



## BACTERIAL VAGINOSIS IN REPRODUCTIVE AGE GROUP- A STUDY USING NUGENT SCORING AND WET MOUNT METHODS

R. K. Jha<sup>1\*</sup>, M. Dias<sup>2</sup>, M. Vijayasimha<sup>1</sup>, R. P. Jayaswal<sup>1</sup> and Praveen N. M.<sup>1</sup>

<sup>1</sup>Department of Medical Laboratory Technology, Amity Medical School, Amity University, Haryana, India.

<sup>2</sup>Department of Microbiology, St John's Medical College, Bangalore (Karnataka).

\*Corresponding Author: R. K. Jha

Department of Medical Laboratory Technology, Amity Medical School, Amity University, Haryana, India

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### ABSTRACT

**Introduction:** Bacterial vaginosis (BV) is a polymicrobial infection which occurs due to disbalance in normal vaginal flora (*Lactobacilli*) and overgrowth of Gram negative bacilli specially *Gardenella*, *Prevotella* and *Mobiluncus*. In order to diagnose BV, Nugent's score and Amsel's criteria has been used as a conventional method with higher reproducibility. Based on Nugent's scoring, the present study further clarified and highlighted the incidence of significant cases of BV infections in the reproductive age group mainly between 20-30 years. **Methods:** In present study, vaginal samples were collected from 100 women attending gynecological department having white discharge. The samples were examined for the presence of *L. morphotype*, *G. morphotypes*, *Prevotella* and *Mobiluncus* by Gram's staining and analyzed through NS criteria for diagnosis and occurrence of BV. **Result:** Our study revealed 34% BV positive, 44% BV intermediate and 22% normal cases. Further study had shown co-infection with *T. vaginalis* and *Candida species* in BV patients comprising percentage of 3% and 11% respectively. **Conclusion:** NS is a convenient and inexpensive method to diagnose bacterial vaginosis. *L. morphotype*, *G. morphotypes*, *Prevotella* and *Mobiluncus* were examined in patient samples in order to diagnose BV. Infection with *Candida species* were also seen randomly in BV positive and BV negative patient, whereas infections with *T. vaginalis* only seen in BV positive patients. Our study supported the prevalence of BV in women under reproductive age group with white discharge.

**KEYWORDS:** Bacterial Vaginosis; White discharge; Gram's staining; Nugent's score; *L. morphotype*; *G. morphotypes*; *Prevotella*; *Mobiluncus*; *T. Vaginalis*; *Candida*.

### INTRODUCTION

BV is a disorder of the vaginal ecosystem characterized by a shift in the vaginal flora from the normally predominant *Lactobacilli*, with one dominated by a mixed flora including *Gardnerella vaginalis*, *Mobiluncus* species *Prevotella* species, *Bacteroides* species, and *Mycoplasma* species.<sup>[1,2,3,4]</sup> BV is the most common reason for abnormal vaginal discharge in adult women. BV is one of the leading cause of preventable preterm birth (PTB) additionally, women with BV are more likely to present in preterm labor (PTL), experience both premature rupture of the membranes (PROM), preterm PROM and have concomitant infections including amnionitis, postpartum endometritis and post cesarean wound infections.<sup>[5,6,7,8,9,10,11]</sup> Effective oral treatment of BV during pregnancy reduces the rate of preterm birth by 30% to 50%.<sup>[12, 13]</sup> Among nonpregnant women, BV has been found associated with pelvic inflammatory disease, endometritis, postoperative infections and infertility.<sup>[14, 15]</sup> The risk of acquiring human immunodeficiency virus is also increased by the presence of BV infections.<sup>[16]</sup>

### MATERIAL AND METHOD

**1) Location of study:** This prospective study was carried out at St. John's Medical College, Bangalore, Karnataka (India).

**2) Sample collection:** In order to proceed our study, 100 samples were collected from OPD patients of Obstetrics and Gynecology department and further investigated in the Microbiology department of the Hospital during 2009-2010.

**Inclusion Criteria:** All women >20 years of age with white vaginal discharge were included.

**Exclusion Criteria:** Patients taking antibiotics for treatment of local and systemic infections and those having menstrual cycle were excluded.

**Sample Collection Methodology:** Vaginal fluids were collected from the posterior fornix with the help of speculum containing cotton swab. The use of lubricants

and antimicrobial cream was avoided while introducing speculum into the vagina.

**Diagnostic methods**

Each sample was examined in microbiology lab by Gram's stained and grading based on Nugent's scoring (NS) criteria, And wet mount preparation.

Each Gram's stained vaginal smear was studied under oil immersion objective. This study revealed presence of *L. Lactobacilli* (L) which showed Gram positive reaction

whereas *Gardenella* (G), *Prevotella* (P) and *Mobiluncus* (M) showed Gram negative reaction. These strains were counted per oil immersion field (O/F) and their NS value was determined as per the standard value of L, G/P and M in relation to O/F given in Table NO 1. The obtained NS value of each morphotype was tallied and interpreted in table 2 in order to screen BV. (1)

Each wet mount preparation was screened for *Trichomonas vaginalis*, and yeast cells.

**RESULT**

**Table-1: Determination of NS value of L, G/P and M in samples**

O/F	Nugent's score		
	L	G/P	M
>50	0	4	2
6-50	1	3	2
1-5	2	2	1
<1	3	1	1
0	4	0	0

L: *Lactobacilli*;  
G/P: *Gardenella/Prevotella*;  
M: *Mobiluncus*

**Table-2: BV screening criteria using NS**

NS value of L + G/P + M	Interpretation
0-3	Normal
4-6	Intermediate
>6	Bacterial Vaginosis

**Table 4: Categories of patients with Bacterial vaginosis and pregnancy**

Patients category	Total of patients	BV Positive	BV Negative
PROM	9	5	4
ANC	1	1	0
Post-natal	3	0	3
IUD	1	1	0

**Table 3: Patient categorization according to Nugent's score**

Patient category	Total number of patients	BV positive (%)	BV normal (%)	BV intermediate (%)
Non-pregnant	86	27(31.39)	15(17.4)	44 (51.16)
Pregnancy and related condition	14	7 (50)	7 (50)	0 (00)

**Table 5: Incidence of co-infection in bacterial vaginosis**

Organisms	Total	BV positive	BV Positive (%)	BV negative
<i>Candida species</i>	19	11	11 %	8
<i>Trichomonas vaginalis</i>	3	3	3 %	0

**Table 6: Age wise occurrence of bacterial vaginosis**

Age	BV Positive [n]	BV positive [%]	BV Intermediate [n]
20-30	28	82	35
31-40	5	15	9
41-50	1	3	0

n means number of cases;

According to NS criteria for screening BV in vaginal samples, it was observed that BV positive, BV intermediate and normal samples were 34%, 44% and 22% respectively among 100 patients. Further it was analysed that 86 samples were collected from non-pregnant and 14 from pregnant women. It was observed that 31% cases without pregnancy and 50% cases with pregnancy were having BV. BV intermediates were noted only in non-pregnant woman (Table 3).

Our study exposed BV cases among 14 pregnant women with white discharge which included 9 PROM, 1 ANC, 3 Post-natal and 1 IUD cases. It was observed that BV were most prevalent in PROM, ANC and IUD cases among pregnant (Table 4).

In order to study infection with *Candida species* and *T. vaginalis*, all positive, intermediate and negative samples of BV were screened and analysed. It was observed that total number of samples infected with *Candida species* and *T. vaginalis* were 19 and 3 respectively (Table 5).

Coinfections in BV with *Candida species* and *T. vaginalis* were 57% and 100% respectively (Table 5). Age wise study revealed that BV positive and intermediates were more prevalent among 20-30 years of age (Table 6).

**DISCUSSION**

Bacterial vaginosis is an important genital syndrome as it affects a large number of women under reproductive age. The presence of BV put patients at increased risk of upper genital tract infections with severe consequences to infertility and pregnancy outcome.<sup>[17]</sup>

In differential research study, the independent diagnosis of BV by Gram stain alone had shown a sensitivity of 92-97% and a specificity of around 79%.<sup>[18, 19]</sup>

Gram staining technique is least expensive and require least time to perform. It is widely available than other laboratory method. Single swab sample is required for diagnosis of infections. The Nugent's scoring method helps to categorize the patients into different group for

specific treatment which may not be possible with other criteria.

The prevalence of bacterial vaginosis varies widely among different areas and communities of the country. In a study conducted in Delhi, it shown 32.8% subjects were diagnosed BV among 237 patients. Highest prevalence were seen in urban slum (38.6%) followed by rural (28.8%) and urban middle class community (25.4%).<sup>[20]</sup> In another study, it shown that prevalence of bacterial vaginosis was 41% in ever married women belonging to an urban slum in Delhi.<sup>[21]</sup> Similarly, 48.5% BV cases were diagnosed in rural women in Haryana.<sup>[22]</sup>

Studies in Karnataka also shown varying results, where 19% married rural women in Mysore were having BV.<sup>[43]</sup>

In our study there were 34% cases of BV positive, 44% were diagnosed as BV intermediate and 22% normal (table No 3).

In a study it shown that, 52% BV positive women were between 26-40 years age.<sup>[17]</sup> Our study further clarified that 82% of BV positive women were among 20- 30 years, 15% among 31-40 years, and 3% in age range of 41-50 years. (Table No:6) Our study supported the occurrence of BV in women with the reproductive age. In pregnancy, BV is one of the leading cause of preterm labor (PTL), postpartum endometritis and post caesarian wound infection.<sup>[5-11]</sup> In the present study, 50% of the patients presented with white discharge per vagina; were found to have BV and these patients were having complications like PROM, ANC and IUD (Table No:4). Infections with *T. vaginalis* was occasionally associated with BV. The mechanisms underlying these relationships are not well understood, and deserve further investigations.<sup>[23]</sup> In women with BV in Delhi, infections with *Trichomonas* was 2.8% and *Candida* was 16.9%. All women with vaginal trichomoniasis were found to have bacterial vaginosis.<sup>[20]</sup> The present study showed co-infections with *Trichomonas* (3%) and *Candida* (11%) as per Table No 5.

## CONCLUSION

100 patients with white discharge per vagina attending the out patients department at the Obstetrics and Gynecology, SJMCH, Bangalore were included in the present study. Bacterial vaginosis was diagnosed in 34% of pregnant and non-pregnant women using the Nugent's criteria.

Proper diagnosis and appropriate antimicrobial therapy is especially important for pregnant women who have ever had a premature delivery or low birth weight baby. They should be considered for a BV examination, regardless of symptom, and should be treated if they have BV. All pregnant women who have symptom of BV should be promptly treated. In non pregnant women diagnosis may be important to prevent complications like PID and

endometritis. and more importantly prevention of other STD including HIV. Clinical method using Gram stain (Nugent's scoring) is a simple and inexpensive easily reproducible, method for diagnosis and can be used even in a peripheral center where laboratory facilities are few.

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