

Research Article

Occurrence of Vaginal Candidiasis among Pregnant Women attending Antenatal in Doma Clinic, Gombe, Gombe State, Nigeria

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Abstract

The present study was aimed at isolating, identifying, evaluating and the occurrence of vaginal candidiasis among pregnant women attending antenatal in Doma clinic, Gombe, Nigeria was determined. A total of fifty (50) pregnant women were examined. Samples of high vaginal swabs were collected from each patient and processed using standard mycological methods. The isolates obtained were related to number of pregnancy (gravidae), 25 (65.5%) were multi-gravidae while 13(25.5%) were primi-gravidae. Pregnant women in the second trimester of pregnancy had the highest incidence of candidiasis (52.5%), followed by third trimester (31.5%) while the least (16%) was obtained in first trimester. The isolates were also related to age, the age range of 21-25 years had the highest occurrence (39.5%), followed by age range of 26-30 years (26.5%) then 31-35 years (18.5) and 16-20 years had the least occurrence (15.5%). The results of this study revealed a high occurrence of vaginal candidiasis among pregnant women attending Doma clinic, Gombe, Nigeria in the period of study.

Keywords: Antenatal; Candidiasis; Pregnancy; Candida; Gravidae.

Introduction

Vaginal candidiasis (VC) is a fungal or yeast infection of the vulva and/or vagina. It is a common gynecologic ailment, affecting three out of four women in their lifetime [16]. More than 40% of affected women would have two or more VC episodes [17,18]. The ailment causes a smelly, thick, white-yellowish discharge that might be accompanied by itching, burning and swelling. It could also make walking, urinating or having sex very painful. This health problem can as well present occasionally even in healthiest women. However, it is more common and severe in women with weakened immune systems, and accordingly, pregnancy is one of such factors that contribute to lowered immunity [6].

Generally, candidiasis is an opportunistic infection caused by a yeast-like fungus, *Candida*. The fungi are endogenous in man, occurring as part of the harmless commensals of the genital, gastrointestinal and respiratory tracts, human oral and other surfaces. Establishing

Candida as the cause of vaginitis can be a difficult task, for the fact that, as many as 50% of asymptomatic women do have *Candida* organisms as part of their endogenous vaginal flora; hence limitations of signs and symptoms in the diagnosis of vaginal infection has been recognised [14,24]. Thus, mere isolation of *Candida* in the laboratory does not show real indication that it is the cause of any disease condition as other causes of vaginitis may include *Trichomonas vaginalis* and bacterial vaginosis.

Under normal circumstances, the *Candida* yeast is held in check by normal body defences together with other members of the normal flora. For instance, the acidity of the vagina is maintained at pH 4.0-4.5 [15]. This acidity level prevents some vaginal pathogens from establishing. However, physiological changes in the balance of the body system would affect both beneficial and harmful yeasts, bacteria and other organisms in the body. This accordingly would alter the acidity of the vagina

reducing it to pH 5.0-6.5, thereby giving room for the establishment of pathogenic organisms such as *Candida* [14,24].

Vaginal pH may increase with age, phase of menstrual cycle, sexual activity, contraception choice, pregnancy, presence of necrotic tissue or foreign bodies, and use of hygienic products or antibiotics [15]. It is generally believed that higher estrogen levels and higher glycogen content in vaginal secretions during pregnancy increase a woman's risk of developing VC, and it is known to be so common in women during their child-bearing years [6]. *C. albicans* infection occurs in the vast majority (80% to 90%) of diagnosed cases, while infection with other species, such as *C. glabrata* or *C. tropicalis*, occurs less frequently (Baron et al., 1993). With adequate pharmacotherapy and avoidance of contributing factors (eg, douching, wearing tight pants), VC and associated symptoms resolve in a short period of time [14,24].

Vulvovaginal candidiasis is characterized by curd like vaginal discharge and itching. It is associated with considerable distress to the patient. The incidence is increased in pregnancy and may lead to complications like abortions, preterm delivery, candida chorioamnionitis and others. It is generally believed that higher estrogen levels and higher glycogen content in vaginal secretions during pregnancy increase a woman's risk of developing vaginal candidiasis, and it is known to be so common in women during their child bearing age.

The aim of this study is to determine the occurrence of Vagina Candidiasis in clinically symptomatic and asymptomatic cases of pregnant women attending routine prenatal care in Doma clinic of Gombe State, Nigeria. The study objective includes, to isolate and identify *candida albican* and to determine the frequency of occurrence of vaginal candidiasis based on gravidae, trimester and age differences during pregnancy.

Materials and methods

Sample Collection

A total of fifty (50) high vagina swab (HVS) samples was collected aseptically using commercially prepared swab sticks from the pregnant women attending antenatal of Doma clinic. All the collected samples were transported

immediately from the antenatal Doma clinic to the microbiology laboratory of Gombe state university. The subjects were aged 16-35 years. The samples were collected aseptically.

Processing of samples

Macroscopic examination of samples

The samples were collected aseptically within subject age of 16-35 was examined for colour, appearance and odour and described as whitish or whitish-gray colour, cottage cheese-like discharge and odourless [31].

Culture of samples

Each patient's sample was inoculated unto Sabouraud dextrose agar plates and and potato dextrose agar plates by the streak plate technique and incubated at 28°C for 3 days [31].

Microscopy

After inoculation few drops of normal saline was added into the HVS swab tube, the swab stick place back in the tube and then tapped vigorously to mix the material with normal saline. A drop of the suspension was put on a clean grease free slide, covered with a cover slip and then examined under the microscope using X10 and X 40 for the identification of budding yeast cells as described by Kurtzma et al., [30].

Identification of isolates

The yeast-like cells were identified based on cultural characteristics, cell morphology, germ tube test. The results recorded were compared with those of known taxa as described by described by Kurtzma et al., [20,30].

Yeast identification

Identification of yeasts was done using standard morphological and physiological tests and identification keys described by Kurtzma et al., [30]. The morphological and cultural characteristics of the yeast were studied after isolation on SDA and PDA. These tests include morphology, surface characteristics, presence of pseudohyphae, ascospore formation.

Germ tube test

The Germ Tube Test was carried out on the yeast like isolates as described by Kurtzma et al., [30].

- i. Pooled human serum was collected and 0.5ml of it was pipette into a test tube.

- ii. The tip of a sterile pipette was used to pick the colony and emulsified in the serum in the tube.
- iii. The mixture was mixed and incubated at 37°C for 3 hours.
- iv. A drop of the mixture was placed after every 30 minutes to 1hr into a cleaned grease free slide and covered with a cover slip and examined using X10 and X40 objective lens for pseudomycellium formation. Germ tube test after 3 hours shows pseudomycellium indicate a positive germ tube test.

Results and discussion

This study was aimed at determining the occurrence of Vagina Candidiasis in clinically symptomatic and asymptomatic cases of pregnant women attending routine prenatal care in Doma clinic of Gombe State, Nigeria. The results of occurrence of vagina candidiasis among pregnant women attending antenatal clinic in Doma hospital are presented as follows. Table 1 shows the results of the rate of occurrence of vagina candidiasis among pregnant women attending Doma clinic. The result shows that out of the 50 patients examined, thirty-eight (38) were positive, which gave an occurrence rate of 76%, while 12 showed negative with (24%). This high occurrence of vaginal candidiasis among pregnant women attending antenatal care in Doma clinic, Gombe, Nigeria may be attributed to inadequate knowledge, poor personal hygiene, limited diagnostic facilities, poor dietary habits, shortage of effective treatment, increased levels of estrogens and corticoids, wearing of tight-fitting synthetic underclothing, prolonged use of antibiotics which kill the good and beneficial bacteria. Interestingly, this result is similar to the findings of Nwadioha *et al.*, [11,22], who also reported a prevalence rate of 60% and 62.2% respectively among pregnant women in Jos and Enugu State, Nigeria. The finding is however in contrast to the observations of Parveen *et al.*, [19], who reported a frequency of 38%.

Table 1. Frequency of occurrence of vagina candidiasis among pregnant women

Sample	Frequency	Frequency, %
Positive	38	76
Negative	12	24
Total	50	100

Table 2 shows the results of the frequency of occurrence based on the number of pregnancy (gravidae). The result reveals that among the 38 positive samples recorded, 13 (34.5%) was found to be primigravidae (women with first pregnancy) while 25 (65.5%) was found to be multigravidae (women that has experience of more than one pregnancy). Furthermore, the result of the frequency of occurrence based on the number of pregnancy (gravidae), shows that among the 38 (76%) pregnant women found to be positive with vaginal candidiasis, 13 (35.5%) were found to be privigravidae (women with first pregnancy) while 25 (65.5%) were found to be multigravidae (women that has experience of more than one pregnancy). This high occurrence among the multigravidae may be due to the use of contraceptive and antibiotics [11]. Consequently, the result of this work is in agreement to that of Aslam *et al.*, [23], who reported an occurrence of 60% among the multigravidae and 40% among primigravidae. The incidence observed could also be due to the fact that multigravidae has longer sexual history and also number of pregnancies that make them more prone to develop vaginal candidiasis than primigravidae who have less sexual exposure [19]. Interestingly, this study is in contrast with Trofa *et al.*, [7], who reported a low occurrence of 34% among multigravidae and 66% among primigravidae.

Table 2. Frequency of occurrence based on the number of pregnancy

Gravidae	Frequency	Frequency, %
Primigravidae	13	34.5
Multigravidae	25	65.5
Total	38	100

Table 3 shows the result of frequency of occurrence based on trimester distribution and percentage of isolates, out of the 38 cases recorded, 6(16%) was women in their first trimester of pregnancy, 20 (52.5%) from second trimester and 12 (31.5%) from their third trimester of pregnancy. In addition, the result of the frequency of occurrence based on trimester distribution and percentage of isolate revealed that pregnant women in their second trimester had the highest occurrence of *Candida* infection (62.5%), followed by women in their third trimester (31.5%) and the least occurrence was observed in pregnant women in their first

trimester of pregnancy (16%). This high occurrence of *Candida* recorded in the second trimester may likely be as a result of fetal demand for nutrients. This agreed with earlier reports of Banwat et al., [13,24]. Whereas in contrast with the work of Nelson et al.,[9,25], who found that pregnant women in their third trimester had the highest prevalence of vagina candidiasis (68.09%) followed by second trimester (21.28%) and the least in first trimester (10.63%).

Table 3. Frequency of occurrence based on trimester distribution

Trimester	Frequency	Frequency, %
First	6	16.0
Second	20	52.5
Third	12	31.5
Total	38	100

Table 4 shows the result of occurrence of *Candida albican* based on age differences. Out of the (76%) rate of occurrence, the result was recorded between ages 16-20 with percentage occurrence of (15.5%), ages 21-25 with percentage occurrence of (39.5%), age 26-30 with percentage occurrence of (26.5%) and ages 31-35 with percentage occurrence of (18.5%). The result of prevalence of candida in relation to age differences, shows that ages 21-25 close had the highest occurrence rate of 15 (39.5%), and age 26-30 close shows occurrence rate of 10 (26.5) and the least occurrence was recorded among ages 31-35 close with occurrence rate of 7(18.5) while 16-20 years shows occurrence rate of 6 (15.5). This high occurrence recorded among age group 21-25 may be due to high sexual activity, poor personal hygiene, the use of contraceptives and drug abuse among this age group. This report agreed with the work of Willacy et al.,[21], who reported a peak vaginal infections between age group 20-40 close.

Table 4. Prevalence of *candida* in relations to gestation age

Age group	No. of isolate	No. of positive samples	Growth, %
16-20	8	6	15.5
21-25	17	15	39.5
26-30	15	10	26.5
31-35	10	7	18.5

Conclusions

Conclusively, *Candida* although it is a naturally occurring yeast that exists in our bodies as well as the environment, it can also wreak havoc when given the opportunity. Vaginal candidiasis is an all female disease especially those of child bearing age and pregnant women. It is important to note that pregnant women are more susceptible to both vaginal colonization and infection by yeast. It is generally believed that vagina candidiasis occurs commonly and is difficult to cure in pregnancy and in the diabetics. This is due to the fact that pregnancy suppresses immune reaction and as such pregnant women are more vulnerable to infection by disease pathogens. During pregnancy, the vagina becomes less acidic and less able to fight diseases or infections. The high occurrence in this study may result into the risk of miscarriage, premature birth, fetal oxygen deficiency, low birth weight and neonate mortality. Other possible risks include pelvic inflammatory disease, infertility, pelvic abscess, stress, discomfort and irritation. The results of this study showed a high occurrence of *Candida* among pregnant women attending antenatal care in Doma clinic Gombe, Nigeria. There was a high occurrence of vaginal candidiasis among multi-gravidae, women at the second trimester and those between age group 21 and 30 close.

Conflict of interest

Authors declare no conflict of interest.

References

- [1] Raviraj K, Archana K. Candidiasis among pregnant women: A prevalence study. *Journal of Applied Medical Sciences* 2017;5(2):336-8.
- [2] Altayyar IA, Alsanosi AS, Osman NA. Prevalence of vaginal candidiasis among pregnant women attending different gynecological clinic at South Libya. *European Journal of Experimental Biology* 2016;6(3):25-9.
- [3] Paul S, Kannan I. Prevalence of antenatal vulvovaginal candidiasis: our experience. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology* 2017;6(2):443-9.
- [4] Al-Aali KY. Prevalence of Vaginal Candidiasis among Pregnant Women Attending Al-Hada Military Hospital,

- Western Region, Taif, Saudi Arabia. *International Journal of Sciences* 2015;4(5):1736-43.
- [5] Okonkwo Nnaemeka J, Umeanaeto Pauline U. Prevalence of Vaginal Candidiasis among Pregnant Women in Nnewi Town of Anambra State, Nigeria *International Multi-Disciplinary Journal* 2010;4(4):539-48.
- [6] Monif GR, Baker DA, Monif GR, Baker DA. *Candida albicans. Infectious diseases in obstetrics and gynecology*. 5th ed. New York Parthenon Press: 2003; pp. 405-21.
- [7] Trofa D, Gácsér A., Nosanchuk JD. Vulvovaginal Candidiasis Clinical Effectiveness Group British Association of Sexual Health and HIV. *Clin Microbiol Rev* 2008;21(4):606-25.
- [8] Okonkwo Nnaemeka J, Umeanaeto Pauline U. Prevalence of Vaginal Candidiasis among Pregnant Women in Nnewi Town of Anambra State, Nigeria. *African Research Review* 2010;4(4):539-48.
- [9] Nelson M, Wanjiru W, Margaret MW. Prevalence of vaginal candidiasis and determination of the occurrence of *Candida* species in pregnant women attending the antenatal clinic of Thika District Hospital, Kenya. *Open Journal of Medical Microbiology* 2013;20:345-52.
- [10] Kamath P, Pais M, Nayak MG, D'souza CP. An awareness program on prevention of vaginal candidiasis among pregnant women. *Nitte University Journal of Health Science* 2014;4(2):86-94.
- [11] Nwadioha SI, Egah DZ, Alao OO, Iheanacho E. Risk factors for vaginal candidiasis among women attending primary health care centers in Jos, Nigeria. *Journal of Clinical Medicine and Research*. 2010;2(7):111-30.
- [12] Oyewole OA, Okoliegbe IN, Alkhalil S, Isah P. Prevalence of Vaginal Candidiasis among Pregnant Women Attending Federal University of Technology, Minna, Nigeria, Bosso Clinic. *Res J Pharm Biol Chem Sci* 2013;4:113-20.
- [13] Jombo GT, Opajobi SO, Egah DZ, Banwat EB, Akaa PD. Symptomatic vulvovaginal candidiasis and genital colonization by *Candida* species in Nigeria. *Journal of public Health and Epidemiology* 2010;2(6):147-51.
- [14] Akinbiyi AA, Watson R, Feyi-Waboso P. Prevalence of *Candida albicans* and bacterial vaginosis in asymptomatic pregnant women in South Yorkshire, United Kingdom. *Arch. Gynecol Obstet* 2008;278:463-69.
- [15] Nwankwo EOK, Kandakai-Olukemi YT, Shuaibu SA. Aetiologic agents of abnormal vaginal discharge among females of reproductive age in Kano, Nigeria. *Journal of Medicine and Biomedical Sciences* 2010;43:12-16.
- [16] Das-Neves J, Pinto E, Teixeira B, Dias G, Rocha P, Cunha T. Local treatment of vulvovaginal candidosis: general and practical considerations. *Drugs*. 2008; 68 (13): 1787–802.
- [17] García HM, García SD, Copolillo EF, Cora EM, Barata AD, Vay CA, de Torres RA, Tiraboschi N, Famiglietti AMR. Prevalence of vaginal candidiasis in pregnant women. Identification of yeasts and susceptibility to antifungal agents. *Revista Argentinade Microbiología* 2006;38 (1):9-12.
- [18] Ferrer J. Vaginal candidosis: epidemiological and etiological factors. *International Journal of Gynaecol. Obstet* 2000;1:21-7.
- [19] Parveen N, Munir AA, Din I, Majeed R. Frequency of vaginal candidiasis in pregnant women attending routine antenatal clinic. See comment in PubMed Commons below *J Coll Physicians Surg Pak* 2008;18:154-7.
- [20] Cheesebrough M. *District laboratory practice in tropical countries*. Part 2. Cambridge University Press. 2006; pp: 434.
- [21] Willacy H, Jackson C. *Vaginal and vulval candidiasis*. 2011.
- [22] Akah PA, Nnamani CE, Nnamani PO. Prevalence and treatment outcome of vulvovaginal candidiasis in pregnancy in a rural community in Enugu State, Nigeria. *Journal of Medicine and Medical Sciences* 2010;1(10):447-52.
- [23] Aslam M, Hafeez R, Ijaz S, Tahir M. Vulvovaginal Candidiasis in Pregnancy. *Journal of Microb Biomedica* 2008;24:54-6.

- [24] Akinbiyi AA, Watson R, Feyi-Waboso P. Prevalence of *Candida albicans* and bacterial vaginosis in asymptomatic pregnant women in South Yorkshire, United Kingdom. *Arch. Gynecol Obstet* 2008;27:463-6.
- [25] Nelson M, Wanjiru W, Margaret MW. Prevalence of vaginal candidiasis and determination of the occurrence of *Candida* species in pregnant women attending the antenatal clinic of Thika District Hospital, Kenya. *Open Journal of Med Microbiol* 2013;(3):264-72.
- [26] Jombo GT, Opajobi SO, Egah DZ, Banwat EB, Denen Akaa P. Symptomatic vulvovaginal candidiasis and genital colonization by *Candida* species in Nigeria. *Journal of Public Health Epidemiology* 2010;2(6):147-51.
- [27] McClelland RS, Richardson BA, Hassan WM, Graham SM, Kiarie J, Baeten JM, Mandaliya K, Jaoko W, Ndinya-Achola JO, Holmes KK. Prospective study of vaginal bacterial flora and other risk factors for vulvovaginal candidiasis. *Journal of Infect Dis* 2009;15:1883-90.
- [28] Nandan D, Gupta YP, Krishnan V, Sharma A, Misra SK. Reproductive tract infection in women of reproductive age group in Sitapur/Shahjahanpur district of Uttar Pradesh. *Indian Journal of Public Health* 2011;45(1):8-13.
- [29] Aring BJ, Mankodi PJ, Jasani JH. Incidence of vaginal candidiasis in leucorrhoea in women attending in OPD of gynecology and obstetrics department. *International Journal of Biomed Adv Res* 2012;3(12):867-9.
- [30] Kurtzma CP, Fell JW, Boekhout T, Robert V. *Methods of isolation, Phenotypic characterization and maintenance of yeasts. The yeasts, a Taxonomic Study*, 5th edn. Elsevier, 2011.
- [31] Ochei JO, Kolhatkar AA. *Medical Laboratory Science Theory and Practice*. 6th Edn. Tata McGraw-Hill, New Delhi, 2007.
