e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2024; 16(4); 482-486

Original Research Article

Establishing Relationship between Bacterial Vaginosis and Both Spontaneous Preterm and Term Delivery: A Retrospective Study

Homa Imam[1], Pinky Priya[2], Anupama Sinha[3]

[1]Senior resident, Department of obstetrics and Gynecology, JLNMCH, Bhagalpur, Bihar, India

[2]Senior resident, Department of obstetrics and Gynecology, JLNMCH, Bhagalpur, Bihar, India

[3]Associate Professor and HOD, Department of obstetrics and Gynecology, JLNMCH, Bhagalpur, Bihar, India

Received: 04-02-2024 / Revised: 14-03-2024 / Accepted: 24-04-2024
Corresponding Author: Dr. Pinky Priya
Conflict of interest: Nil

Abstract

Aim: To determine the relationship between bacterial vaginosis and both spontaneous preterm and term delivery.

Materials and Methods: This was a retrospective study which was carried out in Department of obstetrics and Gynecology, JLNMCH, Bhagalpur, Bihar, India for eight months. In this study, 100 pregnant women were selected. 75 pregnant women were considered as test cases and 25 pregnant women were considered as controls. Inclusion criteria was patients with preterm labor with gestational age of 26 to 36 weeks, singleton pregnancy, with intact membrane, threatened preterm labor and preterm labor with regular uterine contractions at least 3 every 10 minutes, and cervical dilatation of minimum 1 cm but not more than 3 cm. To note the discharge type and to exclude the leaking membranes, speculum examination, systemic and obstetric examination was done. Detailed history was taken. In last 24 hours, the pregnant women shouldn't have douched and during last 48 hours, vaginal medication should not have been taken.

Results: out of 75 pregnant women in study group, 25 pregnant women were followed till delivery who had bacterial vaginosis and 42 pregnant women were followed till delivery who did not have bacterial vaginosis. Bacterial vaginosis incidence was 37% in study group and 24% in control group and this showed high statistical difference ($p<0.001$). 60% cases were unbooked cases and were common in preterm labor and maximum women were from rural areas (70%) and were of lower socioeconomic class (55%). Commonly, preterm labor was seen in women of age group 21-30 years and in primigravidae (40%). Bacterial vaginosis was common in 55% of study group and 25% in control group and this showed high statistical difference ($p<0.001$). Majority of women delivered with BV were 56% and delivered before 34 weeks, 32% delivered between 34- 36 weeks and 12% delivered at term. 67% delivered at term were tested negative for bacterial vaginosis. Thus, BV was significantly associated with preterm birth.

Conclusion: Important cause of perinatal mortality and morbidity is due to preterm delivery. There is no effective treatment of preterm delivery. Majority of vaginitis cases is caused by bacterial vaginosis and is asymptomatic in more than half of cases. The association of bacterial vaginosis and preterm labor, low birth weight and puerperal sepsis is proven by present study.

Keywords: Bacterial vaginosis, Preterm birth, Cervical dilatation

Introduction

Bacterial vaginosis (BV) is a common vaginal infection characterized by an imbalance in the vaginal microbiota, where the normal Lactobacillus-dominated flora is replaced by a polymicrobial community of anaerobic bacteria, including Gardnerella vaginalis, Atopobium vaginae, and various Mobiluncus species. This condition affects a significant portion of reproductive-aged women worldwide and has been associated with various adverse reproductive outcomes, including spontaneous preterm birth (PTB) and complications in term births. Understanding the relationship between BV and birth outcomes is critical for developing effective preventive and therapeutic strategies. [1] BV is prevalent among women of reproductive age, with estimates suggesting that up to 30% of this population may be affected at any given time. The condition is particularly prevalent among women with multiple sexual partners, those who engage in douching, and women of lower socioeconomic status. Ethnic differences have also been noted, with higher rates observed in African

American women compared to Caucasian women. Despite its prevalence, many cases of BV are asymptomatic, complicating the identification and treatment of those at risk for adverse outcomes, such as preterm birth. [2]

Preterm birth, defined as delivery before 37 weeks of gestation, remains a leading cause of neonatal morbidity and mortality worldwide. Spontaneous PTB, in particular, has been strongly associated with intrauterine infections, with BV being one of the most significant contributors. The proposed mechanisms by which BV leads to PTB include the ascension of pathogenic bacteria from the vagina to the amniotic cavity, triggering an inflammatory response that can induce labor. This inflammatory process involves the release of cytokines, prostaglandins, and matrix metalloproteinases, which can weaken the fetal membranes and stimulate uterine contractions. [3] While the connection between BV and PTB is well-documented, the impact of BV on term birth outcomes is less clear but equally important. Studies suggest that BV may contribute to complications such as chorioamnionitis, postpartum endometritis, and neonatal sepsis, even in term deliveries. The presence of BV-related pathogens in the vaginal flora can lead to an inflammatory milieu that compromises the integrity of the fetal membranes and the placenta, potentially resulting in adverse outcomes. [4] Given the significant implications of BV on pregnancy outcomes, effective screening and management strategies are crucial. Current guidelines recommend routine screening for BV in high-risk pregnant women, such as those with a history of PTB. Diagnostic methods include clinical criteria (Amsel's criteria) and laboratory tests (Nugent score), with molecular techniques emerging as more sensitive and specific alternatives. The management of BV during pregnancy typically involves antibiotic therapy, with metronidazole and clindamycin being the most commonly used agents. However, concerns about antibiotic resistance and recurrence rates highlight the need for alternative approaches. Probiotic therapy, which aims to restore the normal vaginal flora, has shown promise in reducing BV recurrence and improving pregnancy outcomes. [5]

Materials and Methods

This was a retrospective study which was carried out in Department of obstetrics and Gynaecology, JLNMCH, Bhagalpur, Bihar, India for eight months. In this study, 100 pregnant women were selected. 75 pregnant women were considered as test cases and 25 pregnant women were considered as controls. Inclusion criteria was patients with preterm labour with gestational age of 26 to 36 weeks, singleton pregnancy, with intact membrane, threatened preterm labour and preterm labour with regular uterine contractions at least 3 every 10 minutes, and cervical dilatation of minimum 1 cm but not more than 3 cm.

Exclusion criteria was premature membranes rupture, preeclampsia, malpresentations, fetal malformations, polyhydramnios, placenta previa and abruptio placenta, severe anemia, intrauterine fetal death, intrauterine growth restriction, uterine and cervical anomalies, urinary tract infections, Rh isoimmunisation, diabetes mellitus, renal disorders and heart disease.

The pregnant women selected in control group at labour term of >37 weeks met none of exclusion criteria and no complications of pregnancy was observed.

To note the discharge type and to exclude the leaking membranes, speculum examination, systemic and obstetric examination was done.

Detailed history was taken. In last 24 hours, the pregnant women shouldn't have douched and during last 48 hours, vaginal medication should not have been taken. The vagina was visualized for vaginal discharge by inserting gently a clean and non-lubricated Cusco's speculum. The following were evaluated such as colour, amount, consistency and vaginal discharge smell, pH test, whiff test or amine test to know the smell of vaginal discharge and fixed smear examination by Papanicolaou technique to detect clue cells i.e. vaginal epithelial cells examined under microscope to detect cells with unclear borders due to adhering bacteria. Amsel's criteria was used in detecting bacterial vaginosis such as thin homogenous discharge, positive whiff test, clue cells present on microscopic examination, atleast 20% of epithelial cells and vaginal pH of >4.5. BV was diagnosed by 3 out of 4 meeting the above criteria. Follow up was taken for all cases till delivery. Preterm labour was divided into labour prior to 34 weeks of gestation and between 34-37 weeks of gestational age. Statistical analysis was done by using SPSS version 22.

Results

75 pregnant women were selected as test cases in preterm labour and 25 pregnant women in labour were selected as controls based on inclusion criteria. Till delivery, preterm labour cases were taken for follow up. Table 1 shows that out of 75 pregnant women in study group, 25 pregnant women were followed till delivery who had bacterial vaginosis and 42 pregnant women were followed till delivery who did not have bacterial vaginosis. Table 2 shows that bacterial vaginosis incidence was 37% in study group and 24% in control group and this showed high statistical difference ($p<0.001$). 60% cases were unbooked cases and were common in preterm labour and maximum women were from rural areas (70%) and were of lower socioeconomic class (55%). Commonly, preterm labour was seen in

women of age group 21-30 years and in primigravidae (40%). Table 3 shows that bacterial vaginosis was common in 55% of study group and 25% in control group and this showed high statistical difference ($p<0.001$). Table 4 shows that majority of women delivered with BV were 56% and delivered before 34 weeks, 32% delivered between 34- 36 weeks and 12% delivered at term. 67% delivered at term were tested negative for bacterial vaginosis. Thus, BV was significantly associated with preterm birth. Table 5 shows that all women who delivered <34 weeks had low birth weight babies, out of which 67% in bacterial vaginosis group, women who delivered between 34-36 weeks had low birth weight babies, out of which 25% in bacterial vaginosis group, while women delivered at term were 60% in bacterial vaginosis.

Table 1: Cases on follow up till delivery in study group

Bacterial Vaginosis	Enrolled	Followed till delivery
Present	28	25
Absent	47	42

Table 2: Bacterial vaginosis incidence

Bacterial Vaginosis	Study Group (No. & %)	Control Group (No. & %)
Present	28 (37%)	6 (24%)
Absent	47 (63%)	19 (76%)

Table 3: Relation between bacterial vaginosis and socio economic status.

Bacterial Vaginosis	Study Group (%)	Control Group (%)
Lower	55	25
Middle	35	15
Upper	10	0

Table 4: Relation between bacterial vaginosis and preterm delivery.

Gestational age at delivery (in weeks)	BV present (No. & %)	BV absent (No. & %)
≤ 33	14 (56%)	2 (13%)
34-36	8 (32%)	3 (20%)
≥37	3 (12%)	10 (67%)

Table 5: Relation between bacterial vaginosis and birth weight.

Birth Weight (in Kgs)	BV present (No. & %) ≤33 weeks	BV present (No. & %) 34-36 weeks	BV present (No. & %) ≥37 weeks
≥2.5	0	0	2 (40%)
1.5-2.4	5 (33%)	6 (75%)	3 (60%)
<1.5	10 (67%)	2 (25%)	0

Table 6: Relation between bacterial vaginosis and puerperal sepsis.

Puerperal Sepsis	BV present (No. & %)	BV absent (No. & %)
Present	5 (20%)	2 (17%)
Absent	20 (80%)	10 (83%)

Discussion

Preterm labour is multifactorial and is found in lesser than half of the cases. The premature babies have enhanced considerably and due to medical progress in neonatal care, there is an insignificant decrease in preterm labour incidence. For prevention of preterm labour in risk group, its accurate identification is important. The major factor in preterm birth induction and neonatal morbidity and mortality, bacterial infection of genital tract is the factor. Goldenberg et al.; conducted a study in which it was reported that the preterm labour onset was earlier, the amniotic fluid infection occurrence was greater. Renu Jain et al. [6], conducted a study in which it was reported that adverse outcomes of pregnancy were associated with bacterial vaginosis. McGregor JA et al. [7] & Holzman et al. [8] conducted a study in which it was reported that 50% of pregnant women had prevalence of bacterial vaginosis whereas in the present study, 37% pregnant women in study group and 24% in control group had bacterial vaginosis. In present study, in the study group, previous preterm birth showed higher frequency when compared to control group, but statistically insignificant difference was observed. None of the pregnant women with

bacterial vaginosis had preterm delivery history. Spong CY et al. [9], conducted a study in which it was reported that preterm birth was correlated to preterm labour. In present study, in both study group and control group, it was found that bacterial vaginosis was more commonly found in pregnant women with prior history of sexually transmitted diseases. Similar results were found in Moi M et al. [10] study. In studies conducted by Hay PE et al. and McGregor JA et al. [7], Kurki et al. [11], Gratacos et al. [12], James DK et al. [13], preterm is more than or equal to double if the pregnant women had bacterial vaginosis. It was reported by Purwar et al. [14]; that bacterial vaginosis accounted for 83% of preterm birth risk. It was reported that preterm delivery risk was increased by bacterial vaginosis with odds ratio of 2.19 in Leitich et al. study. It was reported that bacterial vaginosis and intermediate flora were associated with increase in preterm birth risk in Donders GG, Van Calasteren C, Bellen G et al. [15] studies. The present study showed that low birth weight was associated with bacterial vaginosis. Similar results were observed in Gravett et al. [16], E Holst et al. [17] & Rodrigo et al. [18] study. In present study, 20% of pregnant women with bacterial vaginosis had puerperal sepsis and 17% of pregnant women without bacterial vaginosis had puerperal sepsis. Similar results were reported in Newton ER et al. [19], Rodrigo Pauperio et al. [18], Jacobson et al. [20] studies, showed puerperal sepsis was doubled or tripled in pregnant women with bacterial vaginosis.

Conclusion

Important cause of perinatal mortality and morbidity is due to preterm delivery. There is no effective treatment of preterm delivery. Majority of vaginitis cases is caused by bacterial vaginosis and is asymptomatic in more than half of cases. The association of bacterial vaginosis and preterm labour, low birth weight and puerperal sepsis is proven by present study.

References

1. Kenyon C, Colebunders R, Crucitti T. The global epidemiology of bacterial vaginosis: a systematic review. Am J Obstet Gynecol. 2020 ;223(3):249-260.
2. Marconi C, Donders GG, Parada CMGL, et al. Chorioamnionitis, bacterial vaginosis, and adverse pregnancy outcomes: an immunohi stochemical and microbiological study. Am J Obstet Gynecol. 2020;222(3):282.e1-282.e11.
3. Callahan BJ, DiGiulio DB, Goltsman DSA, et al. Replication and refinement of a vaginal microbial signature of preterm birth in two racial groups. Ann Epidemiol. 2021;53:18-25 .e3.
4. Witkin SS, Linhares IM, Giraldo P, et al. Bacterial vaginosis: implications for the puerperium and beyond. Int J Gynaecol Obstet. 2019;147(2):123-128.
5. Olalere D, Wang C, Fitzhugh M, et al. Microbial markers of preterm birth in high-risk pregnancies: A systematic review and meta-analysis. PLoS One. 2020;15(8)
6. Renu Jain. Role of bacterial vaginosis in preterm labour - a prospective study, Internat ional journal of Medical Research and Review 2016, 4(4).
7. McGregor JA, French JI, Jones W, Milligan K, McKinney PJ, Patterson E et al. Bacterial vaginosis is associated with prematurity and vaginal fluid mucinase and sialidase: results of a controlled trial of topical clindamycin cream. Am j Obstet Gynecol 1994;170(4):1048-59.
8. Holzman C, Leventhal JM, Qiu H, Jones MN, Wang J et al. Factors linked to bacterial vaginosis in non-pregnant women. Am J Public Health 2001;91(10):1664-70.
9. Spong CY. Prediction and prevention of recurrent and spontaneous preterm birth. Obstet Gynecol 2007;110(2):405-415.
10. Moi H. Prevalence of bacterial vaginosis and its association with genital infections, inflammation and contraceptive methods in women attending sexually transmitted disease and primary health clinics. Int J STD AIDS 19 90;1(2):86- 94.
11. Kurki T, Sivonen A, Renkonen OV, Savia E, Ylikorkala O. Bacterial vaginosis in early pregnancy and pregnancy outcome. Obstet Gynecol 1992;80(2):173-177.
12. Gratacos E, Figueras F, Barranco M, Vila J, Cararach V, Alonso P et al. Spontaneous recovery of bacterial vaginosis during pregnancy is not associated with an improved perinatal outcome. Acta Obstet Gynecol Scand 1998;77(1):37-40.
13. James DK, Weiner CP, Steer PJ, Gonik G. High Risk Pregnancy Management Options. Third edition. New Delhi: Elsevier 2006, 12 99-1300.
14. Purwar M, Ughade S, Bhagat B, Agarwal V, Kulkarni H. Bacterial vaginosis in early pregnancy and adverse pregnancy outcome. J Obstet Gynecol Res 2001;27(4):175- 181.
15. Donders GG, Van Calsteren K, Bellen G, Reybrouck R, Bosch TV, Riphagen I et al. Predictive value for preterm birth of abnormal vaginal flora, bacterial vaginosis and aerobic vaginitis during first trimester of pregnancy.BJOG 2009;116(10):1315-1324.
16. Gravett MG, Nelson HP, DeRouen T, Critchlow C, Eschenbach DA, Holmes KK. Independent associations of bacterial vaginosis and Chlamydia trachomatis infection with adverse pregnancy outcome. JAMA 1986;256 (14):1899-1903
17. Holst E, Goffeng AR, Andersch B. Bacterial vaginosis and vaginal microorganisms in

idiopathic preterm labour and associated with pregnancy outcome. J clin microbial 1994;32 (1):176-186.
18. Rodrigo Pauperio Soares de Camargo, Jose AS, Jose GC, Valeria MN, Sebastian F. Impact of treatment of bacterial vaginosis on prematurity among Brazilian pregnant women: a retrospective study. Sao Paulo Med J 2005; 123(3):108- 112.
19. Newton ER, Prihoda TJ, Gibbs RS. A clinical and microbiologic analysis of risk factors for puerperal endometritis. Obstet Gynecol 1990;7 5(3):402-406.
20. Jacobson B, Pernevi P, Chidekel L, Platz-Christensen J. Bacterial vaginosis in early pregnancy may predispose for preterm birth and postpartum endometritis. Acta Obstet Gynecol Scand 2002;81(11):1006.