

Original Article

Diagnosis and Prevalence of Bacterial vaginosis in a rural and urban setup of Surat

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Abstract

Objectives: This study was undertaken to estimate the prevalence of Bacterial vaginosis (BV) in a rural and urban setup of Surat and to compare two methods of diagnosing the condition. **Methods:** A total of 100 married women, 50 from urban and 50 from rural setup, who were in sexually active age group of 15-44 years, were selected. BV was detected by both Gram stain and accepted Gold standard compound criteria (Amsel's composite criteria). High vaginal swabs were taken from posterior vaginal fornix pH of vaginal discharge was measured; wet mount preparation, Amine test (Whiff test) and Gram staining were performed. **Results:** BV was diagnosed in 20/100 patients by using composite criteria and in 28/100 patients by using Gram staining. Prevalence of BV in an urban setup was 30% and in a rural setup was 26%. Using Amsel's criteria as standard, sensitivity, specificity, positive predictive value was 95%, 88%, 67.85% and 98.68% respectively. **Conclusion:** Gram stain provides a simple and inexpensive method for confirmation of BV and can be used as an alternative to Amsel's criteria.

Key words : bacterial vaginosis, gram stain, Amsel's composite criteria

Introduction

Bacterial vaginosis (BV) is a common cause of vaginitis in women who are sexually active during childbearing age and has been associated with severe sequelae^{1,2}. It is a disorder of the vaginal ecosystem characterized by a shift in the vaginal flora from the normally predominant *Lactobacillus* to one dominated by a mixed flora including *Gardnerella vaginalis* and *Mobiluncus*,

Prevotella, *Bacteroides* and *Mycoplasma* species³. BV has been associated with many adverse pregnancy outcomes, such as preterm birth, premature rupture of membranes, infection of the chorion and amnion, histologic chorio-amnionitis and infection of amniotic fluid⁴.

Because BV is a polymicrobial syndrome and is not known to be caused by a single infectious agent, the current diagnostic approach defines a constellation of clinical findings. The so called Amsel criteria defines bacterial vaginosis as being present if three of the following criterion are found (1) homogenous vaginal discharge (2) vaginal pH greater than 4.5 (3) positive 'Whiff' test and (4) the presence of clue cells on wet microscopy of vaginal fluid⁵. The inherent difficulty with a diagnostic scheme such as Amsel criteria is that

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with exception of pH, the remainder of the criteria are either subjective or potentially technically difficult ⁵. Also clinical diagnosis using these criteria may lead to under diagnosis of BV⁶ and as *G. vaginalis* is often found in vaginal flora of women without BV, the significance of a positive vaginal culture for this organism is uncertain⁷.

Another proposed diagnostic criterion for BV is Nugent's score. It uses gram stain to detect the shift of normal vaginal flora to other microorganisms.

The purpose of this study was to determine prevalence of BV in urban and rural setup and to compare clinical and Gram stain in diagnosis of BV considering Amsel criteria as Gold standard.

Materials and Methods

This study was conducted from May 2003 to June 2003 in two different areas, one urban and one rural in Surat district of Gujarat State. A total of 100 married women, 50 from each set up, in the age group of 15-44 years were selected. All widows, pregnant women and unmarried women were excluded from the study. Pre designed and pretested proforma was given to the study population. After taking verbal consent, women were further examined on specific days at the place of study.

After taking history, thorough gynecological examination was done. Routine pelvic examination was done with a clean, unlubricated speculum to inspect vaginal tissues. Characteristics of vaginal discharge was evaluated and obtained for diagnostic testing. Vaginal pH was measured. The Whiff test was performed by adding a drop of 10% potassium hydroxide to the

vaginal fluid and sniffing the mixture. The test was interpreted as positive if a fishy aroma was noted. A swab containing vaginal fluid was obtained and immediately placed into 0.5ml of saline, which was examined under microscope at 400x for presence of clue cells. An additional vaginal swab was used to prepare a smear.

The composite clinical diagnosis according to Amsel's criteria was defined as presence of at least three of the following: homogenous vaginal discharge, pH>4.5 positive amine test and presence of clue cells. The smears on the glass slide are air dried and Gram staining was done. Gram stain diagnosis was based on a criteria score described by Nugent et al as shown in Table 1. The Nugent criteria score vaginal flora as normal (0-3), intermediate (4-6) and Bacterial vaginosis (7-10) ⁴.

Prevalence of BV was estimated in both areas, urban and rural. Using Amsel's criteria as a gold standard, sensitivity, specificity, positive predictive value and negative predictive value was estimated.

Results

We enrolled 100 married women, 50 from urban sites and 50 from rural sites, in the age group of 15-44 years. Prevalence of BV in rural area was 26% and urban area was 30% by laboratory diagnosis that is by Gram staining. The presenting symptoms of the women are listed in Table 2. Table 3 shows the comparison between Nugent's score and Amsel's criteria for the diagnosis of BV. Considering Amsel's criteria as Gold standard, Nugent's score showed a sensitivity of 95%, specificity of 88%, positive predictive value (PPV) of 67.85% and negative predictive value (NPV) of 98.68%.

Table 1. Nugent's Scoring System³ .

Score	Organism Morphotype Per High Power Field		
	Lactobacillus (Parallel-sided, Gram positive rods)	Gardnerella/Bacteroides (tiny, Gram variable coccobacilli and rounded, pleomorphic, Gram negative rods with vacuoles)	Mobiluncus (curved, Gram negative rods)
0	>30	0	0
1	5 - 30	<1	1 - 5
2	1 - 4	1 - 4	>5
3	<1	5 - 30	
4	0	>30	

Table 2. Frequency distribution of diagnostic criteria in Bacterial vaginosis.

Diagnostic Criteria	Women with Bacterial Vaginosis	Women without Bacterial Vaginosis
pH more than 4.5	20	16
Clue cells	20	0
Amine test positive	11	4
Vaginal discharge	15	24
Gram stain	28	0

Table 3. Comparison of Vaginal Fluid Gram Stain versus Amsel's Criteria.

		Amsel's Criteria		Total
		+	-	
Gram stain	+	19 (a)	9 (b)	28
	-	1 (c)	71 (d)	72
Total		20	80	100

Discussion

Bacterial vaginosis is an important risk factor for preterm birth, as well as upper vaginal tract infection in the nonpuerperal patient ⁵.

As discussed above the prevalence of BV in rural set up is higher than that of urban setup. The reason behind it is that the women in rural area may be more secluded and live in a more conservative sexual milieu; by contrast social values in urban areas commonly allow women more sexual freedom ⁸.

Among the individual criteria used to diagnose bacterial vaginosis (Table 2), a raised pH is recognized as the most sensitive but least specific. Amine test is both highly sensitive and specific. False positive amine test occurs rarely. However BV may be misdiagnosed because of suboptimal sensitivity and relatively subjective nature of current individual diagnostic variables ⁵.

The development of a standardized method using vaginal Gram stain for the diagnosis of BV was an attempt to provide an objective, reproducible laboratory

based test. The Gram stain provides a direct look at the bacteriologic morphotypes and is thus unaffected by factors such as menses or recent intercourse, which may alter pH and by technical variables such as observer interpretation of clue cells. The vaginal Gram stain has been shown to have excellent intra and inter-observer reproducibility ⁵.

In present study sensitivity and specificity of Gram stain for diagnosing BV considering Amsel's criteria as Gold standard was 95% and 88% respectively which were well co-related with study done by Schwebke et al⁵ (sensitivity 90.7% and specificity 83.9%).

The Gram stain's lower specificity of 88% suggest that some positive Gram stain results are false positive, e.g. is although bacterial morphotypes present on the slide are identical to those seen in BV patients, the patient dose not fulfill the Amsel's criteria. Because there is a spectrum of symptomatology in patients with BV, change on Gram stain may occur without development of syndrome. However an alternative explanation is that these results represent true positives for the syndrome of BV that were missed by the traditional constellation of clinical findings. Also the subjective nature inherent in the evaluation of clinical criteria may result in significant under diagnosis of BV ⁵.

Thus, we conclude that vaginal Gram stain based diagnosis is reliable and an easy method of diagnosing BV and can be useful where facility for using Amsel's criteria are not available.

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