

The Profile of Bacterial Vaginosis in Academic Hospital Surabaya: A Retrospective Study

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ABSTRACT

Background: Bacterial vaginosis (BV) is a lower genital tract infection, which occur as a result of vaginal microbiome dysbiosis. This vaginal infection can lead to symptoms such as vaginal discharge, malodor and irritation. It is the most common condition occurred in reproductive age but may give 50–75% of asymptomatic signs. **Purpose:** To overview new BV patients at the Sexually Transmitted Infection Division of Dermatology and Venereology Outpatient Clinic Dr. Soetomo General Hospital Surabaya in 2015–2017. **Methods:** A retrospective study was performed by evaluating medical records of new BV patients, including identity, history taking, examination, diagnosis, treatment, follow up and counselling. **Result:** The number of new BV cases was 35 (1,38%). The most infected age group was 25–44 years old (51%), and 65.7% of them were married. The most common chief complaint was vaginal discharge without subjective complaints (74.3%), the most common type of complaint was recurrence (48.6%), the most partner roles which affected by BV patients were husbands (51.4%), history of vaginal douching (34.2%), and the most vaginal discharges were severe (75.8%). The whiff test showed positive results and pH > 4.5 in 48.6% of patients. All microscopical preparations showed clue cells. The most prescribed drug was metronidazole. **Conclusion:** The overview new BV cases showed a small incidence with commonly occurred among women in childbearing age and were asymptomatic. A routine high vaginal swab helps the proper diagnosis and management to prevent the recurrence and complication of BV.

Keywords: Bacterial vaginosis, vaginal discharge, malodor, clue cell.

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BACKGROUND

Bacterial vaginosis (BV) is an abnormal vaginal condition that is characterized by vaginal discharge and odour, which are commonly occurred in reproductive age.^{1,2} This condition is a dysbiosis of the vaginal microbiome. It is characterized by decreased of *Lactobacillus* spp., producer of hydrogen peroxide (H₂O₂), and replaced by dominated commensal anaerobes such as *Prevotella* spp., *Mobiluncus* spp., *Atopobium vaginae*, *Gardnerella vaginalis* and *Mycoplasma hominis* inside the vagina that increases the vaginal pH.^{3–5}

The prevalence data of BV in several countries vary as a result of the diversity of BV diagnosis criteria. A global meta-analysis study based on regio such as Sub-Saharan Africa, Latin America and Carribean, Westerns Europe, Middle East/North Africa, North America, East, South and Southeast Asia and Australia/ New Zealand found that BV prevalence was between 11.1% to 60.8%. The highest and lowest prevalence was found in African Sub Saharan and Asia/Australia/Western Europe, respectively.⁵ Research suggested that the highest BV prevalence in the United States are presented in Afro-American

women compared to Hispanic and Caucasian.^{1,6} Whereas in several countries in Asia such as India and Indonesia are 24.6% and 32.5% respectively.⁷ Two research conducted at the Sexually Transmitted Infection (STI) Division of Dermatology and Venereology Outpatient Clinic, Dr. Soetomo General Hospital by Pujiastuti in 2007–2011 found 35 new BV patients, which was 0.71% of the total visited patients in STI Division and 0.1% of total new visited patients⁷, and by Karim in 2012–2014 found 33 new BV patients, which was 1.35% of total visited patients in STI Division and 0.1% of total new visited patients.⁸

Several researches proposes the relation of sexual behavior such as multiple sexual partners, female sex worker, homosexual and absence of condoms, with the incidence and reccurence of BV.^{9–11} Other risk factors related to BV pathogenesis are the use of intrauterine contraception, black ethnicity, long term use of antibiotic, smoking, vaginal douching, low socio-economic, diet pattern and stress.^{12–14} Although sexual intercourse possibly facilitates transmission, BV is not exclusively considered as a sexually transmitted disease. Moreover, the leading cause of

BV is common microbiome bacteria of the vagina; therefore, BV is called as one of the endogenous infections of the female reproductive tract.^{5,15}

About 50–70% of BV patients did not show any complaints or asymptomatic. However, should there be any complaints, the specific clinical manifestation are white or greyish thin vaginal discharge, homogenous consistency, and fishy odour, especially during sexual intercourse.^{5,16} The diagnosis of BV can be supported by several clinical criteria and simple laboratory examination. The 2015 National Guideline of STI Management by the Ministry of Health of the Republic of Indonesia and the Guideline of dr. Soetomo General Hospital in 2014 suggest Amsel’s criteria (3 out of 4 criteria) for BV diagnosis. It includes white or greyish homogenous vaginal discharge, fishy odour on vaginal discharge when dropped with potassium hydroxide (positive whiff test), vaginal secretion pH of >4.5 (range from 4.7 to 5.7), and clue cells >20% of epithelial cells in microscopy examination.^{17,18}

Women with symptomatic BV are subject for therapy, including pregnant women. The aim of BV therapy is to reduce the infection and symptom as well as to prevent complication and possibility of another infection during pregnancy.⁴ The treatment is also aimed to reduce the risk of sexually transmitted infection caused by *C. trachomatis*, *N. gonorrhoea*, *T. vaginalis*, human immunodeficiency virus (HIV), and type 2 herpes simplex.¹⁹ The treatment conformed with the 2015 Guideline of the Ministry of Health of the Republic of Indonesia and the 2014 Guideline of dr. Soetomo General Hospital, which use metronidazole

and clindamycin systemic or topical.¹⁷

On persistent or recurrent BV, subsequent control is needed for continuous evaluation. In addition to the risk prevention from continuous complication, subsequent control is needed to evaluate the possibility of drug resistance as a prediction for subsequent treatment failure.¹⁹

This retrospective research is intended to overview new BV profile at the STI Division of Dermatology and Venereology Outpatient Clinic, dr. Soetomo General Hospital Surabaya from 2015 to 2017.

METHODS

This is a descriptive retrospective study. The data of BV patients were collected from the medical records of the STI Division of Dermatology and Venereology Outpatient Clinic, dr. Soetomo General Hospital Surabaya from January 2015 to December 2017. The data collected include basic identity data, history taking, physical examination, diagnosis, laboratory examination, treatment, follow-up, and counselling. Ethical clearance was obtained before this research was conducted from the Ethical Committee of Dr. Soetomo General Hospital Surabaya in October 2018.

RESULT

Out of 2,522 patients at the STI division, 35 was found to be BV positive that contributes to 1.38% of prevalence (Table 1). The new patients were mostly in 25–44 years age group, which are 18 patients (51.4%). The data showed that the youngest patient was 19 years old, and the oldest was 55 years old.

Table 1. The distribution of new BV patients in STI Division of Dermatology and Venereology Outpatient Clinic, Dr. Soetomo General Hospital, Surabaya in 2015–2017

New Patient	Year			Total (%)
	2015 (%)	2016 (%)	2017 (%)	
Bacterial Vaginosis	6	9	20	35
STI Division	785 (0.76)	821 (1.09)	916 (2.18)	2,522 (1.38)
Dermatovenereology Outpatient Clinic	17,871 (0.03)	15,719 (0.05)	14,965 (0.13)	48,555(0.07)

STI = Sexually Transmitted Infection

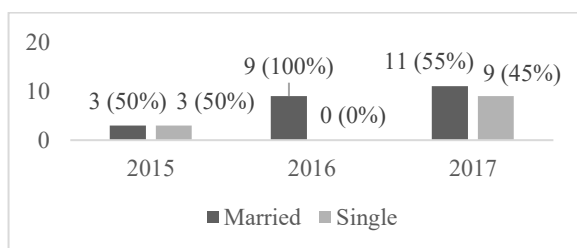


Figure 1. The distribution of marital status of new BV patients in STI Division of Dermatology and Venereology Outpatient Clinic, dr. Soetomo General Hospital, Surabaya in 2015–2017

The main patient complaint is asymptomatic vaginal discharge was observed in 26 patients (74.3%), whereas vaginal discharge with malodor was observed in 11 patients (31.4%) as presented in Table 2. The predominant type of complaint was recurrence as observed in 17 patients (48.6%), first time occurrence as observed in 13 patients (37.1%), and there were 5 patients (14.3%) with no recorded complaints. Vaginal douching was found in 12 patients (34.2%), 7 patients (20.0%) denied the use of vaginal douching, and 16 patients (45.7%) had no record of vaginal douching.

Table 2. The distribution of the main complaint and its companion of new BV patients in STI Division of Dermatology and Venereology Outpatient Clinic, Dr. Soetomo General Hospital, Surabaya in 2015–2017

History taking	Year			Total (%) (n=35)
	2015 (%) (n=6)	2016 (%) (n=9)	2017 (%) (n=20)	
Main Complaints				
Vaginal discharge	2 (5.7)	2 (33.3)	5 (25)	9 (25.7)
No Complaint	4 (66.7)	7 (77.8)	15 (75)	26 (74.3)
Additional Complaints				
Itch	4 (66.7)	5 (55.6)	11 (55)	20 (57.1)
Irritation	0	1 (11.1)	1 (5)	2 (5.7)
Burning sensation	0	1 (11.1)	1 (5)	2 (5.7)
Pain	2 (33.3)	1 (11.1)	3 (15)	6 (17.1)
Odour	4 (66.7)	3 (22.2)	4 (15)	11 (31.4)

Note: one patient may have multiple complaints.

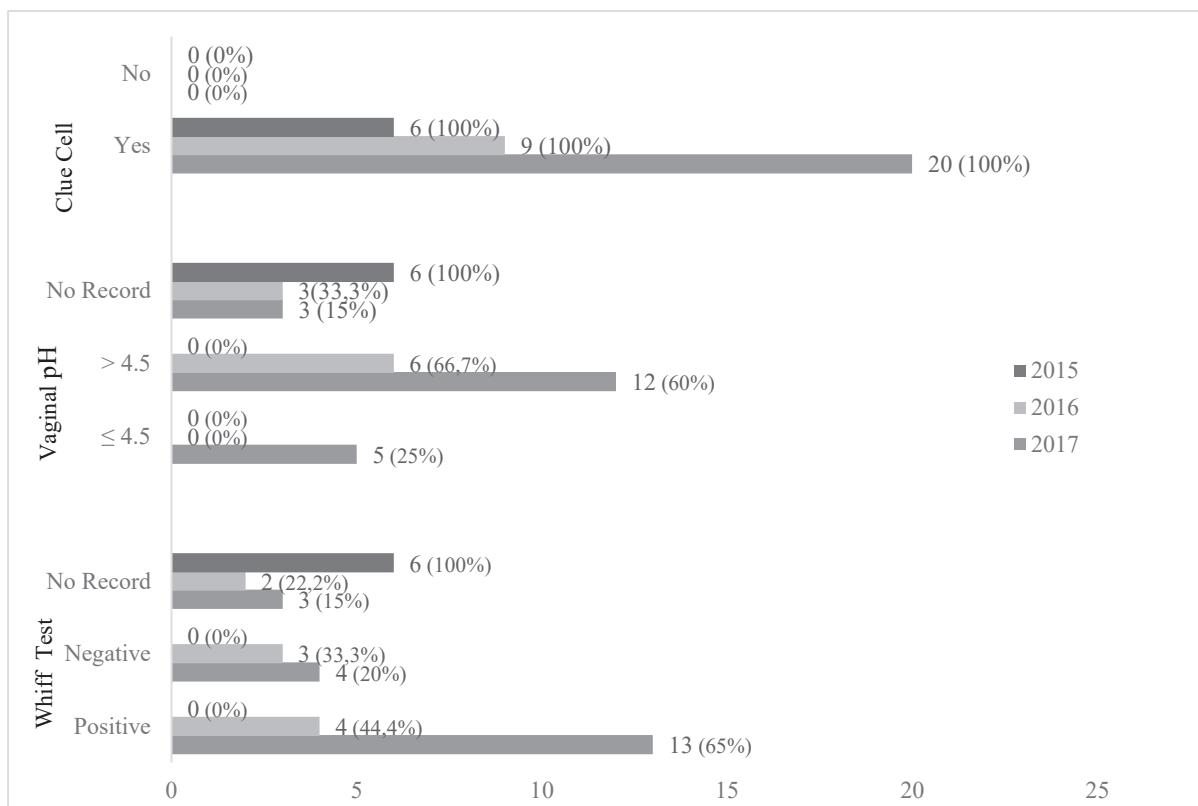


Figure 2. The distribution of Whiff test, vaginal pH and clue cell on new BV patients in STI Division of Dermatology and Venereology Outpatient Clinic, Dr. Soetomo General Hospital, Surabaya in 2015–2017

The laboratory examinations were vaginal wet mount and Gram staining to support the diagnosis of BV patient, which resulted in 100% of clue cell existence. The predominant case diagnosis was BV (48.6%), as shown in Figure 2. The predominant treatment was metronidazole 2 x 500 mg alone, which

was prescribed to 19 patients (54.3%). Seven patients (20%) had one subsequent control, sixteen patients (45.7%) twice subsequent controls, and twelve patients (34.3%) did not attend any subsequent controls. Most new BV patients received counselling, which were 31 patients (88.6%).

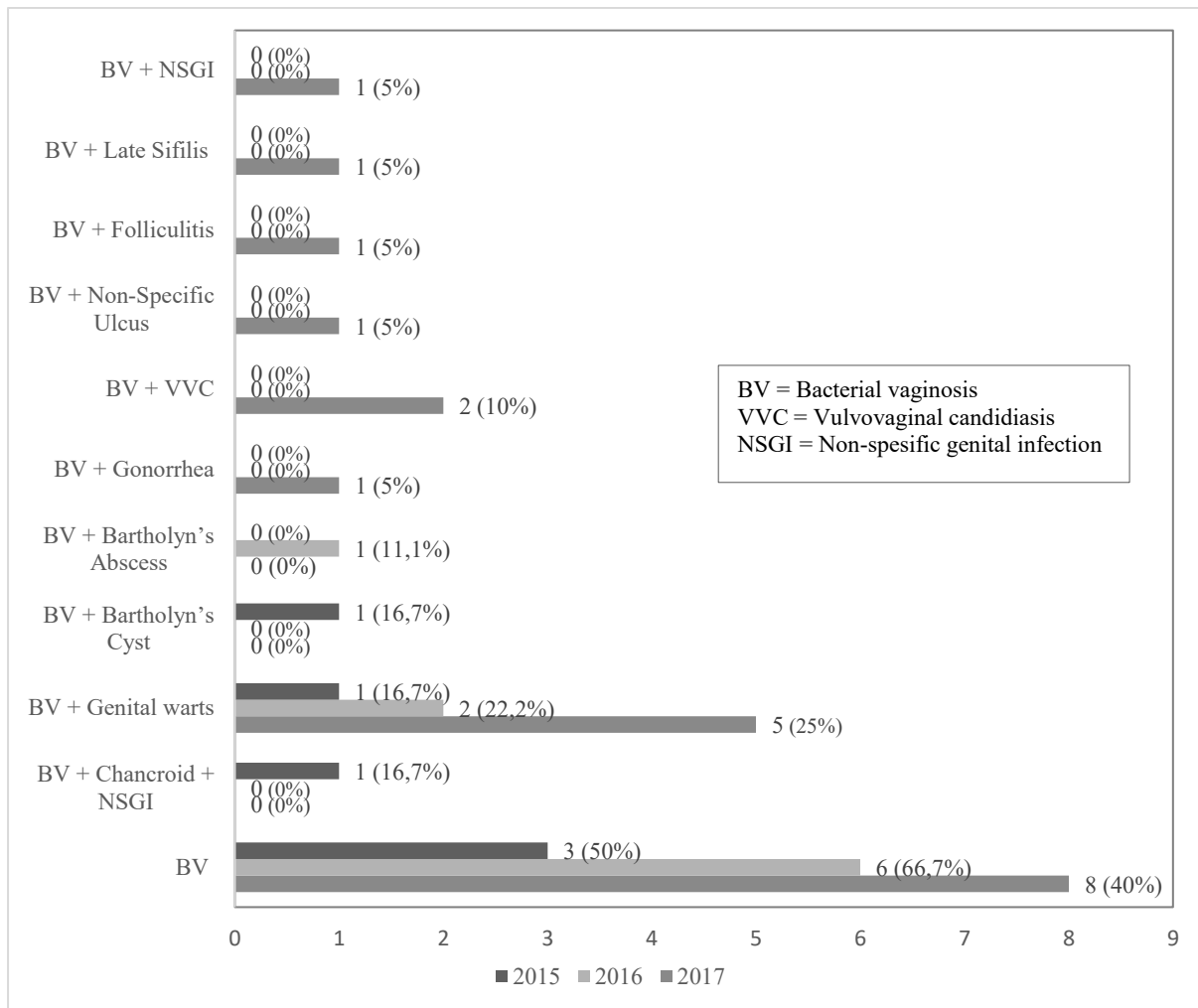


Figure 4. The distribution of new BV patient's diagnosis in STI Division of Dermatology and Venereology Outpatient Clinic, Dr. Soetomo General Hospital, Surabaya in 2015–2017

DISCUSSION

The current study reported as much as 1.38% of new BV patient from total new visits in STI division, Dermatology and Venereology Outpatient Clinic, Dr. Soetomo General Hospital Surabaya. Compared to prior retrospective research by Karim, there was an increase in total new BV patients from 33 cases (1.35%) to 35 cases (1.38%).⁸ It was possibly caused by accuracy of diagnosis and improved duration of BV treatment in the Dermatology ad Venereology Outpatient Clinic, which improve the level of trust and self-awareness of patients to consult their complaints. Other researches from different countries by Ranjit et al., Abdulateff et al., and Seth et al. shows different results of BV prevalence 20.4%, 40% and 44.8% respectively.^{9,11} It is perhaps caused by sample collecting (racial factor), sample quantity and diagnosis determining method (Nugent's criteria and Amsel's criteria), which are different in each researches.

The bacterial vaginosis was found in the age of group of 25–44 years which represents high prevalence

(51.4%). This was in line with a study of Karim conducted from 2012 to 2014, which stated that the majority of BV patients were in 24–44 years age group (57.4%).⁸ It was also supported by the study of Siahaan et al. in 2016, which suggested similar BV case proportion in terms of the age group (52%).¹⁸ Other research by Abdulateef et al. in 2017, proposes that female at the reproductive age of 25-34 years have twice the risk of BV with odd ratio (OR) 2.22; 95% CI 0.37 to 3.093).⁹ BV is an asymptomatic vaginal discharge abnormality that occurs mainly during reproductive age. It is possibly correlates with high sexual activities in females during reproductive age which leads to a higher *G. vaginalis* composition compared to those who are not sexually active.⁴ These findings are in contrary with the research of Ocviyanti et al., Yusuf et al., and Bitew et al., which found a higher BV prevalence in females in >45 years age group.^{6,10,19} Study by Ocviyanti et al. shows that female at the age group of >40 years have a risk three times higher to developing BV (OR 3.15; 95% CI 1.15 to 1.48) and statistically significant (p<0.05).⁶ The

decreased level of estrogen (hypoestrogenic) in female >45 years old reduces the level of glycogen in the vaginal epithelium. *Lactobacillus* spp. requires glycogen as a source of nutrition to produce lactic acid, retaining the level of pH acidity in the vagina and balancing the growth of anaerobic bacteria that prevents the recurrence of BV. This can explain why BV recurrence was observed in females in >45 years age group.¹⁹

According to this study, married women are more susceptible to developing BV (65.7%) compared to single women (34.3%). This was in line with the research by Karim et al. dan Seth et al., suggesting that most BV patients were married (84.8%) and (87.4%).^{8,20} Different researches by Ranjit et al. and Bitew et al. shows contradictive results that BV prevalence was high among single women (90.6%) and (53.8%), respectively.^{10,11} Relationship between BV and sexual activity is debatable. Sexually active females are more susceptible to BV as alkaline vaginal pH increase, promoting anaerobic bacteria such as *G. vaginalis* to dominate the vaginal microbiome composition after sexual intercourse.²¹

Twenty-six (74.3%) new BV patients were asymptomatic and the most common accompanying complaint was itchy as found in 20 patients (57.1%). Research by Abdullateef et al. in 2017 in Nigeria showed that 40.1% of BV females were asymptomatic.⁹ Around 50–75% females with BV positive do not present with any symptom.¹⁷ Symptomatic females manifestation are varies from the increase in white or greyish vaginal discharge and malodor, especially after sexual activity and during menstruation. Other accompanying symptoms are pruritus, lower abdominal pain, and pain during intercourse.^{2,22,23}

Beside asymptomatic, BV patient are occasionally presenting with only malodor without inflammation, it is mainly experienced after sexual intercourse or during menstruation. This study also found BV patients with malodor discharge (31.4%).²² Research by Ranjit et al. suggested that 56% out of 160 women with BV presented with accompanying complaints, which is malodor in vaginal discharge.¹¹ The most common complaint of symptomatic BV patients was malodor of vaginal discharge, accompanied by fishy odour and itchy.^{1,15} Malodors are caused by the presence of abnormal amine, especially trimethylamine. Alkaline seminal fluid (pH 7.2) leads to the release of amine from its attachment to proteins and amine, which evaporates and produces a specific odour. Irritation on the vaginal area or around vaginal could lead to sensation of pain.^{2,4}

There were 17 patients (48.6%) that had recurrent complaints, and the longest duration of the complaint was 14 days, as observed in 19 patients (54.3%). About 50% of females with BV had recurrent complaint within one year of treatment. Possible factors that underly BV recurrence include persistence of residual infection, resistance, and possibly of reinfection from either male or female partners. Persistence host factor such as vaginal douching or IUD usage, patient's obedience during therapy, biofilm formation that protects bacteria causing BV during antimicrobe therapy, failure of *Lactobacillus* vaginal recolonization, or bacterial infection reduces the number of *Lactobacillus* may contribute to BV recurrence as well.^{4,24}

The coitus suspectus period was mostly between 1–7 days, as observed in 16 patients (45.7%). From 35 new BV patients, there was 1 patient (2.9%) with unrelated coitus suspectus. The most common sexual partners were patient's husbands, as observed in 18 patients (51.4%). Relationship between sexual intercourse and BV infection can not be proven yet, as there are BV patients who have never had sexual intercourse.⁴ Research by Ranjit et al. reported that single women have a higher risk of positive test results (100%) compared to married women (24.2%). Changes in lifestyle after marriage, improper perianal hygiene, vaginal douching, and tight clothing may contribute to BV cases in single patients.¹¹

Treatment history revealed that there were 14 patients (40%) with previous treatment. Oral antibiotic was the most prescribed drug, as observed in 6 patients (17.1%). Antifungal and anti-inflammation non-steroid were prescribed in 2 patients (5.7%), antiviral and antihistamine were prescribed in 1 patient (2.9%), and 4 patients (11.4%) were not confident with the prescribed medications. Antibiotic medication is widely accessible for the public, which can be purchased without a prescription, and inexpensive.

Prior studies also proposes the role of vaginal douching in increasing the risk of BV and recurrent BV in non-pregnant females.^{10,11,25,26} Our Findings stated that BV patient have a history of vaginal douching (34.3%). Research by Ranjit et al. showed that 32.1% of BV patients ($p=0.015$) had a frequent vaginal douching habit compared with those who performed it occasionally.¹¹ Different research by Om et al. and Bitew et al. also suggest that vagina douching is increasing BV risk (OR=1.33: 95% CI 0.8 to 2.0) and (OR=1.73: 95% CI 0.99 to 3.04), respectively.^{10,26} Vaginal douching can affect the ecosystem of vaginal microbiome, possibly promoting the growth of opportunistic pathogen bacteria. Discontinuation of

vaginal douching is believed to reduce the risk of BV recurrence.^{11,14}

Vaginal discharge is mostly characterized by serous (75.8%), which was in line with the previous research by Karim (75.8%) and Pujiastuti (71.4%).^{7,8} Clinical symptoms alone were inadequate criteria for BV diagnosis, thus the diagnosis of BV in clinical settings is usually based on Amsel's criteria or Spiegel's or Nugent's criteria or combination of the three. Amsel's criteria are based on clinical criteria and several simple laboratory test whereas Spiegel's and Nugent's criteria are based on normal flora evaluation through Gram staining smear of the vaginal discharge.²⁷ On the clinical setting we performed BV diagnosis by means of Amsel's criteria. Recorded results from 24 patients (68.6%) after Whiff test revealed that 17 patients (48.6%) were positive, and 7 patients (20.0%) were negative. The other 11 new patients (31.4%) had no record of the Whiff test. There were 18 patients (54.4%) with pH \geq 4.5, and wet mount and Gram staining resulted in 100% of clue cell. Research on 120 patients diagnosed with BV that used Amsel's criteria shows that the highest sensitivity between all Amsel's criteria was found in the presence of clue cells on vaginal wet mount (97%). Whereas the other second and third highest sensitivity in the diagnosis of BV are homogenous discharge (86.7%) and pH > 4.5 (83.3%), respectively. Despite the highest specificity, the Whiff test has the lowest sensitivity. Vaginal pH had the lowest specificity (46.6%). Overall, the best single Amsel's criteria for BV diagnosis was the presence of 20% clue cells in the vaginal wet mount or Gram stain with the sensitivity of 97.6% and specificity of 77.3%.²³ In other research by Rao et al. that compared Amsel's criteria with Nugent's criteria resulting in sensitivity, specificity, positive predictive value and negative predictive value of Amsel's criteria were 78.72%, 92.35%, 75.51% and 93.54% (p<0.01). Amsel's criteria is a simple, easy, not expensive, fast and dependable method in numbers of clinical settings, thus it is as good as Nugent's criteria for BV diagnosis.²⁷

Diagnosis of bacterial vaginosis without additional disease was found in 17 patients (48.7%). BV diagnosis with genital warts present in 8 patients (22.9%) and vulvovaginal candidiasis in 2 patients (5.7%). Chancroid, Bartholin's cyst, Bartholin's abscess, gonorrhoea, nonspecific ulcer, folliculitis, latent syphilis and nonspecific genital infection (NSGI) present in each 1 patient (2.9%). Study by Francis et al. found evidence on the association between BV and several STI. The strongest positive association was observed for high-titre syphilis (aOR=2.93; 95% CI 1.62 to 5.39), followed by HIV infection (aOR=1.94;

95% CI 1.54 to 2.44), HSV-2 infections (aOR=1.69; 95% CI 1.27 to 2.24), low-titre syphilis (aOR=1.47; 95% CI 1.04 to 2.09) and *N. gonorrhoeae* infection (aOR=1.30; 95% CI 1.00 to 1.70). In contrast, patient with vaginal yeast infection had reduced risk of BV (aOR=0.45; 95% CI 0.34 to 0.59).²⁸ The mechanisms of vaginal microbiome dysbiosis on BV are not fully understood, and whether BV is the result of the acquisition of a single sexually transmitted pathogen, are still unknown. However, female with BV have a higher risk of other STI (such as HIV, gonorrhoea, chlamydia dan herpes simplex), complication after gynaecology surgery, pregnancy complications, and recurrence. BV also increases the risk of HIV transmission to male sex partners.^{2,4,17}

In this retrospective study, the most prescribed drug is metronidazole, as observed in 19 patients (54.3%). The other was metronidazole with a combination of several drugs as treatment for another disease. The antibiotics prescribed were cefixime 5.7%, doxycycline at 5.7%, clindamycin 2.9% and benzathine penicillin 2.9%. Treatment of BV with vulvovaginitis candidiasis (VVC) involved ketoconazole as therapy and a combination of the trichloroacetic acid solution for patients with genital warts. Recommended BV regimens in non-pregnant are 500 mg of metronidazole orally twice a day for 7 days, metronidazole gel 0.75% in one full applicator (5 grams) intravaginally once a day for 5 days, or clindamycin cream 2% in one full applicator (5 grams) intravaginally at bedtime for 7 days. Other alternative regimens are tinidazole 2 grams orally once a day for 3 days, tinidazole 1 gr orally for 5 days, clindamycin 300 mg orally twice a day for 7 days, or clindamycin ovule 100 mg intravaginally once at bedtime for 3 days.²⁻⁴ BV frequently recurs, but it can be easily cured with adequate therapy. Hiller stated that within a period of 9 months, the recurrence of BV could reach 80% of cases after metronidazole treatment for 7 days; however, on multiple recurrences, the success of the treatment is temporary.⁴ On multiple recurrences, The US Center for Disease Control and Prevention's (CDC) Sexually Transmitted Diseases Treatment Guidelines 2015 suggested alternative therapy. Although several works of literature suggested that BV are sexually transmitted, CDC does not recommend treating male sex partner of a female with BV.¹⁷

Most patient only attend the follow-up control once, which were 16 patients (45.7%). BV recovery criteria include the absence of two or more Amsel criteria and follow-up examination one week or one month after the therapy.⁴ The US Centres for Disease Control and Prevention's Sexually Transmitted Diseases Treatment Guidelines 2015 states that the

second visit is not needed if BV symptoms are fully cured.¹⁷ However, the research by Francis et al. found that among 853 treated BV cases, 72% tested positive again within 3 months.²⁸ Therefore, in consideration of the possible BV recurrence, the patient is encouraged to revisit should any BV symptoms recur.¹⁷

Thirty-one patients received counselling during their visit, which was more than half of the new BV patients. There was 68.7% increase in terms of counselling attendance compared to the retrospective research by Karim.⁸ It is important to educate BV patients about possible recurrent BV due to more sexual partners, absence of condoms, oral contraception use rather than IUD, vaginal douching, and proper antibiotic medication. BV often recurs, so that the patient is advised for revisit whenever the previous symptom is present.^{3,17}

The overview data of new BV cases at the Dr. Soetomo General Hospital Surabaya suggested a small incident (0.07%) that predominantly occurred in the sexually active age group of 15–24 years old and most BV patients were asymptomatic (74.3%). The complete medical record is important. During history taking, it is important to ask about malodor complaint on vaginal discharge as one of the specific symptoms of BV, and about the historical use of vaginal douching. Vaginal pH and Whiff test ought to be performed routinely because it is a part of Amsel criteria in establishing BV diagnosis. It is advised to use Amsel criteria as one of BV diagnosis criteria in the Dr. Soetomo General Hospital, record them in the patient medical report during BV diagnosis, and update the counselling status in an effort to prevent BV recurrence.

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