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Vulvovaginal Candidiasis Among Women with Bacterial Vaginosis Attending Aminu Kano Teaching Hospital, NigeriaSule, H.*¹, Kumurya, A.S.¹, Nasir, A.¹*Department of Medical Laboratory Science, Faculty of Allied Health sciences, Bayero University Kano-Nigeria¹**Author for Correspondence*: sule.hamza@yahoo.com/ +234-803-606-2021***Abstract**

*Vulvovaginal candidiasis is a disturbing genitourinary disease involving the female genital tract, which is associated with discomfort and watery discharge typical of yeast infection. The aim of this study was to identify the magnitude of vulvovaginal candidiasis among females attending Aminu Kano Teaching Hospital, in Kano metropolis. Out of the 204 subjects tested, 85 positive cultures were observed which represented (41.7%) prevalence rate. The study revealed three mycological agents of Vulvovaginal infection. The three-candida species involved were isolated and phenotypically characterized as, *Candida albicans* 68(80%), *Candida glabrata* 13(15.3%), and *Candida tropicalis* 4(2.0%). Majority of the subjects were in the 19-23 years age group 89(43.6%) followed by the 24-28 years 77(37.7%) and the 29-43 year 4(2.0%). There is need for effective personal hygiene, public health awareness and education among women in the area.*

Key Words: *Women, Vulvovaginal, Candida species, CHROMagar, Candidiasis.*

Introduction

Vulvovaginal candidiasis (VVC) is a yeast (candida) infection involving the vagina, particularly the vulval region, although some other parts of the vagina could equally be affected. It is the second most common cause of vaginitis (Schenbach *et al.*, 1989). Its prevalence increases during pregnancy (Ferrer *et al.*, 2000). It also facilitates infection with HIV and other Sexually Transmitted Infections (STIs) (Kannel

et al., 2003). Bacterial vaginosis (BV) is produced when the local vaginal ecosystem is disturbed by the effect of antibiotics, hormonal imbalance, anticonceptives, stress or other factors (ACOG, 1996). The etiology is not well defined however there are decreased quantity of lactobacillus spp and increased Gardnerella vaginalis associated with other bacteria such as Peptoestreptococcus spp, Bacteroides spp, Mycoplasma hominis, Peptococcus spp, Mobiluncus curtisti and Mobiluncus mulieris (Espinosa *et al.*, 2000). It is a bothersome disease because of its abundant vaginal secretions with a characteristic bad smell (Sobel, 1990). Vaginal infections are an extremely common reason for women to seek for medical attention (Sparks, 1991; Amsel *et al.*, 1983). Moreover, many women self-diagnose and treat themselves with over-the-counter preparations (Ferris *et al.*, 1996). In both cases, misdiagnosis is common due to the lack of performance of objective laboratory testing (Wiesenfeld and Macio, 1999). The three (3) most common etiologies for vaginitis are bacterial vaginosis (BV), vulvovaginal candidiasis (VVC) and trichomoniasis. Objective diagnostic criteria exist for each of these. There is however a challenge to their use especially in developing countries (CDC, 2006). There is little known about the prevalence of mixed vaginal infections, particularly BV and VVC, although treatment of the BV component with either nitroimidazoles or clindamycin can exacerbate or uncover VVC.

It has been observed that, candida species are part of the lower genital tract flora in 20-50% of healthy

asymptomatic women (Kanagal *et al.*, 2014). Approximately 75% of all women experience at least one episode of vulvovaginal candidiasis during their lifetime and 50% of them suffer recurrent events (Sobel *et al.*, 1998). Candidiasis is often associated with the production of a thick, white/cream/yellow discharge from the vagina tract, this discharge may be watery, often odourless and usually with an accompanying vulvo-vaginal itching and inflammation (Sobel *et al.*, 1998).

It is common that, genital tract is the portal of entry for numerous sexually transmitted diseases (STD) agents (Akingbade *et al.*, 2013). A number of vaginal infections presents with few or no symptoms and yet produce serious effect and can be transmissible to other people (Akingbade *et al.*, 2013). An abnormal vaginal discharge is a common complaint in women, and it can be due to vaginal infections such as candidiasis, bacterial vaginosis, and trichomoniasis (Fox and Behets, 1995). These vaginal infections increase susceptibility to STD, including HIV. It is associated with complications such as infertility, ectopic pregnancy, low birth weight and prematurity.

Vulvovaginal candidiasis is caused by the overgrowth of candida species. Candida species that cause vaginitis most often include *Candida albicans*, *Candida glabrata*, and *Candida tropicalis* (Nurat, 2015; Radomir *et al.*, 2014).

Vaginal discharge is one of the commonest gynaecological complaints and one of the most frequent reasons that prompt women to seek a gynaecological consultation (Henn, 2005). Some degree of vaginal discharge is normal and healthy for women in their childbearing years (FSRH, 2012). It derives from the physiological secretion of cervical and Bartholin's glands and desquamation of vaginal epithelial cells resulting from bacterial action in the vagina (da Fonseca, 2013). The quantity and type of physiological vaginal discharge vary during the menstrual cycle as a result of hormonal fluctuations (FSRH, 2012). However, vaginal discharge is considered abnormal or pathological when it is more abundant, has an unpleasant odor and/or, abnormal colour,

consistency and is accompanied by vulval or vaginal itching, dysuria, and/or dyspareunia (da Fonseca, 2013).

Materials and Methods

Study Area

The study was carried out in Medical Microbiology Laboratory Department of Aminu Kano Teaching Hospital. Kano is situated between latitude 11° 30` N and longitude, 8°30` E and lies at about 1580 feet above sea level. it's total land area is 20,760 sq km (Ado,2009).

Study Design

The research was a cross sectional and prospective study.

Study Population

Women clinically suspected of bacterial vaginosis attending Aminu Kano Teaching Hospital (AKTH) constituted the subjects for this study.

Inclusion Criteria

Women clinically suspected of bacterial vaginosis and who consented to participating in the research were included in the study and those not on any antifungal drug.

Exclusion Criteria

Women without bacterial vaginosis and those on antifungal drugs due one reason or the other were excluded from participating in the study.

Ethical Clearance and Informed Consent

Ethical permission was obtained from the ethical committee of Aminu Kano Teaching Hospital, Kano and informed consent was obtained from each of the subjects before commencing the study.

Sample Size

The sample size was obtained using the formula stated by (Naing *et al.*, 2006) and calculated using prevalence of (14%) from study conducted by (Okonkwo *et al.*, 2010).

$$n = \frac{z^2 P(1-P)}{d^2}$$

Where
n = number of samples

z = statistic for level of confidence at 95% = 1.96

$p = \text{prevalence} = 14\%$ (Okonkwo *et al.*, 2010)

$d = \text{allowable error of } 5\%, (0.05)$

$n = \frac{1.96^2 \times 0.14 (1 - 0.14)}{0.05^2} = 185$

with 10% attrition rate = 204

Sample Collection

Upon admission to partake in the study, all participants with clinical signs of bacterial vaginosis during examination provided two samples of high vaginal swabs which were collected aseptically using sterile cotton tipped and labeled swab sticks.

Techniques

Cultural Methods

Inoculation

One swab was inoculated onto Sabouraud Dextrose Agar (SDA) and the other on Chocolate and MacConkey agar plates and incubated at

37°C for 24-48hrs.

Candida Species Identification on Chromagar

Pure isolates obtained after subculture were identified to species level base on colours produced by the different *Candida* species using CHROMagar *Candida* culture medium and germ-tube formation in human serum.

Direct Gram

Each swab stick was rolled on clean grease free slide for possible demonstration of large oval

yeast form or the various morphologic forms of bacteria respectively.

Microscopic Examination

For wet preparation, the swab sticks were emulsified on clean grease free glass slides with drops of 10% potassium hydroxide and saline solutions (for KOH and saline wet mount) respectively. They were covered with cover slips and examined under 10x and 40x objective for typical yeast cells in the KOH and bacteria, pus cells RBCs in the saline preparations respectively.

Statistical Methods

Data obtained in the study was analyzed using statistical package for social sciences (SPSS) version 20.

Results

Of the 204 subjects recruited, eighty-five (85) had *Candida*-positive cultures from high vaginal swab samples representing a prevalence of Vulvovaginal candidiasis of 41.7%. Among them, three (3) *Candida* species were isolated and phenotypically identified. These were *Candida albicans* 68(80%), *Candida glabrata* 13(15.3%) and *Candida tropicalis* 4(4.7%). The results showed that most the subjects were in the 19 - 23 years age bracket 89 (43.6%) followed by the 24 - 28 years 77(37.7%) while the age group of 39-43 years had the least number of subjects 4(2.0%).

Table 1: Subjects Status, Frequency and Percentages of the Isolates

Status	Frequency	Percentage (%)
Positive	85	41.7%
Negative	119	58.3%
Total	204	100.0%

Table 4.2 Prevalence of the Isolated species

Candidia spp	Frequency	Percentage %
<i>C. albican</i>	68	80
<i>C. glabratta</i>	13	15.3
<i>C. tropicalis</i>	4	4.7
Total	85	100

Table 3: Age groups Distribution of the Isolates

Age groups	Frequency	Percentage (%)
19-23	89	43.6
24-28	77	37.7
29-33	29	14.2
34-38	5	2.5
39-43	4	2.0
Total	204	100

Discussion

In the study, eighty-five (85) positive cultures were recorded, representing the prevalence of 41.7%. Our observed prevalence is lower than the 69.8% prevalence obtained by Akah *et al.* (2010) in Enugu State, South Eastern Nigeria among six hundred and twenty-nine (629) subjects. The difference in the two studies could be due to the relatively larger number of samples studied by Akah, and the fact that unlike their study, ours involved only subjects with bacterial vaginosis. Our observed prevalence of vulvovaginal candidiasis was higher than the 15% prevalence reported by Charles *et al.* (2011) in the U. S. The lower prevalence in the U.S. may be attributable to their higher standard of personal hygiene and health education as compared to the present study area.

The species involved in vulvovaginal candidiasis observed among our cohort of women included *Candida albicans* (80%), *Candida glabrata* (15.3%) and *Candida tropicalis* (4.7%). A study in the same hospital by Ugwa (2015) reported *Candida albicans* prevalence of 84.5%. Unlike in our study that isolated 3 *Candida* species, a study (Pradhan, *et al.*, 2017) in and around NIMS Hospital, Jaipur, India reported one additional specie (*Candida*

albicans, *Candida tropicalis*, *Candida glabrata*, and *Candida krusei*) with prevalence of 47%, 36.36%, 27.27% and 36.36% respectively. *Candida kusei* was the addition specie over the ones recorded in our study.

Majority of the subjects were in the 19-23 years age group (43.6%) followed by 24-28 years (37.7%) while the age bracket of 39-43 years (2.0%). A previous report (Anuradha *et al.*, 2015) in Navi Mumbai, India indicated that the prevalence of vulvovaginal candidiasis among subjects 18 to ≤24, 25 to ≤34 and 35 to 45 was 48.5%, 39.4% and 12.1% respectively. Similarly, Nnadi *et al.* (2017), also had prevalence of 65%, 59%, and 09% among subjects in the 26-30, 21-25, and 36-40 years respectively. The higher prevalence observed in this study which could be connected to the category of subjects involved (pregnant women) whose' conditions are prone to many health risks due to hormonal in balance and shaky immunity. However, the least prevalence in the two studies was observed among subjects within similar age brackets;(36-40 (09%) and 39-43 (2.0%) respectively.

Conclusion

Having over 40% as prevalence rate of

Vulvovaginal candida, is a pointer that mycological agents are deeply involved in female genitourinary tract infections as suggested by the Three different candida species isolated in the study. Therefore, prompt action is needed to curtail the situation. Moreover, having the highest prevalence in the age bracket of 19-23 further signifies the need for urgent and prompt action to manage this serious public health concern.

Recommendations

There is need for effective personal hygiene, public health awareness and education among stakeholders in public health institution. There is also the need for government to intervene in education, public enlightenment and management of vulvovaginal candidiasis in the study area.

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Conflict of Interest

None

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