

Bacterial Vaginosis in Pregnant Women at Maternal and Child Hospital, West Java, Indonesia, 2018: High Prevalence in Asymptomatic Females

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Abstract

Bacterial vaginosis (BV) is a lower genital tract infection of reproductive women which can occur in pregnant and non-pregnant women. BV in pregnant women can increase the risk of complications, including increased incidence of abortion, premature rupture of membranes, preterm birth, and babies with low birth weight. BV can also increase the risk of acquired sexually transmitted infection (STI) and their further transmission, including human immunodeficiency virus (HIV). Each country has a different prevalence of BV. The previous report of BV prevalence in pregnant women was submitted in Jakarta, Indonesia in 1990. Until now, there is no update data of BV in pregnant women, especially in West Java, Indonesia. Thus, we conducted a descriptive observational study using a cross-sectional design and a consecutive sampling method in June 2018. This study included 60 pregnant women in the Maternal and Child Hospital, Bandung, Indonesia. Out of 60 participants, seven (11.67%) participants had BV according to Amsel criteria. Asymptomatic BV was diagnosed in all participants. This study shows the prevalence of BV in pregnant women in the Maternal and Child Hospital in Bandung during June 2018. The assessment of screening BV should be recommended as a routine workup. To avoid complications in pregnant women and infants it should not be waited for the symptoms to reveal.

Key words: Vaginosis, Bacterial; Reproductive Tract Infections; Pregnancy Complications, Infectious; Prevalence; Asymptomatic Infections; Indonesia

Introduction

Bacterial vaginosis (BV) is a polymicrobial clinical syndrome, occurring in the lower genital tract of women of reproductive age in both non-pregnant and pregnant women (1). BV occurs due to an imbalance of normal vaginal flora in the vagina, *Lactobacillus* spp. which is the main vaginal normal flora, replaced mostly by anaerobic bacteria (2), such as *Gardnerella vaginalis* (*G. vaginalis*), *Mobiluncus* sp., and *Mycoplasma hominis* (*M. hominis*) (2, 3). The prevalence of BV in each country varied in meta-analysis studies performed from 1984 to 2010 in England, Spain, Serbia, Canada, Unit-

ed States of America, Peru, Iran, and China. In this meta-analysis study the prevalence of BV in pregnant women ranged from 4% to 48.7%, and in non-pregnant women from 11.1% to 60.8%. The prevalence of BV in pregnant women in several Asian countries was 7.5% (the Philippines), 12.5% (Thailand) and 22% (Laos) (4). A study including 490 pregnant women from three hospitals in Jakarta was conducted to assess the prevalence of BV in pregnant women and BV was reported in 17% of pregnant patients (5). Until now, data on BV prevalence in pregnant women have not been updated, especially in West Java, Indonesia.

Material and Methods

Study Subjects

This study included 60 pregnant women aged 17-40 years using consecutive sampling method. The exclusion criterion was the patient with pervaginal bleeding at the moment of coming to the hospital.

Study Design

It was a cross-sectional study carried out at the Obstetrics and Gynecology Clinic at Maternal and Child Hospital, Bandung, West Java, Indonesia in June 2018. All the patients were subjected to careful history taking, physical examination, and laboratory examination. Sociodemographic data, sexual behavior characteristics, obstetric and gynecological characteristics, and Amsel criteria characteristics were assessed.

Ethical Considerations

Information of the participants was kept confidential. The study was approved by the Ethical Committee of Dr. Hasan Sadikin Hospital, affiliated with Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia.

Results

Out of 60 pregnant women from this study sample, seven (11.67%) were diagnosed with BV and they fulfilled Amsel criteria. Based on the sociodemographic characteristics and behavior, five out of 28 study participants who were diagnosed with BV were >30 years old. Then, one in four study participants with junior high school education was diagnosed with BV. Meanwhile, out of 53 study participants who were housewives, seven were diagnosed with BV. Then, one study participant who had a frequency of sexual intercourse more than once per week was diagnosed with BV. BV diagnosis was based on all sociodemographic characteristics and behavior of the study participants. Based on the characteristics of the obstetric and gynecological history, two out of nine study participants in the first trimester of pregnancy were diagnosed with BV in this study. Two out of 37 participants in the second trimester of pregnancy were diag-

nosed with BV. Three out of the 47 study participants in the third trimester of pregnancy were diagnosed with BV. There was no history of abortion, premature rupture of membranes, and a history of low birth weight babies (LBWB) in the study participants with BV.

The results of BV examination in patients participating in the study were based on Amsel criteria. All study participants were asymptomatic. Venereological examination revealed homogeneous vaginal discharge in 17 study participants, seven of whom were diagnosed with BV. Examination of vaginal pH > 4.5 was found in 10 study participants, seven of whom had BV. The result of positive Whiff test and clue cells were found in all examined study participants diagnosed with BV.

Discussion

Bacterial vaginosis is one of the main causes of vaginitis in women of reproductive age, and more than 50% of pregnant women with BV are asymptomatic (2, 3). Matic et al. (6) conducted a study in 2014, which included 111 pregnant women who had ante natal care (ANC) in the Military Medical Academy, Serbia, and found that all of pregnant women with BV were asymptomatic. In a meta-analysis study conducted by Leitich et al. (7) out of 10,286 pregnant women, all with BV were asymptomatic. In this study, seven out of 60 pregnant women were diagnosed with BV.

Prevalence of BV in this study was 11.67% out of 60 pregnant women. The prevalence of BV in pregnant women varies in many studies. A study conducted by Ridwan et al. (5), including 490 pregnant women who had ANC at three hospitals in Jakarta found the prevalence of BV to be 17%. While, in the study conducted by Thammalangsy et al. (8) in 500 pregnant women who came to the ANC the BV prevalence was 14.4%. In the study conducted by Lata et al. (9), the prevalence of BV was 20.5% 200 pregnant women who had ANC. Furthermore, in the study conducted by Shresta et al. (10) it was revealed that 78 pregnant women had BV (52.6%). Machado et al. (11) found that the prevalence of BV was 3.88% in 206 pregnant women who had ANC. In a study conducted by Matic et al. (6) in 2014, the prevalence of BV was 26.1% in 111 pregnant women who had ANC.

Table 1. Characteristics of sociodemography and sexual behaviour in participants with positive BV

Characteristics	Positive BV		
	n = 60	Total	Proportion
Age			
<30 years old	32	2	2/32
> 30 years old	28	5	5/28
Education			
Elementary school	6	0	0/6
Junior High school	4	1	1/4
Senior High school	30	5	5/30
College	20	1	1/20
Occupation			
Government officer			
Teacher in junior high school	1	0	0/1
Nurse	1	0	0/1
Private employee			
Textile factory	3	0	0/3
Wedding organizer	1	0	0/1
House wife	54	7	7/54
Sexual behaviour			
Coitarche			
16-20 years old	2	1	1/2
>20 years old	58	6	6/58
Frequency of sexual intercourse			
≥ 1/month	13	0	0/13
1/week	46	6	6/46
> 1/week	1	1	1/1

Various BV cases were influenced by several factors including genetics (12), smoking (13), vaginal douching (13, 14), coitarche (14), and higher frequency of sexual intercourse (15). In this study, all participants had vaginal pH >4.5, seven participants were diagnosed with BV. pH was <4.5 in 50 participants out of 53 study participants who were not diagnosed with BV. Thomason et al. (16) found that the sensitivity and specificity of vaginal pH of women who had BV were 81.6% and 87.7%, respectively. Nelman et al. (17) found that the sensitivity and specificity of vaginal pH examination in women with BV was 86% and 96%, respectively. Vaginal wall examination revealed the presence of clue cells > 20% in BV

patients. Thomason et al. (16) found that the sensitivity and specificity of clue cells in women who experienced BV were 89.8% and 98%, respectively. Similar results were obtained in the study of Nelman et al. (17), i.e. the sensitivity and specificity of clue cells in women who had BV was 82% and 96%, respectively. The characteristics of BV were related to sociodemography, sexual behavior, and age. Out of 32 study participants who were aged <30 years, two had BV. The similar result was reached in the studies conducted by Machado et al. and Octaviyati et al. (11, 18). A study conducted by Machado et al. (11) in 2014, including 206 pregnant women who had ANC at Braga Hospital, Portugal, revealed that in

Table 2. Result of BV in participants based on Amsel criteria

Characteristic Amsel criteria	Total n = 60	Total %
Vaginal discharge*		
No	43	71.67
Yes	17	28.33
If yes		
Characteristic discharge of BV**	17	28.33
Whiff test		
Positive	7	11.67
Negative	53	88.33
pH vagina		
> 4,5	10	16.67
< 4,5	50	83.33
Clue cell		
Yes	7	11.67
No	53	88.33
Amsel criteria > 3	7	11.67

*Vaginal discharge based on venereological examination

**Characteristic discharge of BV including white or grayish colour, with homogenous consistency

women > 30 years old the risk of getting BV was five times higher, with odd ratio (OR) 5.27; 95% CI. In a study conducted by Octaviyanti et al. (18), for 492 women in several Primary Health Care unites in Indonesia, it was known that women over the age of 40 had three times higher risk of developing BV (OR 3.15, 95% confidence interval (CI)), with statistically significant $p < 0.05$. Different results were obtained in the study conducted by Nwadioha et al. (19), it was found that the highest age group that had BV was <30 years old, which was an active sexual age. This is speculated to be related to sexual activity due to semen that has a pH of 7,2. It may affect the normal balance of vaginal flora (20). The increasing vaginal pH will decrease the *Lactobacillus* spp., hence the growth of anaerobic bacteria increases (19, 20).

The dynamics of vaginal microflora is affected by age. As we get older, estrogen production decreases (hypoestrogens), resulting in a decrease in glycogen production in vaginal epithelial cells (21). Glycogen is a nutrient needed by *Lactobacillus* spp. to produce lactic acid which maintains the acidity of vaginal pH

and controls the growth of anaerobic bacteria, thus preventing the occurrence of BV (22). Hence, it explained higher occurrence of BV in the age group >30 years old.

In this study, one in four study participants from 20 research participants had a college education level and suffered from BV. All study participants who had high elementary education did not have BV. In research conducted in developing countries, BV is generally more prevalent in participants with high school level education. Similar results were obtained in the study conducted by Ocviyanti et al. (18) in 492 women, in several Puskesmas in Kerawang, Pedes, Cikampek, Tempuran, and Batalion Clinic, in Indonesia, i.e. the highest number of BV patients had high school education (46.3%). A study conducted by Tachawatcharapunya et al. (23) in Thailand found that women with the highest number of BV had high school education (97.8%), but the results were not statistically significant ($p > 0.05$). In the study conducted by Shahgelbi et al. (24), it was found that the education of women who experienced the highest number of BV was at the high school level. In studies

in developed countries, the level of education of women who experience BV also varies as in studies conducted by Kouman et al. (25), Allworth et al. (26), and Billard et al. (27) In studies conducted by Kouman et al. (25) and Allworth et al. (26) 2001 it has been shown that most women who experienced BV were with junior high school education. On the other hand Bilard et al. (27) have reported that the highest level of education of women with BV is diploma. The level of education of women with BV in previous studies varied. So based on these studies, it is necessary to conduct further studies on the influence of education level on BV risk factors in Indonesia.

According to the study participants, out of 54 housewives, seven (12.96%) experienced BV. The study conducted by Ocviyanti et al. (18), revealed that 69.2% out of 492 women in Indonesia who had BV were housewives. In a study conducted by Thammalangsy et al. (8) 64.4% of 500 pregnant women who had ANC and were diagnosed with BV were housewives. In the study conducted by Siahaan et al. (28) of 117 women in Manado, Indonesia, 35.8% were housewives. The higher prevalence in housewives may be explained by the fact that they have more free time to seek consult (28). This can explain the results of this study, although further research is needed. The Siahaan study was supported also by other studies conducted by Tachawatcharapunya et al. (23) in Thailand and Ocviyanti et al. (18) in Indonesia, it is known that most patients diagnosed with BV are housewives.

Bacterial vaginosis relates to various sexual behaviors including coitarche at a young age (14, 15). In this study based on the characteristics of coitarche, one in two study participants aged 16-20 years was diagnosed with BV. In a study conducted by Fether et al. (14) at Melbourne University, 528 female students had BV and 120 patients (22.2%) had history of coitarche at age <16 years old. In this study, BV patients mostly had coitarche at a young age (<16 years old) that being statistically significant.

The frequency of sexual intercourse is one of the risk factors for BV (15). In this study, six out of 46 study participants who were sexually active once a week had BV. Study participants who were sexually active had a frequency of sexual intercourse more than once

a week. While, all of the study participants who had a frequency of sexual intercourse once a month had no BV. The increase in the incidence of BV against the frequency of sexual intercourse was thought to be caused by alkaline semen with a pH of 7.2 (20) so that *G. vaginalis* became dominant after coitus (15, 29).

In this study, out of nine participants in the first trimester of pregnancy, two experienced BV. Out of 37 study participants in the second trimester of pregnancy, two developed BV. However, out of the 14 study participants in the third trimester of pregnancy, three developed BV. In the study conducted by Nelson et al. (30) it is known that the women in the third trimester are more likely to develop BV. Similar with the study conducted by Machado et al. (11), BV mostly occurred in the second trimester of pregnancy. However, in the study conducted by Kirakoya et al. (31), it occurred within the first trimester of pregnancy. Based on multivariate analysis conducted by Machado et al. (11) there was no relationship between BV and the trimester of pregnancy ($p=0.27$). The results of a similar multivariate analysis were obtained in the study of Kirakoya et al. (31). that BV relationship with gestational age was not statistically significant. While in another study, BV positive study participants with history of abortion, prematurity (32, 33). LBWB, and premature rupture of membranes (PROM) (33) were found to have no history of pregnancy. The results of this study are different from other studies in the positive BV group who had history of pregnancy complications.

Conclusion

The prevalence of BV in pregnant women at Maternal and Child Hospital, West Java, Indonesia was 11.67%. The assessment of screening BV should be recommended as a routine workup. To avoid complications in pregnant women and infants it should not be waited for the symptoms to reveal.

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Bakterijska vaginoza kod trudnica u Bolnici za majku i dete, Zapadna Java, Indonezija, 2018 – visoka prevalencija bez simptoma

Sažetak

Bakterijska vaginoza je infekcija donjeg genitalnog trakta žena u reproduktivnom dobu, koja se može pojaviti kod trudnica i kod žena koje nisu trudne. Bakterijska vaginoza kod trudnica može povećati rizik od komplikacija, uključujući i povišenu incidenciju abortusa, prerane rupture membrana, porođaj pre vremena i malu težinu novorođenčeta. Takođe može da poveća rizik od stečenih i prenetih infekcija koje se prenose seksualnim putem, uključujući i virus humane imunodeficijencije. Svaka država ima različitu prevalenciju bakterijske vaginoze. Pre skoro tri decenije, izveštaj o prevalenciji bakterijske vaginoze kod trudnica je podnet u Džakarti (Indonezija) 1990. godine. Do sada nije bilo ažuriranih podataka o bakterijskoj vaginozi kod trudnica, pogotovo

ne u Zapadnoj Javi (Indonezija). Stoga smo mi u junu 2018. godine sproveli deskriptivnu opservativnu poprečno-presečnu studiju koristeći metod konsekutivnog uzorkovanja. Ova studija je uključila 60 trudnica iz Bolnice za majku i dete u Bandungu (Indonezija). Od 60 učesnica, sedam (11,67%) ih je imalo bakterijsku vaginozu prema Amsel kriterijumima. Asimptomatska bakterijska vaginoza je dijagnostikovana kod svih učesnica. Ova studija pokazuje prevalenciju trudnica u Bolnici za majku i dete u Bandungu juna 2018. godine. Procenu skrininga bakterijske vaginoze bi trebalo preporučiti kao rutinski postupak. Da bi se izbegle komplikacije kod trudnica ne treba čekati da se pojave simptomi.

Ključne reči: Bakterijska vaginoza; Infekcije reproduktivnog trakta; Infektivne komplikacije u trudnoći; Prevalencija; Asimptomatske infekcije; Indonezija

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