

**Role of Lactobacillus in Vaginal Discharge and Bacterial Vaginosis**Smriti Sinha<sup>1,3</sup>, Pritee Kumari<sup>2</sup>, Shashi Bala Prasad<sup>3</sup><sup>1</sup>Assistant Professor, Department of Obstetrics and Gynaecology, Madhubani Medical College and Hospital, Madhubani, Bihar.<sup>2</sup>Postgraduate Student (Final Year), Department of Microbiology, Narayana Medical College, Jamuhar, Sasaram, Bihar.<sup>3</sup>Professor, Department of Obstetrics and Gynaecology, Madhubani Medical College and Hospital, Madhubani, Bihar.

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**Abstract**

**Background:** In the field of women's health, medical professionals frequently have to make a diagnosis and treat individuals who exhibit excessive vaginal discharge without much other information. A correct diagnosis cannot be made until the lab work is finished and the patient's medical history is examined. Only then can the two common causes of vaginal discharge with identical symptoms lactobacillosis and other factors be distinguished. This study aims to explore the function of lactobacillus in bacterial vaginosis and vaginal discharge.

**Methods:** After selecting all patients who presented with vaginal discharge, only those with physiological normal vaginal discharge and those with bacterial vaginosis were isolated, and only in these two groups was lactobacillus counting performed.

**Results:** Recruitment was done for 270 patients with vaginal discharge. Among them, 140 patients had normal vaginal discharge and 60 had bacterial vaginosis. Research was conducted to determine the function of lactobacillus in both normal vaginal discharge and bacterial vaginosis. 85.72% of patients with normal vaginal discharge had a lactobacillus count  $>10^6$  (CFU/mL), compared to 85% of patients with bacterial vaginosis who had a lactobacillus count  $<10^6$  (CFU/mL). Fischer's exact test revealed a statistically significant correlation (p value of 0.001) between the number of lactobacilli in normal vaginal discharge and the number in bacterial vaginosis.

**Conclusion:** Reduced lactobacillus count in bacterial vaginosis and increased count in normal vaginal discharge were statistically significantly correlated.

**Keywords:** Lactobacillus; Bacterial vaginosis; Vaginal discharge; Lactic acid

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**Introduction**

Pathogenic or non-pathogenic vaginal discharge is possible. Transudation through vaginal walls is the natural emergence of the nonpathogenic form. Nearly majority of the lactic acid in a healthy vagina is produced by lactobacillus fermentation of glycogen in keratinized vaginal mucosa cells. Estrogen regulates the procedure. Therefore, the presence or absence of lactobacilli in the lower female genital tract can serve as a reliable indicator of normal or pathological circumstances.

Other commensal bacteria are found in concentrations lower than  $10^5$  colony forming units (CFU) per milliliter of vaginal fluid, whereas lactobacilli, the predominant commensal bacteria, are found at concentrations of  $10^5$ – $10^6$  CFU per milliliter.

Although the exact etiology of bacterial vaginosis is unknown, it can be contracted through intercourse and sexual contact. Additional risk factors for

bacterial vaginosis include smoking, having several sexual partners, having low socioeconomic position, being married, having low levels of education, and rising parity.

Vaginal infections during pregnancy have been linked to serious problems for the mother and the unborn child, including obstetric and gynecologic issues. Additionally, BV raises the chance of contracting HIV and STDs, or sexually transmitted infections.

**Material and Methods**

This cross-sectional study was conducted on patients scheduled for vaginal discharge from March 2023 to August 2023 at the Outpatient Department of Obstetrics & Gynecology, Madhubani Medical College and Hospital, Madhubani, Bihar. Out of the 270 individuals that were evaluated, 140 had normal vaginal discharge, and 60 had bacterial vaginosis. These patients were chosen for more investigation.

Amsel's and Nugent's criteria were used to diagnose bacterial vaginosis.

Clinical diagnosis of bacterial vaginosis was done by Amsel's criteria: Presence of three of the following four criteria were considered to be consistent with the diagnosis.

- Vaginal pH > 4.5
- Clue cells on saline wet mount
- Release of fishy amine odour on addition of 10% KOH to a drop of vaginal discharge
- A characteristic thin, homogenous vaginal discharge

Nugent's criteria 2: Diagnosis of BV was done by examination of gram stained smears. Each Gram stained smear was evaluated under (1000×oil

immersion magnification) and atleast 10-20 fields were counted and average determined. Bacterial vaginosis was graded on a 10 point scale where:

- 0-3 is considered Normal (Predominantly lactobacillus)
- 4-6 is considered Intermediate (Mixed flora)
- 7-10 is considered to be indicative of Bacterial Vaginosis (No lactobacillus)

Gram positive rods are exclusively lactobacillus while short gram variable and gram negative bacteria are part of the anaerobic flora responsible for bacterial vaginosis. The final BV score was obtained by adding the individual points of the three types of bacteria i.e. long gram positive rods, gram negative short rods and curved gram variable rods.

**Table 1 : Scoring chart for Nugent's criteria**

Grade	Average number of bacteria per field	Score		
		Gram+ve	Gram-ve	Mobiluncus species
4+	>30	0	4	2
3+	6-30	1	3	2
2+	1-5	2	2	1
1+	<1	3	1	1
0	0	4	0	0

**Results**

A total of 270 female patients who presented with vaginal discharge were included in this cross-sectional study, which was hospital based. Of these, 70 patients, or 25.93%, had vaginal discharge from

causes such as candidiasis, trichomoniasis, and gonococcal cervicitis, of which 60 patients (22.22%) had bacterial vaginosis. Table 2 shows that 104 individuals (51.85%) had vaginal discharge that was physiologically appropriate.

**Table 2 : Bacterial vaginosis in relation to other causes of vaginal discharge**

Cause	Total number of patients	Percentage
Bacterial vaginosis	60	22.22%
Normal vaginal discharge	140	51.85%
Candidiasis	43	16.25%
Trichomoniasis	20	7.25%
Gonococcal cervicitis	7	2.43%
Total	270	100%

In our study, lactobacillus count <10<sup>6</sup> CFU/mL was taken as decrease in count and considered predictive of bacterial vaginosis and >10<sup>6</sup> CFU/mL was considered as normal lactobacillus count predictive of normal vaginal discharge. Out of the 60 patients with Bacterial vaginosis 51 (85%) had lactobacillus count <10<sup>6</sup> CFU/mL and only nine

patients had count >10<sup>6</sup> CFU/mL. 120 (85.71%) of the total 140 patients with normal vaginal discharge had lactobacillus count >10<sup>6</sup> CFU/mL (Table 3). Fischer's exact test showed statistically significant relationship between decreased lactobacillus count in bacterial vaginosis and increased count in normal vaginal discharge (p value of 0.001).

**Table 3 : Lactobacillus counts in patients with normal vaginal discharge and bacterial vaginosis**

Lactobacillus Count (CFU/ml)	Normal Vaginal Discharge		Bacterial Vaginosis	
	Number	Percentage	Number	Percentage
≤10 <sup>3</sup>	15	10.71%	41	68.33%
10 <sup>4</sup> -10 <sup>6</sup>	5	3.57%	10	16.67%
≥10 <sup>7</sup>	120	85.72%	9	15.00%
Total	140		60	

In the present study, age range of patients presenting with vaginal discharge was 15 to 50 years with a mean of 28.57 years. Mean age of Bacterial vaginosis patients was 28.53 years.

Thirty three patients (16.9%) were unmarried and 167 (81.5%) were married. Out of unmarried patients, 3 (9.09%) had Bacterial vaginosis whereas 57 (34.14%) married patients had bacterial vaginosis (p value of 0.0310).

In our study, 23 (54.76%) patients with polygamous husbands and 34 (27.20%) patients with monogamous husbands had bacterial vaginosis (p value of 0.0412).

In the present study, out of 200 patients 62 (31%) patients had contraception in form of tubal ligation; 28(14%) patients had Cu-T inserted; 30 (15%) had other methods of contraception like oral contraceptive pills, injectable contraception, barrier method etc. Eighty patients (40%) were not using any contraceptive.

Out of the total patients of tubal ligation, 19 (30.64%) had bacterial vaginosis, of these 84.22% had lactobacillus count less than  $10^6$  CFU/mL.

Among intrauterine device users 10(35.71%) patients had bacterial vaginosis; 90% of these had lactobacillus count  $< 10^6$  CFU/mL.

Nine patients (30%) using other methods of contraception had bacterial vaginosis whereas 22 patients (27.50%) not using any contraceptive had bacterial vaginosis.

No statistically significant association could be established between contraceptive use and incidence of bacterial vaginosis.

In the present study patients were divided into two categories either having history of abortion or not.

Out of 200 patients 82(41%) patients had history of abortion and 118 (59%) patients had no history of abortion.

Out of total number of patients with history of abortion 34(41.46%) had bacterial vaginosis and 26 (22.04%) patients (Table 4) with no history of abortion had bacterial vaginosis (p value of 0.0383).

**Table 4 : Association with history of abortion**

Criteria	Total number of patients	Bacterial vaginosis		Normal vaginal discharge	
		Number	Percentage	Number	Percentage
History of abortion	82	34	41.46%	48	58.54%
No Abortion	118	26	22.04%	92	77.96%
Total	200	60		140	

In the current study, 120 patients (or 60%) were literate and 80 patients (or 40%) were illiterate. Of the patients who were illiterate overall, 25 (31.25%) had bacterial vaginosis, whereas 35 (29.56%) of the educated patients also had bacterial vaginosis. There was no discernible statistical correlation found between the incidence of bacterial vaginosis and educational status.

Of the 200 patients, 65 (32.5%) lived in urban areas (middle class); 45 (22, 50%) in urban areas (slums); and 90 (45%) in rural areas. Bacterial vaginosis affected 23 (35.38%) urban (middle-class) residents, 11 (24.45%) urban (slum) residents, and 26 (28.88%) patients from rural areas.

There was no proven statistically significant correlation found between the incidence of bacterial vaginosis and place of residence.

## Discussion

The typical vaginal bacterial flora is altered in bacterial vaginosis, leading to an overgrowth of mostly anaerobic bacteria and a decrease of lactobacilli that produce hydrogen peroxide. [1,2,3,4] Among women of childbearing age, it is the most frequent cause of abnormal vaginal discharge and is linked to STIs (sexually transmitted

infections) and unfavorable pregnancy outcomes. It was discovered that all women with vaginal trichomoniasis had bacterial vaginosis, and 50% of those with syphilis also had the condition. Pelvic inflammatory disease, postabortal PID, post-operative cuff infections following hysterectomy, and abnormal cervical cytology are among the conditions that women with bacterial vaginosis are more likely to experience. [5]

Bacterial vaginosis in pregnancy increases the risk of chorioamnionitis, post-caesarean endometritis, premature membrane rupture, and preterm labor and delivery [6,7].

In our investigation, there were 270 cases of vaginal discharge; 130 (48.14%) had pathological causes, and 140 (51.85%) had physiological causes. According to Joharah M. Al Quaih et al., 56.6% of vaginal discharge cases were caused by pathological reasons. [8]

Trichomoniasis, bacterial vaginosis, candidiasis, and gonococcal cervicitis are the most common causes of pathological vaginal discharge. [9,10] Physiological discharge is frequently caused by pregnancy, premenstruation, and the middle of the menstrual cycle.

The most frequent cause of vaginal discharge in our study was bacterial vaginosis, which had an overall incidence of 22.22%.

Previous studies had also reported similar findings.<sup>4</sup>

We have divided patients into two categories:

Lactobacillus count  $< 10^6$  – Predictive of Bacterial vaginosis

Lactobacillus count  $> 10^6$  – Predictive of Normal vaginal discharge

According to our research, bacterial vaginosis and a decline in lactobacillus count are statistically significantly correlated. A statistically significant correlation between Lactobacillus count and Bacterial vaginosis was discovered by Hillier et al. [11]

The 15–30 year age range has the highest incidence of bacterial vaginosis, according to studies by P Madhivanan et al. and P Bhalla et al. In our study, the age group of 26–30 years old had the highest number of instances. [12,13] In line with a study by P Bhalla et al. that indicated an incidence of 33.9% in married women, we discovered a statistically significant relationship of bacterial vaginosis in married women.

In the current study, there is a statistically significant correlation between the husband's polygamous status and the occurrence of bacterial vaginosis. During the literature review, no findings were discovered that connected husbands' sexual conduct to the prevalence of bacterial vaginosis.

According to a study by P Bhalla et al., there is a statistically significant correlation between the occurrence of bacterial vaginosis and the history of abortion. [13]

According to our study, the greatest incidence of bacterial vaginosis among women using different forms of contraception is observed in those who use intrauterine contraceptive devices (35.71%). This finding is consistent with national and international studies [14, 15].

There is no statistically significant correlation between the educational status and place of residence of patients who have bacterial vaginosis.

### Conclusion

A frequent cause of pathological vaginal discharge, bacterial vaginosis is caused by a decrease in lactobacilli ( $<10^6$ ) that produce hydrogen peroxide, which promotes the proliferation of anaerobic bacteria. It mostly affects sexually active women in the 15–30 age range. Abortion and IUD use are linked to higher rates of bacterial vaginosis.

Oral metronidazole (500 mg) is the recommended dosage. Pelvic inflammatory disease, postabortal

PID, post-operative cuff infections following hysterectomy, and abnormal cervical cytology are among the conditions that women with bacterial vaginosis are more likely to experience.

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