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Research Article

Assessment of the Incidence of Candidiasis among Single and Married Women

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Abstract: 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. Vaginal discharge is a common symptom in primary health care and is often the second most common gynecological problem after menstrual disorders. This study was carried out to determine incidence of candidiasis among single and married women in Ekpoma. The study population comprises of single and married women in Ekpoma, Edo State, Nigeria. A total of 100 samples of High Vaginal Swabs (HVS) were sampled for this study. High vaginal swabs were collected from single and married women using a clean sterile vaginal swab sticks after the passages of a sterile bivale speculum. Two vaginal swabs were taken from each woman, the first swab was subjected to microscopic wet smear examination and Gram stained while the second was cultured. All vaginal swabs were correctly and carefully examined and cultured aerobically and facultatively in aerobic condition on blood agar and Sabourd Dextrose agar. The results of this study showed that the incidence of candidiasis was higher in married women when compared with single women. The prevalence of candidiasis in married women is 18(28%), while in single women is 10(20%). It was observed in this study that the distribution of candidiasis among married and single is not statistically significant (p>0.05). Hence it could be concluded that married and single women are predisposed to candidiasis.

Keywords: Candidiasis, Women, Genital, Vagina.

INTRODUCTON

The genital tract is the portal of entry for numerous sexually and non-sexually transmitted diseases (Dodson and Friedrich, 1997). A number of bacterial and non-bacterial infections exist that affect the female reproductive tract and cause vaginal discharge. 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. There are few women who complain of vaginal discharge, discomfort or odour without any objective finding (Dodson and Friedrich, 1997). Such women may be motivated by a neurotic fear of uncleanness, guilt concerning sexual activities, or anxiety about venereal disease, whether or not sexual exposure has actually taken place. A number of vaginal infection present with few or no symptoms and yet produce serious effect and can be transmissible to other people.

The microbial inhabitants of the human vagina constitute a finely balanced ecosystem, with the vaginal environment controlling the colonizing bacteria and the microflora in turn controlling environment. This dynamic microbial community plays a pivotal role in

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preventing colonization by undesirable organisms, including those responsible for bacterial vaginosis, candidiasis, urinary tract infections, aerobic vaginitis and sexually transmitted diseases (Fredericks et al., 2005; Myer et al., 2005; Vitali et al., 2007). In women of childbearing age, the vaginal ecosystem is dominated by Lactobacillus spp., but a diverse array of other bacteria can be present in much lower numbers (Hyman et al., 2005; Vitali et al., 2007). Lactobacilli are involved in maintaining the normal vaginal microflora by preventing overgrowth by pathogenic and opportunistic organisms (Ronqvist et al., 2006).

There are a number of micro-organisms that may cause vaginal infections and several may co-exist e.g. thrush infection caused by yeast organisms that are found in vagina in 25% of women usually without symptoms. The most common species of Candida to be found in the vagina is Candida albicans which lives in the bowl and can transferred from back to front passage and can produce vaginitis characterized by intense irritation and thick white discharge (Dahash, 2011). Candidiasis is associated with vaginal discharge and pruritus. The discharge appears to be like curded milk and deep erythema of the vulva and vagina is often seen (Khan et al., 2009). Yeast overgrowth can modify the normal vaginal flora. Up to 75% of women experience genital candidiasis (CA) during their lifetime, and 5 to 8% have chronic recurring candidiasis, defined as four or more episodes in the 12 months period (Vitali et al., 2007). The incidence of the infection is almost doubled in pregnant women particularly in the third trimester, compared to the non-pregnant women. It always reoccurs during pregnancy as a result of the increased level of estrogens and corticoids that reduce the vaginal defence mechanism against such opportunistic infections as Candida species, a two fold increase from the prevalence rate in non-pregnant women (Hay, 2009; Alo et al., 2012).

Candidiasis is the most common opportunistic fungal infection (Hedayati and Shafiei, 2010). Vaginitis is one of the principal motives that lead women to seek out an obstetrician or gynecologist. Candidiasis is responsible for 90% of the cases of infectious vaginitis (Adad et al., 2001). Vulvovaginal candidiasis (VVC) is a fungal infection of the female lower genital tract the vulva and the vagina, caused by Candida species (Sobel, 2007; Akah et al., 2010). Candida is the fourth most common cause of nosocomial bloodstream infection in the United States (Pappas et al., 2009). Candida species that cause vaginitis most often are C. albicans, C. glabrata and C. tropicalis. Candida species that rarely causes infection includes C. parapsilosis, C. pseudotropicalis, C. krusei, C. guilliermondii and C. stellatoidea (Crone et al., 1994). The aim of this study is to determine incidence of candidiasis among single and married women in Ekpoma.

**RESULTS**

Table 4.1 presents the incidence of Candidiasis among single and married women. The results of this study show that the incidence of candidiasis was higher in married women when compared with single women. The prevalence of candidiasis in married women is 18 (28%), while in single is 10(20%). It was observed in this study that the distribution among of candidiasis among married and single is not statistically significant (p>0.05).

Table 4.2 the age distribution of candidiasis infection among married women. The results show that out of 25 married within the age range of 24-30 years, 11 (44%) were infected with candida, 31-35 years had a prevalence of 5(33.3) and 36-40 years had a prevalence of 2 (20%). This distribution was statistically significant (p<0.05).

Table 4.3 the age distribution of candidiasis infection among single women. The results show that out of 22 single women within the age range of less
than 20 years, 3 (13.64%) were infected with candida, 21-25 years had a prevalence of 5 (41.67) and 26-30 years had a prevalence of 2 (12.50%). This distribution was not statistically significant (p>0.05).

Table 4.1: Incidence of Candidiasis among Single and Married Women

<table>
<thead>
<tr>
<th>Population</th>
<th>No. Examined</th>
<th>No. Infected</th>
<th>Prevalence (%)</th>
<th>X^2 cal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>50</td>
<td>10</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>50</td>
<td>18</td>
<td>36.00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>28</td>
<td>28.00</td>
<td>2.286</td>
</tr>
</tbody>
</table>

(a = 0.05, p value = 0.130, X^2 tab = 3.841) df =1

Key: X^2 cal = chi-square calculated; X^2 tab = chi-square tabulated; D.f. = Degree of freedom
No. = Number

Table 4.2: Age Distribution of Candidiasis Infection among Married Women

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No. Examined</th>
<th>No. Infected</th>
<th>Prevalence (%)</th>
<th>X^2 cal</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-30</td>
<td>25</td>
<td>11</td>
<td>44.00</td>
<td></td>
</tr>
<tr>
<td>31-35</td>
<td>15</td>
<td>5</td>
<td>33.33</td>
<td></td>
</tr>
<tr>
<td>36-40</td>
<td>10</td>
<td>2</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>18</td>
<td>36</td>
<td>7.000</td>
</tr>
</tbody>
</table>

(a = 0.05, p value = 0.030, X^2 tab = 5.999) df = 2

Key: X^2 cal = chi-square calculated; X^2 tab = chi-square tabulated; D.f. = Degree of freedom
No. = Number

Table 4.3: Age Distribution of Candidiasis Infection among Single Women

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No. Examined</th>
<th>No. Infected</th>
<th>Prevalence (%)</th>
<th>X^2 cal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 20</td>
<td>22</td>
<td>3</td>
<td>13.64</td>
<td></td>
</tr>
<tr>
<td>21-25</td>
<td>12</td>
<td>5</td>
<td>41.67</td>
<td></td>
</tr>
<tr>
<td>26-30</td>
<td>16</td>
<td>2</td>
<td>12.50</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>10</td>
<td>20</td>
<td>1.40</td>
</tr>
</tbody>
</table>

(a = 0.05, p value = 0.360, X^2 tab = 5.999) df = 2

Key: X^2 cal = chi-square calculated; X^2 tab = chi-square tabulated; D.f. = Degree of freedom
No. = Number

**DISCUSSION**

Vaginal environment controls the colonization by bacteria and other micro-flora in the vaginal and this micro-flora community plays a pivotal role in preventing colonization by undesirable organism, including those responsible for candidiasis and others (Fredericks, 2005).

In this study, 18 (36%) of married women were infected with candidiasis while 10 (20%) single women were also infected with candidiasis. The differences recorded may be due to the number examined, hygiene and sexual practices which tends to impact greatly on the prevalence of reproductive tract infections (RTIs) especially among those who involved in multiple sexual partners which may be more in number among unmarried (single) as asserted by Morris et al., (2001) and Holzman et al., (2001). The findings in this study was higher than the prevalence of 17% found in a similar study in South-East Nigeria (Adinma et al., 2001), but in agreement with the 21% and 29% reported in some studies among women in Kenya and South Africa (Govender et al., 1996; Thomas et al., 1996; Schneider et al., 1998).

The results conform to the findings of previous studies in Nigeria and outside Nigeria (Ogunbanjo, 1989; Konje et al., 1991; Fernández-Limia et al., 2007). Candidiasis is a common condition, and an estimated 75% of all women experience an infection with candida yeast during their lifetime (Akah et al., 2010). Tropical venereal diseases still cause genital ulcers in Nigeria (Ogunbanjo, 1989). Dermatophyte infection, genital warts, and pediculosis pubis also occur, but scant data exist (Ogunbanjo, 1989). The 20% for single and 36% for married reported in this study is lower than the 43.13% reported by Konje et al. (1991) in their study. Vaginal discharge is very common problem among females. Alteration in balance of normal flora of the vaginal can cause the overgrowth of the bacteria that creates vaginal discharge. It is common among sexually active women (Shazia et al., 2009).

Furthermore incidence of candidiasis among married and single women can also be attributed to the type of clothing. Although the incidence of these organisms was similar to that found in other parts of Nigeria. This could be attributed to a lot of factors. Many practitioners believe that nylon underwear and tight insulating clothing predispose to vaginal candidiasis by increasing the temperature and moisture of the perineum (Nwankwo et al., 2010). A study among African women wearing tight clothes reported a higher incidence of Candida albicans in Vulvo vaginal candidiasis than those wearing loose clothing (Elegbe...
and Botu, 1982). The same observation was made in the study by Nwankwo et al. (2010), where regular users of tight clothing had 88.2% of Candida albicans and occasional and non-wearers had 68.6% of Candida albicans. In regards to age group ranges, candidiasis was found to be higher in the age group ranges 24-30 for married women with 11(44%) and 5(41.7%) for single women which is in contrast to the findings of Akah et al., (2012) where high incidence of (70%) of vaginal candidiasis among women was reported. The prevalence of candidiasis reported in this study was also in disparity to the findings of Akah et al., (2010); Nwadioha et al., (2010) and Isibor et al., (2011) who reported a prevalence rate of 60%, 62.2% and 67% respectively for vaginal candidiasis.

The occurrence rate of C. albicans observed in this study is an indication that it is a leading causative agent of the reproductive tract yeast infections in women of child bearing age as also observed by (Isibor et al., 2011). This may be due to its virulent factors which include dimorphism and phenotypic switching. Candida albicans produces protease and phosphatase which enhance its attachment to human epithelium. It can also be deduced that the high incidence rate of C. albicans could be due to increased physiological changes, estrogen and rich glycogen content of the vaginal mucosa thereby providing an adequate supply of utilisable sugar that favor its growth during pregnancy. However, Wise et al. (2007) and Trofa et al. (2008) reported a low occurrence of C. albicans in New York. The low occurrence of C. albicans reported by Wise et al. (2007) and Trofa et al. (2008) may be as a result of good personal hygiene, appropriate nutrition, adequate diagnostic facilities and treatment. And the disparity in this present study with previous study could be attributed to the use of contraceptive and antibiotic without medical advices (Trofa et al., 2008).

CONCLUSION

There are a number of microorganisms that may cause vaginal infections and several may co-exist e.g thrush infection caused by yeast organisms that are found in vagina in 25% of women usually without symptoms. In this study, it was discovered that 18 (36%) of the married and 10 (20%) of single women were infected with candidiasis. Hence it could be concluded that married and single women are predisposed to this infection. It is therefore recommended that candidiasis should be included in pre-test to be carried out in screening and medical checkup of women, personal hygiene especially proper toilet habits should be strictly adhered to by women to avoid contamination from the anal region, women who had history/family history of reproductive tract infections (RTIs) previously should be monitored for reproductive tract infections and finally women should limit nylon underwear and tight insulating clothing that moisture the perineum and increases vaginal temperature.

Conflict of Interest

The authors declare no conflicts of interest. The authors alone are responsible for the content and the writing of the paper.

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AUTHORS' CONTRIBUTIONS

Iyevhobu, K.O. and Obodo, B.N., conceptualized the laboratory work and provided scientific guidance, Usoro, E.R. and Airefetalor, A.I. designed and wrote the manuscript while Turay, A.A. and Ken-Iyevhobu, B.A. conducted experiments.

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REFERENCES


