

## Bacterial Vaginosis – Comparative study of PAP smear test and Gram stain for diagnosis. A meta-analysis

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### Abstract:

The pap smear is a screening test to diagnose cervical cancer & also been used as a diagnostic test in cervical infection caused by different pathogenic organisms. The aim of the presented study is to compare the efficacy of Gram stain & Pap smear with that of Amsel's criteria in the diagnosis of BV – which is continually gaining importance in relation to morbidity problems – in cervicovaginal specimens obtained in routine controls. In this study we analysed comparison of pap smear with gram staining in cases of bacterial vaginosis. We conducted a thorough literature search in the PubMed & Google Scholar database. All the patients with vaginal discharge between the age of 18-52 years were included. Six previously published studies were compared & evaluated.

**Study Design:** Review Article and meta-analysis

**Keywords:** Bacterial Vaginosis, PAP smear & Gram stain.

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### I. Introduction:

Bacterial vaginosis was first depicted by Gardner & Dukes [1]. They viewed Gardnerella vaginalis as the etiologic specialist of bacterial vaginosis, however this idea has been changed. Bacterial vaginosis is described by a change in the vaginal vegetation from the predominant verdure of Lactobacillus spp. to a blended vaginal greenery that incorporates G. vaginalis, Bacterioides spp., Mobiluncus spp. also, Mycoplasma hominis. [2,3] The issue of vaginal release is likely the most as often as possible described protest of ladies of regenerative age group. [4,5] Some vaginal releases are typical & can change with age, utilization of contraceptives, period & with the estrogen level. [6,7] The vaginal vegetation is a unique environment that can be effectively altered. Although there are four reasons for vaginal releases which cover practically 95% of cases. These are bacterial vaginosis, candidal vulvovaginitis, Trichomoniasis & ordinary physiological discharge. [8] A typical conviction is that BV is the most well-known kind of vaginal contamination among ladies of conceptive age & records for somewhere around 33% of all vulvovaginal diseases. BV isn't brought about by a solitary microbe yet rather it is a polymicrobial clinical condition. Normal specialists of BV incorporate Gardnerella vaginalis, Mobiluncus, Bacterioides saprophytes & Mycobacterium Hominis. [9] Candidiasis is for the most part because of candida albicans [10] & might be related with diabetes, pregnancy & drag out utilization of anti-microbials. Patient presents with vaginal release & pruritis. Release seems, by all accounts, to resemble coagulated milk & profound erythema of vulva & vagina is frequently seen. Trichomoniasis is a physically communicated illness (STD) that outcomes from contamination with flogged protozoa named as Trichomonas vaginalis. The commonness of Trichomoniasis in American ladies is 3–5 million WHO gauges the overall predominance of Trichomoniasis to be 170 million. The release is meager overflowing & pools in the vaginal vault. On assessment vaginal & vulvar erythema is noted. The strawberry cervix in trichomoniasis coming about because of intersperse. The vaginal Gram-stained smears has been assessed widely as an indicative test for bacterial vaginosis. [11] There is an organic equilibrium in the microorganisms living in vaginal mucosa. The main job in the progression of this equilibrium – & in forestalling the development of pathogenic microorganisms – is that of Lactobacillus species. Lactobacilli produce an acidic medium in the vagina through hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), which changes glycogen present in vaginal epithelium to lactic acid [12].

The point of the current review is to look at the viability of Gram stain & Pap smear with that of Amsel's standards in the analysis of BV – which is constantly acquiring significance corresponding to dreariness issue – in cervicovaginal examples got in routine controls.

We present a review of the available Indian literature on the status of Bacterial Vaginosis – Comparison of PAP smear & gram staining for diagnosis.

## II. Methodology:

We conducted a thorough literature search in the Pub Med & Google Scholar databases using the following keywords: "Bacterial vaginosis," "gram staining" "pap smear test," "meta analysis"

Included were reports in which a recognizable scoring system was used to categories vaginal discharge cases. Case reports were not considered. Cross-references in the chosen articles were also checked for additional studies. Publications with available pap smear & gram staining correlation were considered for meta-analysis. After all the gram stain smears had been evaluated & the Gram stain diagnoses were made, the results were compared with those of the pap smear. Pap smears from the transitional zones were evaluated under the Bethesda system guidelines. If there was a filmy background of small coccobacilli, individual squamous cells with a layer of coccobacilli along the margins of the cell membranes, & conspicuous absence of lactobacilli, the smear was evaluated as positive for bacterial vaginosis.

### Inclusion Criteria:

All the patients with vaginal discharge between the age of 18-52 years were included.

### Exclusion Criteria:

Pregnancy & vaginal bleeding

## III. Results

### Gram staining & Nugent's scoring system[9]:

Gram-stained slides are examined under oil immersion (x100).

Nugent Scoring System, the smears are observed & quantified for the presence of the morphotypes: The number of organisms seen are quantified according to the following scale:

0	No morphotype
1+	1 organism per field
2+	1-4 organisms per field
3+	5-30 organisms per field
4+	30 organisms per field

Numerical score (N score) is calculated by following Table.

**Table 01 -Nugent's Scoring System**

Lactobacilli	Score	Gardnerella, Bacteroides	Score	Curved gram negative bacilli	Score	Sum = n score
4+	0	0	0	0	0	0
3+	1	1	1	1+	1	3
2+	2	2	2	2+	1	5
1+	3	3	3	3+	2	8
0	4	4	4	4+	2	10

**Table02 -Interpretation of Nugent’s Score**

N score	Report
0-3	Gram stain indicates normal bacterial vaginal flora
4-6	Gram stain reveals altered vaginal flora that is not consistent with bacterial vaginosis
>7	Gram stain indicates the presence of bacterial vaginosis.

**Table 03: Diagnostic value of Gram stain & Pap test in the diagnosis of BV compared with other studies.**

	Imtiaz Ahmad	Girishma	Cigdem Tokyol	John D.Davis	Emmanuel E.Siddig	Enver Vardar
Total no of cases	220	52	245	210	300	1060
Gram stain +ve	112	18	72	80	90	286
Gram stain -ve	108	34	173	130	210	774

Total no of cases	220	18	72	80	90	1060
Pap stain +ve	108	8	31	45	75	282
Pap stain -ve	112	10	41	35	15	778

After comparison we found that gram stain is preferred over pap smear for the diagnosis of bacterial vaginosis.

#### IV. Discussion

Bacterial Vaginosis analyzed on routine pap spreads were read for Amsel's clinical rules & Nugent's scoring in gram staining. BV is the most continuous reason for vaginitis, & is described by expansion in development of anaerobic & vigorous microorganisms due to an uneven eco-framework in the vagina. Gardner & Dukes [11&12] were quick to report *Haemophilus vaginalis* as a reason for vague vaginitis in 1955. A few

examinations have recognized BV as the main vaginal contamination[13]. The determination of BV was made by the presence of hint cells i.e., mature squamous cells covered by cocobacilli, commonly reaching out past the cell edge & relative shortfall of lactobacilli on blended verdure. A big part of the patients with BV are asymptomatic; the Pap smear study might be just method for diagnosis.[15] For the diagnosing BV a large portion of the investigations demonstrated that the finding of enlighten cells the Pap smear assessment had 100% affectability & a 96% specificity[16]. The recurrence of hint cells are diminished because of the less factor pH in more established ladies & in more youthful ladies BV is more successive with related pH alterations[17]. Narasimha.A.et al[18] detailed that pap spreads have an affectability & particularity of 90% & 97% separately. Pap-stained vaginal smears can be utilized as an entirely sufficient option in contrast to Gram-stained smears for BV finding. It has been proposed that the presence of piece of information cells on the Pap smear concurs sensibly well with clinical models. So Pap smear test which is a basic, fast, effortless strategy utilized to screen cervical malignant growth can likewise be utilized for diagnosing cervicovaginal infections[19]. The assessment of the outcomes acquired from Pap & Gram stains depended on inspiration by Amsel's measures. Amsel's rules is the most well-known strategy for recognizing BV. Patients were analyzed as having Bacterial Vaginosis on the off chance that they satisfied any three of the accompanying four measures:

- (1) Vaginal discharge thin watery.
- (2) pH of Vagina more than 4.5.
- (3) On Whiff test fishy odour.
- (4) On wet mount clue cell seen.

## V. Conclusion:

Pap smear is the simple & a quick test for diagnosing cervical infections like Bacterial vaginosis. Screening & treatment control the infections. By using Amsel's clinical criteria & Nugent's scoring, BV can be diagnosed effectively in Pap smears. Our study we found that correlation of gram stain and pap smear, gram stain are preferred for the diagnosis of bacterial vaginosis<sup>14</sup>.

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