BACTERIAL VAGINOSIS PREVALENCE IN PREGNANT WOMEN AND ITS RELATION TO PRETERM BIRTH

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ABSTRACT:

BACKGROUND: Bacterial vaginosis when symptomatic, presents as the malodorous and increased amount of vaginal discharge, grey to homogeneous white. Early screening, diagnosis, and treatment of bacterial vaginosis in pregnant women are helpful in preventing maternal and fetal complications. The majority of the cases of bacterial vaginosis are asymptomatic, remain unreported, and hence untreated. Bacterial vaginosis has been associated with spontaneous abortions, preterm delivery, premature rupture of membranes, amniotic fluid infections, and postpartum endometritis. It is known to be a strong independent risk factor for adverse pregnancy outcomes Gardnerella vaginalis are gram-negative to gram-variable small pleomorphic rods that are non-motile. Mobil uncus is a gram-negative anaerobic rod-shaped bacterium.

AIM: Bacterial vaginosis prevalence in pregnant women and its relation to preterm birth

MATERIAL AND METHOD: The study was done in the Department of Obstetrics and Gynecology. Written consent in the patient's own language was taken. All antenatal women were assessed at the first visit and followed up in the subsequent trimesters. First, detailed history followed by a general and obstetric examination was done. All these women were subjected to routine antenatal investigations. Under aseptic precautions, an unlubricated sterile Sim's speculum was inserted into the vagina and the type of discharge was noted. If any vaginal discharge was present, its color, amount, and odor were noted. Vaginal pH was evaluated using conventional pH strips.

RESULTS: The majority of cases of BV in antenatal women were diagnosed after 28 weeks of gestation. There was a significant association of BV with Preterm, early preterm, premature rupture of membranes, and low birth weight. There was no relation between parity and socioeconomic status with Bacterial Vaginosis. The commonest mode of birth was normal vaginal delivery in BV-positive antenatal women. In the first trimester, none of the pregnant women in our study population developed bacterial vaginosis. Between 12-28 weeks, 11.5% of pregnant women developed bacterial vaginosis. 88.5% of pregnant women developed bacterial vaginosis. Majority of pregnant women with bacterial vaginosis diagnosed by Amsel's criteria delivered by normal vaginal delivery.

CONCLUSION: So to conclude, the results of this study suggest that for reducing the problem of low birth weight, the public health strategy needs to focus on the early detection and treatment of Bacterial Vaginosis. Pregnancy with Bacterial Vaginosis should be monitored more closely. Pre-pregnancy maternal genital hygiene has to be emphasized. Bacterial vaginosis needs to be screened and managed timely to reduce the death rates of our premature and low-weight newborns.

KEYWORDS: Bacterial vaginosis, premature rupture of membranes, spontaneous abortions

Introduction:

Bacterial vaginosis (BV) is one of the commonest genital infections in pregnancy. It affects 6.4-38 % of pregnant women. Bacterial vaginosis is a condition in which vaginal flora's symbiotic relationship shifts to one in which anaerobic species overgrow and include Gardnerella vaginalis, Ureaplasma urea lyticum, Mobil uncus species, Mycoplasma hominis and Pre-votella species. It is also associated with a significant reduction or absence of normal hydrogen peroxide(H_2O_2) producing lactobacillus species.[1,2]

Bacterial vaginosis when symptomatic, presents as the malodorous and increased amount of vaginal discharge, grey to homogeneous white.[1] Early screening, diagnosis, and treatment of bacterial vaginosis in pregnant women are helpful in preventing maternal and fetal complications. The majority of the cases of bacterial vaginosis are asymptomatic, remain unreported, and hence untreated. Bacterial vaginosis has been associated with spontaneous abortions, preterm delivery, premature rupture of membranes, amniotic fluid infections, and postpartum endometritis. [3,4,5] It is known to be a strong independent risk factor for adverse pregnancy outcomes

Gardnerella vaginalis is gram-negative to gram-variable small pleomorphic rods that are non-motile. Mobiluncus is a gram-negative anaerobic rod-shaped bacterium. Mycoplasma is spherical to the filamentous cell with no cell wall. Bacterial vaginosis is the common cause of vaginal discharge during reproductive age.

Preterm infants, compared with term infants, appear to be more vulnerable to BIND at lower TB levels.[6] This increased susceptibility was first illustrated by a review of case reports from the 1960s and 1970s in preterm infants with Rhesus iso-immune hemolytic disease.[6] Necrotizing enterocolitis is an inflammatory disorder of the gastrointestinal tract that occurs 100 times more frequently in premature than in term neonates.[7] The intestinal lesions of NEC are characterized by coagulation necrosis ranging from superficial mucosal erosions accompanied by eosinophilic infiltrations to transmural bowel necrosis with perforation.[4] Necrotizing enterocolitis is thought to develop following injury to the gastrointestinal tract followed by bacterial invasion frequently starting in the terminal ileum, but ranging from the stomach to the colon. Invading bacteria produce fermentation gases, such as hydrogen, methane, and carbon dioxide, which create intramural gas collections known as pneumatosis intestinalis, the pathognomonic radiographical sign of NEC.

The frequency of respiratory distress syndrome (RDS) can be decreased through prenatal treatment with potent, corticosteroids, betamethasone, and dexamethasone, but only by about 50%. Severe neonatal lung disease from surfactant deficiency, structural immaturity, and infection remains a frequent neonatal problem. Postnatal treatment of RDS with a variety of endotracheal surfactant preparations improves lung function acutely in many, but not all, preterm newborns.[8]

Mucosal immune system activation may represent a critical determinant of adverse consequences associated with BV. An unequal risk for BV acquisition and or recurrence could derive from different mucosal immune host abilities and or the capability of invading microbes to produce factors that inactivate the local immune response. BV is associated with a two-fold increased risk of preterm birth, with the greatest risk when BV is present before 16 weeks of gestation. This may indicate a critical period during early gestation when BV-related organisms can gain access to the upper genital tract and set the stage for spontaneous preterm labor later in gestation. The results of treatment trials for pregnant women with BV have been heterogeneous, with anywhere from an 80% reduction to a two-fold increase in preterm birth among women who received treatment.[9] Bacterial vaginosis is one of the most common causes of vaginal discharge in reproductive age.[10]

MATERIAL AND METHODS

Research Design

It is a prospective study carried out on antenatal women in all three trimesters in medical colleges and hospitals.

Period of study

It was conducted between November 2020to and August 2021.

Sample size

The sample size is 180 pregnant women

Inclusion criteria

➢ Singleton pregnancy
➢ At 1st visit <12 weeks of gestation

Exclusion criteria

➢ Women with risk for preterm delivery in previous and present
➢ pregnancy- multiple pregnancies, cervical insufficiency, fetal malformations,

- polyhydramnios, ruptured membranes, cervical surgery.
➢ Women with medical disorders and hypertensive disorders in pregnancy
➢ Labor induction before 34 weeks for obstetric and medical conditions.

Methodology

The study was done in the Department of Obstetrics and Gynaecology. Written consent in the patient's own language was taken. All antenatal women were assessed at the first visit and followed up in the subsequent trimesters. First, detailed history followed by a general and obstetric examination was done. All these women were subjected to routine antenatal investigations.

Sample collection

Under aseptic precautions, an unlubricated sterile Sim's speculum was inserted into the vagina and the type of discharge was noted. If any vaginal discharge was present, its color, amount, and odor were noted. Vaginal pH was evaluated using conventional pH strips. The change in color was compared to the color indicator ranging from 3.5-5.2. Next, a high vaginal swab (HVS) was taken from the posterior vaginal fornix and sent to microbiology for Gram staining. The amine test also known as the whiff test was done by noting the fishy odor on the addition of 10% KOH to the discharge on the blade of the speculum. Diagnosis of bacterial vaginosis was done by Amsel's composite criteria.

Gestational age at delivery of fewer than 37 weeks was defined as preterm birth. Gestational age less than 34 weeks was defined as early preterm birth. A birth weight of fewer than 2500 grams was considered low birth weight.

Richard Amsel's criteria

depend on the presence of any three of the following four signs:
1. Presence of clue cells.
2. Homogenous white, non-inflammatory discharge that adheres to the vaginal walls.
3. pH of vaginal fluid >4.5
4. Fishy odor from vaginal discharge before or after the addition of 10 % potassium hydroxide
Screening characteristics of bacterial vaginosis as predictive markers of preterm birth, early preterm birth, premature rupture of membranes, and low birth weight were calculated after estimating the sensitivity, specificity, positive predictive value, negative predictive value, likelihood ratio positive, likelihood ratio negative, and 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 180 pregnant women who attended the outpatient Department of Obstetrics and Gynecology at Medical College Hospital. The prevalence of Bacterial vaginosis was found to be 15.49%. Among 180 antenatal women, 30 pregnant women were found to have bacterial vaginosis.

Table 1: 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)	20	100
High (Class 1 And 2)	10	50
Total (n)	30	150
Number of Preterm Births		
	Preterm Births	Term Births
Lower (Class 3 And 4)	30	95
High (Class 1 And 2)	15	40
Total (n)	45	160

Hence, there is no association between lower socioeconomic class and preterm births. Hence, there is no association between lower socioeconomic class and bacterial vaginosis.

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

Gestational Age of Diagnosis	Amsels Positive	Amsels Negative
Till 12 weeks	0	180
12-28 weeks	4	176
>28 weeks	30	150

In the first trimester, none of the pregnant women in our study population developed bacterial vaginosis. Between 12-28 weeks, 11.5% of pregnant women developed bacterial vaginosis. 88.5% of pregnant women developed bacterial vaginosis.

Table 3: 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	1.53	62	87.26
Preterm normal vaginal delivery	20	82.45	1	5.30
Emergency Caesarean	9	10.22	66	73.48
Elective Caesarean	1	10.5	12	77.2
Outlet Forceps	1	28.12	1	55.44

Majority of pregnant women with bacterial vaginosis diagnosed by Amsel's criteria delivered by normal vaginal delivery.

DISCUSSION

Low birth weight babies are forty times more likely to die within their first four weeks of life than normal birth weight infants. Low birth weight babies are also more likely than normal-weight babies to have neurodevelopmental complications and congenital anomalies.[11] While the under than five childhood mortality rates have declined, the neonatal mortality rates have remained the same.[12] Globally, there are 4 million neonatal deaths out of the approximately 130 million annual live births [13] Low birth weight accounts for nearly 80% of neonatal deaths. The proportion of Low birth weight has increased in the past 20 years. Unfortunately, the documentation of low birth weight is not proper.[14] A Low-birth-weight baby can be a preterm baby due to bacterial vaginosis. Millennium development goals are a broad global commitment to address general poverty and health, goal four of which aims to reduce the under-five mortality rate by two-thirds.[15] With better care of low-birth-weight babies, the fourth Millennium development goal can be achieved. The care of a low-birth-weight newborn necessitates judicious resource utilization as the countries with the highest newborn mortality has the least modern infrastructure.[16]

The frequency of Bacterial Vaginosis found in this study is 18.69 %, and the reported incidence varies from 18 -31.6%.[17-21] There was the maximum prevalence of Bacterial vaginosis in maternal age between 24-26 years. This age is commonly associated with other genital tract infections as evidenced by other studies.[17] Maternal low socioeconomic status was not associated with an increased bacterial vaginosis prevalence in our study though there are studies with contrasting findings in the literature.[20] It is believed that lack of hygiene in the low economy is associated with bacterial vaginosis. Maternal low socioeconomic status was not associated with an increased preterm prevalence in our study though there are studies showing an

association of low economic status with preterm birth in the literature. [21]

The mechanism by which an increase in gestational age could produce this effect is unknown, but hyperestrogenic can lead to decreased pH while pelvic congestion state and associated GDM, and Candida with increasing gestation may contribute to increased susceptibility of Vaginal mucosa to Gardnerella vaginalis.[22] In our study, there were 12 cases of diagnosed Candida in the third trimester. This coexistence of multiple vaginal microorganisms can be a possible cause of increased bacterial vaginosis in the third trimester in pregnant women. In our study, there was an increased likelihood of vaginal delivery. [18,19]

The first case-control study reported by **Eschenbach et al. in 1984** showed the presence of bacterial vaginosis in a high percentage of women with preterm labor 43%, compared to the control (14%). Besides, bacterial vaginosis has also been associated with an increased risk of preterm birth (PTB), premature ruptured membrane (PROM), and intraamniotic infection.[23]

Das et al.2004 A total of 100 pregnant women aged 15-35 years, between 28 and 36 weeks of gestation, with abnormal vaginal discharge and clinically suspected bacterial vaginosis were enrolled in this study. Based on Amsel's clinical criteria and culture, 37 percent of women were identified to have bacterial vaginosis. In their study, preterm delivery was 27 (73%) in Bacterial vaginosis positive cases, which is significantly higher than 16 (25.4%) Bacterial vaginosis negative cases. Bacterial vaginosis is an independent risk factor for preterm birth and suggests that the timing of this infection in gestation significantly affects this risk.[16]

Hillier et al.1995 In their study, women with bacterial vaginosis diagnosed during the second trimester of pregnancy were 40 percent more likely to give birth to a premature, low-birth-weight infant than women without bacterial vaginosis. Bacterial vaginosis was detected in 16 percent of the 10,397 women.[20]

Mengistie et al.2013 In their study, among fifty-seven symptomatic and 195 asymptomatic pregnant women, the prevalence of bacterial vaginosis among symptomatic pregnant were 18(31.6%) but among asymptomatic, the prevalence of BV was 31(15.9%).[21]

Suphaphon et al 2016 study concluded that Bacterial vaginosis during gestational Age 28-32 weeks in asymptomatic Thai pregnant women was prevalent at 19.3% and tended to increase in pregnancy complications, including premature rupture of membranes, preterm birth, and low birth weight. The prevalence of BV, vaginal candidiasis and were 19.3%, 21% respectively. None had trichomoniasis or gonococcal infection. One of the cases had chorioamnionitis and none of the participants had the post-partum infection. In pregnant women with BV, there was an increased risk of PROM 1.1-6.8 times, Preterm birth 1.5-6.9 times, and LBW 1.5-3.2 times.[22]

Akinbiyi et al 2004 The aim of the study was to determine the prevalence and age distribution of Candida albicans and bacterial vaginosis in asymptomatic pregnant women. One thousand and seventy-three (1,073) consecutive women and 65% were in the age group of 21–30 years, and the smallest group was age 40 years and above. The mean Maternal age of all the women was 25.8 years (SD 5.5). The prevalence of Candida albicans was 12.5%, and the highest percentage of 65.7% (88 patients) was in the age group of 21 –30 years. The prevalence of Bacterial Vaginosis was 3.54%, with almost 90% among the age group of 21–30 years.[22]

CONCLUSION:

So, to conclude, the results of this study suggest that for reducing the problem of low birth weight, the public health strategy needs to focus on the early detection and treatment of Bacterial Vaginosis. Pregnancy with Bacterial Vaginosis should be monitored more closely. Prepregnancy maternal genital hygiene has to be emphasized. Bacterial vaginosis needs to be screened and managed timely to reduce the death rates of our premature and low-weight newborns.

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