Risk factors for bacterial vaginosis among Indonesian women

Dwiana Ocviyanti,[1] Yeva Rosana,[2] Shanty Olivia,[1] Ferry Darmawan[1]

[1] Department of Obstetry and Gynecology, Faculty of Medicine University of Indonesia
[2] Department of Microbiology, Faculty of Medicine University of Indonesia

Abstrak

Tujuan *Untuk mengetahui faktor-faktor risiko bakterial vaginosis (BV) pada perempuan Indonesia.*

Metode *Penelitian ini merupakan studi deskriptif potong lintang yang melibatkan 492 perempuan yang berusia 15-50 tahun. Sekret vagina diambil kemudian dilakukan tes Whiff dan tes Nugent untuk mengetahui ada atau tidaknya BV. Tempat penelitian adalah Puskesmas Karawang, Pedes, Cikampek, Tempuran, Klinik Batalyon 201 Cijantung, Fakultas Kedokteran Universitas Indonesia dan Rumah Sakit Cipto Mangunkusumo.*

Hasil *Subjek memiliki usia 15-25 tahun (26,8%), 26 – 40 tahun (59,1%), ¬> 40 tahun (14%). Usia rata-rata adalah 30.9 tahun. Status pernikahan subjek adalah belum menikah (16,9%), menikah 1x (76,4%), dan menikah > 1x (6,7%). Prevalensi bakterial vaginosis pada penelitian ini adalah 30.7% sesuai dengan skor Nugent. Usia >40 tahun (OR=3,15 95% CI = 1,15-1,48) dan pasangan yang tidak disirkumsisi (OR=6,25,95% CI=2,54-15,38) merupakan faktor determinan yang secara signifikan berpengaruh terhadap kejadian BV (p<0,05).*

Kesimpulan *Prevalensi BV pada penelitian ini adalah 30,7%. Faktor risiko BV adalah usia dan pasangan yang tidak disirkumsisi.* **(Med J Indones 2010; 19:130-5)**

Abstract

Aim To identify risk factors for bacterial vaginosis (BV) among Indonesian women.

Methods This is a cross sectional study involving 492 women with age ranged 15-50 years. Vaginal discharge was collected. Whiff test and Nugent scoring were utilized to identify BV. Settings are Puskesmas Karawang, Pedes, Cikampek,Tempuran, Batalyon 201 Clinic Cijantung, Faculty of Medicine University of Indonesia and Cipto Mangunkusumo Hospital.

Results Age of the subjects were 15-25 years old (26,8%), 26 – 40 years old (59,1%), and > 40 years old (14%). The mean age was 30.9 years. Marital status of the subjects were not-married (16,9%), married (76,4%), married more than once (6,7%). Prevalence of bacterial vaginosis in this study was 30.7% according to Nugent's score. Age >40 years old (OR=3,15 IK 95% = 1,15-1,48) and uncircumcised couple (OR=6,25, IK 95% = 2,54 - 15,38) were independently and significantly associated with incidence of BV (p<0.05)

Conclusions Prevalence of BV in this study was 30.7%. Determinant risk factors of BV were age and uncircumcised sexual partner. **(Med J Indones 2010; 19:130-5)**

Key words: *bacterial vaginosis, risk factors, vaginal flora*

Bacterial vaginosis (BV) is one of the most common etiologies of gynecologic complaint.[1,2] BV is caused by an imbalance of normal vaginal flora, allowing disease-causing bacteria. *Lactobacillus sp*, the normal vaginal flora, is replaced by facultative anaerobic bacteria including *Mobiluncus species, Bacteroides species,* especially *Gardnerella vaginalis*, to predominate.[3,4]

The prevalence of BV and morphotype distribution varies among the world population. Some research reported that the prevalence of BV was high among African, Afro-American dan Afro-Caribian population.[5] Research among Asian women in India and Indonesia reported that prevalence of BV was about 32%.[6, 7]

BV is associated with some morbidity in women include urinary tract infections, pelvic inflammatory disease,

premature rupture of membranes, preterm labor, and increased risk of HIV transmission.[8-11] prevention strategies are needed to reduce the incidence of BV. Identification of risk factors is one important precaution effort

The socio-economic risk factors which parameters are income and education level associated with BV.[12,13] Research on other risk factors associated with BV had been carried out in some countries. the study population was small and very selective that did not describe the population in general. In Indonesia, there were no data about the study of risk factors for BV. This research was conducted to identify risk factors for BV among Indonesian women so that a prevention strategy can be made.

Correspondence email to: dwianaocviyanti@yahoo.com

METHODS

This is a descriptive study conducted in Puskesmas Karawang, Pedes, Cikampek, Tempuran (District Karawang), Klinik Batalyon 201 Cijantung and Laboratory of Microbiology, Faculty of Medicine University of Indonesia in the period of May 2008 - February 2009. With a consecutive sampling technique, 492 samples were obtained from the population of Indonesian women aged 15-50 years. It was already arranged that 100 samples would be obtained from each location, but actually 8 of the subject had to be excluded because the laboratory result could not be read. The data collection mechanism is as follows:

1. Interviews and questionnaires to determine the distribution of demographic and medical characteristics data
    Demographic characteristic data of age, education, employment, and marital status were recorded. Recorded medical characteristic data were parity, reproductive tract complaints, history of Diabetes Mellitus, history of sexually transmitted diseases, use of antibiotics, use of contraception, husband circumcision status, use of panty liners, and use of vaginal soap.
2. Whiff test for BV detection
    The procedures of Whiff test are taking a vaginal discharge, putting 1-2 drops of it on an object glass and mixing with 1-2 drops of 5-10% KOH by wooden stick under the nose. Thus the examiner smells the presence of fishy-like odor. Whiff test is positive if the fishy-like odor is present. For not-married subjects, vaginal discharge was taken with cotton buds from distal two-third portion of vagina outside the hymen.

3. Nugent scoring system for BV diagnosis
    Gram-stained preparatory was assessed and scored based on the Nugent Criteria (Table 1)[14]
    Nugent's diagnostic criteria are based on combined score (A+B+C). The diagnosis is normal (score 0-3), indeterminate (score 4-6), and BV (score $\geq$ 7). In this study, BV categorized into two diagnoses: positive (score $\geq$ 7) and negative (score is normal or indeterminate).

Data analysis was done using SPSS 16. Chi square and Fischer exact test were used for bivariate analysis to know the difference of BV's prevalence among each variable. Multivariate analysis was done using logistic regression to know some factors associated with BV.

RESULTS

Demographic characteristic

There were 492 women involved in this study. The average age were $30.9 + 0.27$ years old, consisted of 15-25 years old (26,8%), 26 – 40 years old (59,1%), and > 40 years old (14%). Marital status of subjects were not married (16,9%), married (76.4%), and married more than once (6,7%). All subjects > 40 years old were married or married >1. Most subjects occupation was housewife (69.2%) and education level was high school (46.3%). BV was found in 151 women (30.7%). Among demographic characteristics, factors related to the prevalence of BV were age, education, and occupation (p <0.05). Marital status did not have a relationship with the prevalence of BV.

Table 1. Gram-staining Scoring System

Score	(A) *Lactobacillus* Morphotypes	(B) *Gardnerella* and *Bacteroides spp.* Morphotypes	(C) Curved-gram variable rods Morphotype
0	4+	0	0
1	3+	1+	1+ or 2+
2	2+	2+	3+ or 4+
3	1+	3+	
4	0	4+	

Morphotype scoring is based on the number per field of view. 0, no morphotypes present; 1+, <1 morphotype present; 2+, 1 to 4 morphotypes present; 3+, 5 to 30 morphotypes present; 4+, >30 morphotypes present

Table 2. Demographic characteristics and prevalence of BV

Demographic characteristics	n(%)	BV+ n(%)	p value
Age (years old)			
15-25	132 (26,8)	18 (13,6)	Ref
26-40	291 (59,1)	98 (33,7)	0,000
≥ 40	69 (14,0)	35 (50,7)	0,000
Marital status			
Not married	83 (16,9)	0 (0)	NS
Married	376 (76,4)	138 (36,7)	
Married > 1	33 (6,7)	13 (39,4)	
Education level			
Elementary	75 (13,0)	23 (35,9)	0,008
Junior high	74 (15,0)	26 (35,1)	0,008
Senior high	228 (46,3)	79 (34,6)	0,001
≥ Senior high	126 (25,6)	23 (18,2)	Ref
Occupation			
Housewife	340 (69,1)	94 (27,6)	0,007
Student	71(14,4)	20 (28,2)	0,027
Others	81 (16,5)	37 (45,7)	Ref

Note
Ref: reference
NS: not significant

Medical characteristics

Women with parity > 5 were more prone to of BV compared to nullipara (50% vs 2.4%, p = 0.005) and parity 1-5 (36.9%, p = 0.000). The prevalence of BV was higher among women with uncircumcised spouse compared to women with circumcised spouse (36.9% vs 6.8%, p = 0.000). The prevalence of BV was also high among women using panty liners (p = 0.012) (Table 2). Despite its statistic significance, it was found that the prevalence of BV was higher among women not using any contraception. History of diabetes mellitus (DM), sexual transmitted infections (STIs), use of antibiotics, and use of vaginal soap had no significant correlation with the incident BV.

Multivariate analysis

Age, education, occupation, parity, circumcised spouse and use of panty liners were included in multivariate analysis (Table 4). Based on the analysis, it is found that age above 40 years (OR = 3.15, p = 0.003) and uncircumcised spouse (OR = 6.25, p = 0.00) were the independent factor associated with BV. Other factors included in this multivariate analysis did not have significant correlation to BV.

Table 3. Medical characteristics and prevalence of BV

Medical characteristic	n (%)	BV + n (%)	p value
Parity			
0	118 (24)	12 (2.4)	Ref
1-5	366 (74,4)	135 (36.9)	0,000
> 5	8 (1,6)	4 (50)	0,005
History of DM			
Yes	1 (0,2)	0 (0)	NS
No	491 (99,8)	2 (0,4)	
Unknown			
History of STIs			
Yes	10 (2,0)	134 (30.5)	NS
No	439 (89,2)	3 (30)	
Unknown	43 (8,7)	14 (32.5)	
Use of antibiotics			
Yes	9 (1,8)	147 (30.4)	NS
No	483 (98,2)	4 (44.4)	
Use of contraception			
Yes	259 (52,6)	55 (21,2)	NS
Hormonal/ Combination	89 (34,4)	30 (33.7)	
Progesterone	145 (55,9)	25 (17.2)	
Condom/ IUD	25 (9,7)	0 (0)	
No/sterile	233 (47,4)	96 (41,2)	
Circumcised spouse			
Yes	390 (79,3)	7 (6.8)	Ref
No	102 (20,7)	144 (36.9)	0,000
Use of panty liners			
Yes	68 (13,8)	139 (32.8)	0,012
No	424 (86,1)	12 (17.6)	Ref
Use of vaginal soap			
Yes	188 (38,2)	99 (32.6)	NS
No	304 (61,8)	52 (27.6)	

Note:
Ref: *reference*
NS: not significant

Table 4. Factors affecting prevalence of BV

Risk factor	OR (95% CI)	p value
Age (years old)		
15-25	1,00	Ref
26-40	1,34 (0,70-2,57)	NS
$\geq$40	3,15 (1,15-1,48)	**0,003**
Education		
Elementary	0,70 (0,32-1,56)	NS
Junior high	0,83 (0,39-1,79)	NS
Senior high	0,90 (0,47-1,72)	NS
$\geq$ Senior high	1,00	Ref
Occupation		
House wife	1,85 (0,47-1,55)	NS
Student	1,45 (0,71-2,96)	NS
Other	1,00	Ref
Parity		
0	1,00	Ref
1-5	1,88 (0,87-4,09)	NS
> 5	2,53 (0,49-13,02)	NS
Uncircumcised spouse	6,25 (2,54-15,38)	**0,000**
Use of panty liner	0,97 (0,46-2,06)	NS

Note
Ref: reference
NS: not significant

DISCUSSION

Based on multivariate analysis, determinant risk factors for BV were age above 40 years old and with an uncircumcised spouse.

An Uncircumcised spouse was the most significant independent risk factor for BV (OR = 6.25, 95% CI = 2,54-15,38). Circumcisions are related to the hygiene of penis which is associated with the transmission of infection. Because mucosal membrane of preputium is less keratinized than exposed skin, it is prone to trauma during intercourse and became a pathway for pathogens. The space between preputium and glans penis is a moist and warm environment conducive for discharge and pathogen deposit.[15,16] Gray, et.al has reported that circumcised spouse reduced the risk of genital ulcers, *Trichomonas*, and BV in his partner. Yang and his colleagues also stated that circumcision reduces the risk of sexually transmitted infections including human immunodeficiency virus (HIV), human papilloma virus (HPV), herpes simplex virus (HSV) type 2, and syphilis.[17]

Age above 40 years old was risk factor for BV (OR = 3.15, p = 0.003). It is associated with the perimenopausal hypoestrogenic condition at that age. Declining levels of estrogen causes elevated vaginal pH.[18] This condition is not optimal for *Lactobacillus sp* growth as the dominant normal vaginal flora but very conducive for the growth of microorganisms causing BV.[19] Research on women aged > 40 years conducted by Cauci et al found that perimenopausal women had higher BV prevalence than fertile women and post-menopause and that *Lactobacillus sp* level decreased with age.[20]

There is an interesting finding in the characteristics of contraceptive use. Despite its statistic significance, women using contraception had lower risk for BV than women not using contraception or sterile. More detailed research is needed to identify contraception as risk factor for BV.

In conclusion, The prevalence of BV by Nugent criteria in this study was 30.7%. Factors associated with BV incidence were age, education, occupation, parity, uncircumcised spouse and use of panty liners. Based on the multivariate analysis, determinant risk factors for BV were age and uncircumcised spouse.

Acknowledgments

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