# Risk Factors for Bacterial Vaginosis Occurrence in Female Personnel at the Bhayangkara Hospital of the East Java Regional Police

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**KEYWORDS**

Risk Factors. Bacterial Vaginosis, Female Personnel

**ABSTRACT**

The most common, easily acquired, and frequently caused disease is caused by an imbalance of microbiota that causes conditions such as bacterial vaginosis (BV). The causes of BV vary and there are several risk factors that influence it. Working women are a group that is susceptible to BV. This study aims to determine the risk factors for BV in female personnel working at the Bhayangkara Hospital, East Java Regional Police. This study used an observational analytical design with a cross-sectional approach. Data analysis using chi square and logistic regression tests. The results of this study are that the variables/factors that influence the incidence of BV are *sedentary life* and BMI (Body Mass Index). For the Odds Ratio (OR) on *sedentary life* of 51.99 and BMI 0.342, it can be concluded that *sedentary life* has great power. The probability of female personnel undergoing *sedentary life* and obese BMI who are at risk of experiencing BV is 28.65%. Efforts are needed to change the *sedentary lifestyle* by increasing activities including sports and by regulating diet for efforts towards normal BMI.

## Introduction

Vaginal health is essential to a woman's overall health because impaired vaginal health can lead to a variety of gynecological conditions, such as urinary tract infections, yeast infections, and bacterial vaginosis. The vaginal microbiome plays a vital role in preventing these infections. Vaginal health can be greatly affected by damage to this microbial ecosystem. The most common, easily acquired, and frequently caused by microbiota imbalances leading to conditions such as bacterial vaginosis (BV), vulvovaginal candidiasis, and aerobic vaginitis are examples of non-infectious sexually transmitted diseases (STIs). Vaginal infections cause more than 2.3 million deaths worldwide, with a significant impact on public health. This is especially true in women of childbearing age. STIs can increase the likelihood of developing non-STIs by weakening the immune system and creating an environment susceptible to microbial imbalance. Conversely, non-sexually transmitted diseases can increase susceptibility to STIs by altering the vaginal microbiota and weakening the immune system's natural defense mechanisms. Bacterial and fungal vaginitis are associated with the prevalence and manifestation of several STIs, including chlamydia, gonorrhea, herpes, HIV, syphilis, and trichomoniasis. BV has been shown in prospective trials to significantly increase the likelihood of HIV transmission (Gallo *et al.* , 2012; Torrone *et al.* , 2018) .

Bacterial vaginal infection is a common disease, with a prevalence of around 10-20% in most Asian countries (Peebles *et al.* , 2019) . It is caused by an imbalance of the vaginal microbiota and is associated with serious health problems such as increased risk of sexually

transmitted infections (STIs), infertility, pelvic inflammatory disease, and pregnancy complications [4].

Risk factors for BV include cervical mucus, semen, menstrual blood, vaginal douching, antibiotic use, and hormonal changes during pregnancy and menopause. Other risk factors associated with BV include early sexual intercourse, frequent vaginal douching, use of vaginal cleansers or scented soaps, smoking, and lack of vaginal lactobacilli [5].

There are several studies reporting an association between BV and socio-demographic, clinical and behavioral characteristics of women [6,7]. In the field of public health, the challenges of demographic characteristics complications continue to be investigated to investigate the role of bacteria and their relationship to a number of biomedical and social conditions that can cause major health problems in the community. These factors include education level, age, place of residence, use of contraception, smoking, past health history and history of recurrent infections, there is no significant difference.

The differences in prevalence percentages between types of BV may be related to environmental, behavioral, socioeconomic status and stress due to differences in geographical variation. Vaginal hygiene practices and systematic differences in this regard across populations, lifestyle changes, improper perineal care, dietary habits, tight clothing, lack of attention to menstrual hygiene and other factors may be the causes for the acquisition of BV in women working in factories [8].

Studies have found that women over 35, women who work outside the home, and women who live in slums are more likely to have BV. It is possible that working women experience more psychosocial stress, which other authors have suggested increases the risk of bacterial vaginosis by lowering their immune function [9]. Bhayangkara Hospital personnel and families of East Java Regional Police are susceptible to BV associated with the risk of hospital personnel, both in relation to mobility, namely an inactive lifestyle ( *sedentary life* ), due to long sitting activities, or dealing directly/indirectly with patients. Female workers in Bhayangkara Hospital personnel and families of East Java Regional Police are susceptible to exposure to chemicals that are at risk of BV, so that the length of work of Bhayangkara Hospital personnel and families of East Java Regional Police and work activities in factories need to be studied further.

**Research purposes**

At this stage, the aim is to determine the risk factors for the occurrence of bacterial vaginosis and the differences in the occurrence of Bacterial Vaginosis (BV) in female personnel with a *sedentary lifestyle* and *non-sedentary lifestyle* at Bhayangkara Hospital.

**Method**

This study was conducted on female personnel in the ranks of Bhayangkara Hospital in East Java, including in the areas of Bhayangkara Hospital Surabaya, Bojonegoro, Nganjuk, Tulungagung, Lumajang and Bondowoso. This study used an observational analytical design with a cross-sectional approach. The sampling technique in the study was determined using the minimum sample size formula. Determination of Sample Size from Population with a 95% Confidence Level Krejcie & Morgan . In this study, the population of Bhayangkara Hospital Personnel and families of the East Java Regional Police was 380, so based on the Krejcie and Morgan table, the sample size was 194. Data analysis for bivariate using chi square and multivariate using logistic regression.

**Results**

Sociodemographic Data Table

| | | BV Incident Not Experiencing BV n (%) | Experiencing BV n (%) | Markρ |
|---|---|---|---|---|
| Marital status | Married | 94 (48.5%) | 93 (47.9%) | 0.445 |
| | Divorced | 5 (2.6%) | 2 (1%) | |
| Parity | Never Given Birth | 9 (4.6%) | 8 (4.1%) | 0.935 |
| | Minimum 1 time giving birth | 32 (16.5%) | 33 (17%) | |
| | Never given birth | 58 (29.9%) | 54 (27.8%) | |
| Pregnancy interval | < 2 years | 31 (16%) | 31 (16%) | 0.878 |
| | ≥ 2 years | 68 (35.1%) | 64 (33%) | |
| History of Premature Birth | Have a history of premature birth | 9 (4.6%) | 8 (4.1%) | 1,000 |
| | Has no history of premature birth | 90 (46.4%) | 87 (44.8%) | |
| Sexual Activity | Not having sexual intercourse | 9 (4.6%) | 10 (5.2%) | 0.700 |
| | 1-3 times a month | 34 (17.5%) | 37 (19.1%) | |
| | More than 4 times a month | 56 (28.9%) | 48 (24.7%) | |
| Condom use | Using a condom | 7 (3.6%) | 16 (8.2%) | 0.035 |
| | Not using a condom | 92 (47.4%) | 79 (40.7%) | |
| Use of IUD | Using an IUD | 34 (17.5%) | 35 (18%) | 0.765 |
| | Not Using IUD | 65 (33.5%) | 60 (30.9%) | |
| Vaginal Douching | Perform vaginal douching | 23 (11.9%) | 24 (12.4%) | 0.741 |
| | Do not do vaginal douching | 76 (39.2%) | 71 (36.6%) | |
| IMT | Thin | 9 (4.6%) | 0 (0%) | 0,000 |
| | Normal | 84 (43.3%) | 17 (8.8%) | |
| | Overweight | 5 (2.6%) | 41 (21.1%) | |

| | | | | |
|---|---|---|---|---|
| | Obesity | 1 (0.5%) | 37 (19.1%) | |
| Knowledge | Not enough | 30 (15.5%) | 12 (6.2%) | 0,000 |
| | Enough | 5 (2.6%) | 34 (17.5%) | |
| | Good | 64 (33%) | 49 (25.3%) | |
| SRQ | No stress | 68 (35.1%) | 71 (36.6%) | 0.426 |
| | Experiencing stress | 31 (16%) | 24 (12.4%) | |
| Sedentary Life | Not enough | 47 (24.2%) | 54 (27.8%) | 0.001 |
| | Currently | 32 (16.5%) | 38 (19.6%) | |
| | Tall | 20 (10.3%) | 3 (1.5%) | |

Risk factors for BV events in this study using logistic regression tests. Logistic regression (logistic model or logit model), in statistics is used to predict the probability of an event by matching data to the logit function of the logistic curve. In this study, namely to determine the dominant risk factors influencing the occurrence of BV. The results of the calculation of the influential logistic regression can be seen in the table below:

Table of Risk Factors for Bacterial Vaginosis Occurrence in Female Personnel at the Bhayangkara Hospital of the East Java Regional Police

| | Coefficient | SE | Wald | df | Markρ | OR | IK 95% | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min | Mom |
| Sedentary Life | 3,936 | 1,059 | 13,807 | 1 | 0,000 | 51,199 | 6,422 | 408,174 |
| IMT | -5,661 | 1,144 | 24,487 | 1 | 0,000 | 0.342 | 0.032 | 3.61 |
| Constant | 0.813 | 1,292 | 0.396 | 1 | 0.529 | 2,254 | | |

Based on the table above, it is found that the variables/factors that influence the occurrence of BV are *sedentary life* and BMI (Body Mass Index). For the Odds Ratio (OR) on *sedentary life* of 51.99 and BMI 0.342, which can be concluded that *sedentary life* has great power.

Based on the table above, the probability of a female worker living *a sedentary life* and having an obese BMI who is at risk of experiencing BV is obtained using the formula:

1. The equation obtained is:
   y = constant + a1x1 +a2x2
   y = 0.813 + 3.936 ( *sedentary life* ) + [-5.661 (BMI)]
   y = -0.912
2. Probability
   p = 1/ [1+exp(-y)]
   p = 0.2865

Thus, the probability of female workers with *a sedentary life* and obese BMI who are at risk of experiencing BV is 28.65%.

**Discussion**

The prevalence of BV is high globally, reaching 23-29% of the population (Europe and Central Asia, 23%; East Asia and Pacific, 24%; American Latin, 24%; East middle And Africa North, 25%; Africa sub-Saharan, 25%; North America, 27%; Southeast Asia, 29%). Several studies have reported a high prevalence of bacterial vaginosis in African, African-American, and African-Caribbean populations. The prevalence of bacterial vaginosis in Asian women in India and Indonesia is known to be 32%. The economic burden global for symptomatic BV therapy is estimated to reach 4.8 million US dollars, and reaches three times that if associated with preterm birth and co-infection with HIV [3].

Sedentary lifestyle is an inactive behavior, such as sitting too long and lack of physical activity, becoming increasingly common worldwide due to the lack of exercise facilities,

sedentary jobs, and extensive use of television and video devices [10]. Based on research, sedentary lifestyle factors *are* correlated with the risk of BV. the probability of female workers living *a sedentary life* and obese BMI who are at risk of BV is 28.65%. This study is in line with research conducted by Zeng showing that a sedentary lifestyle is correlated with the incidence of BV, especially those related to recurrent BV ( ρ= 0.0364). Sedentary living conditions can weaken the body's defense system and disrupt the balance of vaginal microflora, allowing the growth of anaerobic bacteria that contribute to recurrent BV [11].

Overweight and obese women have a high Nugent score, known as bacterial vaginosis scoring, and are more susceptible to bacterial vaginosis than women with a normal body mass index, according to a study by Brookheart (2019). Some of the associations between body mass index and bacterial vaginosis cases include obesity, which makes pathogenic bacteria prefer the vaginal environment because it interferes with the hormonal system, metabolism, and immune system [12].

Bacterial Vaginosis is associated with high body mass index. Where the correlation between high body mass index and metabolic syndrome shows how insulin resistance and carbohydrate metabolism and formation are affected. At this time, glycogen produced from the breakdown of glucose by insulin is reduced because metabolic syndrome interferes with insulin function. The structure of vaginal microbes can be changed by this condition. Lactobacillus will convert glycogen into lactic acid, producing an acidic pH below 4.5. This stops the growth of pathogenic bacteria. Women with excess body mass index and obesity may also have both thighs tightly closed, disrupting air circulation and increasing humidity around the vagina. Because their skin surface is larger compared to women with normal body mass index, they produce more sweat, which makes the vaginal area more humid. As a result, obesity also indirectly causes the growth of fungi and bacteria in the vagina [13].

**Conclusion**

Sedentary life can indirectly increase the risk of bacterial vaginosis through its impact on metabolism, immune system, and hormonal balance. Therefore, it is important to adopt an active and healthy lifestyle as a preventive measure against BV and other health disorders. Obesity is one of the indirect risk factors for BV because it affects the immune, metabolic, and hormonal balance. Weight loss and healthy lifestyle management can contribute to the prevention of BV and improve overall quality of life.

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