International Journal of Community Research http://www.anrescentpub.com
ISSN: 2315 – 6562

INCIDENCE OF *CANDIDA ALBICANS* IN PREGNANT WOMEN: A CASE STUDY OF EKPOMA, NIGERIA.

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ABSTRACT

This study examines the incidence of *Candida albicans* among pregnant women of varied age range/occupation, within any of the three trimesters, and attending antenatal clinic in Ekpoma and its environs. A total of 100 high vagina swab- samples were collected from women and then transported to the Medical Laboratory at Irrua Specialist Teaching Hospital, Irrua, Edo, Nigeria, for analysis. The samples were inoculated on CHROMagar *Candida* medium and incubated at 37^0C for 48hours to isolate and presumptively identify the Candida species. The results revealed that 40% of the samples tested positive for *Candida* species (*Candida albicans* (75.0%), *Candida krusei* (2.5%), *Candida novergensis* (7.5%), *Candida parapsilosis* (5.0%), *Candida dublinensis* (2.5%) and mixed *Candida* species (7.5%). The colonization of the vagina by *Candida* species was found to be statistically significant ($P< 0.05$) in the third trimester (21%) when compared to the second (16%) and first (3%) trimesters. On the other hand, *Candida* species colonization was statistically insignificant ($P> 0.05$) when compared with the occupation of the women. These findings therefore, indicate that *Candida albicans* is more predominant in pregnant women than the other non-albicans species and tends to increase as gestation period progresses.

Keywords: Pregnancy, *Candida* species, *Candida albican*, Ekpoma.
Received: 3rd November, 2012 Accepted: 18th January, 2013 Published: 31st January, 2013

INTRODUCTION

Candida is a member of the class of fungi known as *Ascomycetes* that predominantly form intracellular yeast cells and in some cases, myelia (Okungbowa *et al*., 2000). *Candida species* causes a wide variety of disorders that include thrush, *Candida* enteritis, vulvovaginitis and urinary tract candidiasis, mucocutaneous candidiasis and invasive candidiasis (Hidalgo *et al*., 2010).

Candida species has a wide distribution and ranges from pure saprobes to being pathogenic in many humans (Okungbowa *et al*., 2000). The genus *Candida* contains more than 150 species but only a few are regarded as important pathogens of humans (Isibor, 2005). The most pathogenic of these species is *Candida albicans* -a dimorphic fungus that develop both as yeast cells, and as pseudohyphae (Isibor, 2005). The organism has been recovered from soil, hospital environment, inanimate objects and food (Isibor, 2005).

Candida species are ubiquitous and represents the most common fungal pathogens that affect humans. It produces a wide spectrum of diseases ranging from superficial muco-cutaneous disease to invasive illnesses such as hepatosplenic *candidiasis* (Hidalgo *et al*., 2010).

In the genital tract of women, are micro flora made up of a wide variety of species, like the lactobacillus species that play useful roles, while others like *Gardnerella vaginalis* and *Candida albicans* reside there as commensals, but may become pathogenic if opportunity arises (Agbakoba *et al*., 2008).

Generally, vaginal infections are the commonest bases for gynaecological examinations, and disruptions in the normal microbial flora of the vagina, as well as alterations in vaginal pH, can predispose the vagina to infections such as vaginitis (Gardner and Duke, 1985). In fact, vaginal ecosystem balance depends on *Lactobacillus* species, which is essential in maintaining the vaginal pH (at less than 4.5), and assisting host defence to inhibit over growth of other pathogenic bacteria like obligate anaerobes that can lead to infection (Isibor *et al.*, 2005). Approximately 40 - 50% of women during the fertile period have repeated infections, while less than 5% of adult female's population receives repeated frequent attacks of vulvovaginal candidiasis (Kauffman *et al*., 1989).

ISSN: 2315 – 6562

In menopausal women and girls, *Candida* vulvovaginitis is rear, highlighting the hormonal dependence of *Candida.* Vulvovaginitis is known to be associated with increased secretion of sexual hormones, which makes the vagina more sensitive and susceptible to a higher frequency of colonization and symptomatic vaginal candidosis (Sobel *et al*., 1998). The frequency of vaginal candidosis is accompanied by clinical manifestations, particularly during the third trimester (Evans, 1990).

On the other hand, Fonck *et al*. (2000) had reported that the frequency of vaginal infections caused by *Candida albicans* (66.0%) is highest among unemployed women. This study therefore examines the incidence of *Candida albicans* among pregnant women during the three trimester of pregnancy in relation to age and occupation.

MATERIALS AND METHODS

Study area: This study was carried out in two different health facilities in Ekpoma, Esan West Local Government Area of Edo State. Ekpoma is located on latitude $6^{0}75^{1}$N and longitude $6^{0}13^{1}$E with climate characterized by two seasons. The wet season occurs between April and October with an August break and an average rainfall of between 150cm to 250cm, while the dry season lasts from November to April associated with a cold harmattan between December and January. The average temperature is about 25^{0}C (Edo State of Nigeria, 1992).

Study population and duration: A total of one hundred pregnant women of different ages, trimester, and socio-economic status, were enrolled in the study.

The study was conducted over a period of four months from December, 2011 to March, 2012. All the women voluntarily filled the consent forms to be enlisted into the study.

Inclusion and exclusion criteria: Apparently healthy pregnant women attending antenatal clinics in Esan West Local Government Area of Edo State were enrolled in this study.

However, women who are non indigenes and/or have pregnancy complications were excluded.

Ethical consideration: The study was approved by the Ethical Committee of Esan West Local Government Area to cover all health facilities in Esan West Local Government.

Data collection and analysis: High vaginal swab samples were collected from each pregnant women under aseptic conditions using a sterile swab stick and speculum. All were inoculated immediately and were stored at 2-8 ^{0}C for not more than 1hour. The samples were cultured on Sabouraud Dextrose Agar at 37^{0}C for 48 hours. Suspected yeast colonies were subcultured on CHROMagar *Candida* for further phenotypic identification based on the colour chart supplied by the manufacturer for clinically important yeasts (Odds and Bernearts 1994)

Statistical analysis: The results were analysed using the chi – square method with the level of significance set at $P< 0.05$.

RESULTS

Among the 100 high vaginal swabs collected from pregnant women in the various trimesters, 40 (40%) were positive for *Candida species*. Phenotypic identification of the positive cultures of the *Candida species* revealed the following; *Candida albicans*, *Candida krusei*, *Candida novergensis*, *Candida parapsilosis Candida dubliniensis* and mixed *Candida* growths (see culture plates 1 – 6). *Candida albicans* were 30(75%), while the *non-albicans Candida* was 7(17.5%). The mixed *Candida* species were 3(7.5%) while others included *Candida krusei* 1 (2.5%), *Candida novergensis* 3 (7.5%), *Candida parapsilosis* 2 (5.0%), *Candida dubliniensis* 1 (2.5%).

The occurrence of positive culture for *Candida species* in relation to age group of the women shows that it was lowest among age group ≤ 20 (7.5%) and highest among ages ≥ 20 (66.7%). Interestingly, at ages > 40 years, no *Candida* species was observed (see table 1).

Candida distribution with respect to the various trimesters of pregnancy showed that women in their first trimester (7.5%) recorded the lowest while those in the second trimester (40.0%) and third trimester (52.5%) were high and higher respectively. The observed differences were statistically significant at $p < 0.05$ (see table 2).

Candida colonization with respect to occupation of the pregnant women showed that *Candida* species was highest among traders but lowest among the unemployed. Similarly, *Candida albican* was prevalent among traders compared to other occupational status, however, the difference was not statistical significant ($P> 0.05$) (see table 3).

ISSN: 2315 – 6562

Table 1: Incidence of *Candida* species within the age group of pregnant subjects and their characterization using chromagar candida technique

Age (Years)	Positive samples	*C. albicans* (%)	*C. krusei* (%)	*C. novergensis* (%)	*C. parapsilosis* (%)	*C. dubliniensis* (%)	Mixed growth (%)
≤ 20	4(10)	3 (75)	0 (0)	1 (25)	0 (0)	0 (0)	0 (0)
21 – 30	30(75)	21 (70)	1 (3.3)	2 (6.7)	2 (6.7)	1 (3.3)	3 (10)
31 – 40	6(15)	6 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
> 40	0(0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	40(100)	30 (75)	1 (2.5)	3 (7.5)	2 (5.0)	1 (2.5)	3 (7.5)

$X^2 = 0.9484$, P = 0.80; P > 0.05; C = *Candida*

Table 2: Incidence of *Candida albicans*, non – albicans and mixed candida growth in relation to various trimesters of pregnant subjects (%)

Trimester	Number tested	Positive culture	*Candida albicans*	Non – *albicans*	Mixed growth
First	8	3 (7.5)	0 (0)	2 (66.7)	1 (33.3)
Second	43	16(40)	15 (93.8)	0 (0)	1 (6.2)
Third	49	21(52.5)	15 (71.4)	5 (23.8)	1 (4.8)
Total	100	40(100)	30 (75.0)	7 (17.5)	3 (7.5)

$X^2 = 10.4335$, P = 0.001; P < 0.05.

Table 3: Incidence of *Candida albicans*, non-albicans and mixed candida growth in relation to occupational group of pregnant subjects

Occupation	Positive culture (%)	*Candida albicans* (%)	Non – *albicans* (%)	Mixed growth (%)
Hairdressers	4(10)	3 (75.0)	1 (25.0)	0 (0)
Fashion designers	6(15)	5 (83.3)	1 (16.7)	0 (0)
Traders	21(52.5)	17 (80.9)	3 (14.3)	1 (33.3)
Students	4(10)	1 (25.0)	2 (50.0)	1 (33.3)
Civil servant	3(7.5)	2 (75.0)	0 (0)	1 (33.3)
Unemployed	2(5.0)	2 (100.0)	0 (0)	0 (0)
Total	40(100)	30 (75.0)	7 (17.5)	3 (7.5)

$X^2 = 6.732$, P = 0.2; P > 0.05.

DISCUSSION

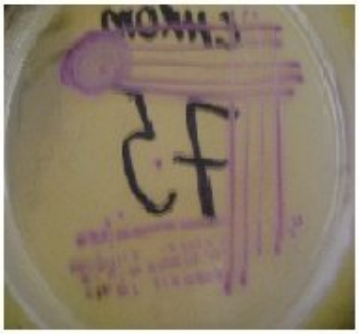
The high prevalence of *Candida albicans* observed in this study is in line with reports by Babic and Mirsada (2010) and Rihter *et al*. (2004) who reported that despite the incidence of *non-albicans Candida*, infections involving *Candida albicans* are still predominant.

Our finding on the distribution of *Candida* species in terms of age group is also in line with the studies of Okungbowa *et al.* (2003) who reported a highest incidence of genitourinary tract infection among females within 21 – 30 years in Northern Nigeria. Iin fact, Enweani *et al.* (1987) had reported a 40.7% asymptomatic *Candidiasis* in female students of the University of Jos, Nigeria. The differences observed between these studies may be due to geographical location, environmental condition, sample size and personal hygiene.

The present study also showed that ages > 40 years recorded a no-positive *Candida* culture. This observation is in line with the findings of Howard and Kent (1991) that *Candidiasis* was very rare among menopausal women and documented that *Candida* infection is hormone dependent.

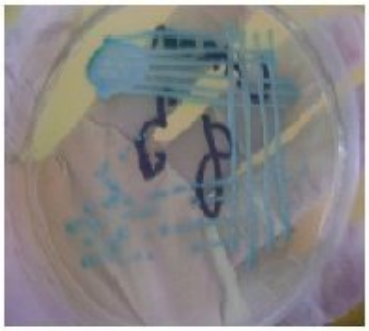
CULTURE PLATES

1.Culture slant of yeast growth



2. *Candida novergenesis*

3. *Candida parapsilosis*



4. *Candida albicans*

5. *Candida dublinensis*

6. *Candida krusei*

Our finding in relation to the distribution of *Candida* spices in the various trimesters of pregnancy supports the report by Sobel (1992), that *Candida* infections increases in pregnancy particularly in the third trimester due to secretion of reproductive hormones. Similarly, Fidel *et al.* (2000) did observe that during pregnancy the vagina is often sensitive, and infection occurs significantly more often. This is especially true in the second and third trimesters of pregnancy, considering the observe increase in the growth of *Candida species.*

Furthermore, the incidence of *Candida* colonization in relation to occupation showed that traders were more affected. This disagrees with Fonck *et al*. (2000) who reported that majority of unemployed women had the highest frequency of vaginal infections caused by *Candida* species.

Finally, the findings of this study indicate that *Candida* species are prevalent among pregnant women in Ekpoma and its environs, and the *albicans* species are most common. In addition, the distribution of *Candida* species is affected by socio-demographic characteristics. Thus, it is recommended that screening for *Candida* be included in anti-natal care.

ACKNOWLEDGEMENT

We wish to acknowledge every one that in one way or the other contributed to the success of this work and the presentation of this article.

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AUTHOR'S CONTRIBUTION

Imahe, P.O., Inyang, N.J., Obiazi, H., Okpidu, E.E., Okon, A.U., and Oguanya, F.C., were involved in the literatures searched, preparation and presentation of this article.