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## Comparative Study on the Prevalence of Vaginal Candidiasis among Non-Pregnant and Pregnant Women Attending Antenatal Care at the General Hospital, Calabar – Nigeria



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### ABSTRACT

According to this study, vaginal candidiasis is found on the mucosa of the vagina and is commonly associated with women of childbearing age and is caused by an overgrowth of *Candida albicans*. This organism grows out of proportion when the natural balance of the vagina microbiota is disrupted resulting in candidiasis. A comparative study on the prevalence of candidiasis, alongside administration of questionnaires to obtain the demography and health history of non-pregnant and pregnant women attending General Hospital, Calabar was carried out. A total of 102 and 100 samples were collected from non-pregnant and pregnant women respectively. High vaginal swab (HVS) samples were collected from both non-pregnant and pregnant women and cultured on Sabouraud Dextrose Agar (SDA) for microbiological examination following standard laboratory procedures. The presence of *Candida albicans* was confirmed using the germ tube test. Results of this study shows that at  $P < 0.05$  there was no significant difference in the yeast growth based on growth pattern and age. Data obtained from pregnant women showed the highest value of 12 (60.0%) at age group of 26-30 years and least value of 3 (100%) at age group of 16-20 years, while that of the nonpregnant women had highest value of 18 (69.2%) at age group of 26-30 years and least value of 3 (50.0%) at age group of 36-40 years. Women in their 3<sup>rd</sup> trimester had the highest prevalence of *Candida albicans* seen, 20/33 (60.6%) while women in their 1<sup>st</sup> trimester had the least prevalence 2/4 (50%). Many of the pregnant women were married (73%) and have attained mostly a tertiary level of education (56%).

## INTRODUCTION

Vaginal candidiasis is the overgrowth of yeast especially *Candida albicans* on the vaginal mucosa. It is not an uncommon finding among women of reproductive age (Abad and Safdar, 2009). It often results from an imbalance in the normal vaginal microbiota which douches, sugary diets, abuse of antibiotics etcetera can cause. The essential predisposing factors for colonization and inflammation are: changes in reproductive hormone levels associated with premenstrual periods, pregnancy, oral contraceptive pills, abusive use of antibiotics and diabetes mellitus. *Candida* species belong to the normal microbiota of an individual mucosal oral cavity, gastrointestinal tract and vagina (Saporito et al., 2001).

Symptoms including vulvovaginal candidiasis, vaginal thrush, vaginal yeast and candida vaginitis are terms used in describing vaginal candidiasis, one of the most frequent infections seen in general practice (Egbe et al., 2011). There are differences in pathogenicity among *Candida* species isolates. Some properties related to *Candida albicans* cells, confer them with the capacity to cause disease. The enzymes produced them, especially protease and phospholipase, allowed the yeast penetration into the cells, including inflammatory response with injury of adjacent tissues (Roemer et al., 2003). During pregnancy, the levels of both progesterone and estrogen hormones are elevated. Progesterone has suppressive effect on the anti-candida activity of the neutrophils, while estrogen have been found to reduce the ability of vaginal epithelial cell from inhibiting the growth of *Candida albicans* and also decrease immunoglobins in vaginal secretion resulting in increased vulnerability of pregnant women to vaginal candidiasis (Kamath et al., 2013). Complication of vaginal candidiasis can also result to inadequate treatment or self-re-infection (Babic and Hukic, 2010). Prolong scratching may cause the skin of the vulva to become cracked and raw, making it more susceptible to infections. It is true that vaginal yeast infections always cause severe itching in the vaginal area, this may lead to further infections (Olowe et al., 2014). Since clinical diagnosis cannot be relied on perfectly in the diagnosis of vaginal candidiasis, laboratory diagnosis needs to be carried out for proper confirmation (Sobe et al., 2014; Nnadi and Singh, 2017).

## MATERIALS AND METHODS

A cross-sectional study was carried on pregnant (100) and non-pregnant (102) women who were randomly selected for the study in General Hospital, Mary Slessor Avenue, Calabar, Cross River State, Nigeria. High Vaginal Swab (HVS) samples were collected from both

categories and the yeast cells were isolated using Sabouraud Dextrose Agar. Direct microscopy and Germ Tube test were employed to further enhance the cultural characteristics. The Germ tube technique involves the transfer of 0.5ml of sheep serum with a pipette into a test tube, and with a sterile wire loop, a colony of the test organism was inoculated into the serum. The tube was then inoculated at 37°C for about 2 – 4 hours.

After incubation, a Pasteur pipette was used to transfer a drop of the serum yeast culture onto a clean grease free glass slide and covered with coverslip. The slide was then viewed using the X10 and X40 magnification.

## RESULTS

**Table No. 1: Complaints/symptoms experienced by pregnant and non-pregnant women**

Complaints/Symptoms	Pregnant Women Frequency (n = 102)	Non-Pregnant Women Frequency (n = 100)
Thick whitish discharge	54%	41.2%
Vulvar pruritis	41%	39.2%
Discomfort	24%	18.6%
Burning sensation	43%	35.3%
Redness and vulva swelling	36%	28.4%
Sexually active	Nil	69.6%
Douching	Nil	41.2%

The above table shows the common complaints experienced by pregnant women and non-pregnant women. 54% complained of thick whitish discharge in pregnant women compared to 41.2% in non-pregnant women. The frequency rate of complaints experienced by the non-pregnant women were apparently shown to be lesser than that of the pregnant women.

**Table No. 2: Age Distribution Pattern and rate of vulvovaginal candidiasis among pregnant and non- pregnant women**

Age range	Non- pregnant women			Pregnant Women		
	Total No. (n = 102)	Growth shown (n = 70)	<i>Candida albicans</i> (n = 44)	Total No. (n = 100)	Growth shown (n = 63)	<i>Candida albicans</i> (n = 38)
16 – 20	6	6	4 (66.7%)	3	3	3 (100%)
21 – 25	31	22	15 (68.2%)	32	22	12 (54.6%)
26 – 30	41	26	18 (69.2%)	34	20	12 (60.0%)
31 – 35	14	10	4 (40.0%)	20	10	7 (70.0%)
36 – 40	10	6	3 (50.0%)	11	8	4 (50.0%)

$X^2 = 3.627; P = 0.459$

$X^2 = 5.09; P = 0.278$

Table 2 shows the percentage distribution of yeast growth based on age range for non-pregnant and pregnant women. For both categories of women, the age range of 26 – 30 years recorded the highest amount of yeast growth 26 and 20 from the study. However, at  $P < 0.05$ , it showed that there was no significant difference in the studied parameters based on age range for both categories.

**Table No. 3: Prevalence of *Candida albicans* based on trimester among pregnant women**

Trimester	Growth seen	<i>Candida albicans</i>
1 <sup>st</sup>	4	2 (50%)
2 <sup>nd</sup>	26	16 (61.5%)
3 <sup>rd</sup>	33	20 (60.6%)

$\chi^2 = 6.834 P = 0.033$

Table 3 shows the prevalence of *Candida albicans* based on trimester among pregnant women. For the first trimester, second trimester and third trimester, the number of subjects whose samples showed growth on culture medium was (4, 26 and 33). However, subjects who had growth on Germ tube test for the respective trimesters were (2, 16 and 20). P value of 0.033 showed that there was a significant elevation in the parameters studied as the trimester progresses. However, trimester studies was not carried out on non-pregnant women.

## DISCUSSIONS

This study could be regarded as an exploratory study which is aimed at determining the prevalence of vaginal candidiasis among pregnant and non-pregnant women attending General Hospital, Calabar. Among the 100 pregnant women examined, thick whitish discharge was heavily complained of by the women (54%) as shown in table 1 followed by burning sensation (43%). Other complaints were also reported such as vulvar pruritis, discomfort and redness with discomfort being the least of them all (24%). However, of the 102 non-pregnant women examined, 70 showed positive to vaginal candidiasis while 32 were negative, thus giving a prevalence rate of 68.6%. Thick whitish discharge (41.2%) was mainly complained of by the women followed by vaginal pruritis (39.2%) with discomfort being the least (18.6%).

From table 2, *Candida* positive cultures were observed mostly among the age group 26-30 years while the least was found among the age groups 36-40 years in non-pregnant women as opposed to the age group of 16-20 years in pregnant women. There was no significant statistical relationship between the prevalence of vaginal candidiasis and age at  $P < 0.05$ . Thus, this report concurs with previous findings (Emeribe et al., 2015). During pregnancy, levels of both progesterone and estrogen hormones are elevated. Progesterone has oppressive effects on the anti-candida activity of neutrophils, while estrogen has been found to reduce the ability of vaginal epithelial cells to inhibit the growth of *Candida albicans* and also decreases immunoglobulins in vaginal secretions resulting in increased vulnerability of pregnant women to candidiasis (Paul and Kannan, 2017). Advancement in age, on the other hand, reduces the effect of estrogen hormone in women which could result to lower rates of infection as women advance in age. Majority of women aged over 46 years have attained menopause and are less or not sexually active. This is evident from the age group of 36-40 year which makes this study to be in consonance with previous works (Nelson et al., 2013). Vaginal candidiasis was affected by the trimester of pregnancy as it shows a progressive

increase with the duration of pregnancy. A very high prevalent rate of 52.4% (33 out of 63) was observed in the third trimester of pregnancy compared to a rate of 6.4% (4 out of 63) and 41.3% (26 out of 63) in the first and second trimester respectively as shown in table 3. This report is in tandem with a recent report (Nnadi and Singh, 2017). As such, it was found to be statistically significant at  $X^2 = 16.038$ ,  $P = 0.033$ .

The rate of infection with candida appears to increase with the duration of pregnancy. In this study, the highest prevalence of candidiasis in pregnancy was observed within the third trimester of gestation. This could be attributed to higher levels of placental estrogens, progesterone, and corticosteroids in advanced pregnancy which reduce the vaginal defense mechanisms and encourage the growth of yeast cells (Lisiak et al., 2000).

## RECOMMENDATIONS

This study recommends that: personal and proper hygiene should be observed and antibiotic chemotherapy should be administered with prophylactic treatment of candidal drugs. Also, there is a huge need to educate women on genital hygiene. Furthermore, it is imperative to incorporate routine screening for candidiasis in our antenatal program to identify and treat symptomatic women.

## CONCLUSION

This study has clearly shown that there is a high prevalence of vaginal candidiasis among pregnant and non-pregnant women in Calabar metropolis. Candidiasis was highly prevalent in both categories of women with the age group of 26-30 years and were attributed to lack of personal hygiene and change in the normal pH of the vagina.

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