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Bacterial vaginosis in spontaneous preterm and term birth: A prospective case control study

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Abstract
Background: Vaginal infection caused by bacteria is called bacterial vaginosis. In reproductive age women, it is common cause of abnormal vaginal discharge.
Aim: This study was conducted to evaluate the relationship between decreasing preterm labour rate and bacterial vaginosis by screening and treating pregnant women.
Materials and Methods: This was a prospective case control study which was carried out in Department of Obstetrics and Gynaecology. This was conducted during period from August 2018 to November 2019. In this study, 100 pregnant women were selected. 75 pregnant women were considered as test cases and 25 pregnant women were considered as controls.
Results: 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%). Bacterial vaginosis was associated with low birth weight and was significantly associated with puerperal sepsis.
Conclusion: 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.

Keywords: Bacterial vaginosis, preterm birth

Introduction
Vaginal flora imbalance through anaerobic bacteria multiplication and resulting in diminishing of well-known protective lactobacilli is called bacterial vaginosis (BV) [1]. In women of reproductive age, it is the most common lower genital tract infection. It has a prevalence ranging from 4% to 64%. During pregnancy, several adverse outcomes and spontaneous preterm birth are the risks increased by BV. After preterm birth, the risk of neonatal morbidity and mortality is enhanced. Preterm birth which occurs early causes neurological disability from infancy to adulthood [2]. Preterm birth increases the burden of parents and families as the cost of neonatal intensive care associated with preterm birth is high. 75% neonatal births and 50% of long term morbidity accounts for preterm birth. In bacterial vaginosis, a large increase in anaerobic and facultative bacteria concentration which includes Gardnerella vaginalis, prevotella, Bacteroides speices and Mycoplasma hominis [3]. Many obstetric complications like amniotic fluid infection, chorio-amnionitis, preterm birth and puerperal endometritis [4]. Vaginitis is mostly caused by bacterial vaginosis among pregnant and non-pregnant women. Among pregnant women, 50% prevelance of bacterial vaginosis and 15-30% prevelance was among non-pregnant women [5]. This study was conducted to evaluate the relationship between decreasing preterm labour rate and bacterial vaginosis by screening and treating pregnant women.

Materials and Methods
This was a prospective case control study which was carried out in Department of Obstetrics and Gynaecology in SVS medical college, Telangana State. This was conducted during period from August 2018 to November 2019. 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 Chi square test.

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: Cases on follow up till delivery in study group

Sl. No.	Bacterial Vaginosis	Enrolled	Followed till delivery
1	Present	28	25
2	Absent	47	42
Total		75	67

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: Bacterial vaginosis incidence

Sl. No.	Bacterial Vaginosis	Study Group (No. & %)	Control Group (No. & %)
1	Present	28 (37%)	6 (24%)
2	Absent	47 (63%)	19 (76%)
Total		75	25

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: Relation between bacterial vaginosis and socio economic status.

Sl. No.	Bacterial Vaginosis	Study Group (%)	Control Group (%)
1	Lower	55	25
2	Middle	35	15
3	Upper	10	0
Total		100	100

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: Relation between bacterial vaginosis and preterm delivery.

Sl. No.	Gestational age at delivery (in weeks)	BV present (No. & %)	BV absent (No. & %)
1	≤ 33	14 (56%)	2 (13%)
2	34-36	8 (32%)	3 (20%)
3	≥37	3 (12%)	10 (67%)
Total		25 (100%)	15 (100%)

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: Relation between bacterial vaginosis and birth weight.

Sl. No.	Birth Weight (in Kgs)	BV present (No. & %) ≤33 weeks	BV present (No. & %) 34-36 weeks	BV present (No. & %) ≥37 weeks
1	≥2.5	0	0	2 (40%)
2	1.5-2.4	5 (33%)	6 (75%)	3 (60%)
3	<1.5	10 (67%)	2 (25%)	0
Total		15	8	5

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 6: Relation between bacterial vaginosis and puerperal sepsis.

Sl. No.	Puerperal Sepsis	BV present (No. & %)	BV absent (No. & %)
1	Present	5 (20%)	2 (17%)
2	Absent	20 (80%)	10 (83%)
Total		25	12

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.

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