

# Vulvovaginal Candidiasis in Aminu Kano Teaching Hospital, North-West Nigeria: Hospital-Based Epidemiological Study

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## Abstract

**Background:** Vulvovaginal candidiasis (VVC) remains a common problem worldwide and the role of douching as a predisposing factor is unclear. **Aim:** This study was undertaken to highlight the prevalence and predisposing factors of VVC in North-west Nigeria. **Subjects and Methods:** This was a prospective study done at Aminu Kano Teaching Hospital (AKTH), North-west. AKTH is a 500-bed tertiary hospital located in Kano, the most populous state in Nigeria. Ethical clearance was obtained. Three hundred patients with VVC were recruited from the gynecologic and general outpatients' clinics of AKTH. Research structured questionnaires were used to obtain sociodemographic and clinical information. The data obtained were analyzed using SPSS version 16.0 statistical software (SPSS Inc., Chicago IL, USA). Frequency, mean and simple percentages were used to analyze data. **Result:** *Candida albicans* was the most frequent cause of the positive high vaginal swabs constituting 84.5% (316/374) while *Proteus vulgaris* was the least frequent cause constituting 0.53% (2/374). Fifty-three percent (143/270) of those with VVC were aged 26–35 years; the married were 80% (216/270) and those who were unmarried were 20% (54/270). Douching was the commonest predisposing factor occurring in 42.5% (115/270) of cases. **Conclusion:** VVC was the most prevalent cause of vaginosis in North-west Nigeria, and douching was the commonest predisposing factor.

**Keywords:** Epidemiology, Hospital, Nigeria, North-west, Vulvovaginal candidiasis

## Introduction

Vulvovaginal candidiasis (VVC) remains a common problem worldwide, affecting all strata of society. The absence of rapid, simple, and inexpensive diagnostic tests continues to result in both overdiagnosis and underdiagnosis of VVC. Although commonly caused by *Candida albicans*, non-albican species and immunosuppression have led to the development of recurrent diseases some of which are nonresponsive to conventional antifungal regimes.

Nwadioha and colleagues reported that *C. albicans* were responsible for 60% of high vaginal swab (HVS) specimen.<sup>[1]</sup> Ibrahim and colleagues in a study done in Maiduguri, north-east

Nigeria, reported a prevalence of 41% among pregnant women attending antenatal care.<sup>[2]</sup> Another study involving a cohort of apparently healthy women reported that about 30% had yeast isolated, confirming the diagnosis of VVC.<sup>[3]</sup>

Studies have reported the prevalence of VVC as 25%,<sup>[4]</sup> 24%<sup>[5]</sup> and 18.5%.<sup>[6]</sup> Parveen *et al.* Maccato and Kaufman reported a high rate among pregnant women<sup>[7,8]</sup> and Okonofua *et al.*, reported a high carriage of *C. albicans* in Nigeria infertile women compared with controls.<sup>[9]</sup> Okonkwo reported no significant difference in prevalence of VVC among women of various socioeconomic status in Nnewi.<sup>[10]</sup>

A higher prevalence of vaginal colonization and symptomatic vaginitis is more often seen in pregnant women than in those who are not pregnant and this is due to high concentrations of reproductive hormones that increase the glycogen content in the vaginal tissue thereby providing a carbon source for candida organisms.<sup>[11]</sup>

Increased vaginal colonization with candida has been shown after the use of oral contraceptives with high estrogen

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content.<sup>[12]</sup> Increased carriage of yeast is reported in users of intrauterine contraceptive devices, contraceptive sponges, diaphragms, and condoms, with or without spermicides.<sup>[13]</sup>

However, an extensive study of college students did not show an increase in the risk of symptomatic VVC in users of oral contraceptives, diaphragms, condoms, or spermicides.<sup>[14]</sup> Women with type 2 diabetes are more prone to colonization with *Candida glabrata*.<sup>[15]</sup> Symptomatic VVC frequently follows use of vaginal or systemic antibiotics.<sup>[16]</sup> Douching has been shown to be a risk factor for candida vulvovaginitis for some women, and for others, there was no relationship found. Ekpenyong and Davis, in Uyo, found a paradoxical relation between vaginal douching and adverse reproductive tract disorders.<sup>[17]</sup> Heng, *et al.*,<sup>[18]</sup> found a high prevalence of VVC among Cambodian women who douched, while no similar association was reported among Indian women by Sujit, *et al.*<sup>[19]</sup>

With much emphasis on drug use and misuse by the female folks with respect to reproductive tract infections, little interest is shown in some cultural practices such as douching which can also predispose women to certain reproductive tract infections including VVC.

The aim of this study is to highlight the prevalence and predisposing factors of VVC in North-west Nigeria and make a recommendation on how to reduce the prevalence.

## Subjects and Methods

This was a prospective study done at Aminu Kano Teaching Hospital (AKTH), North-west. AKTH is a 500-bed Tertiary Hospital Located in Kano, the most populous state in Nigeria. Ethical approval was obtained from AKTH Research and Ethics Committee with reference number AKTH/MAC/SUB/12A/P3/796 and dated January 21, 2010. Informed consent was also obtained from the respondents. The study period was between November 1, 2011 and February 28, 2012 and involved 300 women who had clinical and laboratory evidence of VVC. Selection was by simple random sampling.

Sample size was calculated based on prevalence of VVC from previous studies.<sup>[6-9]</sup>

$$n = z^2 P q/d^2$$

( $n$  = Sample size,  $z$  = Standard normal deviation = 1.96 at 95% confidence limit,  $P$  = Prevalence rate = 22.5%,  $q = 1-P = 1-22.5\% = 0.775$ ,  $d$  = Error margin = 5%).

The minimum sample size was 268. Because of the possibility of drop-out the sample size was increased to 300 after applying the exclusion criteria. Exclusion criteria were females less than 16 years of age, those who were menstruating, those who had any immunosuppressive illness, those with history of diabetes mellitus, those with recurrent VVC, those with premalignant or malignant cervical lesions and those who were pregnant.

Postmenarchal females with a diagnosis of VVC were included in the study. The patients had a clinical diagnosis of VVC based on history and physical examination (including vaginal examination).

Signs and symptoms that were evaluated include: Itching, burning, irritation, edema, erythema and/or excoriation of the vagina/vulva. Each evaluated sign and/or symptom was given a numerical rating based on severity (absent = 0; mild = 1; moderate = 2; severe = 3). Patients with VVC may have a vaginal discharge, which is usually described as white, creamy, and cottage cheese-like in appearance and adherent to the epithelium.

Research structured questionnaires were administered to all the 300 subjects. These gave various sociodemographic and clinical informations. To ensure content validity of the research instrument, the draft questionnaire was submitted to a senior colleague for scrutiny regarding the relevance of each item. Pretesting of the questionnaire was also done where 20 self-administered questionnaires were distributed to volunteers with vulvovaginal symptoms to comment on the clarity of the questions. All the recruited patients were examined by the researcher. They were put in lithotomy position, and the vulva was inspected. Under good light, a sterile Cusco's bivalve speculum was used to expose the vagina after swabbing the vulva with sterile water. Specimens were taken from the posterior fornix with a sterile cotton swab that was immediately put into a sterile tube containing about 3 ml of saline. A screening 10% potassium hydroxide (KOH) preparation from the inflamed vaginal mucosa or vaginal discharge was done to identify yeast forms (hyphae/pseudohyphae) or budding yeasts. A drop of 10% KOH on the pool of the secretion on the speculum when it produced a fishy smell denoted a positive test for *Gardnerella vaginalis*. The tube was labeled with the patient's initials and case form number and taken to the laboratory for further investigations that included wet microscopy and preparation of a dry Gram stain slide for microscopy. A Gram stain slide can reveal candida (pseudohyphae) or *Bacteria vaginosis* (clue cells and proportions of lactobacilli and other organisms). Wet microscopy was prepared in the laboratory by dipping a small amount of discharge from a HVS into saline on a microscope slide. This was useful in identifying pseudohyphae in candida. Culture in Sabouraud's medium was used to detect the candida when microscopy was inconclusive. Whenever the HVS was not transported immediately to the laboratory, it was stored at 4°C for no longer than 48 h. Those HVS specimens in which *C. albicans* was isolated were included in the study.

The data obtained were analyzed using SPSS version 16.0 statistical software (SPSS Inc., Chicago IL, USA). Absolute numbers and simple percentages were used to describe categorical variables. Similarly, quantitative variables were described using measures of central tendency (mean, median) and measures of dispersion (range, standard deviation) as appropriate.

## Results

Of the 300 women included in the study, 30 were drop-outs and 90% (270/300) completed the study. These 30 droppers did not continue with the study because their husbands did not give consent for them to participate in the study. The culture in many parts of Northern Nigeria is that the husbands consent is required about aspects of the woman's reproductive and sexual health. VVC constituted 84.5% of all HVS specimens. The results are shown in Tables 1-3.

## Discussions

This study reports a very high prevalence (84.5%) of VVC compared to 25%,<sup>[4]</sup> 24%,<sup>[5]</sup> 18.5%<sup>[6]</sup> and 61%<sup>[1]</sup> from previous studies. The report of this study is similar to that of Onifade and Olorunfemi in Ondo State who reported a prevalence of 81.5%.<sup>[20]</sup>

Vulvovaginal candidiasis occurs among women in the age group 16–45 years as shown in this study. This was similarly

reported.<sup>[4,21]</sup> The reason is the high estrogen levels in this group of women resulting in a favorable pH for candida colonization. The mean age of women with VVC in this study was 27.7 (7.8) years. The condition was more prevalent in women aged 26–35 years (53%) and lowest in those aged 36–45 years (13.7%). This report is a replication of that of another study<sup>[22]</sup> that showed that the occurrence of VVC peaks in the third decade of life, declining in women older than 40 years. It is, however, contrary to study by Ako-Nai *et al.*,<sup>[23]</sup> where highest incidence was among women 20–25 years of age.

This present study has shown that marital factor affects the prevalence of VVC. Although Enweani *et al.*,<sup>[24]</sup> reported that marital factor had no effect on the prevalence of VVC, Okungbowa *et al.*,<sup>[22]</sup> are of the view that marital factor was important. This study showed higher incidence among the married (69.6%) compared to the unmarried (30.4%). The report of this study agrees with that of Okungbowa, *et al.*,<sup>[22]</sup> that VVC is commoner among the married women.

The result of this study has shown that cheesy vaginal discharge was the commonest presentation in patients with VVC occurring in 47.4% of cases. This was followed by vulval itching or pruritus that occurred in 30.4% of cases. Vulval redness occurred in 12.2% and vulval burning sensation in 10% of cases. This is compatible with the reported symptoms for

**Table 1: Microbiological pattern in 374 positive high vaginal swabs specimens in AKTH**

Organism	Frequency percentage
<i>Candida albicans</i>	316 (84.5)
<i>Streptococcus</i> species	20 (5.35)
<i>Staphylococcus</i> species	14 (3.74)
<i>Escherichia coli</i>	14 (3.74)
Bacterial vaginosis	8 (2.14)
<i>Proteus vulgaris</i>	2 (0.53)

AKTH: Aminu Kano Teaching Hospital

**Table 2: Distribution of sociodemographic characteristics of study population**

Parameters	Frequency (%)	Mean (SD)
Age (year)		27.7 (7.8)
16-25	90 (33.3)	
26-35	143 (53)	
36-45	37 (13.70)	
Parity		2 (2)
0	60 (22.2)	
1-2	113 (41.9)	
3-4	62 (23.00)	
≥5	35 (13.0)	
Marital status		
Married	216 (80)	
Unmarried	54 (20)	
Occupation		
Housewife	119 (44.1)	
Employee	61 (22.6)	
Trader	29 (10.7)	
Students	61 (22.6)	
Educational status		
None	64 (23.7)	
Primary	34 (12.6)	
Secondary	72 (26.7)	
Tertiary	100 (37.0)	

SD: Standard deviation

**Table 3: Distribution of clinical presentations, perceptions and predisposing factors of vulvovaginal candidiasis in the study population**

Parameters	Frequency (%)	Mean (SD)
Presenting clinical features		-
Cheesy vaginal discharge	128 (47.4)	
Itching	82 (30.4)	
Burning	27 (10)	
Redness	33 (12.2)	
Total	270 (100)	
Duration of symptoms (days)		13.3 (7.4)
0-7	71 (26.3)	
8-14	105 (38.9)	
15-21	57 (21.1)	
22-29	37 (13.7)	
Total	270 (100)	
Patient's perception of the source of infection		-
Sexual	73 (27)	
Toilet	113 (41.9)	
Unknown	84 (31.1)	
Total	270 (100)	
Risk factors		-
Contraceptive	78 (28.9)	
Antibiotics	52 (19.3)	
Douching	115 (42.6)	
None	25 (9.3)	
Total	270 (100)	

SD: Standard deviation

VVC including vaginal discharge, burning and pruritus.<sup>[25,26]</sup> Vaginal discharge is a common presentation in gynecological patients.<sup>[27,28]</sup>

Of 41.9% of the patients believed that they contracted VVC from the toilet, 31.1% did not know the source of the infection and 27% believed that it was sexually transmitted. Rabiou *et al.*,<sup>[29]</sup> from Lagos, Nigeria, also reported that 44.6% of women perceived that they contracted reproductive tract infection from the toilet, followed by sexual intercourse and poor hygiene. Although VVC is not a sexually transmitted disease, there are some evidences to suggest that the frequency/periodicity of sexual intercourse is associated with acute vaginitis.<sup>[13]</sup>

Douching was the most common risk factor responsible for VVC prevalence occurring in 42.6% of the patients in this study, followed by use of contraceptives (combined oral contraceptive pills and intrauterine devices) in 28.9% of cases and antibiotics use in 19.3% of cases. Douching has been shown to be a risk factor for candida vulvovaginitis for some women, and for others, there was no relationship found.<sup>[18,19,30]</sup>

This study has also shown that VVC is associated with usage of the oral contraceptive pills and intrauterine contraceptive devices. While this finding is similar to some studies,<sup>[14]</sup> it is not replicated by others.<sup>[31]</sup>

Vulvovaginal candidiasis is the most prevalent cause of vaginosis in North-west Nigeria and douching is the commonest predisposing factor. It will be a good practice to discourage women from douching.

The limitation of this study is that the use of the questionnaire means that individual opinion was assessed which may not be very objective. Also, future research using case-control design may help make better deductions.

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