

PREVALENCE OF VAGINAL CANDIDIASIS AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN SELECTED HOSPITALS WITHIN GUSAU, ZAMFARA STATE, NIGERIA

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ABSTRACT

Vulvovaginal candidiasis is a fungal infection caused by *Candida* species mostly *Candida albicans*. Symptoms of this infection include vaginal itching, irritation of the vulva and vagina, discharge and burning sensation around the genito- urinary tract of infected individuals. This study was conducted to detect and determine the prevalence of vaginal candidiasis in pregnant women attending antenatal care in selected hospitals within Gusau, Zamfara state, Nigeria. Vaginal swab samples of 300 pregnant women aged between 15 and 40 years were collected and mycologically analysed using standard microbiological procedures for the detection of *Candida albicans* usually implicated in cases of vaginitis. Out of the 300 vaginal swab samples analysed, 65 (21.67%) were found to be positive. Women aged 26- 30 had the highest percentage distribution of *C. albicans*. Distribution of the organism was observed to be least among those aged 36-40. The study underscores the need to periodically determine the prevalence of vaginal candidiasis among pregnant women so that adequate measures can be put in place to forestall any negative effect of such infection on the mother and unborn child.

Keywords: Prevalence; *Candida albicans*; vaginal candidiasis; pregnant women; antenatal care
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INTRODUCTION

Candida albicans is an opportunistic yeast pathogen responsible for candidiasis often called vulvovaginal candidiasis (VVC). It is a common infection of the genital tract and mostly prevalent among women especially during pregnancy (Nnadi and Singh, 2017). Approximately 75% of women have been reported to have at least an episode of vaginal candidiasis in their life time (Maurissen *et al.*, 2009). Chew and Than (2016) reported that three out of four women encounter the infection in their life time. In most individuals, *Candida albicans* is a member of the mucosal flora and a normal human microbiome which resides for a long period of time as a harmless commensal, but could pose superficial infection or life-threatening systemic infection due to change in certain circumstances (Mayer *et al.*, 2013; Sudbery, 2011).

The organism has been reported to be the most prevalent human fungal pathogen that could colonise many areas of the body (Nobile and Johnson, 2015). Pathogenic potentials of the organism have been identified in a report of Mayer *et al.* (2013) which include ability to adhere and invade host cells, secretion of enzyme hydrolases and biofilm formation. Though *Candida albicans* has been reported to be resistant to many antifungal drugs, it is usually treated with azole class of antifungal drugs due to their less toxicity and availability (Whaley *et al.*, 2017), (Dovnik *et al.*, 2015). Vulvovaginal candidiasis poses a global concern because of its economic importance (Bitev and Abebaw, 2018). Rodríguez-Cerdeira *et al.* (2019) reported that mechanisms used by *Candida* species to produce vaginal inflammation are not known. Lee *et al.* (2015) identified diabetes mellitus as a predisposing factor alongside pregnancy. Other factors include use of broad spectrum antibiotics, high dose of estrogen, oral contraceptives and abuse of drugs. In a recent study, *C. albicans* was reported to derive its virulence by biofilm formation (Gulati and Nobile, 2016). Vulvovaginal candidiasis is an infection that affects millions of women every year (Gonçalves *et al.*, 2016). The infection is estimated to be the second most common cause of vaginitis after bacterial vaginosis. *Candida albicans* accounts for 85-90% of vulvovaginal candidiasis (Martin, 2015).

This study was aimed to determine the prevalence of vaginal candidiasis caused by *Candida albicans* among pregnant women attending antenatal clinic in selected hospitals within Gusau metropolis in Zamfara State, Nigeria.

MATERIALS AND METHODS

Study Area

Gusau is a city and Local Government Area located in northwestern Nigeria. It is the capital of Zamfara State. The state has a population of 3,278,873 distributed in 14 LGAs (Nasiru *et al.*, 2015). Its population is mostly Hausa with some Fulani, Yoruba, Igbo, Igala and Nupe tribes. Gusau has a tropical savanna climate.

Inclusion and Exclusion Criteria

The study was designed for pregnant women attending antenatal care in some selected hospitals within Gusau metropolis aged between 15 and 40. It excluded participants from non- antenatal care unit of the selected hospitals, those below the age of 15 and those above 40.

Ethical Approval and Consent

Before the commencement of sample collection, ethical approval was obtained from the management of the selected hospitals. Participants were fully informed on the essence and importance of the study. As such, they all agreed to volunteer and offer samples for the study. Oral and written consent was sought from all participants in the study.

Vaginal Swab Sample Collection

Three hundred (300) vaginal swab samples were collected from pregnant women attending antenatal clinic (ANC) of the selected hospitals including the General Hospital, Gusau (n=50), Dr. Karima Primary Health Care Gusau (n=150) and King Fahad Ibn AbdulAziz Women and Children Hospital Gusau (n=100) between August and December, 2018. The samples were transported to Department of Microbiology Laboratory, Federal University Gusau for processing and analysis. Of the 300 samples, 293 (97.70%) were from participants who came from the rural areas of Gusau while 7 (2.30%) were from urban areas of Gusau.

Isolation and Identification of *Candida albicans*

The samples were enriched in a nutrient broth for 24 hours, then streaked onto Sabouraud Dextrose Agar (SDA) plates and incubated for 3 days. Afterwards, *Candida albicans* was identified as rapid-growing colonies of yeast, with smooth, soft, shiny and creamy colonies (Cheesbrough, 2006). Cells of *Candida albicans* were also identified as distinctive or budding yeast cells, and this was done by placing a drop of 20% potassium hydroxide (KOH) onto a clean microscopic slide. A sterile wire loop was then used to pick a small portion of the colonies and emulsified on the slide containing a drop of KOH. The slide was then covered with a cover slip and viewed under microscope using x 10 and x 40 objective lenses with condenser iris diaphragm closed to give good contrast (Cheesbrough, 2006).

Germ Tube Test

Germ tube formation by *Candida albicans* is one of the essential factors that increases the virulence of the organism (Ahmad *et al.*, 2016). Kim *et al.* (2002) identified germ tube formation by *Candida albicans* at 39 °C in rabbit serum as a rapid method of distinguishing *C. albicans* from other *Candida* species. In this study, germ tube formation was carried out as confirmatory test in accordance with the standard procedure described by Cheesbrough (2006). This was done by placing 0.5 ml of rabbit serum into a sterile test tube; a colony of the *Candida* was picked using a sterile wire loop and inoculated into the test tube and incubated for three (3) hours at 37 °C. A drop of the serum yeast culture was then placed on a clean grease-free microscopic slide and covered with a cover slip. The slide was then examined under the microscope using x 10 and x 40 objective lens with iris diaphragm closed to give sufficient contrast.

RESULTS

Candida albicans was observed to be a fast-growing yeast which grows within 24 hours at 25 °C. It also forms a short lateral filament (germ tube) when inoculated into a serum of rabbit at the same temperature. Out of 300 samples analysed, 65 (21.67%) were found to be positive for *Candida albicans* (Table 1). On the occurrence of *Candida albicans* among age groups, it was found that pregnant women between the ages of 26 and 30 had the highest rate of occurrence of 25 (8.33%). This was followed by those between 21 and 25 with 22 (7.33%) and those between 15 and 20 with 13 (4.33%). The occurrence rate was observed to decline among those between the ages of 31 and 35. The age group with the least rate of occurrence was between 36 and 40 with 1(0.33%).

Table 1: Percentage Frequency of occurrence of *Candida albicans* from Pregnant Women

No. of Samples	Positive	Negative	Frequency (%)
300	65	235	21.67

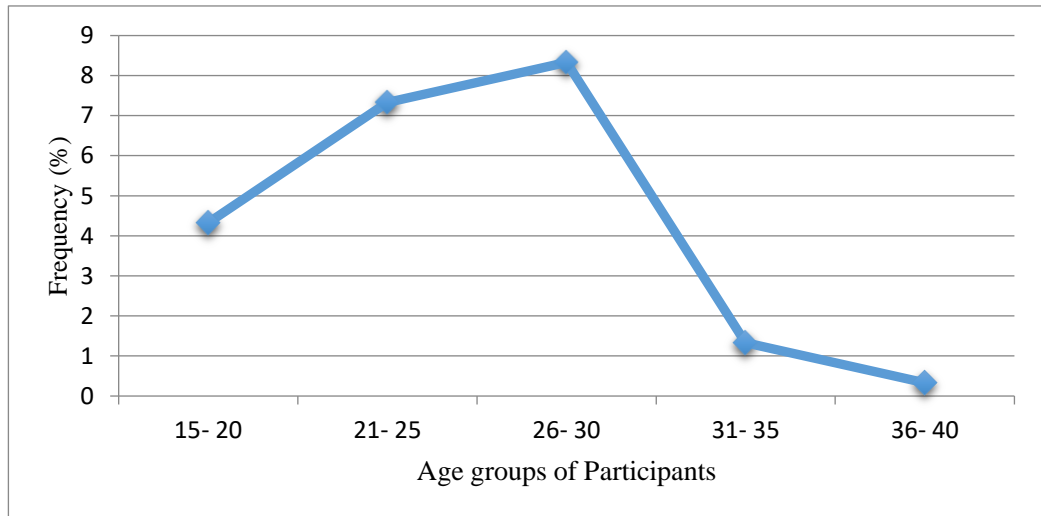


Figure 1: Frequency distribution of *Candida albicans* based on age groups of participants

DISCUSSION

The prevalence of vaginal candidiasis in pregnant women has been reported in different authors as 30%, 35% and 36% (Olowe *et al.*, 2014; Aguin and Sobel, 2015; Yadav and Prakash, 2016). In this study, the highest prevalence was observed to be 21.67%, which is in agreement with the findings of Sangaré *et al.* (2018), who reported 22.7% prevalence of vaginal candidiasis. This relatively low prevalence of vaginal candidiasis among women attending ANC in the selected hospitals may be attributed to good personal hygiene and normal levels of estrogens (Daniel and Swati, 2017). Another study conducted at University of Abuja Teaching Hospital showed that the prevalence

was low (14 %) compared to the findings of the present study (Abdullahi *et al.*, 2015). This could be due to adequate knowledge and environmental factors such as hygiene and nutrition (Hansen *et al.*, 2004).

Pregnant women aged 26-30 who participated in the study were found to have *C. albicans* with percentage distribution of 8.33%. The least positive cultures were observed among those from 36 to 40 years and above. This finding disagrees with the report of Moses and Michael (2012) who reported a high prevalence of *Candida albicans* of 33.33% among the age bracket of 36- 40 from Southeastern Nigeria. However, it is in conformity with the report of Okonkwo and Umeanaeto (2011) who reported that the age bracket of 26-30 had a high prevalence of 13.6%, while those between 36-40 years had the lowest prevalence of 0.33%. The reason for the high prevalence of vaginal candidiasis for women aged 26-30 could be due to high sexual activity, use of contraceptives and abuse of antibiotics. These factors could contribute to lower the immunity of the infected individuals (Daniel and Swati, 2017). However, decline in the occurrence of vaginal candidiasis among women aged 31 and above may be attributed to decline in sexual activities. Women below 20 years of age are not engaged in active sexual activities which accounted for low incidence of vaginal candidiasis (Akortha *et al.*, 2009).

CONCLUSION

Vulvovaginal candidiasis is among vaginal infections caused by *Candida* species with *Candida albicans* accounting for high occurrence. Prevalence of vaginal candidiasis among pregnant women attending antenatal care was high in the women within the age group of 26- 30 years. Routine medical check-up and antenatal care services should be provided to pregnant women. Appropriate treatment after proper susceptibility test should also be given to the affected individuals.

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