Prevalence of Bacterial Vaginosis in Cases of High Risk for Preterm Labor

Original Article

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ABSTRACT

Objectives: The aim of this work was to screen the asymptomatic bacterial vaginosis (BV) in cases of high-risk preterm labor (PTL). Detection of the cervical changes and obstetric outcome in relation to asymptomatic BV.

Patients and Methods: This Observational cohort work was carried out on 100 pregnant women with high risk for PTL, previous PTL with gestational age ≥ 20 - ≤ 32 weeks. Cases were divided into two groups; group A (-ve BV 87 cases): with negative screening, group B (+ve BV 13 case): with positive screening.

Results: Women with vaginal discharge with a pH greater than 4.5, fishy amine odor, Clue cells on saline wet mount, lower abdominal pain, cervical length <25 mm, women with PTL were significantly higher in group B. vaginal flora abnormality, gestational age at delivery, neonates' birth wight, neonatal infection, babies needed neonatal intensive care unit transfer, neonatal deaths and total PTL showed statistically significant different between groups. There was a statistically highly significant negative correlation between cervical length, gestational age at delivery and vaginal smear pH as well as Nugent score.

Conclusion: There was a significant negative correlation between cervical length in mm, gestational age at delivery and vaginal smear pH as well as vaginal discharge Nugent score. The percentage ofthenen having PTL, and neonatal complications were higher in the cases that were proved to be positive asymptomatic BV, than the cases proved to be negative.

Key Words: Bacterial vaginosis, preterm birth, preterm labor.

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INTRODUCTION

Preterm birth (PTB) refers to o be each live birth that occurs prior to 37 full weeks of gestation[1].

Following pneumonia, PTB is the 2nd most prevalent reason for mortality in children below the age of five and the primary cause of prenatal morbidity and mortality[2,3].

The most prevalent reason for atypical vaginal discharge and corresponding symptoms globally is bacterial vaginosis (BV), a widespread aberrant vaginal disease. Researchers have worked over the last 40 years to define the pathobiology, etiology, clinical features, diagnostic procedures, pathologic consequences, and viable therapies for BV[4,5].

Preterm labor and low birth weight, late miscarriage, premature rupture of the membranes(ROM), spontaneous abortion, post-partum maternal infections, chorioamnionitis, and infertility are among the obstetric problems that are more common in people with BV[6].

BV may or may not present with symptoms. A profuse, thin, homogenous, milky, unpleasant-smelling vaginal discharge is a hallmark of symptomatic BV and is aggravated by menstruation and sexual activity without the use of a condom[7,8].

This study's objective was to identify asymptomatic BV in pregnancies with a high risk of preterm birth. Determination about cervical alterations that might be seen, and the results of obstetric procedures related to asymptomatic BV.

PATIENTS AND METHODS

This observational cohort work was performed on 100 pregnant women with high risk for preterm labor, previous PTL, obstetric factors (Twins, uterine abnormalities,

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polyhydramnios), non-obstetric factors (Smoking, abnormal lifestyle, heavy workers) with gestational age ≥ 20 - ≤ 32 weeks (to give a chance for follow up till 37 weeks).

The study was done from May 2020 till April 2021 following permission from the Ethics Committee Tanta University' Hospitals. The patients provided signed permission after being fully briefed.

Exclusion criteria were symptomatic preterm labor, symptomatic BV, ROM, antepartum hemorrhage, chorioamnionitis, vaginal-candidiasis or trichomoniasis, incompetent cervix.

Nonrandom selection was adopted based on the screening for BV. Cases were allocated based on the microbiological smear findings into two groups; group A (-ve BV cases): with negative screening, group B (+ve BV13 case): with positive screening.

Each participant was exposed to

Complete taking of history: Past history any risk factor for PTL, menstrual history, obstetric history (Gravidity, parity and any previous similar condition): Parity is often expressed as 4 numbers (TPAL): term births (following 37 weeks), preterm births (more than 20 and less than 37 weeks), abortions (≤ 20 weeks), living children.

A full general examination, at each prenatal checkup, blood pressure and weight should be taken. The main areas of attention during an obstetric checkup include the uterine size, fundal height (measured in centimeters over the symphysis pubis), fetal heart rate and activity, mother nutrition, weight development, and general health.

Speculum examination: to ensure that the cervix is closed without vaginal bleeding and to help in taking the vaginal swabs.

Per vaginal examination often not necessary except there is vaginal discharge, leakage of fluid, or pain is present.

Routine laboratory investigations and routine obstetric transabdominal ultrasound were done.

Specific laboratory investigations (Screening for BV): Two vaginal swabs were taken from posterior fornix and lateral vaginal wall utilizing sterile swabs during saline moistened speculum examination.

-1st swab is used as general screening of BV using the "Amsel's criteria": Vaginal discharge with a pH greater than 4.5, a fishy odor after stirring the swab onto a drop of 10% KOH (whiff test), presence of clue cells on saline wet mount:

2nd vaginal swab is used for Specific Microbiological screening of BV: the second swab is smeared onto a slide and air dried for later Gram stain.

***Graded Gram stain of smear:** using Safranin as the counterstain, the stained slide was examined under oil immersion lens (×1000), and the number of morphotypes is evaluated based on a standardized scoring method (Figure 1).

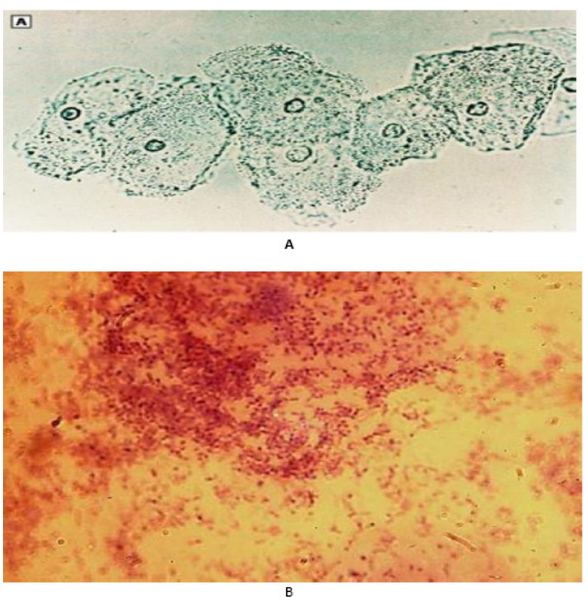

Fig. 1: (A)Wet mount smear showing Clue cells, (B) Gram stain (x1000) shows small gram-variable coccobacilli[9].

*Nugent criteria: to score the different morphotypes; Lactobacillus (large Gram positive rods), Bacteroides (small Gram-negative rods), Gardnerella (small Gram variable rods), and Mobil uncus (curved Gram-variable rods), Grading on a scale of 0 to 4 (0 is no cells, 1+ is <1 cell/ field, 2+ was 1–4 cells/ field, 3+ was 5–30 cells /field, and 4+ was >30 cells/ field). Total scores were summated and used as follows: 0 to 3, consistent with normal bacterial vaginal flora; 4 to 6, altered vaginal flora not consistent with BV (this frequently represented a transitional intermediate stage); and 7–10, consistent with BV[9].

Cervical length by trans-vaginal ultrasonography (TVUS): With empty bladder before the procedures, the patients were placed in the lithotomy position with her hips elevated on a supportive pillow, TVS was done using 5 - 7.5 MHz vaginal transducer (Samsung; Seoul, South Korea), the cervical length with a cut off <25 mm or ≥25 mm was used as a specific criterion, the measurement was taken from the cervical internal to external os utilizing a multiple

straight-line segment approach with caliper placement, and obtained as the sum of all multiple straight lines from the internal to external cervical os, cases <25 mm are at high risk of preterm delivery; therefore, it is recommended to begin interventions[10].

Study approach and follow up: Symptomatic cases of BV received treatment in the form of metronidazole (500 mg) or clindamycin (300 mg) twice daily for one week and they were excluded from the study and patients with both negative BV and with confirmed BV (yet they were still asymptomatic) were included (100 cases).

Follow up was done throughout the remaining period (TVS evaluation of cervical length every 2-4 weeks, for at least three visits before presenting with PT birth and average cervical length scores were documented for every case), once presented in PTL, classical protocol was applied, and the cases were evaluated for the different outcomes.

The primary outcome was cervical shortening. Secondary results involved spontaneous premature birth at less than 37 weeks and perinatal morbidity and mortality (Figure 2).

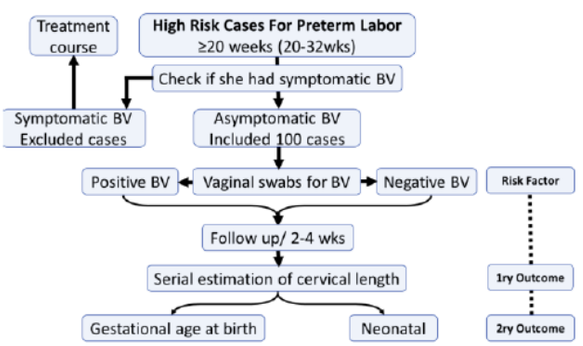

Fig. 2: Our study approach and follow up

Statistical analysis

SPSS v21 (IBM Inc., Chicago, IL, USA) was used for statistical analysis. The mean and standard deviation (SD) of the quantitative parameters were reported, and they were contrasted for the same group using a paired Student's t-test. The frequencies and percentages (%) were used to illustrate qualitative characteristics. In the instance of categorical variables, the chi-square test ($\chi 2$), Instead of the $\chi 2$test, Fisher's Exact or Monte Carlo correction were employed to contrast results across various groups, upon violation of the assumption that at least 80% of the expected frequencies were > five, i.e. when more than 20% of the cells had expected counts < five. A two tailed *P value* < 0.05 was considered significant.

RESULTS

Maternal age, BMI and Gestational age at enrolment were 25.24±4.51 years, 28.33±5.26 kg/m2, and 21.57±1.75 weeks respectively. The reported risk factors were previous PTL, previous Caesarean, heavy workers, 2nd trimester abortion, polyhydramnios, smoking, recurrent abortion and previous uterine surgery are shown in (Table 1, Figure 3).

Table 1: Demographic characters of all the studied sample

All patients (n= 100)	Mean($\bar{x}$) ±SD	Range
Maternal age (years) ($\bar{x}$ ±SD)	25.24±4.51	(19-38)
BMI (kg/m2) ($\bar{x}$ ±SD)	28.33±5.26	(21-33)
Gestational age at enrollment (weeks) ($\bar{x}$ ±SD)	22.57±1.75	(20-24)
Gravidity ($\bar{x}$ ±SD)	3.44 ± 0.67	(2-7)
Parity ($\bar{x}$ ±SD)	2.73 ± 0.23	(1-5)
Risk Factors	N	
Previous PTL	37	(Some cases have ≥ one factor)
Previous Cesarean section	22	
Heavy workers	24	
2nd trimester abortion	15	
Polyhydramnios	13	
Smoking	13	
Recurrent abortion	12	
Previous uterine surgery (Myomectomy, D&C, Hysteroscopy)	9	

Data are presented as mean ± SD or frequency, BMI: Body mass index, PTL: preterm labor.

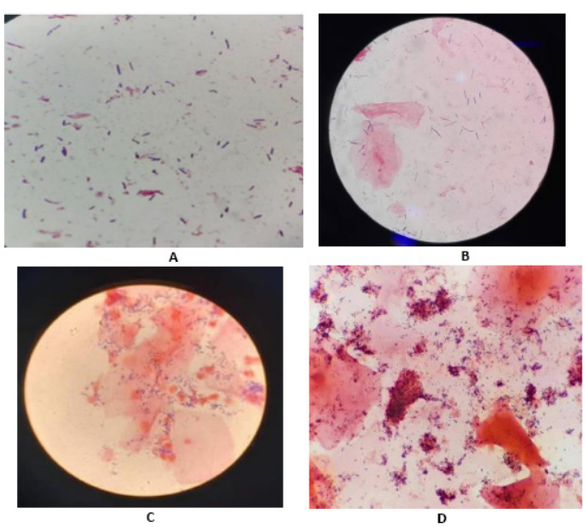

Fig. 3: Microscopic view of (A) a Gram-stained vaginal smear taken from a case of normal flora, (B) vaginal smear taken from a case of –ve BV; it shows the clue cells, (C) Gram-stained vaginal smear taken from a case of +ve BV, (D) Gram-stained vaginal smear taken from a case of +ve BV (high power magnification).

The cases were divided according to the microbiological smear findings into group A (-ve BV; n=87) and group B (+ve BV; n=13). Vaginal PH, the number (percentage) of women with Vaginal discharge and A fishy amine odor with a pH greater than 4.5 was substantially higher in Group B versus Group A. The number (percentage) of women with A fishy amine odor was substantially greater in Group B 6 (46.2%) vs 17 (19.5%) in Group A (p-value =0.033). Nugent score was substantially greater in Group B versus Group A. According to vaginal flora abnormality it was significantly statistically various among Group A and Group B. (Table 2).

There was statistical non-significant difference regarding maternal age, BMI, Gestational age at enrolment (weeks), Gravidity and Parity. (Table 3).

Percentage of women with lower abdominal pain was substantially greater in Group B versus Group A. The mean ±SD Cervical length was significantly lower in Group B versus group A. The % of women with Cervical length <25 mm was substantially greater in Group B vs group A. a statistically highly significant negative association existed among cervical length in mm and vaginal smear pH (rs=-0.381, *p*=0.001) and Nugent score (rs=-0.204, *p*=0.042). (Table 4).

Gestational age at delivery and percentage of women with PTL (<37 weeks) were higher in Group A (-ve BV) versus group B (+ve BV), with a statistically significant difference.

There was a statistically highly significant negative association among gestational age at delivery in weeks and vaginal smear pH (rs=-0.594, p=0.001) and Nugent score (rs=-0.427, p=0.042). (Table 5).

A statistically substantial variation existed among the two groups as regard Birth weight, Neonatal infection, Neonatal intensive care unit and Neonatal deaths. (Table 6)

Gestational age in the subgroups of normal flora, altered flora and +ve BV group, were statistically significant differente, as well as comparing Normal Vs BV group, showed a statistically highly significant difference. The total PTL cases were 36 (36% of all the cases). This was divided as 16 (24%) in normal subgroup, 11 (55%) in altered flora subgroup; and 9 (69.2%) in BV group. Comparison showed a statistically significant difference between all subgroups. Extreme PTL was only observed in 2 cases of BV group (15.4%). (Table 7).

Table 2: Analysis of first and second vaginal smear microbiological screening of bacterial vaginosis (BV) in the vaginal discharge in the studied sample

All patients (n= 100)		All Cases	Group A BV Negative (n= 87)	Group B BV Positive (n= 13)	Statistical analysis	
					Statistic	*P value*
pH ($\bar{x}$ ±SD)		4.91±0.59	4.57±0.63	5.24±0.55	t test, p	0.01**
pH greater than 4.5 (n, %)		35 (35%)	24 (27.6%)	11 (84.6%)	2 χ =16.17	0.001**
Fishy amine odor (Whiff test) (n, %)		23 (23%)	17 (19.5%)	6 (46.2%)	2 χ =3.39	0.065
Presence of Clue cells (n, %)		22 (22%)	13 (14.9%)	9 (69.2%)	2 χ =16.5	0.001**
Vaginal Flora	Normal (n, %)	67 (67%)	67	0		
	Altered ≠ but not BV (n, %)	20 (20%)	20	0	2 χ (FE)=100	0.001**
	Altered ≡ equal to BV (n, %)	13 (13%)	0	13		
Nugent score ($\bar{x}$ ±SD)		4.46±0.91	1.55±1.17	7.38±0.65	t test, *p*	0.01**

Data are presented as mean ± SD or frequency, * *P value* significant ≤0.05, BV: bacterial vaginosis.

Table 3: Demographic characters of the studied groups (+ve or -ve) BV

Parameters	Group A BV Negative (n= 87)	Group B BV Positive (n= 13)	Statistical analysis	
			Statistic	*P value*
Maternal age (years) ($\bar{x}$ ±SD)	25.46±4.58	23.77±3.74	t test	0.209
BMI (kg/m^2) ($\bar{x}$ ±SD)	28.37±5.18	28.07±5.96	t test	0.851
Gestational age at enrollment (weeks) ($\bar{x}$ ±SD)	22.94±1.53	21.76±2.48	t test	0.121
Gravidity ($\bar{x}$ ±SD)	3.58 ± 0.56	3.27 ± 0.32	t test	0.362
Parity ($\bar{x}$ ±SD)	2.93 ± 0.43	2.36 ± 0.54	t test	0.227

Data are presented as mean ± SD, BMI: Body mass index, BV: bacterial vaginosis.

Table 4: Analysis of the cervical length in the studied groups (+ve or -ve) of BV

Parameters	Group A BV Negative (n= 87)	Group B BV Positive (n= 13)	Statistical analysis	
			Statistic	*P value*
Lower abdominal pain, (n, %)	22 (25.3%)	9 (69.2%)	2 χ =6.137	0.003*
Cervical length (mm.) (x̄ ±SD)	33.70±8.87	27.40±7.13	t test	0.016*
Cervical length (<25 mm.), (n, %)	26 (29.9%)	8 (61.5%)	2 χ =5.049	0.025*
Cervical length (≥25 mm.), (n, %)	61 (70.1%)	5 (38.5%)		
Correlation		Vaginal pH	BV Nugent Score	
Cervical length	r	-0.381	-0.204	
	P value	0.01**	0.042*	

Data are presented as mean ± SD or frequency, * *P value* significant ≤0.05, BV: bacterial vaginosis.

Table 5: Gestational age (GA) in the studied sample according to the presence of BV

Parameters	Group A BV Negative (n= 87)	Group B BV Positive (n= 13)	Statistical analysis	
			Statistic	*P value*
GA at delivery (weeks) (x̄ ±SD)	36.09±2. 5	33.23±3.98	t test =2.72	0.017*
GA at delivery (>37 weeks) (n, %)	60 (68.9%)	4 (30.8%)	2 χ =7.16	0.007**
GA at delivery (<37 weeks) (n, %)	27 (31.1%)	9 (69.2%)		
GA at delivery (34-37 weeks) (n, %)	11 (12.6%)	3 (23.1%)	2 χ (FE)=1.02	0.312
GA at delivery (32-34 weeks) (n, %)	8 (9.3%)	2 (15.4%)	2 χ (FE)=0.48	0.312
GA at delivery (28-32 weeks) (n, %)	5 (5.7%)	2 (15.4%)	2 χ (FE)=1.63	0.198
GA at delivery (<28 weeks) (n, %)	3 (3.4%)	2 (15.4%)	2 χ (FE)=3.39	0.065
Correlation		Vaginal pH	Nugent Score	
Gestational age at delivery	r	-0.594	-0.427	
	P value	0.01**	<0.01**	

Data are presented as mean ± SD or frequency, * *P value* significant ≤0.05.

Table 6: Neonatal outcome according to vaginal flora results of the studied sample:

Parameters	Group A BV Negative (n= 87)	Group B BV Positive (n= 13)	Statistical analysis	
			test	*P value*
Birth weight <2500 g (n, %)	18 (20.7%)	6 (46.2%)	2 χ =4.02	0.044*
Neonatal infection (n, %)	9 (10.3%)	4 (30.8%)	2 χ =4.17	0.041*
Neonatal intensive care unit (n, %)	7 (8.0%)	3 (23.1%)	2 χ =3.83	0.049*
Neonatal deaths (n, %)	0 (0%)	1 (7.7%)	2 χ =6.75	0.001**

Data are presented as frequency, * *P value* significant ≤0.05.

Table 7: Gestational age according to results of vaginal flora in the studied sample

Parameters	Normal flora (n=67)	Vaginosis (n=20)	Vaginosis (n=13)	Statistic	*P value*
GA at delivery (weeks) (x̄ ±SD)	36.4±2.41	35.05±2.58	33.23±3.98	p1 =t test= 2.89, p2 = t test= 3.41 P3= t test= 1.64	0.007 0.004** 0.12
Delivery >37 weeks, (n, %)	51 (76%)	9 (45%)	4 (30.8%)	χχ2 =13.6	
Delivery <37 weeks, (n, %)	16 (24%)	11 (55%)	9 (69.2%)	χχ22=10.42	
Delivery 34-37 weeks, (n, %)	6 (8.9%)	6 (30%)	3 (23.1%)	χ2(FE)=6.11	0.04*
Delivery 32-34 weeks, (n, %)	5 (7.5%)	3 (15%)	2 (15.4%)	χ2(FE)=1.45	0.48
Delivery 28-32 weeks, (n, %)	5 (7.5%)	2 (10%)	2 (15.4%)	χ2(FE)=0.86	0.65
Delivery <28 weeks, (n, %)	0 (0%)	0 (0%)	2 (15.4%)	χ2(FE)=13.6	0.001**

Data are presented as mean ± SD or frequency, * *P value* significant ≤0.05.

DISCUSSION

In the current study, heavy working was the second most common risk factor for preterm birth and was detected in 24% of the cases also smoking was reported in 13% of the cases. Other research on the relationship between smoking and prematurity has produced a range of findings, with no influence on `a strong negative correlation. The findings of a research done in the US in 2010 revealed that women who are exposed to smoking cigarettes had a 2.3 times higher risk of premature birth compared to other women[11]. This agreed with El-Gilany A. *et al*.[12] who found that PTL was significantly associated with physical work demands, heavy weight carrying, PTD risk is increased by transient employment and lengthy hours.

In the current study, abortion was a common risk factor for preterm labor. The history of the 2nd trimester abortion was reported in 15% of the females and recurrent abortion was detected in 12% of the cases. Multiple studies were in accordance with these findings regarding the risk of preterm-birth across women with prior history of abortions and recurrent abortion[13-15].

In the current study, previous uterine surgery (Myomectomy, D&C, Hysteroscopy) was also reported as a factor of risk for preterm birth in 9% of the cases. El Beltagy *et al*.[16] agreed with our results as they found that presence of one or more previous gynecological problems were substantially more in women whom gave birth to premature babies, cotrasted to women who gave birth to full-term babies.

In the present study, the prevalence of positive BV was 13%; and this figure represented asymptomatic cases.

The first vaginal smear showed that the vaginal PH, the number (percentage) of women with Vaginal discharge with a pH higher than 4.5, and the number (percentage) of women with A fishy amine odor discharge, were significantly higher in Group B. This agreed with Bhakta V. *et al*.[17] who showed that in the cases with BV included in their study, 25% showed malodor versus 12.7% in the cases with no BV with statistically substantial variation among the two groups.

In the current study, the number (percentage) of women with Clue cells on saline wet mount was substantially greater in positive BV group. This agreed with Achdiat P. *et al*.[18] showed that vaginal wall examination revealed the existence of clue cells > 20% in BV patients.

The current research unequivocally indicates a substantial correlation between BV and premature labor. A greater number of participants in the premature labor group revealed positive pathogenic organisms in the culture of vaginal swabs, more than in term labor group.

Teja, G.K.,[21] reported that the prevalence of BV varies from 12 to 25%, in asymptomatic women. Achdiat P. *et al*.[18,19,20] showed that all individuals who had vaginal pH >4.5 were diagnosed with BV. The pH was <4.5 in 50 individuals out of 53 study individuals who were not diagnosed with BV.

On the other hand, in the current work the mean ±SD Nugent score was substantially greater in Group B versus in Group A. The vaginal flora abnormality was significantly statistically various among Group A and Group B. Similarly, Mancuso M.S. *et al*.[22] showed that the Nugent score of the cases with BV included in their study was statistically significantly higher as compared with the cases with no BV.

In the current study, the percentage of women with lower abdominal pain was s substantially greater in Group B versus Group A. The cervical length was substantially reduced in Group B. The % of women with cervical length <25 mm was substantially greater in Group B.

Mancuso M.S. *et al*.[22] showed that the mean cervical length in the cases with BV was significantly lower as compared with the cases with no BV.

In the current study, the number (percentage) of women with Lower abdominal pain was substantially greater in positive BV group. This was in line with Bhakta V. *et al*.[17] who showed that no statistically substantial variation existed among the two groups.

Correlation analysis showed that there was a statistically highly substantial negative association between cervical length in mm. and vaginal smear and Nugent score.

Mancuso M.S. *et al*.[22] showed that the cervical length was inversely related to Nugent score and vaginal fluid.

Women with BV according to Nugent score ≥7 (P = .04) or pH ≥5 (P = .016) had substantially reduced cervical length compared to unaffected women.

Fahmy M. *et al*.[24], showed that the incidence of PTL was 20%. The incidence of PTL in women who had BV was 52%, which is statistically significant. The incidence of PTL in cases with short CL ≤ 30 mm was 39%. The incidence of PTL was 16% for cases with BV and short CL.

Şahin, H.Ö. and Gülkılık, A.,[23] reported no statistically substantial variation was existed among BV and preterm labour or shortened cervical length.

In the current study, the gestational age at delivery was greater in Group A, with a statistically substantial

variation. The percentage of women with PTL (<37 weeks) was significantly higher in Group B (+ve BV). A statistically highly substantial negative association existed among gestational age at delivery in weeks and vaginal smear and vaginal discharge Nugent score. The total PTL cases showed a statistically significant difference between all subgroups. Extreme PTL was only observed in 2 cases of BV group (15.4%). Similar results were obtained by Jain R.[13] denoted that BV was substantially correlated with preterm birth.

On the other hand, Figueroa D. *et al*.,[25], work came to conclude that the existence of BV at 16-22 week-of-gestation doesn't anticipate premature birth in the study group.

In the current study, there were 6 neonates (46.2%) born to 13 positive instances of BV had low birth weight (LBW), contrasted to 18 neonates (20.7%) of LBW born.

Shilpa M. *et al*.[26] showed that 90% of individuals with BV delivered a low-birth-weight infants. Afolapi B.B. *et al*.[27] also revealed that out of the 64 women who were positive for BV, 14.1% had LBW. They had 3.2 times the risk of LBW compared with those who had negative BV. Bhakta V. *et al*[17] demonstrated a statistically substantial correlation among BV and LBW.

The percentage of neonatal infection in the current study was statistically significant. Goffinet, F.*et al*[28] Out of 354 women tested, 24 had BV (6.8%). Very premature birth (less than 33 weeks) was significantly associated with the flora grade and the highest risk of very premature birth was correlated with BV.

Dingens A.S. *et al*.[29] across full-term infants, BV was correlated with an increased risk of neonatal sepsis. across premature infants, BV-exposure was not correlated with such a risk.

More recently, Teja G.K.[21] concluded that The frequency of prenatal screening helped reduce the number of unfavorable pregnancy outcomes.

The percentage of babies needed NICU transfer in the current study is statistically significant. No neonatal deaths were reported in Group A. One case was reported in Group B and this serious complication was statistically highly significant.

Laxmi U. *et al*.[30] reported that the proportions of infants with admission to NICU was greater across positive BV exposed compared to across negative BV pregnancies. But also like our results, they didn't achieve a statistically significant value.

Dingens A.S. *et al*.[29] showed that there was an increased risk of NICU admission across fully-term infants. Across premature birth, BV-exposed was correlated with a higher risk for admission at NICU.

Afolapi B.B. *et al*.[27] who showed that BV was not significantly correlated with admission at NICU.

Algameel A. *et al*.[15] showed that An elevated risk of newborn morbidity was linked to PTL delivery. Additionally, there was a greater incidence of NICU admission, a longer average length of stay, and a higher fatality rate. Bhakta V. *et al*[17] stated a statistically significant correlation among BV and NICU admission.

Based on the current study, as well as the previous findings in the majority of publications, BV is associated with neonatal problems. The routine screening of antenatal women for BV may result in the reduce of adverse pregnancy outcomes.

Limitations

The sample size was relatively small due to Covid-19 had its effect on the availability of cases, inclusion of asymptomatic cases is difficult as many cases might not come to the hospital and some women may have a deceiving symptom, inclusion of high-risk cases for PTL rather than the actual PTL, may also add another difficulty, fear of women from the smear might limit the acceptance of cases. The majority of the anaerobes linked to BV are picky, need specific enriched medium, and sometimes are difficult to detect using conventional biochemical testing. The need for intensive laboratory work to diagnose BV may limit the use and effectiveness of the methods. The variable views as regard the need for screening, make a psychological barrier against screening.

CONCLUSION

A significant negative association between cervical length in mm, gestational age at delivery and vaginal smear pH as well as vaginal discharge Nugent score. The percentage of women having preterm labor and neonatal complications were higher in the cases that were proved to be positive asymptomatic BV, than the cases proved to be negative.

CONFLICT OF INTERESTS

There are no conflicts of interest.

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