



# Microbes and Infectious Diseases

Journal homepage: <https://mid.journals.ekb.eg/>

## Original article

### Prevalence of vulvovaginal candidiasis in pregnant women attending antenatal clinic in Abak, South- South Nigeria

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#### ARTICLE INFO

##### Article history:

Received 23 July 2021

Received in revised form 7 September 2021

Accepted 11 September 2021

##### Keywords:

Prevalence  
Candidiasis  
Fungi  
Pregnancy

#### ABSTRACT

**Background:** 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. The study aim to determine vulvovaginal candidiasis in pregnant women attending antenatal clinic at the Mercy Hospital, Abak Local Government Area. **Methods:** A total number of 50 samples of high vaginal swabs were collected from pregnant women with symptoms of vaginal infection and investigated for *Candida* isolates using standard techniques. **Results:** In this study, 25(50%) pregnant women were presented with vaginal discharges, 22(44%) with itching and 3(6%) with burn. The highest prevalence of *Candida albicans* (*C. albicans*) was noted among pregnant women of the age group 26-35year (56.7%) followed by those of age 16-25years, (33.3%) and those of age 36-45year (10%), Age group 26-35years had the highest occurrence of *C. albicans*. The second trimester pregnant women were most infected with *C. albicans* (56.7%). The 1<sup>st</sup> and 3<sup>rd</sup> trimester pregnant women recorded low prevalent rates of 16% and 26.7%, respectively. **Conclusion:** In this study the high prevalence of *C. albicans* was due to many different reasons such as: suppression of the immune system due to the pregnancy, prolonged and misuse of antibiotics which destroy the good and beneficial bacteria resulting in the reduction of vaginal immunity.

#### Introduction

Vaginal infections are the most common women's health problem, and have been increasingly linked to a growing array of serious health risks [1]. Vulvovaginal candidiasis (VVC) is a widespread vaginal infection primarily caused by *Candida albicans* (*C. albicans*). Vulvovaginal candidiasis affects up to 75% of women of childbearing age once in their life, and up to 9% of

women in different populations experience more than three episodes per year, which is defined as recurrent vulvovaginal candidiasis (RVVC). Recurrent vulvovaginal candidiasis results in diminished quality of life as well as increased associated healthcare costs [2]. *Candida* is a dimorphic fungus from the phyla Ascomycota that inhabits the respiratory, gastrointestinal and

DOI: 10.21608/MID.2021.87167.1175

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genitourinary tracts of more than 30% of healthy individuals during their lifetime [3]. The ailment causes a smelly, thick, white-yellowish discharge that might be accompanied by itching, burning and swelling. Up to 9% of women in various populations experience more than three or four episodes within one year, which is regarded as RVVC [4]. It could also make walking, urinating or having sex very painful. This health problem can as well present occasionally even in the healthiest of women, however, it is more common and severe in women with weakened immune systems. 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. 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. Pregnancy is a physiological state, which produces several normal and expected changes in all the maternal organ systems. Vaginal secretions during pregnancy fall from a pH of greater than 7 (an alkaline pH) to 4 or 5 (an acid pH). This occurs because of the action of *Lactobacillus acidophilus*, bacteria that grow freely in the increased glycogen environment, by so doing increase the lactic acid content of secretions. This changing acid content helps to make the vagina resistant to bacterial invasion for the length of the pregnancy. This change in pH also unfortunately, favours the growth of *C. albicans*. *Candida* infection occurs more frequently in pregnant women. It is believed that higher estrogen levels and higher glycogen content in vaginal secretions during pregnancy increase a woman's risk of developing vulvo-vaginal candidiasis. *Candida* species are part of the lower genital tract flora in 20-50 % of healthy asymptomatic women [5]. Nelson et al. showed that *C. albicans* is the most common vaginal *Candida* species followed by *Candida glabrata* causing vaginal Candidiasis among pregnant women [6]. Early Laboratory diagnosis done by Gram staining of the smears and culture and appropriate treatment may improve the clinical condition of the women and neonates. Vulvovaginal candidiasis can be

treated with topical or oral antifungal formulations, among which azoles (e.g., miconazole, clotrimazole and fluconazole) are the most frequently prescribed therapeutics [7]. Although they do not prevent recurrent episodes, after therapy cessation necessitating antifungal prophylaxis [2]. Recurrent vulvovaginal candidiasis does not correlate with mortality rates but the morbidity is dramatically increasing, and the costs associated with medical care rise accordingly. Hence, more effort needs to be made on the one hand to understand the immune-pathogenesis and on the other hand to treat VVC patients efficiently and prevent recurrences.

### Statement of problem

Vaginal infections have been associated with serious pregnancy outcomes and complication such as preterm delivery, rupture of membrane, post hysterectomy infection, low birth weight, miscarriage e.t.c. Pregnant women are an appropriate group for studying reproductive tract infection (RTI) especially sexually transmitted infections (STI). This is due to the risk of the infection on the unborn baby and the mother. Moreover, knowing women sexual behaviours and practices which disrupt the normal flora of the vagina and predisposing them to STI is essential.

### Justification

This study aids in planning intervention studies aimed at reducing vaginal infections and improving birth outcomes in Akwa Ibom State and Nigeria as a whole.

### Aim of the study

To determine *C. albicans* in pregnant women attending antenatal clinic at the Mercy Hospital, Abak Local Government Area.

### Objectives

This study is designed to fulfil the following objectives:

- To isolate and identify *C. albicans*.
- To establish the frequency of *C. albicans* among pregnant women.
- To determine the association of vaginal candidiasis with age, trimester, gravidity and marital status.

### Materials and Methods

#### Study area

This cross-sectional study was conducted in the Abak is a town and Local Government Area in

Akwa Ibom State, Nigeria. The L.G.A. was previously part of Cross River State. It was later sub divided into other local government areas such as Oruk Anam, Etim Ekpo, Ukanafun and Ika.

### Study population

The study population consisted of all pregnant women attending antenatal visits in the hospitals aforementioned. All the pregnant patients attending the hospitals who consented willingly to participate in the study were included irrespective of their trimester, age, parity and socio-economic status.

### Data collection

A structured closed ended questionnaire was used for data collection; also results of laboratory investigations of the participants

### Ethical considerations

- Written application for ethical approval was submitted to the hospital of study.
- Informed consent had been taken from all patients.
- The participants informed into their simple language about the infection, aim of the research and the benefits of the study.

### Inclusion criteria/Exclusion criteria

Since the subject of interest is women with *C. albicans*, women included in this research were those with symptoms associated with *C. albicans* infections while those without the symptoms were excluded.

### Sample collection

A total number of 50 samples of high vaginal swabs (HVS) were collected from pregnant women with symptoms of vaginal infection, women age between the ranged from 16-45 years. Samples were collected at Mercy Hospital, Abak Local Government Area between the period of June and August, 2018. After obtaining informed consents, personal biometric data and trimesters of pregnancy were documented. Two swabs were collected for each patient in the same time and transported immediately to Akwa Ibom State University Microbiology Laboratory. The first swab was used to prepare wet mount and thin smear on microscopic slide for gram stain, second swab was inoculated under aseptic condition on Sabouraud Dextrose agar (SDA) and incubated at 37°C for 24 to 72 hours. Colonial morphology, wet preparation, Gram staining, germ tube test, were carried out for identification of the isolated organisms. Germ tube method was carried out with each pure cultures of yeast growth to identify *C. albicans*.

### Culture

Swab was cultured on SDA, a selective media for fungal growth with 0.05mg/ml Gentamicin and incubated at 37°C for 48-72 hours [8].

### Identification of *Candida* species

#### Macroscopic examination

The odour, consistency, colour and texture of each specimen discharge was observed and recorded.

#### Microscopic examination

Vaginal swabs were examined microscopically by 10% potassium hydroxide (KOH) wet mount and Gram's staining for the presence of budding yeast and pseudo-hyphae of *Candida* species.

#### Wet preparation

Swab was rolled on clean slide, 2 drops of 10% potassium hydroxide was added, and covered with cover slip, then examined under microscope using X10 and X40 for the presence of budding yeast and pseudo-hyphae of *Candida* spp [9].

#### Gram's staining procedure

Indirect Gram's stain was performed for yeast suspected colonies which revealed gram positive (G + ve) yeast cells.

#### Germ Tube Test (GTT) (A confirmatory test for *C. albicans*)

Positive test: presence of short lateral filament (germ tube) for *C. albicans*, Negative test: yeast cell only for *C. non albicans* [8].

### Statistical analysis

Results were reported as mean  $\pm$  standard deviation, Percentage. All data were subjected to statistical analysis by analysis of variance (ANOVA). The means were separated with least significant difference. The result was considered significant at  $p < 0.05$ .

### Results

In this study, a total of 50 swab samples were aseptically collected and examined from pregnant women attending antenatal clinic at Mercy hospital, Abak L.G.A so as to determine candidiasis among pregnant women and their age ranged from 16-45 years.

**Table 1** shows 50 samples that were examined, 30 (60%) samples were positive to *C. albicans*. The rest of the 20 swab samples (40%) were negative to *C. albicans*.

According to age, a majority of the pregnant women (58%) were in the age group of 26-35. **Table 2** shows frequency distribution of *C.*

*albicans* among pregnant women of different ages. Pregnant women of age 26-35 had the highest number of candida positive of 17(56.7%) followed by those who were in the age group of 16-25, 10 (33.3%) and the least were pregnant women of the age group of 36-45 with 3 (10%) positive sample of candidiasis.

According to duration of pregnancy, a majority of the pregnant women (50%) were in their 2<sup>nd</sup> trimester. **Table 3** shows frequency distribution of *C. albican* among pregnant women of different trimester. Pregnant women with the highest number of Candida positive were those in their 2<sup>nd</sup> trimester

which had a total number of 17 (56.7%) positive sample and those with the lowest number of Candida positive were those in their 1<sup>st</sup> trimester which had a total number of 5 (16.7%) positive sample, pregnant women in their 3<sup>rd</sup> trimester had a total of 8 (26.7%) candida positive sample.

According to symptoms, most of the pregnant women 25 (50%) of them had vaginal discharge, 22 (44%) of them had itching and 3 (6%) of them had burning as their symptoms. **Table 4** shows the frequency distribution of symptoms among pregnant women.

**Table 1.** Frequency of positive *C. albicans* among pregnant women.

Sample	No. sampled	% Positive
No. positive	30	60%
No. negative	20	40%
Total	50	100%

**Table 2.** Frequency distribution of *C. albicans* among pregnant women of different ages .

Age	No. sampled	No. of positive	Percentage %
16-25	15	10	33.3
26-35	29	17	56.7
36-45	6.00	3	10.0
Total	50	30	

**Table 3.** Frequency distribution of *C. albican* among pregnant women of different trimester.

Trimester	No. sampled	Candida positive	Percentage %
1st (0-3months)	11	5	16.7
2nd (4-6 months)	25	17	56.7
3 rd (7-9 months)	14	8	26.7
Total	50	30	

**Table 4.** Frequency distribution of symptoms among pregnant women

Symptoms	No. sampled	% Positive
Discharge	25	50%
Itching	22	44%
Burn	3	6%

## Discussion

Candidiasis is an infection caused by overgrowth of *Candida* species affecting the genital tract as opportunistic pathogen whereby *C. albicans* is the most common species. Candidiasis is a common type of vaginitis, a gynecologic disorder with a white discharge, soreness, irritation and itching [2]. *Candida albicans* is common among pregnant woman due to altered pH and sugar content in vaginal secretions. Increased physiological changes in oestrogen and rich glycogen content of the vaginal mucosa provide adequate supply of utilizable sugar that supports the proliferation of *C. albicans*. In this study the overall frequency of *C. albicans* among pregnant woman was 30(60%). The high prevalence of *C. albicans* may be due to many different reasons such as: suppression of the immune system due to the pregnancy, prolonged and misuse of antibiotics which destroy the good and beneficial bacteria resulting in the reduction of vaginal immunity. The most common *Candida* species causing vaginal candidiasis is primarily *C. albicans* [10] and responsible for 70-90% of all vaginal candidiasis [11].

In this study, vaginal discharge was the most common symptom between pregnant women followed by itching; 25(50%) pregnant women presented with vaginal discharges, 22(44%) pregnant women with itching and 3(6%) pregnant women presented with burn.

The highest prevalence of *C. albicans* in this study was noted among pregnant women of the age group 26-35year (56.7%) followed by those of age 16-25years, (33.3%) and those of age 36-45year (10%), other report found that age group 26-35years had the highest occurrence of *C. albicans*, which showed that ages is a common factor in the cause of the spread of the infection. In this study, the second trimester pregnant women were more infect (56.7%). The 1<sup>st</sup> and 3<sup>rd</sup> trimester pregnant women recorded low prevalent rates of *C. albicans* of 16% and 26.7% respectively. This may be due to the fact that pregnant women if their 2<sup>nd</sup> trimester of pregnancy could have been more emotionally stressed high level of estrogen and corticoid hormones, therefore, the reduction in immune system against *C. albicans*. This work agreed with the work of other researchers, a 60% frequency of *C. albicans* among pregnant women [6], about, 55% incidence in Benin City, Edo state [12], 60% in Jos [13] and 62.2% in Enugu [5]. The impaired cellular immunity" and decreased Candidacidal effects of

leucocytes associated with pregnancy may also contribute to the increased incidence.

## Recommendation

Proper identification and treatment, thus reduce the risk of preterm birth and its consequences.

## Acknowledgements

We thank Akwa Ibom State University for giving us the opportunity to carry out the research.

## Conflicts of interest

The authors declare no conflicts of interest regarding the publication of this paper.

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