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Prevalence of Candida albicans among Women Attending Federal Medical Centre Asaba, South-South, Nigeria.

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Abstract
Four hundred(400)High Vaginal Swabs(HVS) were carefully and aseptically collected from symptomatic and asymptomatic pregnant and non pregnant women aged 18-49 years. The samples were analyzed using standard microbiological methods. Wet preparation of the samples were examined microscopically and the swabs were cultured on Sabouraud Dextrose Agar (SDA) plates and incubated at 37^0C for 3-4 days. The overall prevalence of *Candida albicans* was 137(34.25%). Among this number 96(36.36%) of the symptomatic women had *Candida albicans* while 41(30.14%) asymptomatic women as well had *Candida albicans.* This investigation recommends good personal hygiene and regular check up for women domiciled in this area since *C. albicans* poses a major health challenge to avoid complicated health problems.
Keywords: *Candida albicans*, asymptomatic, prevalence, candidiasis.

1. INTRODUCTION

The genital tract is the portal of entry for numerous sexually and non-sexually transmitted diseases. Different kinds of bacterial and non-bacterial infections exist that affect the female reproductive tract and cause vaginal discharge. Vaginal discharge is a common symptom in primary health care and is often the second most common gynecological problem after menstrual disorders. Most women regard any secretion from the vagina as abnormal discharge and the first task for primary health care providers is to ascertain whether it is pathological or physiological. There are few women who complain of vaginal discharge, discomfort or odour without any objective finding (Dodson and Friedrich, 1997). *Candida albicans* is the most frequently isolated invasive fungal pathogen in humans, with the majority of infections being localized to the urogenital or oropharyngeal tracts of the patient (Fidel, 1996). In addition to localized infections, *Candida albicans* is also able to establish a systemic infection in its host.

Vaginal candidiasis is a common gynecological problem among women of child bearing age worldwide (Anderson et al; 2004; Naglik et al; 2003). It has been reported that up to 75% of sexually active women will have experienced symptomatic vaginal candidiasis (Schroppei et al; 1994; Lisiak et al; 2003).*Candida* species are part of the lower genital tract flora in 20-50 % of healthy asymptomatic women (McClelland et al., 2009; Akah et al., 2010). It is reported that Carrier rates are higher in women treated with broad spectrum antibiotics (Singh, 2003), in pregnant and diabetic women (Donders, 2002; de Leon et al., 2002) and women with HIV/AIDS (Reed et al., 2003; Duerr et al., 2003; Akah et al., 2010). *Candida albicans* is both the most frequent colonizer and is responsible for most cases of vulvo vaginal candidiasis (Singh, 2003).

Several factors can be associated with increased rate of vaginal colonization by *C. albicans*: these include pregnancy, use of high oestrogen content drugs and oral contraceptives (Akah et al., 2010; Alli et al., 2011), uncontrolled diabetes mellitus (CDC, 2002; Alli et al., 2011), prolonged use of broad spectrum antibiotics (Mardh et al., 2002; Alli et al., 2011) which kill the good and beneficial bacteria, allowing yeast overgrowth, poor dietary habits and poor personal hygiene. Many practitioners believe that nylon underwear and tight insulating clothing predispose to vaginal candidiasis by increasing the temperature and moisture of the perineum (Nwankwo et al., 2010; Alli et al., 2011). A study among African women wearing tight clothes reported a higher prevalence of *Candida albicans* in Vulvovaginal candidiasis than those wearing loose clothing (Alli et al., 2011).The aim of this research work was to determine the prevalence of *candida albicans* among women attending Federal Medical Centre Asaba South-South, Nigeria.

2. MATERIALS AND METHODS

2.1 Collection of samples

Four hundred (400) high vaginal swab (HVS) specimens were collected from both symptomatic and asymptomatic pregnant(300) and non pregnant(100) attending Federal Medical Centre Asaba using sterile swab sticks. The characteristic features of the symptoms include foul smelling odour, vaginal discharge (scanty or purulent), burning sensation and pain during urination, as well as itching and irritation of the vagina. The samples were labelled appropriately and taken to the laboratory immediately for analysis.

2.2 Microscopic Examination of Samples

About 1 ml of normal saline was put in the tube containing the swab to cover the cotton bud, shaken and allowed to stand for some minutes. A drop of this was placed on a clean grease- free slide and was viewed with low power objectives (10× and 40×) for yeast cells. Germ tube test was also carried out on suspected yeast colonies and positive colonies were sub-cultured onto corn meal agar medium for further identification by the formation of chlamydiospore by *C. albicans.*

2.3 Microbiological analysis

All the specimens were streaked on prepared Sabouraud Dextrose agar (SDA) plates. The plates were incubated at 37°C for 3-4 days. Colonies were sub-cultured on MacConkey agar to obtain pure cultures. Colonial morphology, gram staining and biochemical reactions were used to identify the isolated organisms.

3. RESULTS

Table 1: Prevalence of *Candida albicans* among pregnant and non pregnant women.

Status	No examined	*Candida albicans* (%)	Non-albicans(%)
Pregnant women	300	120 (40%)	21 (7%)
Non pregnant women	100	17 (17%)	6 (6%)
Total	400	137 (34.25)	27 (6.75%)

Out of 300 pregnant women who were examined, 120(40%) had *Candida albicans* which was higher than the non pregnant women 17(17%) (Table 1).

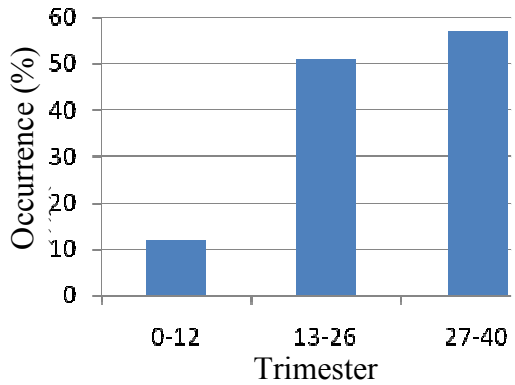

Fig 1: Distribution frequency of *Candida albicans* in different trimester of pregnancy

Figure 1 shows the frequency of *Candida albicans* at different trimester of pregnancy with the highest at the third trimester 57(47.5%) followed by second trimester 51(36.95%).

Table 2: Prevalence of *Candida albicans* among symptomatic and asymptomatic women

Status	Number examined	*Candida albicans* (%)	Non-albicans (%)
Symptomatic	264(66)	96 (36.36%)	18(6.81%)
Asymptomatic	136(34)	41 (30.14%)	9 (6.61%)
Total	400(100)	137 (34.24)	27(6.75%)

In table 2, *C. albicans* of the symptomatic women 96(36.36%) was higher than the asymptomatic 41(30.14%) women.

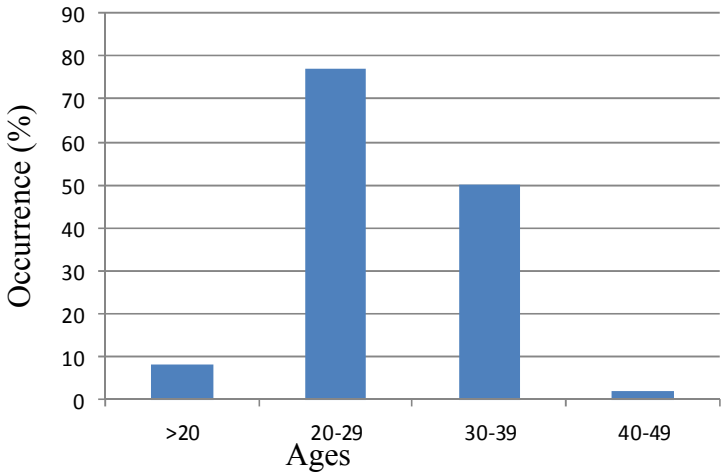

Fig 2: Frequency distribution of *Candida albicans* in the different age groups

From figure 2, it becomes imperative that age 20-29 had the highest prevalence of *Candida albicans* with 77(38.5%), followed by ages 30-39 with prevalence of 50(33%) and the least was ages 40-49 with prevalence of 2.

Table 3: Prevalence of *Candida albicans* in women who use antibiotics

Antibiotics	No examined	*Candida albicans* (%)	Non-albicans (%)
Users	226	76 (33.6%)	9 (3.98%)
Non users	174	61 (35.05%)	18 (10.34%)
Total	400	137 (34.25%)	27 (6.75%)

This showed a higher prevalence of *C. albicans* in users of antibiotics 76(33.6%) than the non users of antibiotics 61(35.05%)(Table 3).

Table 4: Prevalence of *Candida albicans* in relation to mode of dressing.

Type of underwear	No examined	*Candida albicans* (%)	Non-albicans (%)
Synthetic	225	90 (40%)	16 (7.1%)
Cotton	175	47 (26%)	11 (6.2%)
Total	400	137 (34.25%)	27 (6.75%)

Table 4 showed the prevalence of *C.albicans* 90(40%) in women wearing synthetic underwear is higher than those wearing cotton 47(26%).

4. DISCUSSION

In this study, the result showed that out of 400 women, 137(34.25%) showed positive result for *C. albicans*. This 34.25% observed in this study corroborates the works of (Singh, 2003; Akah *et al*., 2010; Alli *et al*., 2011) which stated that *Candida albicans* is the most frequent colonizer as well as responsible for most cases of vulvovaginitis.This prevalence of *Candida albicans* (34.25%) was higher compared to that reported by Choudhry et al. (2010) to be 2.0% in their study. It was also higher than the 2.20% reported by Konje et al. (1991) in Ibadan and 22.1% reported by Anorlu et al (2004) among women in Lagos University Teaching Hospital(LUTH), Nigeria. However, it was lower than the 60.0% reported for *C. albicans* infection among pregnant women by Alli et al. (2011) and the 40.0% reported by Oyewole et al. (2010) among non-HIV infected women in Sagamu, Ogun state, Nigeria. The prevalence among pregnant (40%) was higher than non pregnant women (17%). This result supports the findings of Newman et al. (1975) who demonstrated increased number of positive microscopic findings in pregnant women (40.9%, 83/203), compared to (23.8% 58/244) in non-pregnant women and that of Enweani et al. (2001) which showed a greater percentage of the vaginal yeast detected in pregnant women (51.5%, 203/394), compared to non-pregnant women (40.6%, 43/106). This confirms that pregnancy could be a risk factor which increased the possibility of vaginal candidiasis. The high prevalence in this study among pregnant women could be attributed to the fact that there was an increased secretion of reproductive hormones during pregnancy which favors the proliferation of *C. albicans* (Sobel 1997). High levels of estrogen provide an increased amount of glycogen in the vagina. In this study, pregnant women in their third trimester had the highest prevalence of 57(47%). This result supports previous findings that pregnant women within their 3rd trimesters had the highest prevalence of 30.40% and 32.41% respectively for *T. vaginalis* and *Candida albicans* as reported by (Okonkwo et al ., 2010;Okpara et al.,2009).The result of this study however

differed with that of Oviasogie 2009, who reported that women in their second trimester had the highest occurrence of *Candida* infection of (68.8%). During pregnancy, the vagina is more sensitive, and the infection occur significantly more often. This is especially true in the last trimester of pregnancy, due to the increased amount of glycogen in the vagina and high levels of hormones. The result on the occurrence of *Candida albicans* in different age groups suggests that some age groups are more prone to the infection than others. The results showed that ages 20-29 years had the highest prevalence of vaginal candidiasis of 38.5%. This differed with the results of Adad et al. (2001),who reported that *Candida* species were most frequent among younger patients, especially those ages under 20 years. These results showed that the prevalence rate among antibiotics users was 76(33.6%) which was higher than non antibiotic users 61(35.5%). The result of this present study disagrees with that of Nwadioha et al (2010), who reported that broad spectrum antibiotic users posed a 16% risk for vaginal candidiasis. The use of antibiotics is a predisposing factor to colonization of *Candida* and equally the absence of risk factors do not necessarily guard against vaginal candidiasis (Sobel et al 1998).The prevalence according to the mode of dressing among the women showed an increase in *Candida albicans* in women who put on tights and synthetic underwears 90(40%) against those who do not. These materials are being noted to trap bacteria and increase temperature in the vagina areas thereby creating a warm, moist environment, a pre-requisite for the development and proliferation of the pathogenic strains of *Candida albicans*.

5. CONCLUSION

A relatively high prevalence of *Candida albicans* was observed in this study. This was similar to that found in other parts of Nigeria. This study has shown that factors such as age of the women, use of antibiotics, stage of pregnancy and dressing among women were responsible for high prevalence of *Candida albicans*. These findings should be taken into account in further studies concerning presence of *C. albicans* among women in Nigeria since it is responsible for female genital discharge. More studies should be encouraged in this direction to reduce the incidence of female genital discharge. There should also be regular public enlightenment for young women on the importance of personal hygiene, appropriate use of antibiotics and proper choice of cloths to avoid wearing tight fitting underpants that allow the proliferation of pathogenic organisms like *C. albicans*. Females are equally advised to go for regular routine check- up.

REFERENCES

Adad, S.J., de Lima, R.V., Sawan, Z.T., Silva, M.L., de Souza, M.A. Saldanha, J.C., Falcons, V.A., da Cunha, A.H., Murta, E.F., (2001). Frequency of *Trichomonas vaginalis, Candida* sp and *Gardnerella vaginalis* in cervical-vaginal smears in four different decades. *Sao Paulo Med J*. 119(6):200-205.

Akah, P.A., Nnamani, C.E., Nnamani, P.O.(2010) Prevalence and treatment outcome of vulvovaginal candidiasis in pregnancy in a rural community in Enugu State, Nigeria *J. Med. Med. Sci*. **1**(10): 447-452.

Alli, J.A.O., Okonko, I.O., Odu, N.N., Kolade, A.F., Nwanze, J.C. (2011). Detection and prevalence of *Candida* isolates among patients in Ibadan, South western Nigeria. *Journal of Microbiology and Biotechnology Research **1***(3): 176-184

Anderson, M., Korasz, A., Friedland, S. (2004). Are vaginal symptoms ever normal. *A review of the literature. Med Gen J **6*** (4) 49-55.

Anorlu, R., Imosemi, D., Odunukwe, N., Abudu, O., Otuonye, M. (2004). Prevalence of HIV among women with vaginal discharge in a gynecological clinic. Nat Med Assoc. **96**(3): 367-371.

Centre for Disease Control & Prevention (2002).Sexually Transmitted Diseases Guidelines.

Morbidity & Mortality Weekly Recommendation Report, 51 (RR-6): 1 – 78.

Choudhry, S., Ramachandran, V.G., Das, A., Bhatta-Charya, S.N., Mogha, N.S. (2013). Pattern of sexually transmitted infections and performance of syndemic management against etiological diagnosis in patients attending the sexually transmitted infection clinic of a tertiary care hospital. *Indian J Sex Transm Dis* 31:104-108.

de Leon E.M, Jacober S.J, Sobel J.D, Foxman B (2002). Prevalence and risk factors for vaginal *Candida* colonization in women with type 1 and type 2 diabetes. *BMC Infect Dis*. **2**(1):1186-1471.

Dodson M.G, Friedrich E.G (1997).Psychosomatic vulvovaginitis. *J. Obstet. Gynecol*. **51**(23): 98.

Donders G.G(2002). Lower Genital Tract Infections in Diabetic Women. *Curr Infect Dis Rep*. **4**(6): 536-539.

Duerr A, Heilig C.M, Meikle S.F, Cu-Uvin S, Klein R.S, Rompalo A, Sobel J.D, (2003).Incident and persistent vulvovaginal candidiasis among human immunodeficiency virus-infected women: Risk factors and severity. *J.Obstet Gynecol* **10** (3): 548-56.

Enweani, I.B., Gugnani, O.R., Ojo, S.B. (2001). Effect of contraceptive on the prevalence of vaginal colonization of *Candida* species in Edo State, Nigeria. Rev. Iberoam. *Micol* **18**(4): 17-30.

Fidel, P.L., Sobel J.D. (1996). Immunopathogenesis of recurrent vulvovaginal candidiasis. *Microbiol Rev* **9**(1):335-348.

Konje, J.C., Otolorin, E.O., Ogunniyi J.O., Obisesan, K.A., Ladipo, O.A. (1991). The prevalence of *Gardnerella*

vaginalis, *Trichomonas vaginalis* and *Candida albicans* in the cytology clinic at Ibadan, Nigeria. *Afr J Med Sci*. **20**(1):29-34.

Lisiak, M., Klyszejko, C., Pierzchalo, T., Marcinkowski, Z.(2003). Vaginal candidiasis:frequency of occurrence and risk factors, *Ginekol Pol* **71.**

Mardh P.A, Rodrigues A.G, Genc M.(2002). Facts and myths on recurrent vulvovaginal candidosis: a review on epidemiology, clinical manifestations, diagnosis, pathogenesis and therapy. *Int. J. STD. AIDS* **13**(8): 522-539.

McClelland, R.S., Richardson, B.A., Hassan, W.M., Graham, S.M., Kiarie, J., Baeten, J.M., Mandaliy, A.K., Jacke ,W., Ndinya-Achola, J.O., Holmes, K.K. (2009). Prospective study of vaginal bacterial flora and other risk factors for vulvovaginal candidiasis. *J Infect Dis* **15**: 1883-1890.

Naglik, J.R., Challacombe, S.J., Hube, B. (2003). *Candida albicans* secreted aspartyl proteinases in virulence and pathogens . *Microbiol Mol Bio Rev* **67**(3):400-428.

Newman, G., Kaben, U. (1975). Blastomycoid flora of the urogenital tract in non-pregnant and pregnant patients. *Zentralbl. Gynakol* **97**(6): 372-378.

Nwadioha, S., J.O. Egesie, H. Emejuo and E. Iheanacho. (2010). Prevalence of pathogens of abnormal vaginal discharges in a Nigerian tertiary hospital. *Asian Pac J Trop Med* **3**(6): 483-485.

Nwankwo, E.O.K., Y.T. Kandakai-Olukemi, and S.A. Shuaibu (2010). Aetiologic Agents of abnormal Vaginal Discharge among Females of Reproductive Age in Kano, Nigeria. J Med Biomed Sci **3**:12-16

Okonkwo, F.C., Amadi, E.S., Idioha, J.C., and Nworie, O. (2010). Prevalence of *Trichomonas vaginalis* among pregnant women in Abakaliki, Ebonyi State. *Int J Curr Res* **11**: 011-015.

Okpara, K., Udoidiung, N., Ahing, I., Bassey, E., Okon, E,. and Nwabueze, A. (2009). Risk factors for vaginal *Trichomoniasis* among women in Uyo, Nigeria. *Int J Health* **9**(2):101-115.

Oviasogie F.E, Okungbowa F.I (2009). **Candida** species amongst pregnant women in Benin city,Nigeria: Effect of predisposing factors. *Afr J Clin Exp Microbiol* **10**:92–98.

Oyewole, I.O., G.N. Anyasor, and E.C. Michael- Chikezie(2010). Prevalence of STI Pathogens in HIV- Infected and Non-Infected Women: Implications for Acquisition and Transmission of HIV in Nigeria. *Asian J Med Sci* **2**(3): 163-166

Reed B.D, Zazove P, Pierson C.L, Gorenflo D.W, Horrocks J. (2003). Candida transmission and sexual behaviors as risks for a repeat episode of Candida vulvovaginitis. *J. Women's Health* **12**(10): 979-89.

Schroppei K, Rotman M, Galask R, Mac K, Soll D.R (1994). Evolution and replacement of Candida albicans strains during recurrent vaginitis demonstrated by DNA fingerprinting. *J. Clin Microbiol* **32**(11): 2646-2654.

Singh S.I. (2003). Treatment of vulvovaginal candidiasis. *Clin. Rev. CPJ/RPC.* **136**(9): 26-30.

Sobel J.D, Faro S, Force R.W, Fox B.(1998).Vulvovaginal candidiasis.Epidemiologic, diagnostic and therapeutic conditions. *Am. J. Obs. and Gynea*. **17**: 203-211.

Sobel, T.D. (1997).Vaginitis. *New England J Med* **33(7)**:1896-1903.