptoms and signs of urinary tract infections or other renal problems.

Study Period: Study will be done over a period of 1 year from the date of approval.

Sample Size: Pregnant women with asymptomatic bacteriuria were followed longitudinally for certain maternal and fetal outcome. The sample size is required to follow up pregnant women with asymptomatic bacteriuria to observe the fetal outcome of LBW and preterm birth is 50. the confidence level is 90% and relative precision specified is 0.23.

Inclusion Criteria:

- Pregnant women attending antenatal clinic irrespective of parity.
- Pregnant women with no signs and symptoms of UTI.
- Pregnant women planning to get delivered at our hospital.
- Pregnant women who gave consent for the study.

Exclusion Criteria:

- Symptoms of UTI (flank pain, dysuria).
- Who has taken antibiotic therapy recently (within 7 days).
- Who are not willing to participate in the study.
- History of urolithiasis.
- History of preterm delivery, PROM.
- Known case of renal diseases and patients with renal anomalies.
- History of fetal congenital malformations.

Data Collection:

- The study was conducted over a period of 1 year among the pregnant women attending the antenatal op at DHH.
- There was no be history of taking antibiotics for any reason within the last 2 weeks.
- Pregnant with history or complaints suggestive of UTI were excluded.

- The aim of the study was explained to them and informed consent was obtained.
- Patients who are not willing to participate in this study were excluded.
- Apart from the routine investigations taken during the first visit, a midstream clean catch early morning urine sample was collected from each of them.
- The method to reduce the chances of contamination was explained to them.
- The sample was collected in sterile containers and sent for processing immediately or within two hours of collection.
- The urine sample, one portion was sent for routine urine analysis and another portion sent for culture and sensitivity and colony count.

RESULTS AND DISCUSSIONS

Table 1: Fetal outcome and Bacteriuria

Fetal outcome	Bacteriurics (n=12) No. (%)	Non-bacteriurics (n=88) No. (%)	p-value
Gestational age			
Preterm (n=10)	03(25.0)	07(7.95)	0.001*
Term (n=90)	09(75.0)	81(92.0)	
Birth weight			
<2.5kg(n=10)	02(16.6)	08(9.0)	0.41
≥2.5kg(n=90)	10(83.3)	80(90.9)	

*Chisquare test., p-value<0.05 is significant.

Fetal outcomes like Preterm birth and low birth weight were more among Bacteriurics which was 25% and 16.6% respectively compared to non Bacteriurics. However, among these two outcomes, association between Bacteriuria and Preterm birth was found to be statistically significant.

Table 2: Maternal Outcome and Bacteriuria

Maternal outcome	Bacteriurics (n=12) No. (%)	Non-Bacteriurics (n=88) No. (%)	p-value
Anaemia			
Present(n=77)	09(75.0)	68(77.2)	0.86
Absent(n=23)	03(25.0)	20(22.7)	

There was almost similar proportion of anaemic mothers in both Bacteriuria and non-bacteriuria groups which was 75% and 77.2% respectively. However, this difference is statistically not significant.

Table 3: Association Between Bacteriuria and Age

Age (years)	Bacteriurics (n=12) No. (%)	Non-bacteriurics (n=88) No. (%)	p-value
20-25(n=42)	03(25.0)	39(44.3)	0.94
26-30(n=38)	08(66.6)	30(34.0)	
31-35(n=20)	01(8.3)	19(21.5)	

Bacteriuria was most common in 26-30 years age group and 20-25 years age group pregnant women were less prone to Bacteriuria. This difference is statistically not significant.

Table 4: Association Between Bacteriuria and Parity

Gravida	Bacteriurics (n=12) No. (%)	Non-bacteriurics (n=88) No. (%)	p-value
Primi (n=76)	09(75.0)	67(76.1)	0.77
G2 (n=13)	02(16.6)	11(12.5)	
G3 and above (n=11)	01(8.3)	10(11.3)	

It was observed that Primi mothers are more prone to Bacteriuria and as the gravida increases, the incidence of Bacteriuria decreases. This observation is statistically not significant.

Table 5: Association Between Socioeconomic Status and Bacteriuria

Socioeconomic class	Bacteriuria (n=12) No. (%)	Non-bacteriuria (n=88) No. (%)	P-value
Class I (n=02)	00	02(2.27)	0.68
Class II (n=27)	03(25.0)	24(27.2)	
Class III (n=62)	05(41.6)	57(64.7)	
Class IV (n=09)	04(33.3)	05(5.68)	

It was found that lower socioeconomic class mothers are more prone to Bacteriuria and this observation is statistically not significant.

In the current study, fetal outcomes like Preterm birth and low birth weight were more among Bacteriurics which was 25% and 16.6% respectively compared to non Bacteriurics. However, among these two outcomes, association between Bacteriuria and Preterm birth was found to be statistically significant. In contrast, a separate study conducted by Eshwarappa et al. in 2024 found that the occurrence of low birth weight (LBW) and anemia was greater in the group with asymptomatic bacteriuria (ASB) compared to the group without bacteriuria. In the ASB group, the occurrence of anemia was more frequent throughout the second and third trimesters of pregnancy. Pregnant women with asymptomatic bacteriuria (ASB) had a higher prevalence of preterm delivery compared to those in the non-bacteriuria group and this difference was statistically significant. In their research, Radha et al. and Verma *et al.* demonstrated marginally reduced rates of low birth weight (LBW), anemia and preterm birth weight among pregnant women with asymptomatic bacteriuria (ASB)[7,8]. The association between asymptomatic bacteriuria and low birthweight and preterm delivery is currently a topic of debate and the underlying mechanism remains unclear. While both the presence of bacteria in the amniotic fluid and the resulting inflammatory process can cause uterine contractions, it is important to note that women affected by lower urinary or genital tract infections typically have additional risk factors for preterm birth and low birthweight. These additional factors may complicate the relationship between infections and adverse pregnancy outcomes. Nevertheless, since the existence of bacteria increases the likelihood of early uterine contractions, it is logical to use antibiotics as a treatment to eliminate the infection and so prevent negative effects for the newborn.

There was almost similar proportion of anaemic mothers in both Bacteriuria and non-bacteriuria groups which was 75% and 77.2% respectively. However, this difference is statistically not significant. Several studies have established a link between maternal urinary tract infection, namely asymptomatic bacteriuria and negative pregnancy outcomes. Research has also indicated that acute pyelonephritis exhibits a comparable correlation. However, there are other factors that could potentially complicate this correlation, including socioeconomic status and prior premature delivery[9,10]. Most research have found that not treating bacteriuria increases the risk of preterm birth, low birth weight and perinatal mortality. However, there are some studies that do not support this association. For instance, in a meta-analysis of 19 trials, it was found that women without bacteriuria had a 50% lower risk of preterm birth and a 66% lower risk of having a low-birth-weight infant compared to women with asymptomatic bacteriuria. Bacteriuria has also been linked to other issues during pregnancy. For instance, a case-control research including more than 15,000 pregnant women revealed a heightened likelihood of preeclampsia when either asymptomatic bacteriuria or symptomatic urinary tract infection (UTI) was present[11]. The relationship between acute cystitis during pregnancy and an elevated likelihood of low birth weight, premature delivery, or pyelonephritis has not been definitively proven, possibly due to the fact that pregnant women with symptomatic lower urinary tract infections typically receive treatment. Nevertheless, pyelonephritis has been linked to unfavorable pregnancy results. During an 18-year study of >500,000 pregnancies with only one fetus, conducted at a major healthcare system in the United States, it was found that the rate of giving birth prematurely, specifically between weeks 33 and 36, was higher among the 2894 women who experienced pyelonephritis during pregnancy. The rate was 10.3 percent for these women, compared to 7.9 percent for those who did not have pyelonephritis. The odds ratio (OR) was 1.3, with a 95% confidence interval (CI) of 1.2-1.5. There were no disparities observed in terms of stillbirth or neonatal mortality. Additional consequences associated with pyelonephritis include anemia, sepsis and respiratory distress. There is no significant difference in maternal morbidity and obstetric outcomes associated with pyelonephritis throughout different trimesters[12]. If left untreated, ASB can lead to acute pyelonephritis in up to 30% of moms. Pyelonephritis occurring during pregnancy is linked to substantial morbidity for both the mother and the fetus. Recent studies have found a connection between women who have untreated bacteriuria and a higher likelihood of experiencing preterm birth, preterm premature rupture of membranes, low birth weight (LBW), an increased risk of preeclampsia, poor 5-minute Apgar score and even perinatal mortality. Hence, it is imperative to conduct thorough screening and administer appropriate therapy for asymptomatic bacteriuria (ASB) in order to avert any potential problems. The administration of ASB involves the use of antibiotics that are specifically chosen based on the findings of culture tests. Additionally, follow-up cultures are conducted to ensure that the urine has been completely cleared of bacteria.

CONCLUSION

Fetal outcome and Bacteriuria. Fetal outcomes like Preterm birth and low birth weight were more among Bacteriurics which was 25% and 16.6% respectively compared to non Bacteriurics. However, among these two outcomes, association between Bacteriuria and Preterm birth was found to be statistically significant. Maternal outcome and Bacteriuria. There was almost similar proportion of anaemic mothers in both Bacteriuria and non-bacteriuria groups which was 75% and 77.2% respectively. However, this difference is statistically not significant.

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