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Prevalence of Bacterial Vaginosis among Women Attending Gynecology Clinic of Ruhengeri Referral Hospital

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Bacterial vaginosis is among the common condition that affect reproductive tract of women worldwide. Its prevalence was found to vary worldwide. Although bacterial vaginosis prevalence is generally high in most parts of Africa and low in much of Asia and Europe.
Aim: current study aimed to study the prevalence of bacterial vaginosis among women attending Ruhengeri Referral Hospital.
Methodology: This retrospective study was carried out at Ruhengeri Referral Hospital, where data of three months (March to May 2021) from laboratory log books were used. Recorded data was analyzed by using Microsoft excel version 2016 and SPSS version 20.
Results and Discussion: The findings showed that 134(40.36%) out of 332 women were tested positive for bacterial vaginosis. It was found that bacterial vaginosis is distributed differently in

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reproductive aged women and post menopause woman with 40.06% and 44% respectively (P-value= 0.506). The age group of 34-44 years was observed to be more susceptible to bacterial vaginosis with 45.16% followed by age group of ≥45 years old with 44%, however, age group between 12-22 showed lower prevalence of 34.95% and group of 23-33 years shows 41.54%. Therefore, the study observed that, based on the age, bacterial vaginosis has higher prevalence in post menopause women than reproductive aged women, but they not attend laboratory at high number. In fact, they have weakened immune system. Based on this high prevalence, preventive measures and special attention should be taken to avoid bacterial vaginosis and related complications.

Keywords: Bacterial vaginosis; menopause; reproductive age.

1. INTRODUCTION

"Bacterial vaginosis is a condition caused by an overgrowth of normal vaginal flora. Most commonly, this presents clinically with increased vaginal discharge that has a fish-like odor. The discharge itself is typically thin and either gray or white" [1]. "Post menopause is a non-reproductive state marked by hormonal changes, more specifically a decrease in the levels of the ovarian hormones, estrogen and progesterone, Without these hormones, the vaginal mucosa thins and begins to reduce in functions, becoming smaller and less elastic" [2]. "Functionally, the vagina produces fewer secretions, less lubrication and is more vulnerable to small tears during intercourse, which can contribute to dyspareunia" [3].

"In the typical reproductive-aged vaginal environment, estradiol promotes glycogen production from the vaginal epithelium. The glycogen is hydrolyzed into glucose, which are metabolized into lactic acid by beneficial *lactobacilli*, producing hydrogen peroxide. This process maintains an acidic environment and controls pathogenic overgrowth" [4]. "This biological sequence is altered with the thinning of the vaginal wall in postmenopause, resulting in reduced vaginal epithelial exfoliation and increased pH, a prime environment for anaerobic bacterial overgrowth" [5]. "The colonization of anaerobic bacteria in the vagina, or BV, is usually found in an alkaline environment (pH greater than 4.5) more frequently observed in postmenopausal women" [6].

"Bacterial vaginosis is a clinical syndrome resulting from the reduction of normal hydrogen peroxide-producing lactobacillus species in the vagina with high concentration of anaerobic bacteria such as *Gardnerella vaginalis* and *Mycoplasma hominis*, *Bacteroides spp*., *Bifidobacterium spp*., *Propionibacterium*, *Fusobacterium spp*., *Peptococcus spp*., *Prevotella spp*., *Veillonella spp*., *Peptostreptococcus spp*., *Atopobium vaginae*, *Ureaplasma urealiticum*, and *Mobiluncus"* (Russo & Karadja, 2019). "BV is also responsible for the presence of enzymes that reduce the ability of host leukocytes to fight infection, and for an increased release of endotoxins that stimulate cytokine and prostaglandin production within the vagina" [1].

"Bacterial vaginosis prevalence was found to vary worldwide, although bacterial vaginosis prevalence is in general, high in parts of Africa and low in much of Asia and Europe, in Norway 24 %, Turkey 23 %, and Poland 19 %, women have moderately high bacterial vaginosis rates. Women from South-east Asia, Australia, New Zealand, and Indonesia have rates of bacterial vaginosis that are typically greater than 30 %. While women from South and East Africa have higher rates of BV 68 % in Mozambique, 51 % in Lesotho, 44 % in Kenya, 37 % in Gambia compared to women from West Africa 7 % in Burkina Faso" (Christian *et al*., 2016). In Rwanda, the prevalence of bacterial vaginosis is 17.8 % [7].

"There are two standard diagnostic tests methods for BV detection based on use of vaginal swab. First is based on gram stain of vaginal flora, the other is a bedside wet mount microscopic test for vaginal clue cells. At least 50% of women with BV have no symptoms" [8] and there is a debate on whether this form of BV should be considered a disease [9]. "In the other half, BV most often manifests clinically as a thin homogenous vaginal discharge, a pH of more than 4.5, presence of "clue cells" and an amine odor (after addition of 10% of KOH). Few or no Lactobacilli are usually found through microscopy in the vaginal fluid. Several methods are currently in use for the diagnosis of BV" [10].

"Antimicrobial therapy include clindamycin and metronidazole is used for management of BV. Antibiotic use alters the abnormal vaginal microflora, inhibits anaerobes that support *G. vaginalis*, as well as some other anaerobes, without affecting lactobacilli, thereby treating BV and preventing its recurrence. However, antibiotic use causes side effects such as nausea, dizziness, rash, thrush, as well as antibiotic resistance and recurrence. Lactobacilli probiotics have been developed to effectively treat and prevent BV without antibiotic resistance or adverse effects even with long-term use. Recently, probiotics used in conjunction with antibiotics has been proposed as a new remedy for vaginal infections including BV" [11].

2. METHODOLOGY

2.1 Study Area

This study was conducted at Ruhengeri Referral Hospital in laboratory service located in Musanze district, Northern Province. The hospital offers different services to many people of Northern Province and other nearby districts.

2.2 Study Design

The conducted study was retrospective. Data collection on prevalence of bacterial vaginosis in women was collected from archived logbook of laboratory unity of Ruhengeri referral hospital.

2.3 Study Population

All female patients attending gynecology unit of Ruhengeri referral hospital in the period of six months were included in this study. However, the collected data were only for patients who were fulfilled inclusion criteria. Therefore, a total of 332 female's data were used during this study.

2.4 Data Collection

The archived data were collected from laboratory department using spreadsheet. Two types of logbooks were used; one of vaginal swab result book was used for recording laboratory identification number, diagnosis method (microscopic examination and gram stain) results. Other was general book which was used for recording information about age and other necessary information. Therefore, data were recorded and used for study purpose.

2.5 Data Analysis

Data were analyzed using Microsoft Excel and statistical package for social sciences "SPSS" application. Variables were represented as frequencies and percentages. Date was represented using tables.

3. RESULTS

Bacterial vaginosis is an infection that affect a huge number of females nowadays. The most prevalence of bacterial vaginosis is occurred in women within the ages above 45 (post menopause women) as their prevalence is 44% while in reproductive age is 40.06%. That means among 332 women who participated in the study, 307 were having below 45 years 123 were positive to BV and 25 were above 45 years 11 were positive among them.

3.1 Distribution of Patients According to Age Groups

Bacterial vaginosis (BV) is a dysbiosis of the vaginal flora characterized by a shift from a Lactobacillus-dominant environment to a polymicrobial mixture including Actinobacteria and Gram-negative bacilli (Gilbert *et al.*, 2013). The most prevalence of women who attend laboratory department for vaginal swab test are in age group of 23-33, while low frequency is in women belongs to 45 ages and above. In fact, women within group 22-33 ages are more sex active than other groups. More detail information are provided in the Table 1.

3.2 Distribution of BV within Age Groups

The frequencies of BV associated by age group are presented in table below. BV was distributed highly in age group of 34-44 years old patients with prevalence of 45.16%, in 62 patients of this age 28 have BV. While lower distributed in age group of 12-22 years old patients with prevalence of 34.95%, in 103 patients 36 have BV. Few patients have been found in age of ≥45 years old there were 25 patients only, among them 11 were found to have BV infection that means they are more likely to have this infection.

3.3 Prevalence of BV in Women of 12-44 and ≥45 Years Old

According to my study, out of 332 patients 134(40.36%) of all age were having BV. The Table 3 show detail on the prevalence of BV, the

prevalence in age group of ≥45 years old (44%) is greater than prevalence in age group of 12-44 years old (40.06%). i.e.: elders are more likely to have BV, those women are in post menopause stage. However, BV can affect women of all age.

4. DISCUSSION

Vaginal infections are among the first reason for women to see healthcare providers, it has occurred as a global health issue. Having asymptomatic infection in half of the cases goes with the prevalence variation in different communities. Bacterial vaginosis was evaluated among women attending Ruhengeri referral hospital, age group were important variable, women under 12 years old were excluded. Bacterial vaginosis was assessed for reproductive women (12-44 years old) and post menopause women (≥45 years old). Since that kind of infection, affect women of all age and causes gynecology and obstetrics complications.

"According to CDC, bacterial vaginosis is the most common vaginal condition in women ages 15-44. Also reported that the role of sexual activity in development of BV is not clear. The prevalence in the United States is estimated to be 21.2 million (29.2%) among women ages 14-49, based on a nationally representative sample of women who participated in NHANES 2001-2004. Nonwhite women have higher rates (African –American 51%) than white women (23%) do" [12].

Bacterial vaginosis prevalence in east African countries are as follows, the study established in Ethiopia among symptomatic and asymptomatic women found that 19.4% have BV infection [13]. "The over all prevalence of BV in 13 studies conducted in the eastern part of africa was about 23.8%, which has the intermediate prevalence of BV in African region ,with the highest prevalence reported from Kenya 52%" (Farquhar *et al*., 2010) then followed from Sudan 49.8% [14] and ethiopia 19.4% [13].

A cross-sectional study on "the prevalence of BV, conducted in CDC central clinic, Tiko, Cameroon, among sexually active pregnant and non-pregnant women aged 15-45 years shows a total prevalence of 38%. In addition, this study investigated that BV was more prevalent in the age group of 20-25 years (48.1%) followed by 25-29 years (44.4%)" [15].

Another study that shows "age as a significantly associated risk factor with BV was reported from Ghana by Konadu, 2015 on the prevalence of BV, trichomoniasis, and candidiasis among pregnant women. This report revealed that 50.55% of the BV positive pregnant woman were in the age group of 21-30 years followed by less than 20 years of age, with a prevalence of 29.67%.

Table 1. Distribution of patients according to age groups

Age group (years)	Frequency	Percent	Valid percent	Cumulative percent
12-22	103	31.0	31.0	31.0
23-33	142	42.8	42.8	73.8
34-44	62	18.7	18.7	92.5
≥45	25	7.5	7.5	100.0
Total	332	100.0	100.0	

Table 2. Distribution of BV within age groups of participants

Age of participant	Results of participant				Total
	Bacterial vaginosis	Vaginal normal flora	Intermediate	Lack of vaginal normal flora	
12-22	36	59	5	3	103
23-33	59	75	7	1	142
34-44	28	30	3	1	62
≥45	11	11	1	2	25
Total	134	175	16	7	332

Table 3. Prevalence of BV in two age groups

Group age	BV positive	BV negative	Total	BV prevalence (%)
12 - 44	123	184	307	40.06
≥ 45	11	14	25	44
Total	134	198	332	40.36

In Ethiopia, a study conducted in Felegehiwot referral hospital, on common causes of vaginal infections and antibiotic susceptibility of aerobic bacterial isolates in women of reproductive age (pregnant and non-pregnant), reported that BV was higher among non pregnant women (5.6%) than pregnant women (0.5%) and significant association was seen in the age group of 40-49 years" [16].

The study carried out in "Rwanda which was a prospective study for 297 patients with vaginal symptoms at the laboratory of Butare Teaching Hospital, south province reported that, the overall prevalence of bacterial vaginosis was 17.8%, and the highest percentage of 52.8% found in the age group 21-30 years compared with the lowest percentage of 1.9% in the age group less than 20 years. Almost half of patients with trichomoniasis were found to have bacterial vaginosis". [7]. Strongly different from my study in table 3, overall BV prevalence was 40.36% among women attending Ruhengeri Referral Hospital. This study is different from my study findings which show that post menopause women 11/25 (44%) have higher prevalence of BV than women in reproductive ages 123/307 (40.06%).

Differences in prevalence reported in different settings could be due to environmental, behavioral, socioeconomic status and stressor differences with geographical variation. The high prevalence of BV reported in present study may be due to the lack of studies presenting the associated risk factor to the population. There are striking variations in prevalence among countries, races and even groups within the same country.

The obtained prevalence is at high rate as long as the hospital used the nugent method through which Awoniyi et al. 2015 showed that in his study 33.3% were identified for BV with Amsel criteria while 60% were identified by Nugent criteria due to the fact that Amsel's criteria showed some limitations mainly because they were based on clinical signs that are neither quantifiable nor reproducible. The present study limitations include lacking the information on the associated risk factor as the key point to guide physician to a treatment.

5. CONCLUSION

In this study, Bacterial vaginosis was studied among women (reproductive and non reproductive women) attending Ruhengeri Referral Hospital. The findings showed that the prevalence of bacterial vaginosis is statistically significant different in both reproductive and non-reproductive women. However, the women ranging in ≥45 years of age were observed to be highly infected than 12- 44 age group, due to the fact that they have weakened immune system.

CONSENT

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The requesting letter of data collection in order to have access on the patients' data result was submitted to the ethic committee of Ruhengeri Referral Hospital for approval. Therefore, the patients' recorded results were collected anonymously and kept confidential only for research purpose.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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