DOI: https://doi.org/10.53350/pjmhs22161604

ORIGINAL ARTICLE

Evaluation of Prevalence of Vaginal Candidiasis and Related Risk Factors: A Cross Sectional Study

MADHU BALA[1], RAJNI RAJ KUMAR[2], SHAGUFTA MAGSI[3], SABAHAT FATIMA[4], NADIA NAWAZ[5], USHA ASHOK[6]
[1]*Assistant Professor Gynaecology, Muhammad Medical and Dental College Mirpurkhas, Pakistan.*
[2]*Consultant Gynecologist, Hashmani Hospital in Karachi, Pakistan.*
[3]*Gynaecologist, Liaquat University Hospital Hyderabad, Pakistan.*
[4]*Assistant Professor Gynaecology, Ghulam Muhammad Medical College Sukkur, Pakistan.*
[5]*Consultant Gynecologist, Bahria International Hospital Karachi, Pakistan.*
[6]*Gynaecologist, Sindh Government Hospital Korangi Karachi, Pakistan.*
Corresponding author: Madhu Bala, Email: dr.madiluck@gmail.com

ABSTRACT

Aim: The study aims to evaluate the prevalence of vaginal candidiasis and associated risk factors
Study design: Cross sectional study
Place and duration: This study was conducted in Muhammad Medical and Dental College Mirpurkhas, Pakistan from March 2020 to March 2021.
Methodology: The present study includes a total of 216 participants who had presented with symptoms of vaginal candidiasis. During this whole duration, 1800 patients visited the department. The laboratory investigations used in this regard were Gram-stained smears, vaginal cultures, and wet mount microscopy. Evaluation of risk factors such as diabetes mellitus, pregnancy, and use of contraceptive pills and antibiotics was keenly done. The data was recorded and analyzed in IBM SPSS version 26.
Result: Vaginal candidiasis was diagnosed in 26 (12.03%) participants. The most common symptom observed was pruritus in 184 (85.18%), the second was vaginal discharge in 143 (66.20%), the third was soreness in 67 (31.01%) and dyspareunia was seen in 11 (5.09%) participants. Candida albicans were present in 172 (79.63%) participants, while non-albicans were present in 44 (20.37%) participants. Diabetes, pregnancy, reproductive age, and use of contraceptive drugs and antibiotics were associated with both Candida albicans and non-albicans. However, dyspareunia and soreness were significantly associated with non-albicans. The rate of recurrence was 8.8%. Recurrence was positively correlated with non-albicans species.
Conclusion: The prevalence of Candida albicans specie is much greater than non-albicans species. Vaginal candidiasis is a common health issue in the community as well as in hospitalized patients. Common risk factors of vaginal candidiasis are reproductive age, pregnancy, sexual activeness, diabetes, use of contraception, use of antibiotics, and cancer. The most common clinical symptom of vaginal candidiasis is pruritus.
Keywords: Candida albicans, non-albicans, vaginal candidiasis

INTRODUCTION

Candida infections have been a prominent root of vaginal infections in hospitalized and community patients. The second most prevalent cause of infection in female genitals is vaginal candidiasis [1]. Almost 70% of females have reported vaginal candidiasis at least once in their lifetime. Almost 8% of them have reported recurrence. The most common pathogen that is responsible for vaginal candidiasis is Candida albicans. It is present in 90% of the cases. In remaining cases, non-albicans species are seen. However, the percentage of non-albicans is increasing in recent studies. Recognized risk factors in this regard are the use of broad-spectrum antibiotics, estrogen, pregnancy-induced rise in estrogen level, diabetes mellitus, and immunosuppressant therapy (such as in chemotherapy, transplant patients, and HIV patients) [2]. Positive candidal culture is detected in 30% pregnant women and 15% non-pregnant women [3]. Candidal infections are more common in sexually active, whereas, there is no proof of candidal infection being a sexually transmitted disease. Genetic factors are also responsible for the recurrence of the infection and hypersensitivity towards Candida [4].

The Candida species penetrate the mucosal lining of the genital area and the body reacts in the form of inflammation. Macrophages and Polymorphonuclear cells are the predominant cell types in this inflammatory response. The patients typically present with symptoms like vaginal discharge, dysuria, vaginal burning, vaginal itching, swelling, and dyspareunia [5]. Symptoms are aggravated before the menstrual period. The clinician would observe erythema in the vaginal and vulva, thick white vaginal discharge, swelling, and excoriations. The symptoms are more exaggerated in cases of Candida albicans as compared to non-albicans. The symptoms of vaginal candidiasis overlap with those of cervicitis of vaginitis. Hence, a thorough examination of the pelvis and vagina must be performed to differentiate. Inflammation in the pelvis and the absence of inflammation in the cervix are signs of candidiasis. Additional investigations such as wet mount, pH testing, and whiff test should be performed in order to make a definite diagnosis [6]. The pH in vaginal candidiasis is less than 5 and the whiff test comes out negative.

The vaginal candidiasis can be treated with broad-spectrum antifungal medication. Azole antifungals are more beneficial in this regard keeping in view the non-resistance of Candida albicans to it. They are an agent of choice to treat vaginal candidiasis. The treatment regimen is different for normal cases, pregnancy, immunosuppressed patients, and in case of recurrence [7].

Other diseases which have similar signs and symptoms as that of vaginal candidiasis are atopic dermatitis, Lichen simplex chronicus, Paget disease, psoriasis, vulvodynia, allergic reaction, Lichen sclerosis, neoplasm, and physiological leukorrhea [8]. The purpose of this study was to determine the prevalence of vaginal candidiasis and associated risk factors in the population under study.

METHODOLOGY

The study included 216 patients who had presented with symptoms suggestive of vaginal candida infection. The study was conducted in the Gynecological and Obstetrics department of Muhammad Medical and Dental College Mirpurkhas, Pakistan from March 2020 to March 2021.

During this whole time, total 1800 patients visited the department. The patients who had been selected for the study were based on the inclusion and exclusion criteria. The inclusion criteria were the presence of clinical symptoms related to vaginal candidiasis and participants who have given consent for examination and investigation for the sake of research. The exclusion criteria involved patients who did not give consent, who have any other sexually transmitted infection going on and those who have been diagnosed with any malignancy in the genital area. Permission from the ethical committee was acquired beforehand for the research. All the patients have described the research and counseled about examination and investigation. Written informed consent was signed by all the participants.

A detailed history was taken from all the participants. The information of the patients was recorded on individual performance. Vaginal candidiasis was diagnosed on the basis of the clinical symptoms of the patient. Then a general physical examination was done. After that, a thorough pelvic and vaginal examination was done. Following the history and examination, laboratory investigations were performed. The laboratory investigations used in this regard were Gram-stained smears, vaginal cultures (aerobic and non-aerobic microorganisms), and wet mount microscopy. Wet mount preparation was done by the introduction of a vaginal swab into 1 ml of saline and then dripping a drop of this preparation on a clean glass slide. The slide was covered by a coverslip. The examination was done under bright-field microscopy.

The gram-staining was done by rolling the swab on a glass slide. Then it was left to get dried in the air and fixed by a flame. The stains used for the slide were iodine and crystal violet for one minute each. Following that, washings, decolorizing by acetone alcohol, and counter-staining by safranin for one minute were done. After that, the glass slides were rinsed with plain tap water and allowed to dry in air for microscopy. The yeast was isolated on Sabouraud agar followed by incubation for 48 to 72 hours at 38°C. The API system ID 32 C, ATB Expression, and VITEK System were used to identify the isolated strains.

All the patients who had a positive culture were interrogated regarding the risk factors such as contraceptive method, menopausal status, pregnancy, recently used antibiotics, and diabetes mellitus. The data was entered and analyzed in IBM SPSS version 26. The x-2 test was performed. The p-value <0.5 was taken as significant.

RESULT

Out of 1800 patients, 216 (12%) cases had vaginal candidiasis. These selected patients had positive symptoms of vaginal candidiasis. The disease was confirmed by vaginal culture in all the patients. A total of 134 (62.03%) patients were positive for the presence of yeast on wet mount preparation and microscopy. A total of 158 (73.14%) patients had positive Gram-stained smears. The isolates had 172 (79.63%) Candida albicans while non-albicans were present in 44 (20.37%) participants. In the patients detected with non-albicans species, 16 (7.40%) had Candida glabrata, 6 (2.77%) had Zygosaccharomyces spp., 5 (2.31%) had Candida parapsilosis, 3 (1.39%) had Candida tropicalis, 2 (0.93%) had Candida guilliermondii, 3 (1.39%) had Candida kefyr, 2 (0.93%) had Candida krusei, 2 (0.93%) had Candida cifferii, 2 (0.93%) had Candida famata, 2 (0.93) had Candida lusitaniae and 1 (0.46%) had Candida dubliniensis. They all were included in a single group due to their low percentage. The percentage of Candida albicans was much more than that of non-albicans. The differences in their occurrence have been tabulated in table 1.

It can be seen that the percentage of non-albicans species was higher in percentage in obstetrical wards (4.5%) compared to the outpatient clinic (1.5%) and gynecological wards (2.4%). All Candida albicans and non-albicans infections were prevalent in patients of reproductive age compared to those in the menopausal phase (p-value= <0.0001). The isolation rate of Candida albicans in all age groups was higher. The rate of prevalence of vaginal candidiasis is more in single women, whereas, the prevalence of Candida albicans is equal in both single and married participants. In pregnant participants, the positivity of Candida albicans culture is more than that of non-albicans species. Its percentage was higher in diabetic compared to non-diabetic participants. The percentage of Candida albicans was almost equal in the patients that were taking antibiotics compared to those who were not taking antibiotics. However, non-albicans species were predominant in those who had been taking antibiotics. Those participants who were on contraceptives had a higher percentage of vaginal candidiasis compared to those who were not pregnant

Table 1: Occurrence of Candida albicans and non-albicans specie in different clinics of the department

Clinic	Candida Albicans (n=172)	Non-albicans species (n=44)
Outpatient clinic (n=1188)	112 (9.4%)	18 (1.5%)
Gynecological wards (n=198)	19 (9.5%)	5 (2.5%)
Obstetrical wards (n=414)	41 (9.9%)	21 (5.07%)
p-value	<0.0001	

The percentage of vaginal candidiasis was directly proportional to cancer. Recurrence was in higher percentage in the case of non-albicans species in contrast

to that in the Candida albicans. Pruritus was the most commonly observed symptom in both species and dyspareunia was the least common one. The statistics have been tabulated in table 2.

Table 2: Characteristic of the participants included in the study

Variables	Candida albicans		Candida non-albicans	
	Frequency	Percentage	Frequency	Percentage
Age (n=1800)	172	79.62	44	20.37
Reproductive (n=1566)	156	9.96	41	2.61
Menopausal (n=234)	16	6.83	3	1.28
Pregnancy				
Positive (n=360)	85	23.61	19	5.27
Negative (n=1440)	87	6.04	25	1.73
Marital Status				
Married (n=666)	60	9	6	0.9
Single (n=1134)	112	9.87	38	3.35
Diabetes mellitus				
Diabetic (n=72)	11	15.28	8	11.11
Non-diabetic (n=1728)	161	9.31	36	2.08
Recent antibiotics use				
Yes (n=808)	79	9.78	29	3.59
No (n= 992)	93	9.37	15	1.51
Use of contraception				
Yes (n=769)	64	8.32	24	3.12
No (n=1031)	108	10.47	20	1.93
Cancer				
Yes (n=54)	6	11.11	4	7.4
No (n=1746)	166	9.50	40	2.29
Recurrence				
Yes (n=19)	7	4.06	12	27.27
No (n=197)	165	95.93	32	72.72
Clinical Symptoms (n=216)				
Vaginal discharge (n=143)				
Dyspareunia (n=186)	117	68.02	26	59.09
Soreness (n=67)				
Pruritus (n=11)	7	4.06	4	9.09
	46	26.74	18	40.90
	146	84.88	38	86.3
p-value	<0.0001			

DISCUSSION

Vaginal Candidiasis is a common health issue concerning female genital health and almost 70 % of females experience it at least once in a lifetime. The present study is concerned with the prevalence of the disease and the risk factors associated with it. According to a similar study conducted by Ali et al in which 100 participants were considered, infection prevalence was 13%. The study was only conceded to the correlation of method of contraception with the Candida albicans. They concluded that intrauterine device use was the safest of all the methods in terms of the occurrence of vaginal candidiasis as a result of contraception [9]. Another such study was conducted by Siddique et al. They had included 300 patients in their study to analyze the prevalence of vaginal candidiasis in diabetic patients. 45% of the diabetic patients had developed vulvovaginal candidiasis and only 27% of the non-diabetic patients had developed the disease. They concluded that the frequency of the disease was seen higher in diabetic individuals [10]. These results were similar to the results of the present study.

According to the study of Manzoor et al, candidiasis was in higher frequency in the second and third trimester of pregnancy. They suggested education and awareness of females in this regard [11]. Another study on candidiasis in pregnancy was conducted by Khaskheli et al in which they concluded that vaginal discharge during pregnancy, either due to candidiasis or any other pathology, can bring adverse perinatal and maternal outcomes [12]. Tsega et al also studied candidiasis in pregnancy. The research was conducted on 384 pregnant women. 25% of their participants were positive for vaginal candidiasis. They found out that Amphotericin B was the most sensitive antifungal drug in those patients. However, multi-drug resistance was also detected in many patients. It was suggested to regularly screen and give treatment accordingly [13]. Rizwan et al studied the sensitivity pattern in candidal patients. They concluded that the resistance to azole, the most commonly used drug for vaginal candidiasis, is increasing rapidly. Hence, it was recommended to first carry out the culture and sensitivity of the vaginal swab and then prescribe drugs [14].

CONCLUSION

The prevalence of Candida albicans specie is much greater than non-albicans species. Vaginal candidiasis is a common health issue in the community as well as in hospitalized patients. Common risk factors of vaginal

candidiasis are reproductive age, pregnancy, sexual activeness, diabetes, use of contraception, use of antibiotics, and cancer. The most common clinical symptom of vaginal candidiasis is pruritus.

Conflict of interest: None
Funding source: None
Permission: It was taken from the ethical review committee of the institute

REFERENCES

1. Buggio L, Somigliana E, Borghi A, Vercellini P. Probiotics and vaginal microecology: fact or fancy?. BMC women's health. 2019; 19(1):1-6.
2. Aguirre-Quiñonero A, Castillo-Sedano IS, Calvo-Muro F, Canut-Blasco A. Accuracy of the BD MAX™ vaginal panel in the diagnosis of infectious vaginitis. Eur J Clin Microbiol Infect Dis. 2019; 38(5):877-882.
3. Ahangari F, Farshbaf-Khalili A, Javadzadeh Y, Adibpour M, Sadeghzadeh Oskouei B. Comparing the effectiveness of Salvia officinalis, clotrimazole and their combination on vulvovaginal candidiasis: A randomized, controlled clinical trial. J Obstet Gynaecol Res. 2019; 45(4):897-907.
4. Swidsinski A, Guschin A, Tang Q, Dörffel Y, Verstraelen H, Tertychnyy A, Khayrullina G, Luo X, Sobel JD, Jiang X. Vulvovaginal candidiasis: histologic lesions are primarily polymicrobial and invasive and do not contain biofilms. Am J Obstet Gynecol. 2019; 220(1):91.e1-91.e8.
5. Farhan MA, Moharram AM, Salah T, Shaaban OM. Types of yeasts that cause vulvovaginal candidiasis in chronic users of corticosteroids. Med Mycol. 2019; 57(6):681-687.
6. Barnes P, Vieira R, Harwood J, Chauhan M. Self-taken vaginal swabs versus clinician-taken for detection of candida and bacterial vaginosis: a case-control study in primary care. Br J Gen Pract. 2017; 67(665):e824-e829.
7. Donders GGG, Ravel J, Vitali B, Netea MG, Salumets A, Unemo M. Role of Molecular Biology in Diagnosis and Characterization of Vulvo-Vaginitis in Clinical Practice. Gynecol Obstet Invest. 2017; 82(6):607-616.
8. Mendling W, Brasch J, Cornely OA, Effendy I, Friese K, Ginter-Hanselmayer G, Hof H, Mayser P, Mylonas I, Ruhnke M, Schaller M, Weissenbacher ER. Guideline: vulvovaginal candidosis (AWMF 015/072), S2k (excluding chronic mucocutaneous candidosis). Mycoses. 2015;58 Suppl 1:1-15.4
9. Ali MU, Namau NH, Yahaya SM, Umar UA, Inuwa MS, Hassan MI, Sale AI. Preliminary Survey on the Prevalence of Vaginal Candidiasis among Women Contraceptive Users Attending a Tertiary Health Facility in Kano Metropolis, Northern Nigeria. International STD Research & Reviews. 2018 May 7:1-8.
10. Siddique UZ, Latif H, Hameed A, Rathore R, Farooq Butt N, Iqbal A. Prevalence of Vulvo-Vaginal Candidiasis in Diabetic and Non-diabetic Pregnant Females. PJMHS. 2018; 12(2):742-5.
11. Manzoor S, Aziz M, Sheikh AS. Identification and Characterization of Candida on CHROM Agar™ in Pregnant Women of Multan. Pakistan. J Women's Health Care. 2018; 7(424):2167-0420.
12. Khaskheli M, Baloch S, Baloch AS, Shah SG. Vaginal discharge during pregnancy and associated adverse maternal and perinatal outcomes. Pakistan journal of medical sciences. 2021; 37(5):1302.
13. Tsega A, Mekonnen F. Prevalence, risk factors and antifungal susceptibility pattern of Candida species among pregnant women at Debre Markos Referral Hospital, Northwest Ethiopia. BMC pregnancy and childbirth. 2019; 19(1):1-8.
14. Rizwan R, Memon Z, Shaheen S, Afridi F, Zaib M. Prevalence and Sensitivity Patterns of Candidal Infections in Various Tertiary Care Health Subunits of Karachi. International Journal of Clinical Medicine. 2018; 9(9):645-59.