Bacterial vaginosis – a risk factor for preterm labour: a case-control study

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Abstract
Aim: To estimate the prevalence of bacterial vaginosis in preterm labour patients when compared to term labour patients.

Materials and Method: It was a hospital based prospective case-control study conducted over a period of two years. Study population was selected as per our study criteria. Speculum examination was done for both control and cases and evaluated for any abnormal vaginal discharge and vaginal pH. Smear from posterior fornix was taken using sterile cotton swabs for wet mount and KOH test (Whiff test). Diagnosis of bacterial vaginosis was made if three of the four signs of Amsel criteria were found. The data were analysed using SPSS software 20 and results were derived.

Results: Among the patients bacterial vaginosis was present in 24 of the preterm labour (26.7%) patients and 5 of the term labour (5.6%) patients (Table 1). It was statistically significant (p < 0.001) by Chi-square test. Considering the relative risk(RR), women with bacterial vaginosis has increased risk of preterm labour when compared to patients without bacterial vaginosis(Odds ratio - 6.182;RR-4.800).

Conclusion: Our study concluded that bacterial vaginosis is one of the most important causes of preterm labour. Routine screening and treatment of bacterial vaginosis for women at high risk for preterm labour will help in reduction of preterm birth related perinatal morbidity and mortality.

Keywords: Bacterial vaginosis, Amsel criteria, Preterm labour, Preterm birth, Perinatal morbidity

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Introduction
Preterm birth, defined as delivery before 37 completed weeks of gestation, is the single most important factor of adverse neonatal outcome.1) It is the leading cause of perinatal and neonatal morbidity and mortality worldwide.2) With the increasing contribution of neonatal deaths to overall childhood mortality, it is crucial to address the predisposing factors related to preterm birth to achieve reduction in perinatal and child mortality.3-5) Many evidence based studies suggest that vaginal infections play a key role in preterm births, which is especially true in bacterial vaginosis. Bacterial vaginosis is a common but poorly understood clinical syndrome where the vaginal flora’s symbiotic relationship shifts for unknown reasons to one in which anaerobic species overgrow like Gardnerella vaginalis, Mobilincus and Ureaplasma urealyticum, etc. It is diagnosed by demonstrating three of the following four Amsel’s criteria:6)

- Characteristic discharge appearance is thin, gray, and homogeneous.
- The whiff test may be positive in up to 70% of BV patients. This test is performed by placing a drop of 10% KOH on the speculum after the vaginal examination or mixing vaginal fluid with a drop of KOH on a microscope slide. The KOH, by virtue of its alkaline properties, causes the release of volatile amines from the vaginal fluid. The amines are products of anaerobic bacterial metabolism.
- Women with bacterial vaginosis found to have higher incidence of preterm delivery.7) Many trials have found a significant reduction in preterm births among pregnant women with high risk of preterm birth and whose bacterial vaginosis was treated with metronidazole.8,9) Hence, this study was designed to estimate the prevalence of bacterial vaginosis in preterm labour patients when compared to term labour patients.

Materials and Method
It was a hospital based prospective case-control study conducted in Dept of OBG in our teaching medical college and hospital over a period of two years (Jan2014 -Dec2015).

Case selection: Patients at ≥28weeks till ≤36th weeks admitted in labour ward with true labour pains were informed about the study and well informed consent was obtained. From these patients, patients with known causes of preterm labour were excluded.
Exclusion Criteria:
Women ≤ 18 years or ≥ 35 years
Previous H/O preterm labour
Premature rupture of membranes
Multiple pregnancy
Placenta previa/Abruption placenta
Uterine anomalies/Fibroid uterus altering the shape of
the endometrial cavity
Pregnancy Induced Hypertension/ Diabetes mellitus
H/O Urinary tract infections/ vaginal candidiasis/
Trichomoniasis in current pregnancy

Control selection: Equal number of patients at ≥ 37
weeks admitted in labour ward in the same period with
true labour pains but intact membranes were informed
about the study and recruited as control population after
well informed consent. Exclusion criteria was not
applied to control patients.

Speculum examination was done for both control
cases and evaluated for any abnormal vaginal
discharge, vaginal pH. Smear from posterior fornix was
taken using cotton sterile swabs for wet mount, KOH
test (Whiff test). Diagnosis of bacterial vaginosis was
made if three of the four signs of Amsel criteria were
found. The data were analysed using SPSS software 20
and results were derived.

Results
In this study, as per our study criteria, 90 pre term
labour patients were recruited as cases and same
number of term labour patients was recruited as
controls during our study period. All the cases and
controls were studied for the presence of bacterial
vaginosis. Among them bacterial vaginosis was present
in 24 of the preterm labour (26.7%) patients and 5 of
the term labour (5.6%) patients (Table 1). It was
statistically significant (p < 0.001) by Chi-square
test(Table 2a). Considering the relative risk(RR),
women with bacterial vaginosis has increased risk of
preterm labour when compared to patients without
bacterial vaginosis(Odds ratio -6.182; RR-4.800)(Table
2b)

Table 1: Prevalence of Bacterial vaginosis

<table>
<thead>
<tr>
<th>Bacterial vaginosis</th>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (Term labour)</td>
<td>5(5.6%)</td>
<td>85(94.4%)</td>
</tr>
<tr>
<td>Cases (Preterm labour)</td>
<td>24(26.7%)</td>
<td>66(73.3%)</td>
</tr>
</tbody>
</table>

Table 2a: Chi-Square Tests

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>14.839⁴</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Continuity Correction⁵</td>
<td>13.318</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>15.937</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>14.757</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2b: Risk Estimate

<table>
<thead>
<tr>
<th>Value</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odds Ratio for Type (Preterm labor (case) / Term labor (control))</td>
<td>6.182(Odds ratio) / 2.239 - 17.071</td>
</tr>
<tr>
<td>For cohort Disease = Present</td>
<td>4.800(Relative risk) / 1.916 - 12.022</td>
</tr>
<tr>
<td>For cohort Disease = Absent</td>
<td>.776 / .679 - .888</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>180</td>
</tr>
</tbody>
</table>

Discussion
Bacterial vaginosis is associated with significant
number of obstetric complications, such as, preterm
labour and delivery, preterm premature rupture of the
membranes, spontaneous miscarriages, chorioamnionitis, postpartum endometritis, post
caesarean delivery and infections.10-12 Bacterial
vaginosis is a polymicrobial infection resulting in a
reduced concentration of lactobacilli and an increase in
pathogenic bacteria, mainly anaerobes or microaerophiles.13,14 In pregnant women, bacterial
vaginosis prevalence was ranging from 6% to 32%.15
In our current study it was 26.7% in preterm labour and
5.6% in term labour patients. The prevalence of
bacterial vaginosis in preterm labour patients in our
present study is similar to study by Mittal et al16 and
Svare et al.17

In present study bacterial vaginosis is found to be
more common in preterm labour patients (26.7%) when
compared to term labour patients (5.6%) which is
statistically significant (p<0.001). Our observation
reinforces that bacterial vaginosis is one of the
important risk factors for preterm labour as supported
by other studies by Hillier et al18 and Subtil et al.19
Inspite of many studies proving the association between
bacterial vaginosis and preterm labour, screening and

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treatment in large scale studies of women at low risk of adverse outcomes were not able to demonstrate a reduction in prematurity.\(^{(20)}\) So routine screening in average risk asymptomatic women is not recommended.\(^{(21)}\) The Health Canada Guidelines on Sexually Transmitted Infections recommends that there is no need for screening or treatment of asymptomatic or low risk women, at the same time, it also recommends to screen and treat at 12-16 weeks gestation for high risk women.\(^{(22,23)}\)

To conclude, bacterial vaginosis is one of the most important causes of preterm labour. Routine screening and treatment of bacterial vaginosis for women at high risk for preterm labour will help in reduction of preterm birth related perinatal morbidity and mortality.

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**Permission from IRB:** Yes

**References**


