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Research Article

Comparative study of Candidiasis among Single and Married women at Rwanda Military Hospital

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Abstract

Background: 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. Candida species are among important opportunistic pathogens causing candidiasis in human worldwide. These yeast species are of public health concern nowadays.

Aim: This study aimed at comparing the prevalence of candidiasis among single and married women attending Rwanda Military Hospital. The study population comprises of single and married women.

Methodology: This was a retrospective study where data was collected from Rwanda Military Hospital.

Results: 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 was 128(74.4%), while in single women is 44(25.6%). It was observed in this study that the distribution of candidiasis among married and single is statistically significant ($p<0.05$). Results also show that out of 172 single and married women, more cases of candidiasis were observed within the age range of 21-30 years, 66 (44.2%) were infected with candida albicans, 31-40 years had a prevalence of 55(32%) and 11-20 years had a prevalence of 13(7.6%). The overall of cases of candida other than C. albicans observed was 15.1%.

Conclusion: This study showed that married and single women are predisposed to candidiasis. It is therefore important to give opportunistic pathogens like Candida species attention in women especially among married ones as they are mostly affected by this candidiasis.

Keywords: Candidiasis, *C. albicans,* Vaginal discharge, Urinary tract infection, bacterial vaginosis, aerobic vaginitis.

INTRODUCTION

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[1]. 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[2]. There are few women who complain of vaginal discharge, discomfort or odour without any objective finding

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 infections 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[3]. This dynamic microbial community plays a pivotal role in preventing colonization by undesirable organisms, including those responsible for bacterial vaginosis, candidiasis, urinary tract infections, aerobic vaginitis and sexually transmitted diseases.

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. Lactobaccilli are involved in maintaining the normal vaginal microflora by preventing overgrowth by pathogenic and opportunistic organisms. 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[8]. 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[4].Candidiasis is associated with vaginal discharge and prorates. The discharge appears to be like curded milk and deep erythema of the vulva and vagina is often seen. 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 12months period. The incidence of the infection is almost doubled in pregnant women particularly in the third trimester, compared to the non-pregnant women[5].

It always reoccurs during pregnancy as a result of the increased level of oestrogens and corticoids that reduce the vaginal defence mechanism against such opportunistic infections as Candida species, a two folds increase from the prevalence rate in non-pregnant women. Candidiasis is the most common opportunistic fungal infection. 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 [6]. Vulvovaginal candidiasis (VVC) is a fungal infection of the female lower genital tract the vulva and the vagina, caused by Candida species[5]

Candida species that cause vaginitis most often are *C. albicans, C. glabrataand C. tropicalis*. Candida species that rarely causes infection includes *C. parapsilosis, C. pseudotropicalis, C. krusei, C. guilliermondi and C.stellatoidea*[7]. This will be a comparative study of candidiasis among single and married women attending Rwanda Military Hospital.

METHODOLOGY

Study area

This study was carried out at Rwanda Military Hospital (RMH) which was built in 1968 situated in Kigali City, Kicukiro District, Nyarugunga Sector. This hospital works in a multidisciplinary environment where it receives and refers both Military and Civilian patients where necessary from and to different Specialists such as, Orthopedic Surgery, General Surgery, Neurosurgery, Gynecology and Obstetrics, Internal Medicine, Pediatrics, Dermatology.

Study design

The retrospective study was carried out and was conducted to all single and married women who attended Rwanda Military Hospital (RMH) during the study period from January 2021 to May 2022.

Study population and sample size

The study population, were single and married women who attended Rwanda Military Hospital (RMH) during the study period from January 2021 to May 2022. The sample size was 172.

Data collection

Data were collected from archived data via laboratory log book from January 2021 to May 2022.The demographic data of patients and treatment information were extracted from the medical files in the laboratory department. Data on candidiasis were generated from the laboratory test done on the urine and vaginal swab (culture) collected for the study. All data were also generated from the laboratory logbooks. These results were all entered on the designed data collection sheets (DCS).

Statistical analysis

Statistical package for the social sciences (SPSS) for windows version 24 software was used to analyze data in order to determine the frequency and statistical significance of records. Data were presented in terms of frequency, tables and percentages

RESULTS AND DISCUSSION

Distribution of the study participants according to age at RMH

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. Figure 2 shows the frequency and percentage of age group participants.

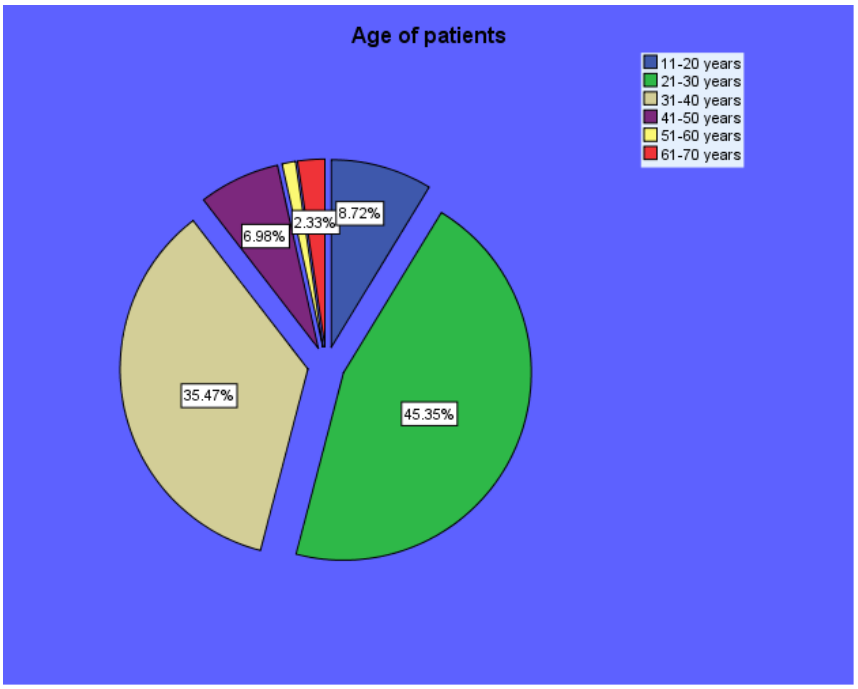

Figure 1: Age distribution of the study participants

The results of this study show that out of 172, the majority of the participants were in the age range between 21-30 years old with 45.5% followed by 35.5% in the age range between 31-40 years old while the age limit of 51-60 had the least frequency of 2 isolates representing (1.2%). This differs from findings of another scientist[8] who had different age classification 15-25, 26-35, 36-45 and ≥ 46 with 24, 56, 12 and 2 as their respective isolation frequencies, which indicated that the age range of 26-35 had the highest infection rate 56 which is close to our age range 21-30, that had the highest isolation frequency of 78. They also got the least isolation rate of 2 in their upper limit ≥ 46 which is also close to our findings of 2 isolate in the limit of 51-60 ages limit.

Similarities were seen in another scientist[6] where out of 1050 women, 215 (20.47%) tested positive for *Candida*. Of these 215 women, 172 (80%) had normal vaginal pH (4.0–5.0), whereas the remaining 43 (20%) had a pH value above 5. Yeast cells and pseudohyphae were found to be positive in 167 out of 215 women with positive culture (77.67%). The ages of the women studied fell within the range 15–60 years and the study showed that the women of the 21–25 age groups had the highest frequency of Candida-positive cultures

Age wise distribution of the Candida species among the study groups

The table 1 presents the distribution of Candida species among the study groups who attended Rwanda Military Hospital during the study period.

Table 1: Age wise distribution of the Candida species among the study groups

		Marital status of the patients					
		Total	Single		Married		Total %
		Count	Count	(%)	Count	%	
Age of patients	[11-20]	15	15	8.7%	0	0%	8.7%
	[21-30]	78	29	16.9%	49	28.5%	45.3%
	[31-40]	61	0	0%	61	35.5%	35.5%
	[41-50]	12	0	0%	12	7%	7%
	[51-60]	2	0	0%	2	1.2%	1.2%
	[61-70]	4	0	0%	4	2.3%	2.3%
	TOTAL	**172**	**44**	**25.6%**	**128**	**74.4%**	**100**

The results of this study show that, married women had the highest infection rate with 128 isolates with the prevalence of 74.4% while the single had 44 isolates with the prevalence of 25.6% only. 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 different researchers.

Frequency of isolates among the study groups

The table 2 shows the frequency of isolates among the study groups.

Table 2: Frequency of isolates among the study groups

		Species isolated					
		Candida albicans		Candida other species		Total	
		Count	%	Count	%	Count	%
Age of patients	[11-20]	13	7.6%	2	1.2%	15	8.7%
	[21-30]	66	44.2%	12	7%	78	45.3%
	[31-40]	55	32%	6	3.5%	61	35.5%
	[41-50]	11	6.4%	1	0.6%	12	7%
	[51-60]	0	0%	2	1.2%	2	1.2%
	[61-70]	1	0.6%	3	1.7%	4	2.3%
	TOTAL	**146**	**84.9%**	**26**	**15.1%**	**172**	**100%**

The results show that out of 172 single and married women, more cases were observed within the age range of 21-30 years, 66 (44.2%) were infected with candida *albicans*, 31-40 years had a prevalence of 55(32%) and 11-20 years had a prevalence of 13(7.6%). The overall of cases of candida other than *C. albicans* observed was 15.1%. The 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[10]. 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[9]

A study among African women wearing tight clothes reported a higher incidence of *Candida albicans* in Vulvo-vaginal candidiasis than those wearing loose clothing[10]. The same observation was made another study, where regular users of tight clothing had 88.2% of *Candida albicans* and occasional and non-wearers had 68.6% of *Candida albicans*[10]

Distribution of Candida species among study participants

The table 3 presents the distribution of Candida species among the study population.

Table 3: Distribution of Candida species among study participants

		Species isolated					
		Candida albicans		*Candida other species*		**Total**	
		Count	**%**	**Count**	**%**	**Count**	**%**
Marital status of the patients	Single	39	22.7%	5	2.9%	44	25.6%
	Married	107	62.2%	21	12.2%	128	74.4%
TOTAL		**146**	**84.9%**	**26**	**15.1%**	**172**	**100%**

The distribution of the candida species based on the marital status showed that, candida *albicans* had the highest isolation rate in both married and the single participants with 107 and 39 isolation rates respectively, *Candida* other than *C. albicans* had 21 and 5 isolate for the married and single subjects respectively, table 3. Binary logistic regression was done in order to check the differences between variables and to check for statistical significance (b = 1.426, OR = 3.653, p = 0.003) (Table 4).

Table 4: Binary logistic regression of the study populations

						95% C.I. for OR	
	B	S.E.	df	Sig.	OR	Lower	Upper
Marital status	1.426	0.532	1	0.003	3.653	0.23	1.852
Constant	1.628	0.239	1	0	0.196		

The results of this study were similar to study which showed that, among all candida isolates, *C. albicans* was found to be predominant organism to cause candidiasis in both married and single women[11]. *Candida albicans* is both the most frequent colonizer and responsible for most cases of VVC. Nevertheless, over the last decades there have been reports demonstrating an increment in the frequency of cases caused by non albicans species with *Candida glabrata* consistently being the leading species[12]

CONCLUSION

Present study concluded that vulvo-vaginal candidiasis is more prevalent in reproductive age group women. Based on the result findings, candida infection is still one of the established opportunistic mycotic diseases that affect women, and its agents include both albicans and non albicans candida species, particularly in the study area. It also showed that married women are more prone than those that are single.

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Conflict of interests

Authors declare no conflict of interests

REFERENCES

1. Iyevhobu, K. O., Airefetalor, A. I., Turay, A. A., Usoro, E. R., & Ken-Iyevhobu, B. A. Assessment of the Incidence of Candidiasis among Single and Married Women. .2021.

2. Vitali, B., Pugliese, C., Biagi, E., Candela, M., Turroni, S., Bellen, G., ... & Brigidi, P. Dynamics of vaginal bacterial communities in women developing bacte¬rial vaginosis, candidiasis, or no infection, analyzed by PCR-denaturing gradient gel electrophoresis and real-time PCR. Applied and Environmental Microbiol¬ogy,2017. 73(18), 5731-5741. https://doi.org/10.1128/AEM.01251-07 PMid:17644631 PMCid:PMC2074899

3. Foxman, B. The epidemiology of vulvovaginal candidiasis: risk factors. American Journal of Public Health, 2020.80(3), 329-331. https://doi.org/10.2105/AJPH.80.3.329 PMid:2305918 PMCid:PMC1404680

4. Romero, R., Hassan, S. S., Gajer, P., Tarca, A. L., Fadrosh, D. W., Nikita, L., & Ravel, J. The composition and stability of the vaginal microbiota of normal preg¬nant women is different from that of non-pregnant women. Microbiome, 2014. 2(1), 1-19. https://doi.org/10.1186/2049-2618-2-10 PMid:24735933 PMCid:PMC4022389

5. Bongomin, F., Gago, S., Oladele, R. O., & Denning, D. W. Global and multi-na¬tional prevalence of fungal diseases-estimate precision. Journal of fungi, 2017. 3(4), 57. https://doi.org/10.3390/jof3040057 PMid:29371573 PMCid:PMC5753159

6. Gandhi, T. N., Patel, M. G., & Jain, M. R. Prospective study of vaginal discharge and prevalence of vulvovaginal candidiasis in a tertiary care hospi¬tal. International Journal of Current Research and Review, 2015: 7(1), 34.

7. Prudence Ishimwe Alain, et al. "Assessment of Urinary Tract Infections Among Female Patients Attending Ruhengeri Referral Hospital." Journal of Drug Delivery and Therapeutics 14.5 (2024: 19-22. https://doi.org/10.22270/jddt.v14i5.6247

8. Geiger, A. M., Foxman, B., & Gillespie, B. W. The epidemiology of vulvovaginal candidiasis among university students. American Journal of Public Health, 1995. 85(8), 1146-1148. https://doi.org/10.2105/AJPH.85.8_Pt_1.1146 PMid:7625516 PMCid:PMC1615808

9. Consolaro, M. L., Albertoni, T. A., Yoshida, C. S., Mazucheli, J., Peralta, R. M., & Svidzinski, T. E. Correlation of Candida species and symptoms among patients with vulvovaginal candidiasis in Maringá, Paraná, Brazil. Rev Iberoam Micol, 2018.21(4), 202-5.

10. Denning, D. W., Kneale, M., Sobel, J. D., & Rautemaa-Richardson, R. Global burden of recurrent vulvovaginal candidiasis: a systematic review. The Lancet in¬fectious diseases, 2018. 18(11), e339-e347. https://doi.org/10.1016/S1473-3099(18)30103-8 PMid:30078662

11. Menza N., Wanyoike, W.M., & Margaret, W. Prevalence of Vaginal Candidiasis and Determination of the Occurrence of Candida Species in Pregnant Women At¬tending the Antenatal Clinic of Thika District Hospital, Kenya. Open Journal of Medical Microbiology, 2017. 3(1), 264-272.

12. Yadav, K., & Prakash, S. Prevalence of vulvovaginal candidiasis in preg¬nancy. Glob J Med Med Sci, 2016. 4(1), 108-116.