Research Article

PREVALENCE OF VULVOVAGINAL CANDIDIASIS AMONG PREGNANT WOMEN ATTENDING 345 AEROMEDICAL HOSPITAL (NAF) KADUNA AND PRIMARY HEALTH CARE CLINIC SAMARU ZARIA, KADUNA STATE, NIGERIA

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ABSTRACT

Vulvovaginal*Candidiasis (*VVC) is a fungal infection caused by overgrowth of *Candida* species affecting mostly the female genital tract as an opportunistic pathogen. High Vaginal Swab (HVS) isolates were obtained after proper ethical consents from six hundred and ten (610) pregnant women attending 345 Aeromedical Hospital (NAF) and Primary Health Care Clinic, Samaru, Zaria, Kaduna State within a ten month period. Brilliance ™ Candida Agar Base and selective supplement (SR0231E) were prepared, then samples introduced and incubated at 37°c under 5% CO_2 atmosphere for optimal growth of species for 24-48 hours. Identification was based on specific colour of colonies on the media as described by the manufacturer.The result revealeddifferent *Candida* species, namely *Candida albicans*(55.11%), *C. glabrata*(19.53%), *C. tropicalis*(12.33%), *C. krusei*(8.84%), and *C. parapsilosis*(4.19%). The overall total disease prevalence (70.49%) was determined by using the formula where: $\frac{O}{P}$X 100%; where: O is the number of individuals with the disease and P is the total number of population involved in the study. Also the prevalent species, *Candida albicans*53.81% from Aeromedical hospital NAF and 85.40% from PHC SamaruZaria when compared using Chi square analysis showedsignificant difference (P> 0.05)in the prevalence of VVC in pregnant women within first, second and third trimester in the twohealth Centers. High prevalence of *Candida albicans* and other Candida species among pregnant women were documented in this study. Screening protocol for early diagnosis of candidiasis is recommended.

INTRODUCTION

Vaginal *Candidiasis* (VC) is a common type of vaginitis, and a gynaecologic disorder with a white discharge, soreness, dyspareunia, irritation and itching. Systemic symptoms, such as fever and abdominal pain, usually are not seen with vaginitis alone, and may suggest another disease process, (Giraldo *et al., 2012*). Vulvovaginal candidiasis (VVC) has been defined as vulvovaginal inflammation in the presence of candida species and in the absence of other infectious aetiology (Achkar & Fries, 2010). Vulva symptoms can occur with patients presenting with a complaint of ''vaginitis,'' irritation, itching, burning, redness, and dyspareunia. Vaginitis also can present with lower–urinary tract signs and symptoms such as urethritis or dysuria, (Richards *et al.*, 2000).

It is important to make this distinction between urine and gynecologic studies to prevent the over diagnosis of urinary tract infections and under diagnosis of vaginal infections (Tahniat *et al.,* 2004). The most frequent cause of genital discharge in women is an infection or colonization with different microorganisms; the commonest are *Gardnerellavaginalis* with a combination of mixed anaerobes, *Candida albicans,* and *Trichomonasvaginalis. Gardnerellavaginalis*, in combination with mixed anaerobic bacteria, is associated with the unpleasant condition bacterial vaginosis (Nelson *et al.*, 2013). In the developed world, it is the commonest cause of vaginal discharge, but the prevalence is unknown in the developing area. Its significance arises from being associated with pregnancy complications, preterm labour and post caesarean endometritis (Rania *et al.*, 2014). In pregnancy, vaginal *candidiasis* is common due to altered pH and sugar content in vaginal secretions. Increased estrogen level during pregnancy produces more glycogen in the vagina and it also has direct effect on yeast cells, causing it to grow faster and stick more easily with the walls of vagina (Parveen *et al.*, 2008).

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The conditions which predispose urinary and reproductive tract infections are not very clear, however in many cases, sexual intercourse with infected person have been blamed (Ifeanyi *et al.,* 2015). The genital tract is the portal of entry for numerous sexually and non-sexually transmitted diseases. A number of bacterial and non-bacterial infections exist that affect the female reproductive tract and cause vaginal discharge. The administration of corticosteroids or immunosuppressive drugs, drug addiction and immunological deficiencies support the growth of Candida. Besides, systematic conditions such as vitamin B deficiency, hypothyroidism and lymphoblastomafavors*Candida* infection. From the fore going, it is evident that the treatment of other infections with broad spectrum antibiotics increases the number of persons harboring *Candida* in their intestine, vagina and perianal sites (Morgan, 2005). The effect of antibiotics on proliferation of *Candidiasis* based on the fact that these drugs militate against susceptible micro flora and are antagonistic to the fungi thereby enhancing their growth. Traumatic ulceration, postoperative situations, malnutrition, malignancy and anemia also predisposes *Candidiasis* (Onianwah, 2014). Vaginal discharge is a common symptom in primary health care and is often the second most common gynecological problem after menstrual disorders. Most women regard any secretion from the vagina as abnormal discharge and the first task for primary health care providers is to ascertain whether it is pathological or physiological, (Akingbade *etal.,* 2013).

Candida albicans infection manifests in different parts of the body. Common symptomsin the vagina are found which includes itching, redness and a thick white vaginal discharge with occasional white patches on the skin of the vaginal area the irritation. It was also noted that vaginal *Candidiasis* is responsible for the physical discomfort experienced by some patients. The offensive vaginal discharge is a product of organic decomposition of the proteinous component on the vaginal mucosa. Vaginal Candidiasis of pregnant women may occur as mild vaginal infection and may not be connected with infection of the anus (Onianwah, 2014).

Many studies indicate that yeast colonization rate is more frequent in diabetic women than non-diabetic; Women with type 2 diabetes mellitus are more prone to colonization with *C. glabrata* (Donlan and Costerton, 2002).Vaginal inflammation or infection, especially VVC is more disturbing in severe hyperglycemic conditions. Vulvovaginal candidiasis (VVC) in diabetic women is more prevalent than in non-diabetic ones, *C. albicans* was the most predominant yeast isolated (Faraji *et al.,*2012). Also diabetic women were significantly more prone to develop fungal vaginitis than non-diabetic (Grigoriou *et al.,*2006). Glucose can stimulate yeast development and even promote change to a more virulent stage. In pregnancy, vaginal infections can be associated with drastic complications both to the mother and the neonate. It can be easily treated with antibiotics; however, the situation is complicated by the absence of symptoms since patients will not seek medical attention. Identifying the size of infection among antenatal attendees would provide valuable information to health care authorities. Further, unveiling the identity of associated microbes by applying methodologies and criteria that are unusual in clinical practice would point out the importance of following standard protocols in the routine work-up of vaginal specimen (Rania *et al.*, 2014).

Vulvovaginal*Candidiasis* is the second most common cause of vaginitis after bacterial vaginosis and symptomatic vaginitis is higher during pregnancy. *C. albicans* infection occurs in the vast majority of diagnosed true VVC cases. Among the *Candida* spp. causing infections, *C. albicans, C. glabrata, C. parapsilosis,* and *C. tropicalis*account for 80 to 90% of fungal isolates encountered worldwide, (CDC, 2010).

MATERIALS AND METHODS

Study Area

The study was carried out at the 345 Aeromedical Hospital, Kaduna (NAF Base) and Kaduna State Primary Health Care Clinic Samaru, Zaria. Kaduna State is located in the North-West of Nigeria, and lies between Latitudes11034' and 90 01' North of the equator and longitude 6011' and 8049' east of the Greenwich meridian, (Fig. 1).
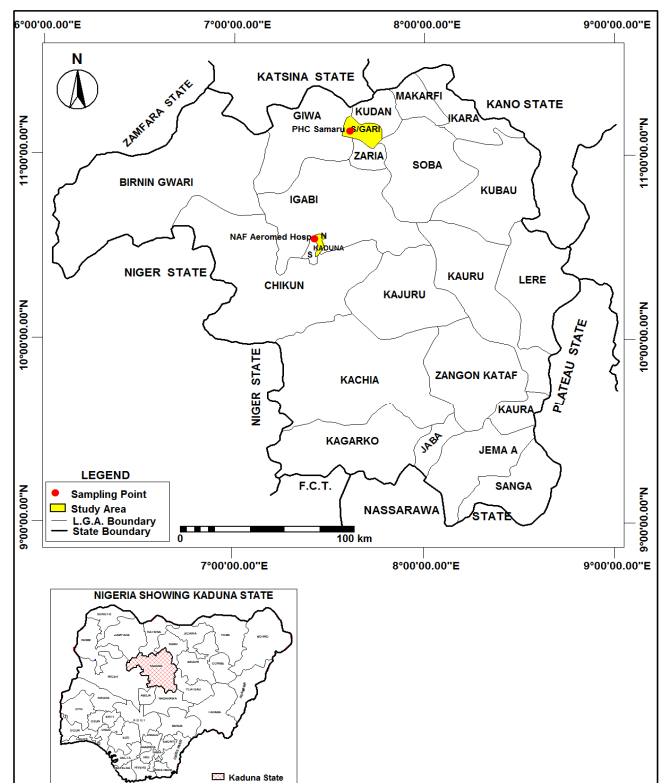

Figure 1 Map Nigeria showing the study area

Study population

Six hundred and ten (610) high vaginal swabs (HVS) samples were collected from pregnant women attending 345 Aeromedical Hospital (NAF Base) and PHC Samaru Zaria from August 2015 to May 2016; after ethical and informed consent of the subject was sought. The methods described by WHO (2009) was adopted.

Specimen collection

A sterile vaginal speculum (single use, manufactured by Changzhou Shaungma Medical Devices Co. Ltd.) was moistened in warm sterile water and inserted into the vagina to examine and appreciate the state of the cervix. A sterile cotton-wool swab stick was then inserted 20-30 mm into the cervical canal and gently rotated against the cervical wall to pick a high vaginal swab. The swab stick was immediately replaced in its casing and labeled appropriately with the patient's information (first name, surname, date of birth, location, physician,

telephone number, time and date). The patient's details were also filled in a request form.

Preparation of Culture Media

Brilliance ™ Candida Agar Base (Oxoid cm1002) 15.6 gm was poured in 500 ml of distilled water and one vile of Brilliance ™ candida selective supplement (SR0231E) was added into the content to reconstitute the mixture. The mixture was well mixed and boiled using hot plate to dissolve granules with frequent agitation (not autoclave). It was then allowed to cool at 45°c. The mixture was poured into sterile petri dishes and allowed to gel.

Isolation and Identification of Candida species

HVS samples were transported to the Microbiology laboratory of 345 Aero Medical Hospital, Kaduna; 2 hours after collection. Wet mount preparation was made from each HVS obtained containing the vaginal discharge to make pool on the medium (Brilliance ™ Candida Agar Base). Sterile wire loop was used to streak starting from the pool. It was then incubated at 37°c under 5% CO_2 atmosphere for optimal growth of species for 24-48 hours. Identification was done by the specific color of colonies on the media as described by the manufacturers.

RESULTS

Using the formula where: $\frac{O}{P}$X 100% ; where: O is the number of individuals with the disease and P is the total number of population involved in the study;(Nelson *et al.,* 2013).

Table 1 shows a total of 430(70.5%) of the pregnant women are positive of VVC from both health centres; 275(63.95%) from PHC Samaru Zaria and 155(36.05%) from Aeromedical Hospital (NAF) Kaduna.
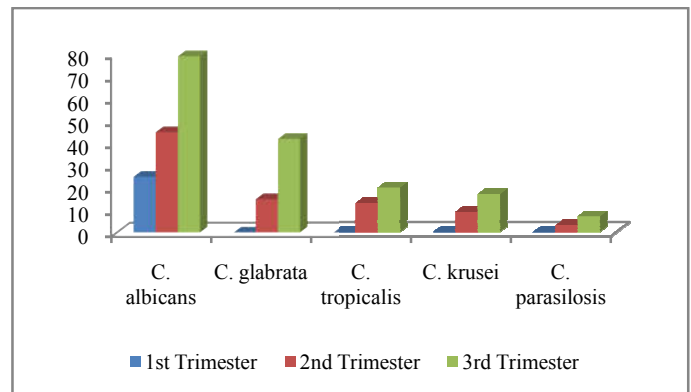
Table 1 Prevalence of VVC in pregnant women attending antenatal clinics in 345 Aeromedical Hospital (NAF) Kaduna and PHC Samaru Zaria

Clinics	Number of Samples	Status	
		Positive %	Negative%
Aeromedical Hospital (NAF)	288	155(53.8)	133(46.2)
PHC Samaru, Zaria	322	275(85.4)	47(14.6)
Total	610	430(70.5)	180(29.5)

Figures 2 and 3 below shows the prevalence of VVC species in pregnant women in relation to pregnancy stages in 345 Aeromedical Hospital (NAF) Kaduna and PHC Samaru Zaria respectively. As observed, *C.albicans* is prevalent in women in the1[st], 2[nd]and3[rd] trimester stage periods with prevalence rate of (55.11%). Considering the trimester stages, *C.albicans* is the only species prevalent in the 1st trimester period. While women in the 2nd and 3rd trimester stages encountered all the five species of *Candida*species. The results were analyzed using the chi-square test, with the level of significance set at p < 0.05.
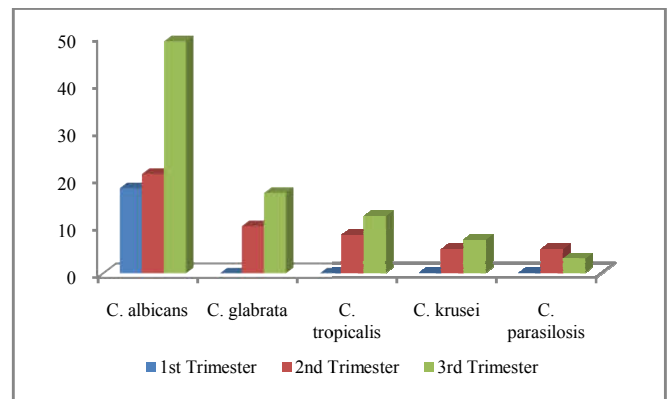
Figure 2 Prevalence of VVC species in pregnant women according to stages/trimester of pregnancy in 345 Aeromedical Hospital (NAF)

Figure 3 Prevalence of VVC species in pregnant women according to stages/trimester of pregnancy in PHC hospital Zaria

DISCUSSION

This study investigated the prevalence of VVC among pregnant women attending antenatal clinic over the period of 10 months in 345 Aeromedical Hospital Kaduna and PHC Samaru Zaria. The prevalence of VVC in pregnant women attending antenatal clinics in the two Health facilities revealed 155(53.81%) and 275(85.40%) for 345 Aeromedical Hospital and PHC Samaru Zaria respectively. However, there is a significant difference in the prevalence according to hospital. In other studies,**(Nikolov *et al.,* 2006) reported 88.3 % prevalence, Klufio *et al.,* (1995) reported 57 % infection. The high rates are in conformity with the fact that *Candida albicans* is both the most frequent colonizer and responsible for most cases of vulvovaginitis (Singh, 2003; Hainsworth, 2002; Watson *et al.,* 2001).**

This finding is similar to that of (Heredia *et al.,*2006) who reported in their study on pregnant patients that the *C. albicans*species account up to 90.4% of the *Candida* spp isolated in the women in Brazil. The same high prevalence of *C. albicans* in relation to the other species was reported by other researchers (Namkinga *et al.,* 2005; Heredia *et al.,* 2006; (Us and Cengiz 2006). However, US and Cengiz (2006) studied a group of 218 pregnant women with signs and symptoms of VVC in Ankara, Turkey, they found a percentage of *53.2%* for the species *C. albicans* which is lower figure than that found in the present study. Our finding does not agree with what Okungbowa *et al.,*(2003) reported that *Candida glabrata*is the most common *Candida* species among the symptomatic pregnant women in Nigeria cities. *Candida* species especially *Candida glabrata* continue to replace *Candida albicans* in causing vaginal candidiasis in pregnant women they observed (Okungbowa *et al.,* 2003).

Conversely, in some studies VVC was found in very low rates (8% -15%) among women showing vulvovaginitis contrasting with others reports (Arzeni *et al.,* 1997; Karaer *et a!.,* 2005). The role of *Candida* species as a cause of vulvovaginitis is controversial and as many as 15% - 20% of female with vaginal infections are asymptomatic with exclusive vaginal discharge. The absence of rapid, simple, and inexpensive diagnostic tests continues to result in both over diagnosis and under diagnosis of VulvovaginalCandidosis (Sobel, 2007). The occurrence of other species of *Candida* causing VVC was not significant among the pregnant women we investigated but in contrast it was reported that *non-albicans* species had a markedly higher prevalence in non-pregnant patients in a study conducted by Chong *et al.,*(2007).

The association with trimester or Stages study revealed in both 345 aeromedical hospital and PHC, VVC species is prevalent in women in 3rd trimester although, VVC species is more prevalent in pregnant women in PHC than pregnant women in 345 Aeromedical Hospital, the prevalent rate were 88(56.8%) for women in Aeromedical Hospital and 165(60.0%) for women in PHC. The study further shows that, there is no significant difference in the Prevalence of VVC species in pregnant women according to stages/trimester of pregnancy in 345 Aeromedical Hospital (NAF) (p>0.05).

The prevalence of VVC species in pregnant women according to the stages or trimester of the pregnancy showed that the 3rd trimester had the highest prevalence rate followed by 2nd and the 1st trimester with the least as shown in Figure 1 and Figure 2. Pregnant women in the 3rd trimester of pregnancy have suppressed immune system than those in the 2nd and 1st trimesters which steps up the risk of *Candida* species to become pathogenic. This is due to the emotional stress, which increases as one is expecting a child. At this trimester, an increased level of estrogen and corticoids hormones decreases the level of vaginal defense mechanisms against such opportunistic infections as *Candida* (Sobel, 1997). These factors contributed to the highest prevalence of vaginal candidiasis in the 3rd trimester of pregnancy.

The results are in agreement with the study conducted by Sobel *et al.* (2000) who reported the highest prevalent rate of 67% in the 3rd trimester of pregnancy. He reported that it was due to increased emotional stress as a pregnant woman is expecting a child resulting to suppression of the immune system that step up the risk of *Candida* species to become pathogenic. The 1st and 2nd trimesters of pregnancy recorded low prevalent rates of VVC infection. The pregnant women in these two trimesters could have less emotional stresses, high levels of vaginal defense mechanisms against *Candida* infections as a result of low levels of estrogen and corticoids hormones. Therefore, they have strong immune system against *Candida* species infections (Sobel, 1997).

CONCLUSION

The pregnant women in this study had non-complicated VVC. The study revealed that VVC among pregnant women in this locality was not uncommon so that continuous antenatal screening should be an ongoing exercise for all pregnant women with history of itching and vaginal discomfort. This will prevent further complications and even transmission to partners. Nystatin has a long-standing efficacy and is cheap but clotrimazole is equally effective but far more expensive. The study recommends that in the face of scarce resources, the old traditional cheap values should not be abandoned for more expensive new ones when both have similar outcomes.

Recommendations

- There is a need for routine surveillance and education of pregnant women on the incidence of VVC as a holistic procedure in antenatal care.
- The need for regular check-up at different gestation period should be encouraged
- Self-medication among pregnant women should be discouraged
- Further studies on the pattern of complications of VVC in pregnant women should be encouraged.

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