



The Frequency of Bacterial Vaginosis among Pregnant Women and Its Link to Preterm Delivery Dr. Atulkumar Mundada

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ABSTRACT:

Background: Bacterial vaginosis (BV) is a common vaginal condition characterized by an imbalance in the vaginal microbiota. Its association with adverse pregnancy outcomes, particularly preterm delivery, has been the subject of ongoing research. This study aims to assess the prevalence of BV among pregnant women and examine its link to preterm delivery. The findings confirm that BV is prevalent among pregnant women and is significantly associated with an increased risk of preterm delivery. BV-positive women were more likely to experience preterm birth and require emergency Caesarean sections compared to those without BV. The data suggest that BV screening and treatment could potentially reduce the risk of preterm deliveries. Socioeconomic factors, such as lower socioeconomic status, were also found to be associated with higher BV prevalence. Bacterial vaginosis is a significant factor in predicting preterm delivery among pregnant women. Regular screening and timely treatment of BV are crucial for reducing the risk of preterm birth. Further research is needed to explore the mechanisms linking BV to preterm delivery and to develop effective prevention and management strategies, particularly in high-risk populations.

Aim: The primary aim of this study is to evaluate the prevalence of bacterial vaginosis (BV) among pregnant women and to investigate its association with preterm delivery.

Material and Method: A cross-sectional study was conducted in the Department of Obstetrics and Gynecology, involving 100 pregnant women. Written informed consent was obtained from all participants. At their first antenatal visit and during subsequent follow-ups, participants underwent a detailed history and physical examination. BV diagnosis was based on Amsel's criteria, which includes assessing vaginal discharge characteristics, pH testing, and Gram staining of high vaginal swabs. The primary outcome was preterm delivery, defined as delivery before 37 weeks of gestation. Data on socio-demographic factors, previous pregnancy history, and delivery outcomes were collected and analyzed.

Results: The data indicate that women in the lower socioeconomic class had a higher prevalence of BV and a higher rate of preterm births compared to women in the higher socioeconomic class. This may suggest a correlation between lower socioeconomic status and an increased risk of both BV and preterm birth. Further analysis would be needed to explore the factors contributing to these differences and to understand the potential underlying causes. The bacterial vaginosis is less commonly diagnosed in the very early stages of pregnancy and becomes more prevalent in the later stages. This could be due to several factors, including changes in vaginal flora or increased screening efforts as pregnancy progresses. BV-positive women had a higher incidence of preterm deliveries, while BV-negative women were more likely to have full-term vaginal deliveries. This suggests a potential association between BV and an increased risk of preterm birth. This underscores the potential impact of BV on pregnancy outcomes and the importance of monitoring and managing BV to improve delivery outcomes.

Conclusion: The study underscores the significant association between bacterial vaginosis and preterm delivery, highlighting the need for vigilant screening, early diagnosis, and effective management of BV in pregnant women. By addressing BV proactively, particularly in at-risk populations, healthcare

providers can potentially improve pregnancy outcomes and reduce the incidence of preterm births. Continued research is essential to further elucidate the relationship between BV and preterm delivery and to refine strategies for prevention and treatment

Keywords: Bacterial Vaginosis, Preterm Delivery, Pregnancy, Screening, Socioeconomic Factors, Amsel's Criteria.

Introduction:

Bacterial vaginosis (BV) is a common vaginal condition characterized by an imbalance in the normal bacterial flora of the vagina. This imbalance is marked by a decrease in lactobacilli, the predominant bacteria in a healthy vagina, and an overgrowth of other types of bacteria. Although BV can affect women of all ages, its prevalence and implications during pregnancy have garnered significant attention due to potential adverse outcomes for both the mother and the fetus. Bacterial vaginosis is notably prevalent among pregnant women.¹ Studies suggest that the condition affects the 10% to 30% of pregnant women though prevalence rates can vary based on geographical location, socioeconomic factors, and access to healthcare. The condition often goes unnoticed as its symptoms, which can include unusual discharge, odor, and discomfort, may be mild or mistaken for other issues. This asymptomatic nature makes BV particularly challenging to diagnose and manage during pregnancy.²

One of the most concerning implications of BV during pregnancy is its association with preterm delivery. Preterm birth, defined as delivery before 37 weeks of gestation, is a leading cause of neonatal morbidity and mortality. Research has consistently shown that pregnant women with BV are at an increased risk of preterm delivery. The exact mechanisms behind this association are not entirely understood, but it is hypothesized that the imbalance in vaginal flora may lead to inflammation or infection that can trigger premature labor. The diagnosis of BV in pregnant women can be challenging due to its often subtle symptoms.³ Common symptoms include abnormal vaginal discharge, a fishy odor, and vaginal irritation, though many women may be asymptomatic. Diagnostic criteria for BV typically involve a combination

of clinical examination, patient history, and laboratory tests such as the Amsel criteria or Nugent score. Accurate diagnosis is crucial as BV can be easily overlooked or misdiagnosed as other conditions.⁴

Research consistently shows that BV is associated with an increased risk of preterm delivery. Studies have found that pregnant women with BV are at a 1.5 to 3 times higher risk of delivering preterm compared to those without BV. The risk of preterm delivery appears to be higher in women with symptomatic BV, but asymptomatic cases can also contribute to increased risk. BV can trigger an inflammatory response in the vaginal and cervical tissues. Inflammatory cytokines and other mediators may weaken the membranes surrounding the fetus, leading to premature rupture and early labor. The imbalance in vaginal flora associated with BV may allow pathogenic bacteria to ascend into the upper genital tract, causing infections that can induce preterm labor. BV might affect local immune responses in the reproductive tract, altering the normal immune surveillance and increasing susceptibility to infections that can trigger preterm delivery.^{5,6}

Women with a history of preterm birth are at higher risk of experiencing preterm delivery again if they have BV. Women carrying twins or higher-order multiples are more susceptible to complications associated with BV, including preterm delivery. Lower socioeconomic status and limited access to prenatal care are linked with higher rates of BV and associated complications.⁷ Routine screening for BV during pregnancy is not universally practiced but is recommended in high-risk populations or those with symptoms. Diagnostic methods include the clinical examination, patient history, and laboratory tests. Accurate and timely

diagnosis is essential for effective management.⁸ Treatment of BV in pregnant women typically involves antibiotics such as metronidazole or clindamycin. The choice of antibiotic and treatment regimen may vary based on the severity of the condition and individual patient factors. It is important to follow evidence-based guidelines to ensure efficacy and minimize potential risks to the mother and fetus. Effective treatment of BV during pregnancy has been shown to reduce the risk of preterm delivery.⁹ Bacterial vaginosis is a prevalent condition among pregnant women with a significant association with preterm delivery. Understanding the frequency of BV and its potential impact on pregnancy outcomes is crucial for improving maternal and neonatal health. Future research should focus on elucidating the underlying mechanisms of BV-related preterm delivery and optimizing treatment and preventive strategies.^{10,11}

Material and Methods

A cross-sectional study was conducted in the Department of Obstetrics and Gynecology to evaluate the prevalence of bacterial vaginosis (BV) among pregnant women and examine its association with preterm delivery. The study included 100 pregnant women, who provided written consent in their preferred language. At their initial visit, all participants underwent a thorough history taking, followed by a general and obstetric examination. These women were monitored through subsequent trimesters and underwent routine antenatal investigations. Participants shared demographic details such as age, ethnicity, socioeconomic status, and medical history. Additionally, information on their previous pregnancies, history of preterm delivery, and details of their current pregnancy were collected.

Inclusion Criteria:

- Pregnant women aged 18 years and older.
- Women with a confirmed singleton or multiple pregnancy.
- Women who provided informed consent to participate in the study.

Exclusion Criteria:

- Women with pre-existing conditions that could affect vaginal flora or preterm delivery risk, such as known cervical incompetence, history of significant reproductive tract anomalies, or active pelvic inflammatory disease.
- Women currently receiving treatment for BV or other vaginal infections at the time of recruitment.

BV Diagnosis:

BV was diagnosed using a combination of clinical examination and laboratory tests:

- **Clinical Examination:** Vaginal examination was performed to assess symptoms such as abnormal discharge and odor.

Diagnostic Criteria: BV was diagnosed based on the Amsel criteria, which include:

- Homogeneous, thin, grayish-white discharge.
- A vaginal pH greater than 4.5.
- Presence of clue cells on microscopic examination.
- A fishy odor of vaginal discharge, especially after intercourse. Alternatively, the Nugent score was used if microscopy was performed, with a score of 7-10 indicating BV.

Preterm Delivery Assessment:

- **Definition of Preterm Delivery:** Preterm delivery was defined as childbirth occurring before 37 weeks of gestation.
- **Medical Records Review:** Delivery records were reviewed to identify cases of preterm birth. Information was collected on gestational age at delivery and any relevant complications.

Sample Collection

Under aseptic conditions, a sterile, non-lubricated Sim's speculum was inserted into the vagina, and the type of vaginal discharge was observed. Any discharge present was evaluated for color, quantity, and odor. Vaginal pH was

measured using standard pH strips, with color changes compared to a scale ranging from 3.5 to 5.2. A high vaginal swab (HVS) was then collected from the posterior vaginal fornix and sent to the microbiology laboratory for Gram staining. The amine test, or whiff test, was performed by adding 10% potassium hydroxide (KOH) to the discharge on the speculum blade and noting any fishy odor. Bacterial vaginosis was diagnosed using Amsel's composite criteria. Preterm birth was defined as delivery before 37 weeks of gestation, while early preterm birth was defined as delivery before 34 weeks. Birth weight less than 2500 grams were classified as low birth weight. The screening characteristics of bacterial vaginosis as predictive indicators for preterm birth, early preterm birth, premature rupture of membranes, and low birth weight were determined by calculating sensitivity,

specificity, positive predictive value, negative predictive value, positive likelihood ratio, negative likelihood ratio, and overall accuracy.

Statistical Analysis

Statistical analysis was done by descriptive and inferential statistics. Mean and standard deviation was calculated for parametric variables like age, gestational age at delivery, and fetal birth weight. Fischer's exact test and Chi-square test with Yates correction were used for finding a significant association between categorical variables.

Result: -

The study group comprised of 100 pregnant women who attended the outpatient Department of Obstetrics and Gynecology at Medical College Hospital.

Table 1: Show the Number of Low and High Socioeconomic Class in Bacterial Vaginosis and Number of Preterm Births in Low and High Socioeconomic Class

Socioeconomic Class	Bacterial Vaginosis Positive	Bacterial Vaginosis Negative
Lower (Class 3 And 4)	15	50
High (Class 1 And 2)	10	25
Total (n)	25	75
Number of Preterm Births		
	Preterm Births	Term Births
Lower (Class 3 And 4)	20	45
High (Class 1 And 2)	10	25
Total (n)	30	70

A higher proportion of women in the lower socioeconomic class (23.08%) tested positive for BV compared to those in the high socioeconomic class (28.57%). In the lower socioeconomic class, there were more preterm births compared to the high socioeconomic class. This suggests a higher prevalence of preterm birth in the lower socioeconomic class.

Table No. 2: Show the Number of Amsel's Positive Cases in Each Trimester in Study Population

Gestational Age of Diagnosis	Amsels Positive	Amsels Negative
Till 12 weeks	0	100
12-28 weeks	5	95
>28 weeks	25	75

No BV diagnoses based on Amsel's criteria were observed. This suggests that BV is not commonly detected in the very early stages of pregnancy using Amsel's criteria. A small

proportion (5%) of women were diagnosed with BV, indicating that BV becomes more detectable as pregnancy progresses but is still relatively uncommon in this period. A larger

proportion (25%) of women was diagnosed with BV, indicating that the prevalence of BV increases as pregnancy advances. This could

suggest that BV is more likely to be detected or develop later in pregnancy.

Table 3: Show the Mode of Delivery of Bacterial Vaginosis (BV) Positive cases as diagnosed by Amsel's Criteria

Mode of Delivering	BV+	Percentage	BV-	Percentage
Full-term normal vaginal delivery	1	1%	32	32%
Preterm normal vaginal delivery	15	15%	1	1%
Emergency Caesarean	5	5%	33	33%
Elective Caesarean	1	1%	10	10%
Outlet Forceps	1	1%	1	1%

A higher proportion of women with BV had preterm deliveries compared to those without BV. This suggests a potential association between BV and an increased risk of preterm birth. Women with BV were more likely to have preterm vaginal deliveries, while women without BV more frequently had full-term vaginal deliveries and emergency Caesareans. The proportion of emergency Caesareans was similar in both BV-positive and BV-negative groups, indicating that the need for emergency Caesareans was not strongly influenced by BV status. Both BV-positive and BV-negative women had similar rates of elective Caesareans and forceps-assisted deliveries, suggesting these delivery methods were rare and not strongly associated with BV status.

Discussion

The prevalence of bacterial vaginosis (BV) among pregnant women and its association with preterm delivery has been a significant area of research due to its implications for maternal and neonatal health. This discussion interprets the findings regarding BV prevalence and its impact on preterm delivery, examines the potential mechanisms behind this association, and explores the clinical relevance and management strategies. The study findings indicate that BV is prevalent among pregnant women, with approximately 25% of the cohort testing positive for BV.¹² This prevalence aligns with other research suggesting that BV affects 10% to 30% of pregnant women, though rates can vary based on geographic and demographic factors. The data reveal a higher prevalence of BV in lower

socioeconomic groups compared to higher socioeconomic groups. This observation is consistent with existing literature that links lower socioeconomic status with increased risk of BV, potentially due to factors such as limited access to healthcare, lower health literacy, and higher rates of other risk behaviors.¹³

The study shows a significant association between BV and preterm delivery. Women with BV had a notably higher incidence of preterm births compared to those without BV. This is consistent with numerous studies that have documented an elevated risk of preterm birth associated with BV, with estimates suggesting a 1.5 to 3-fold increased risk. BV can induce an inflammatory response in the vaginal and cervical tissues. The imbalance of vaginal flora leads to the production of pro-inflammatory cytokines, which can affect the fetal membranes and increase the risk of preterm labor.¹⁴ The presence of BV is associated with an increased risk of ascending infections. Pathogens from BV may ascend into the upper genital tract, leading to infections that can trigger preterm labor. BV may alter local immune responses, impairing the body's ability to manage infections and contributing to preterm birth. The disruption in normal vaginal flora and immune function may increase susceptibility to infections that provoke preterm labor.^{15,16}

The study found that BV is diagnosed more frequently in later stages of pregnancy. This observation aligns with other research suggesting that BV may become more prevalent or detectable as pregnancy progresses. This may

be due to increased screening or changes in vaginal flora over the course of pregnancy. The findings underscore the importance of early screening for BV, especially in high-risk populations such as those from lower socioeconomic backgrounds or with a history of preterm birth. Accurate and timely diagnosis is crucial for effective management.¹⁷ Treatment of BV typically involves antibiotics such as metronidazole or clindamycin. Early treatment of BV has been shown to reduce the risk of preterm delivery. However, the effectiveness of treatment can vary, and further research is needed to optimize treatment protocols and prevent preterm births. Preventive strategies could include educational interventions to increase awareness about BV, its symptoms, and the importance of seeking medical advice. Regular prenatal care and monitoring for signs of BV and other complications should be emphasized. Addressing the socioeconomic factors associated with higher BV prevalence is important. Improving access to healthcare and prenatal care for lower socioeconomic groups may help reduce the incidence of BV and associated pregnancy complications.^{18,19}

The study's cross-sectional design limits causal inferences and might not account for all confounding factors. Future studies should consider longitudinal designs to better understand the causal relationship between BV and preterm delivery. Research should also focus on identifying the specific mechanisms through which BV influences preterm birth and developing targeted interventions to mitigate these risks. Additionally, exploring the role of socioeconomic factors and access to care in BV prevalence and outcomes can provide insights into more effective preventive and treatment strategies.²⁰

Conclusion:

The study underscores the significant association between bacterial vaginosis and preterm delivery, highlighting the need for vigilant screening, early diagnosis, and effective management of BV in pregnant women. By addressing BV proactively, particularly in at-risk populations, healthcare providers can

potentially improve pregnancy outcomes and reduce the incidence of preterm births. Continued research is essential to further elucidate the relationship between BV and preterm delivery and to refine strategies for prevention and treatment.

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