British Journal of Medicine & Medical Research
9(3): 1-6, 2015, Article no.BJMMR.18264
ISSN: 2231-0614

SCIENCEDOMAIN *international*
www.sciencedomain.org

Vaginal Candidiasis Infection among Pregnant Women in Aba, Abia State, Nigeria

O. R. Ezeigbo[1*], F. C. Anolue[2] and I. A. Nnadozie[3]

[1]Department of Biology/Microbiology, Abia State Polytechnic, Aba, Nigeria.
[2]Department of Obstetrics and Gynaecology, Imo State University Teaching Hospital, Orlu, Nigeria.
[3]Department of Biological Sciences, Federal University of Technology, Owerri, Nigeria.

Authors' contributions

This work was carried out in collaboration between all authors. Author ORE designed the study, wrote the protocol, managed the experimental process. Author FCA wrote the first draft of the manuscript and managed the literature searches and author IAN performed the analysis of the work. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJMMR/2015/18264
Editor(s):
(1) Edward J. Pavlik, University Kentucky Medical Center, Division of Gynecological Oncology, USA.
Reviewers:
(1) Anonymous, Adiyaman University School of Medicine, Turkey.
(2) Megha Maheshwari, Department of Microbiology, SGT University, Haryana, India.
Complete Peer review History: http://sciencedomain.org/review-history/9838

Original Research Article

Received 12th April 2015
Accepted 5th June 2015
Published 18th June 2015

ABSTRACT

Epidemiological monitoring of vaginal candidiasis infection associated with preterm delivery and death of the infants is highly desirable especially on pregnant women. The objectives of this study were to determine the prevalence of vaginal candidiasis and the occurrence of *Candida* species in pregnant women attending antenatal clinics (not necessarily presenting any disease symptoms) in Aba, Abia State, Nigeria. Selection was by subject consent and presence at the clinics. Vaginal swab and urine samples were collected from 400 pregnant women between the months of May and October, 2014. *Candida* species were identified using sabouraud dextrose agar (SDA). All cultures were screened for the presence of *Candida albicans* using the germ tube test. Out of 400 pregnant women sampled, 126 (31.5%) tested positive. The age group 19-28 years had the highest prevalence rate with 48 (39.7%) while 49 years and above recorded the least prevalence rate – 23 (26.7%). The result also showed that women at their third trimester recorded the highest prevalence rate of 71 (38.0%). In terms of the effect of the levels of education, the illiterate pregnant women recorded the highest rate with 22 (46.8%) while the least was obtained from those with tertiary education. Based on their occupation, the traders recorded the highest rate -76

**Corresponding author: Email: obyezeigbotxt1@yahoo.com;*

(47.8%) while house wives had the least with 8 (8.3%). There is a need for routine surveillance and education of pregnant women on *Candida albicans* as a holistic procedure in antenatal care.

Keywords: Vaginal candidiasis; pregnant women; antenatal clinics.

1. INTRODUCTION

Vaginal candidiasis is a fungal or yeast infection of the vulva or vagina. It is a common gynecological ailment affecting three out of four women in their lifetime [1]. *Candida* infection of the genital tract is one of the commonest sexually transmitted diseases and the most singular cause of vaginal discharge. Approximately, 75% of all women have a vaginal infection episode during their life span [2]. Vaginal candidiasis is caused by *Candida* species of which *Candida albicans* is the most common. *Candida albicans* is a dimorphic yeast-like fungus, commonly present in the upper respiratory, alimentary tract, female coital organ and on the skin of healthy people [3]. It becomes an opportunistic pathogen for immune-compromised patients or even the healthy persons. However, certain conditions can cause it to multiply, thereby weakening the immune system. From time to time, it becomes pathogenic often as a result of malnutrition, general debility, diabetes, use of oral contraceptive, steroid drugs and immuno-suppressive agents and antibiotics [4,5]. The infection is characterized by vulvar pruritus, dysuria, dyspareunia, irritation and soreness of the vulva and swelling of the vagina with discharges. The discharge appears to look like curded milk and deep erythema of vulva and vagina is often seen [6].

The ailment is common and more severe in women with weakened immune system and accordingly, pregnancy is one of the factors that contribute to lowered immunity [7]. *Candida* infection has also been identified as one of the commonest fungal infections associated with HIV infections in women [8,9,10]. Abebe [11] and Duerr et al. [12] reported higher incidence and greater persistence of the infection in HIV seropositive women. Similarly, Dahl [13] reported that *Candida albicans* occurs as one of the commonest complications of HIV infection, affecting HIV seropositive women in Lagos, Nigeria. A survey conducted in West Africa by Jumbo et al. [14] among 150 pregnant women on symptomatic vulvovaginal candidiasis, revealed an infection rate of 47.7%. It is generally believed that high oestrogen levels and higher glycogen content in vaginal secretions during pregnancy increase a woman's risk of developing vaginal candidiasis. This is most common in women during their child bearing age [7]. The objective of this study was to investigate the current status of vaginal candidiasis among pregnant women attending antenatal clinics in the major hospitals in Aba, Nigeria and to recommend appropriate measures of control.

2. MATERIALS AND METHODS

2.1 Study Area

The study was conducted in Aba, Abia State, Nigeria. Aba lies between latitude 5º 07' N and longitude 7º 22' E and 205 m (673ft) above sea level. Aba is a commercial town in Abia State. The people are predominantly traders, artisans, farmers and public/civil servants. Aba is a major settlement and commercial centre in a region that is surrounded by small towns and villages.

2.2 Study Population

The study was carried out in four major hospitals (both private and government-owned hospitals) in Aba between May and October, 2014. A total of 400 pregnant women who attended antenatal clinics in these hospitals were investigated for vaginal candidiasis. The hospitals were selected based on their high utilization.

2.3 Research Ethics

Ethical review and clearance of the research protocol were obtained from the Ethical Review Committee of the Department of Biology/ Microbiology, Abia State Polytechnic, Aba and permission obtained from the Hospital authorities. The patients' consent was obtained prior to sampling on their different antenatal days by filling the Patient Consent Form. All subjects who accepted provided their bio-data.

2.4 Data Collection

Two procedures were used in the data collection. First, a structured questionnaire was administered to the pregnant women to obtain information on their age, trimester, educational status and occupation. The second procedure was the collection of high vaginal swabs and

urine samples from the women. A sterile swab stick was used to swab the outer region of the vagina from each of the pregnant women, while the urine samples were collected using sterile containers. Each specimen was labeled serially with code numbers, date and time of collection. The collected samples were immediately transported to the Microbiology Laboratory of Abia State Polytechnic, Aba for analysis.

2.5 Preparation of Culture Media

Sabouraud dextrose agar (SDA) was used as a growth medium for the isolation of *Candida* species. The medium was prepared according to the manufacture's procedures.

2.6 Microscopy

A saline mount of both specimens (urine and high vaginal swab- HVS) were examined microscopically using x40 magnification to detect the isolates. Other colonial morphologies were also used to identify the isolated organisms.

2.7 Microbiological Analysis

The swabs and urine samples were cultured in sabouraud dextrose agar under sterile conditions at 37ºC for 48 hours. An inoculum pool was made using the specimens. Then a sterile wire loop was used on each inoculum by streaking in quadrate plates to obtain discrete colonies. After incubation, colonies which appeared white to cream in colour with smooth border, pasty and moist consistency was observed.

Germ tube test was used for the identification of *Candida albicans.* Using a sterile loop, pure colonies of the isolates were harvested and inoculated into a sterile test tube containing 0.5 ml of human serum. The resulting suspension was incubated at 37ºC for 3 hours. A drop of the yeast-serum suspension was placed on a clean microscopic slide, covered with a cover slip and examined microscopically using the x10 and x40 objective lenses for the identification of *Candida albicans.*

3. RESULTS

Table 1 shows the age-related prevalence of *Candida albicans* among the sampled pregnant women. The age group 19-28 years recorded the highest prevalence of 48(39.7%) while the least was age group ≥ 49 with prevalence rate of 23(26.7%). Results in Table 2-4 showed that vaginal infection among the sampled population was significantly associated with level of trimester, educational status and occupation, while age had no significant effect on the infection.

The prevalence of candidiasis in relation to trimester among the pregnant women is shown in Table 2. The highest prevalence occurred among the pregnant women at their third trimester while the least prevalence was recorded on those at their first trimester. The rate of infection increased as the time of pregnancy (trimester) increased.

Table 3 shows the prevalence of candidiasis in relation to educational status. The result revealed that the illiterate pregnant women recorded the highest prevalence with 22(47.8%) while those at the tertiary level of education had the least prevalence with 33(23.2%).

The Prevalence of candidiasis in relation to their occupation is shown in Table 4. Traders recorded the highest prevalence of 76 (47.8%) while the house wives have the least prevalence with 8(8.3%).

Table 1. Age-related prevalence of candidiasis among the sampled pregnant women

Age group (years)	Number examined	Number infected	Percentage infected (%)
19-28	121	48	39.7
29-38	102	29	28.4
39-48	91	26	28.6
≥ 49	86	23	26.7
Total	400	126	31.5

P-value= 0.142

Table 2. Prevalence of candidiasis infection in relation to trimester

Trimester	Number examined	Number infected	Percentage infected (%)
First	81	19	23.5
Second	132	36	27.3
Third	187	71	38.0
Total	400	126	31.5

P-value= 0.000

Table 3. Prevalence of candidiasis in relation to educational status

Educational status	Number examined	Number infected	Percentage infected (%)
Primary	92	29	31.5
Secondary	119	42	35.3
Tertiary	142	33	23.2
Illiterate	47	22	47.8
Total	400	126	31.5

P-value= 0.016

Table 4. Prevalence of candidiasis in relation to the occupation of the sampled pregnant women

Occupation	Number examined	Number infected	Percentage prevalence
Civil Servants	108	32	29.6
Traders	159	76	47.8
House wives	96	8	8.3
Students	37	10	27.0
Total	400	126	31.5

P-value= 0.000

4. DISCUSSION

This study focused on the current status of vaginal candidiasis among pregnant women attending antenatal clinics in the major hospitals in Aba, Nigeria. Candidiasis is the most common opportunistic fungal infection responsible for about 90% of the cases of vaginal infection [15]. It is associated with pruritus and vaginal discharge, which appears like curded milk [7]. The pregnant women are more vulnerable to both vaginal colonization and infection by yeast. It has been observed that high concentration of oestrogen hormone and glycogen content of the vaginal mucosa provides ample supply of sugar that promotes the growth of *Candida albicans* during pregnancy [16,17]. This study revealed a prevalence rate of 31.5% which agrees with the prevalence rate of 30.7% obtained by Kamara et al. [18] and 30.0% rate obtained by Okonkwo [17] using urine samples. Women within the age range of 19-28 years (39.7%) and in their third trimester (38.0%) had the highest prevalence rates. Okonkwo [17] also observed that vaginal acidity and hormonal factors influenced the rate of occurrence of candidiasis more in pregnant women, especially in their last trimester. This result agrees with the reports of Okungbowa et al. [19] and Ugochukwu et al. [20] where the highest prevalence was observed among 17-23 years and 22-26 years age groups respectively. This result is not surprising since this group is sexually active and thus emphasizes the fact that sexual activity could contribute to a larger extent the spread of candidiasis. On occupational status, traders recorded the highest prevalence of 47.8% compared to students with 27.0%. This result was also confirmed by Ugochukwu et al. [20] and Wenjin and Yifu [21]. Traders may not have enough time for laboratory tests and therefore may resort to self medication which can increase the rate of infection.

The study also revealed that pregnant women in their tertiary level of education had lower prevalence rate (23.2%) when compared with their illiterate counterparts with prevalence rate of 47.8%. This indicates that the level of education played an important role in candidiasis prevalence. Gaining an education combats various misconceptions about many illnesses including candidiasis and encourages preventive practices [22].

5. CONCLUSION

Owing to the detrimental effects of candidiasis in pregnancy, their predisposing effects in HIV/AIDS infection and other pathogenic effects including inflammations, there is a need to create awareness through campaigns, symposia, seminars, conferences and talks in antenatal clinics on the debilitating effects of this opportunistic infection (candidiasis). With adequate pharmacotherapy, avoidance of contributing factors such as malnutrition, use of contraceptive, steroids drug, wearing tight under-wears, improvement of personal hygiene and sex discipline, the incidence and prevalence of candidiasis can be greatly reduced.

CONSENT

All authors declare that written informed consent was obtained from the participants for the publication of this report.

ETHICAL APPROVAL

All authors hereby declare that all experiments were examined and approved by the appropriate ethical committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Das-Neves J, Pinto E, Telxeira B, Dias G, Rochas P, Cunha T. Local treatment of vulvovaginal candidosis: General and practical considerations. Drug. 2008; 68(13):1787-1802.
2. Lanchares JL, Hermandez ML. Recurrent vaginal candidiasis changes in etiopasthogenical patterns. Int. J. Gynecol. Obstet. 2000;71:529-535.
3. 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;278:463-466.
4. Nyirjesy P. Vulvovaginal candidiasis and bacterial vaginosis. Infect. Dis. Clin. North Am. 2008;22(4):637-652.
5. Brook H, Jones T. The diploid genome sequence of *Candida albicans*. Processing of the National Academy of Sciences of the United States of America. 2002;29-34.
6. Khan SA, Amir F, Ahaf S, Tanveer R. Evaluation organism causing vaginal discharge. J. Ayub. Coll. Abbottabad. 2009;21(2):90-93.
7. Monif GR, Baker DA, Monif GR, Baker DA. Candida albicans. Infectious diseases in obstetrics and gynecology. 5th ed. New York Parthenon Press.2008;405-421.
8. Anorlu R, Imosemi D, Odunukwe N, Abudu O, Otuonye M. prevalence of HIV among women with vaginal discharge in a gynecological clinic. J. Natl. Med. Assoc. 2004;96:367-371.
9. Ogunshe AAO, Lawal OA, Iheakanwa CI. Effects of simulated preparations of plants used in Nigerian Traditional Medicine on *Candida* spp associated with vaginal candidiasis. Ethnobot. Res. Appl. 2008;6: 373-382.
10. Umeh EU, Umeakanne BI. HIV/vaginal Candida co-infection: Risk factors in women. Journal of Microbiology and Antimicrobial. 2010;2(3):30-35.
11. Abebe EA, Olumide M, Oke O. Syndromic management of STI: Manual for Health workers. Federal Ministry of Health Abuja: National AIDS and STD Control Programme. 2001;3-7.
12. Duerr A, Heilig CM, Meikie SF, Cu-Uvin S, Klein RS, Rompalo A, Sobel JD. Incidence and persistent vulvovaginal candidiasis among human immunodeficiency virus-infected women: Risk factors and severity. Obstet. Gynecol. 2003;101:548-556.
13. Dahl KM, Keath EJ, Fraser VI, Powderly WG. Molecular epidemiology of mucosal candidiasis in HIV-positive women. AIDS Res. Hum. Retroviruses. 1997;13:485-491.
14. Jumbo GTA, Akpera MT, Hemba SH, Eyongo KA. Symptomatic vulvivaginal candidiasis: Knowledge perception and treatment modalities among pregnant women of an urban settlement in West Africa. Afri. J. Cln. Exper. Microbiol. 2011; 12(1):33-36.
15. Adad SJ, De lima RV, Sawan ZT, Silva ML, De Souza MA, Saldanha JC, Faco VA, Dacunha AH, Murta EF. Frequency of *Trichomonas vaginalis*, *Candida* species, *Gardnerella vaginalis* in cervical-vaginal smear in four different decades. Soa Paulo Med J. 2001;119(96):200-205.

16. Sagay AS, Kapiga SH, Imade GE, Sankale JL, Idoko J, Kanki P. HIV infection among pregnant women in Nigeria. Int J. Gyanaecol. Obstet. 2005;90:61-67.
17. Okonkwo NJ, Umeanaeto PU. Prevalence of vaginal candidiasis among pregnant women in Nnewi town of Anambra state, Nigeria. An Intl. Multi-disciplinary Ethiopia. 2010;4(4):539-548.
18. Kamara P, Hylton-Kong T, Brathwaite A, Del Rosario GR, Kristensen S, Patrick N, Weiss H, Figueora PJ, Vermund SH, Jolly PE. Vaginal infections in pregnant women in Jamaica: Prevalence and risk factors. Intl. Journal of STD and AIDS. 2000; 11(8):516-520.
19. Okungbowa FI, Isuehuemhen OS, Dede A. The distribution frequency of Candida species in genitourinary tract among symptomatic individuals in Nigeria cities. Revista Iberoamericana de Micologia. 2003;20:60-63.
20. Ugochukwu DO, Agu MC, Nwenyi UC, Agu U. Epidemiology of Candida vaginitis in women of reproductive age in selected hospitals in Onitsha metropolis, Anambra State, Nigeria and its environs 2007-2012. Journal of Public Health and Epidemiology. 2013;459-462.
21. Wenjin Q, Yifu S. Epidemiological study on vaginal *Candida glabrata* isolated from pregnant women. Scand. J. Infect. Disease. 2006;38(1):49-54.
22. Moosa B, Shavina M, Malhotra S, Sawhney H. Role of male partner in lower genitorurinary tract. Indian J. Med. Res. 1991;112:9-14.

Peer-review history:
The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/9838