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# A study of female genital swabs in primary health care centres in Jos, Nigeria

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## ABSTRACT

**Objective:** To detect some common microbial agents of female genital discharges in order to improve the current syndromic management of abnormal vaginal discharge. **Methods:** A prospective study of female genital swabs collected from Primary Health Care Centres, Jos, and analysed for microscopy, culture and sensitivity in Jos University Teaching Hospital, December 2006 to December 2007 was carried out. **Results:** Microbial agents were detected in 70% (700) of a total 1 000 female genital swabs studied. *Candida* species peaked with 42.0% (420) out of the 1000 samples, followed by *Gardnerella vaginalis*, an agent of bacterial vaginosis with 26.0%. The distribution of abnormal vaginal discharge was highest in young adults aged 21 to 30 years. **Conclusions:** It is concluded that abnormal vaginal discharge is most prevalent in the young sexually active age group with *Candida* species as the commonest agent. We recommend prevention, early diagnosis and prompt treatment of infective female genital discharge in order to reduce the menace of HIV transmission.

## 1. Introduction

Abnormal vaginal discharge is a gynecologic disorder that manifests with an offensive non-bloody discharge in the female lower reproductive tracts. It is a common complaint among women of different age groups in any society whether or not they are sexually active. It may be regarded as any amount of secretion that the patient is worried about. Vaginal discharge may be normal or abnormal[1]. Normal vaginal discharge is physiologic when it occurs during sexual arousal, pregnancy or at specific period in the menstrual cycle. It is colourless or white, non irritating and odourless or has mild odour and is non infective in nature with no sequelae. On the other hand, abnormal vaginal discharge may be green, yellow, brown or red in colour with foul smelling odour, pruritus, irritation, dysuria or dyspareunia depending on the type of infection[2].

Microbial agents of abnormal vaginal discharge include *Neisseria gonorrhoeae* (*N. gonorrhoeae*), *Chlamydia*

*trachomatis* (*C. trachomatis*), Group B-streptococcus, *Ureaplasma urealyticum* (*U. urealyticum*), Herpes simplex virus in the cervix and *Candida albicans* (*C. albicans*), *Trichomonas vaginalis* (*T. vaginalis*) and *Gardnerella vaginalis* (*G. vaginalis*) in the vagina[2].

Although vaginitis or inflammation of the vagina generally is both treatable and mild, when left untreated, it is a possible risk for acquisition of HIV/AIDS as well as other complications[3]. Other complications of vaginal infection include pelvic inflammatory disease, infertility, ectopic pregnancy, pelvic abscess, menstrual disorders, spontaneous abortion and premature birth. It is now well established that the presence of sexually transmitted infections greatly facilitates transmission and acquisition of HIV between sexual partners[4]. Therefore, there is a need for prevention, early diagnosis and prompt treatment of this condition. This work is to improve the new syndromic treatment guideline of abnormal vaginal discharges.

## 2. Materials and methods

Female genital swabs were collected from December 2006 to December 2007 in some primary health care centres in

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Jos, Nigeria. The choice of selection of the PHCs was based on simple balloting.

Endocervical and high vaginal swabs were collected following aseptic precautions[5]. The genital swabs were immediately sent to the genital bench of Medical Microbiology and Parasitology Laboratory, Jos University Teaching Hospital where they were processed according to standard procedures[5]. Infection with *Candida* species was diagnosed by microscopy of a saline mount, gram-stained smear of material from the vagina and colonial growth on Sabouraud's Dextrose agar. *Trichomonas vaginalis* was diagnosed by microscopy of a saline mount for the actively motile, spear shaped flagellates. *Gardnerella vaginalis*, an agent of bacterial vaginosis, was diagnosed by evaluation of gram stained smear at oil immersion power ( $\times 1\ 000$ ) objective for clue cells, usually representing at least 20 percent of vaginal epithelial cells.

Cervical specimens were gram-stained and cultures were inoculated on plates of Chocolates and Thayer-Martin (Oxoid) media and incubated at 37 °C in a moisturized candle extinction jar for 24 to 72 h. *Neisseria gonorrhoeae* was identified by typical colonial morphology, reactions to gram-stain, positive oxidase test, and sugar fermentation. The antibiotic sensitivity of isolates was tested by the agar diffusion method on chocolate agar plates using oxoid

**Table 1**

Distribution of microbial agents of female genital discharge in PHC centres in Jos, December 2006 to December 2007.

Age group in years	Microbial agents				Undetermined causes
	<i>Candida</i> species	<i>G. vaginalis</i>	<i>T. vaginalis</i>	<i>N. gonorrhoeae</i>	
0–10	5	–	–	1	4
11–20	103	70	–	–	47
21–30	180	140	6	4	111
31–40	100	50	9	–	60
41–50	30	–	–	–	60
51–60	2	–	–	–	18
Total	420 (42.0%)	260 (26.0%)	15 (1.5%)	5 (0.5%)	300 (30.0%)

695 (69.5%) and undetermined agents (no growth, no pathogen isolated) in 300 (30.0%) of the total 1000 female genital smears. The aetiologic investigation indicated *N. gonorrhoeae* in 5 (0.5%), *Candidiasis* in 420 (42.0%), *G. vaginalis* 260 (26.0%), *T. vaginalis* 15 (1.5%) of the 1 000 genital swabs. Out of the total of 420 *Candida* species, 180 (42.8%) was detected in age decade 21–30 years. Also, one hundred and forty (53.8%) of total 260 cases of bacterial vaginosis and 4 isolates of *N. gonorrhoeae* were found in the same age group 21–30 years (Table 1).

#### 4. Discussion

The present study was set to detect common microbial causes of female genital discharges in primary health care centres in Jos, in order to improve the syndromic management of vaginal discharges. The microbial agents of female genital discharges were as follows, *Candida* species,

multidisks with standard antibiotic concentrations. The samples collection, transportation and processing including microscopy, culture and biochemical tests were carried out according to recommended standard[5]. The results were analysed using SPSS 11.0 statistical software. *Chi-square* ( $\chi^2$ ) was used to compare association between proportions and  $P < 0.05$  was considered significant at 95.0% confidence interval. Formal ethical clearance was obtained from Jos University Teaching Hospital and permission from Jos local government council head quarters.

#### 3. Results

A total of 1 000 female genital samples were received. Microbial agents were detected only in 700 (70.0%) of the total samples while 300 (30.0%) of the total samples were undetermined. The samples were arranged according to the age groups of the patients ranging from 0–60 years. The age range 0–10 years constituted 10 (1.0%) out of the 1000 patient population, 11–20 years 220 (22.0%), 21–30 years 390 (39.0%), 31–40 years 270 (27.0%), 41–50 years 90 (9.0%), 51–60 years 20 (2.0%). The peak age bracket at risk was 21–30 years which constituted 390 (39.0%).

Cervical agents were detected in 5 (0.5%), vaginal agents in

*G. vaginalis*, *T. vaginalis* and *N. gonorrhoeae* in descending order.

Candidiasis was a leading cause of vaginal discharge in the study with 420 (42.0%) of the total 1000 female genital samples. The result was similar to some earlier studies[6], which recorded 52.5% and 60%, respectively. Predominance of candidiasis in the study was in the age group 21–30. The age decade of 21–30 is the most sexually active age group with highest risk of pregnancies, indulgence in family planning pills and immunosuppression due to HIV/AIDS[7–10]. The inflammation of the vagina, as in any inflammatory STI, increases the risk of acquisition of HIV[11,12]. Candidiasis is not usually sexually transmitted, though male contacts should be treated, firstly, if they have symptoms, and secondly, if the woman is having recurrences.

Bacterial vaginosis (BV) was one of the leading causes of vaginal discharge in the study with 260 (26.0%) out of the total 1000 female genital samples. A previous study by Ison and Hay, recorded 30% of BV[9] which was similar to the present

study. Predominant finding of BV was in the age range of 21–30 years in the study.

BV is the most common cause of vaginal discharge among young women of child bearing age with sexual promiscuity as a risk factor<sup>[10,13,14]</sup>. The rate of acquisition of HIV among women with BV is much higher than in women with normal vaginal flora<sup>[10,11,15]</sup>. There is need for early diagnosis, prompt treatment and prevention of BV, especially in pregnant mothers because of the greater risk of transmission of HIV to the unborn child and serious effects of premature rupture of membrane, prematurity and low birth weight.

Out of the total of 1 000 female genital samples only 15 (1.5%) was due to *T. vaginalis* and 5 (0.5%) was *N. gonorrhoeae*. A reason for the very low finding of *N. gonorrhoeae* was owed to indiscriminate and wide use of antibiotics<sup>[11,16,17]</sup>. Our community is in a developing country, where antibiotics are easily purchased without prescription both from legal sources like pharmaceutical and chemist stores and illegal sources like free markets and streets hawkers. *N. gonorrhoeae* in particular is very sensitive to antibiotics. Secondly, unlike the male urethra discharge, there is a lot of microbial flora in vaginal discharge that can muddle identification of *N. gonorrhoeae*. Vaginal trichomoniasis has been implicated with an increased risk of transmission of HIV and further complication in pregnancy includes premature rupture of membrane, pre-term delivery and low birth weight. Sexual partners of patients with *T. vaginalis* should always receive treatment, whether or not they are symptomatic.

Undetermined agents contributed 300 (30.0%) out of the 1000 total samples of female genital discharge in the study, which was similar to other previous studies<sup>[8, 11]</sup> which recorded 35% and 46.2%, respectively. Inability to resolve the undetermined causes in the study was a limitation. It is possible that a number of women might harbour some infections due to *Chlamydia*, *U. urealyticum* and other organisms which are not easily detected by our tools. Also some undetected chemicals and physical agents could be contributory to the discharge.

In conclusion, abnormal vaginal discharge was most prevalent in the young sexually active age group with *Candida* species as the commonest agent. We recommend prevention, early diagnosis and prompt treatment of abnormal vaginal discharges in order to curtail the transmission of HIV.

### Conflict of interest statement

We declare that we have no conflict of interest.

### References

- [1] Omole–Ohonsi A, Mohammed Z, Ihesiulor U. Vaginal discharge in pregnancy in Kano, Northern Nigeria. *Niger Med Pract* 2006; **50**: 68–71.
- [2] Nwadioha SI, Egah DZ, Jombo G, Alao OO, Egesie UG. Risk factors for abnormal vaginal discharge among women attending primary health care centers in Jos Nigeria. *J Adv Med Pharm Sci* 2010; **4**(1): 1–3.
- [3] Joint United Nations Programme. *Technical report on AIDS epidemic update 2003*. Geneva: Joint United Nations Programme on HIV/AIDS; 2003, p. 35.
- [4] Federal Ministry of Health. *Technical report on the 2005 national HIV/Syphilis sentinel survey among pregnant women attending antenatal clinics in Nigeria*. Abuja: Federal Ministry of Health; 2006, p. 1–11.
- [5] Van Dyck E, Meheus AS, Piot P. *Practical manual on laboratory diagnosis of sexually transmitted disease*. Geneva: Joint United Nations Programme on HIV/AIDS; 1999, p. 90–94.
- [6] Nwokedi EE, Anyiam NN. A study of high vaginal swabs in Kano teaching hospital: a preliminary report. *Highland Med Res J* 2003; **1**: 57–61.
- [7] Nwadioha SI, Egah DZ, Banwat EB, Alao OO. Microbial agents of abnormal vaginal discharge in pregnant mothers attending PHC centers of Jos, Nigeria. *J Clin Med & Res* 2009; **2**: 7–11.
- [8] Skolucka N, Daczewska M, Saczko J, Chwilkowska A, Choromanska A, Kotulska M, et al. ETM study of electroporation influence on cell morphology in human malignant melanoma and human primary gingival fibroblast cells. *Asian Pac J Trop Biomed* 2011; **1**(1): 94–98.
- [9] Ison CA, Hay PE. Validation of a simplified grading of gram stained vaginal smears for use in genitourinary medicine clinics. *Sex Transm Infect* 2002; **78**: 413–415.
- [10] Kenneth OB. STDs/HIV/AIDS—challenge of next millennium. *Niger J Genitourinary Med* 2003; **18**: 18–30.
- [11] Nwadioha SI, Egesie JO, Emejuo H, Iheanacho E. A study of female genital swabs in a Nigerian tertiary hospital. *Asian Pac J Trop Med* 2010; **3**(7): 577–579.
- [12] Nwadioha SI, Egah DZ, Alao OO, Iheanacho E. Risk factors for vaginal candidiasis among women attending primary health care centres of Jos, Nigeria. *J Clin Med Res* 2010; **2**(7): 110–113.
- [13] Nwadioha S, Egesie JO, Emejuo H, Iheanacho E. A study of female genital swabs in a Nigerian tertiary hospital. *Niger Hosp Pract* 2010; **6**(3): 65–68.
- [14] Nwadioha S, Egesie JO, Emejuo H, Iheanacho E. Prevalence of pathogens of abnormal vaginal discharges in a Nigerian tertiary hospital. *Asian Pac J Trop Med* 2010; **3**(6): 483–485.
- [15] Jombo GTA, Opajobi SO, Egah DZ, Banwat EB, Akaa PD. Symptomatic vulvovaginal candidiasis and genital colonization by candida species in Nigeria. *J Public Health & Epidemiol* 2010; **2**(6): 147–151.
- [16] Akerele J, Abdul P, Okonfua F. Prevalence of asymptomatic genital infection among pregnant women in Benin city, Nigeria. *Afri J Reprod Health* 2002; **6**(3): 93–97.
- [17] Anderson MR, Klink K, Cohrsen A. Evaluation of vaginal complaints. *JAMA* 2000; **291**: 1368.

[1] Omole–Ohonsi A, Mohammed Z, Ihesiulor U. Vaginal discharge in pregnancy in Kano, Northern Nigeria. *Niger*