Original Article

Frequency of Vulvovaginal Candidiasis in Pregnant Women Attending the Antenatal Clinic

Jasmine R[1], Hussein MN[2], Chowdhury NN[3]

Abstract

Background: *Vulvovaginal candidiasis (VVC) is the most common lower genital tract infection during pregnancy. Candida is the leading cause of vaginitis, and 75% of women have at least one episode of infection in their childbearing age, with pregnancy being a predisposing factor.*

Objective: *The objective of this study was to observe the frequency of vulvovaginal candidiasis in pregnant women who visited the antenatal clinic for antenatal checkup.*

Material and Method: *This prospective cross-sectional study was conducted in the laboratory of a regional hospital in Tejgaon, Dhaka, Bangladesh, from 01 January to 31 March 2024. The samples of high vaginal swab were collected from 306 consented pregnant women during their regular antenatal checkup in the aforementioned hospital. Two samples from each patient were collected of which one swab was for direct wet film (saline preparation) and the other for direct Gram smear for Gram positive oval-shaped organisms with buds and/ or pseudo-hyphae/ hyphae. Wet film test and Gram stain were used to identify the presence of the organism.*

Result: *Out of 306 patients, the proportion of VVC among these study participants was 35.29%. Non-symptomatic patients and symptomatic patients had a proportion of 25.9% and 74.1 % respectively. The patients were grouped according to age and VVC noticed highest in the 25-29 years group with 58%. The other age groups of pregnant women with proportion were, 24% with group I of 20-24 years, 14% with group 3 of 30-34 years and 4% with group 4 of 35-39 years. In this study, the highest proportion observed in the third trimesters, which was 46%, and respectively 38% and 16% in the second trimester and first trimester among 108 pregnant women.*

Conclusion: *Vaginal candidiasis is found to increase during pregnancy, with more common in young adults of age group ranging from 25 to 29 years, particularly in the 3rd trimester. If left untreated, women may have complicated VVC, which can lead to chorioamnionitis with subsequent abortion, prematurity and congenital infection of the neonate, requiring special diagnostic and therapeutic consideration. Therefore, routine medical examination and regular screening for candidiasis in the antenatal care program is highly recommended to manage the disease and its complications.*

Keywords: *Vulvovaginal candidiasis, pregnancy, symptom, trimester*

Int. Med. Col. J. 2025; 10(2): 46-50

Introduction

The World Health Organization (WHO) defines reproductive health as "a condition of full physical, mental, and social well-being in all aspects relevant to the reproductive system and its activities and processes, which goes beyond the simple absence of sickness or infirmity"[1]. Good health of the reproductive system should be ensured for a healthy sexual life. Likewise, it's important for the growth of healthy kids[2].

1. Col Rezina Jasmine, FCPS, DCP, MCPS (Clinical Pathology), Professor, Dept of Microbiology, Armed Forces Medical College, Dhaka Cantonment.
2. Dr. Md. Nurul Hussein, DDV, FDV, Senior Consultant (Dermatology and Venereology), High Tech Multi-care and Hospital, Kachukhet, Dhaka.
3. Dr. Nurun Nahar Chowdhury, MCPS, Civil MO, Medical Squadron, BAF Base Basher, Dhaka Cantonment.

Address of Correspondence: Col Rezina Jasmine, FCPS, DCP, MCPS (Clinical Pathology), Professor, Dept of Microbiology, Armed Forces Medical College, Dhaka.

Women's reproductive health problems are directly responsible for the bulk of the world's 1.3 million female deaths per year[3].

A 2003 CDC (Centre for Disease Control) study found that the prevalence of reproductive tract disorders among women in underdeveloped nations was 10-15% greater than in developed ones[4]. The study of Msuya et al. shows that there was a proportion of female morbidity attributable to reproductive tract infections, which was 22 worldwide, with the highest frequency in South Asia and Sub-Saharan Africa (where 150 million of the total 340 million cases were concentrated)[5]. The female genital tract provides an environment that is colonized by variety of species of commensals causing no harm except under abnormal conditions. For example, Lactobacillus proliferates and causes enzymatic breakdown of cellular glycogen, resulting in lactic acid and hydrogen peroxide (H_2O_2), which lowers the pH up to 3.5-4.5 which indicates normal vaginal environment that inhibits growth of pathogenic organisms.[6] The other commensals are frequently found in the vagina, such as *Gardnerella vaginalis, Mobiluncus, Peptostreptococcus* spp., *Staphylococcus* spp., *Streptococcus* spp., *Bacteroides* spp., *Fusobacterium* spp., *Prevotella* spp., and coliform bacteria, such as *Escherichia coli*[6,7,8]. Vulvovaginal Candidiasis (VVC) is the second most common type of infections that women face most during their lifetime[9]. Candidiasis is a fungal infection caused by Candida, a yeast, which is a natural habitant of human skin and in parts of the body (like the mouth, throat, gut, and vagina) but normally do not cause any health effects. Susceptibility to VVC is enhanced by multiple risk factors, for instance, pregnancy, the luteal phase of the menstrual cycle, immunosuppression, HIV infection, diabetes, use of oral contraceptives, and antibiotic use[10]. In addition, some pregnancy-related factors such as increased estrogen levels, increased vaginal mucosal glycogen production, low vaginal pH, and decreased cell-mediated immunity are likely to cause both asymptomatic colonization and the increased risk of VVC during pregnancy[9]. Breastfeeding, or menopause can also influence the hormonal changes in the vagina, which impacts its ability to cause VVC. The most common species that can overgrow and cause candidiasis are: *Candida albicans, Candida glabrata, Candida parapsilosis, Candida tropicalis, and Candida krusei* which are seen under microscope as Gram positive budding yeast and or pseudo-hyphae or hyphae[9,10].

The aim of this study was to observe the frequency of vulvovaginal candidiasis in the pregnant women with or without symptoms who visited antenatal clinic for antenatal checkup.

Materials and Methods

This prospective cross-sectional study was conducted in the laboratory of a regional hospital in Tejgaon, Dhaka, Bangladesh from 01 January to 31 March 2024. The samples of high vaginal swabs were collected from 306 consented pregnant women during their regular antenatal checkup at outdoor patient department in the aforementioned hospital. Patients fulfilling the criteria for selection were integrated into the study; as like, all pregnant women of age between 20 to 40 years with different parity and with any complaints like itching, inflammation, burning sensation or white discharge present during examination or without any complaints in their ante-natal checkup. Non-pregnant and pregnant women aged below 20 and above 40 years were excluded in this study.

Frequency was assessed based on-

- Antenatal checkup during pregnancy
- Symptoms reported by patients, such as white discharge, itching etc.
- Proper history and examination
- Per speculum examination
- Investigation such as wet vaginal smear and vaginal swab for Gram stain.

Two samples from each patient were collected with sterile cotton-tipped swabs at the same time, of which one swab was sent for direct wet film (saline preparation) and the other for direct Gram smear for Gram positive oval-shaped organisms with buds and/ or pseudo-hyphae/ hyphae. The first swab was obtained, spread

on a grease free glass slide, used for the preparation of wet mount film to rule out trichomonas vaginalis, vaginal candidiasis, pus cells and epithelial cells. The second vaginal swab was obtained, spread on a grease free glass slide, allow it to air dry and sent it to microbiology laboratory for Gram stain to see the budding yeasts or hyphae.

Results

A total of 306 pregnant women were included in this study who came for regular antenatal checkup at an outdoor antenatal clinic. After preparing the slides of high vaginal swabs, these were seen under microscope and the results were documented and analyzed. Vulvovaginal candidiasis (VVC) was observed in 108 (35.29%) cases among 306 pregnant women (Fig 1). Among 108 pregnant women with VVC, 28 (25.9%) patients were non-symptomatic and 80 (74.1%) patients reported with different symptoms like, pruritus, burning micturition or white discharge per vagina during antenatal checkup (Table I).

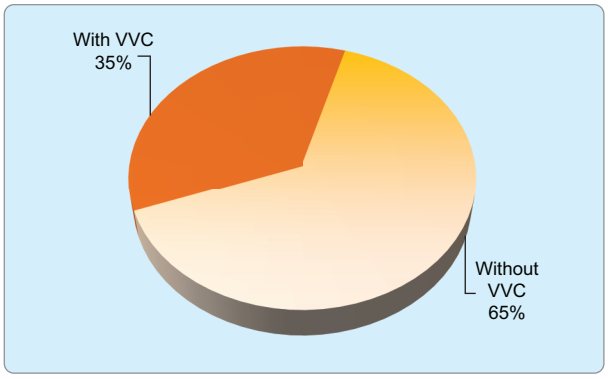

Figure 1: *Diagram showing the frequency of Vulvovaginal candidiasis (VVC) among the studied cases (n=306)*

Findings observed under the microscope indicated that, 35.29% of pregnant patients were with Gram positive budding yeast/pseudo-hyphae/hyphae, suggestive of Candidiasis (Table II). The pregnant women with VVC were noticed the highest frequency in the 25-29 year-age group with the ratio 58.3% (Table III). The highest prevalence of VVC was noticed in the third trimester (46.3%) and was followed by second and first trimesters (Table IV).

Table I

Distribution of Pregnant women with VVC as per existence of symptoms (n=108)

Presentation	Frequency	%
With symptom	80	(74.1%)
Without symptom	28	(25.9%)

Table II

Microscopic findings of the total sample (n=306)

Findings	Frequency	%
Gram positive budding yeast/pseudo-hyphae/ hyphae	108	35.29
Microorganisms other than fungus	10	03.27
Fungus other than Gram positive budding yeast/ pseudo-hyphae/hyphae	10	03.27
Normal finding	178	58.17

Table-III

Age group (years) wise distribution of the pregnant women with VVC(n=108)

Age group	Frequency	%
20-24 years	26	24.1
25-29 years	63	58.3
30-34 years	15	13.9
35-39 years	04	03.7

Table IV

Gestational period-wise distribution of VVC (n=108)

Gestational Period	Frequency	%
First trimester	17	15.7
Second trimester	41	38.0
Third trimester	50	46.3

Discussion

Vaginal candidiasis is a common and frequently distressing infection in women of child bearing age in Bangladesh. Whether asymptomatic or symptomatic, it is usually

neglected by women making the diagnosis more difficult[11]. This was a cross sectional study conducted to ascertain the prevalence of VVC in pregnancy by simple non-invasive diagnostic method. In this study, the frequency of VVC among the study participants was 108 (35.29%). Multiple studies were carried out among the pregnant women and found out that they have a higher prevalence rate of VVC. Grigoriou et al. performed the study consistent with this result where the prevalence of VVC among 952 pregnant women was tested, and Candida spp. were detected in 29.1% pregnant women[10]. Yanhong Zhai et al. also performed a study where the prevalence of Candida was found to be 21.8 %.[12] Furthermore, 27.65% were positive for Candida spp. culture in a study of Isaac Mboh Eyong et al[13]. The present study was comparable to those observed by aforementioned studies in which both patients with and without clinical signs were included. Thus, these results highlight the higher prevalence of VVC during pregnancy.

In this study, among 108 patients with VVC, 80 (74.1%) patients complained about pruritus or burning micturition or white discharge per vagina and rest (25.9%) patients didn't complaint of any discomfort during antenatal checkup. Many researchers focused on understanding whether the presence of symptoms was associated with a higher organism load and whether a higher organism load is linked to a greater risk of mother/fetus transmission, and, ultimately, complicated delivery[14]. Gigi et al., stated that during pregnancy the vagina is colonized by Candida spp. (at least 30% of cases), primarily due to elevated estrogen levels. Estrogen levels promote the invasive filamentous form of Candida spp., facilitating the production of a toxin known as candidalysin, which exerts a cytotoxic effect on host cells and promotes an inflammatory reaction in the vagina.[15] The history of VVC during pregnancy could help clinicians to prevent the negative outcomes of VVC for both the mother and the newborn, though screening for the detection of VVC in pregnancy is not included in international guidelines[8].

In the present study, it was noticed that VVC due to Candida spp. was in 35.29% of cases (n=306), infection due to other than Candida was in 6.52% and normal findings were in 58.2% of cases. GY Ali observed that the risk of VVC was approximately 30% during pregnancy and usually 90% due to Candida albicans, often harmless and causes no symptoms[16]. In another study of Joseph M Bliss observed that 66% (n=76) of mothers were colonized with yeast[17]. The prevalence of VVC due to Candida spp. accounted for 40.39% as observed by Sangare et al[18].

The pregnant women population was divided in several studies into different age groups to identify the highest prevalence rate of VVC with the age group. Disha T and HaqueF reviewed in their study that, VVC was most common in the age group 26 to 30 year in Karnataka, India, in 21 to 25 year in Janakpur, Nepal, in 16 to 25 year in South Libya and in 28 to 37 year in Ibb, Yemen[11]. Isaac Mboh Eyong et al., stated that VVC was observed mostly (35.9%) among the age group of 26-30 year and least (2.6%) among those of 15-20 year[13]. So, the range of age groups with the highest occurrence of VVC in different studies is between 15 to 37 years. In this study, the highest prevalence of VVC was noticed in the age group of 25–29 years, which was 58.3% (Table III) and lowest in 35 to 39 year-age group (3.7%).

Several studies linked the trimester of pregnancy with the vulnerability of pregnant women to VVC. A study by Olowe et al. had found the highest (93%) prevalence of VVC in the last trimester of pregnancy[9]. According to Kinghorn, the prevalence of VVC increases with the progression of pregnancy, especially in the last trimester[19]. The majority of the prevalence of present study mentioned in Table III is consistent with this, where the highest prevalence was observed in the 3rd trimester 46%. In first and second trimesters the prevalence were 15.7% and 38.0% respectively. Therefore, it cannot be firmly said that prevalence increases only with the gestational period as women in their 1st and 2nd trimesters also had shown a higher risk of getting vulvovaginal candidiasis.

Conclusion

Vaginal candidiasis was found to increase during pregnancy, with more common in young

adults of age group ranging from 25 to 29 years, particularly in the 3rd trimester. If left untreated, women may have complicated VVC, can lead to abortion, premature or complicated delivery and congenital fungal infection of the neonate, requiring special diagnostic and therapeutic consideration. Therefore, routine medical examination and regular screening for candidiasis in the antenatal care program is highly recommended to manage the disease and to avoid any complications.

Reference

1. World Health Organization (WHO). Reproductive Health. Available in https://www.who.int/westernpacific/health-topics/reproductive-health.
2. National Institute of Environmental Health Sciences. Reproductive Health. Available in https://www.niehs.nih.gov/health/topics/conditions/repro-health
3. United Nations International Children's Emergency Fund (UNICEF).Maternal Mortality. Available in https://data.unicef.org/topic/maternal-health/maternal-mortality/
4. Center for Disease Control and Prevention. Candidiasis Basics (CDC). Available in: https://www.cdc.gov/candidiasis/about/index.html
5. Msuya SE, Mbizvo E, Stray-Pedersen B, Sundby J, Sam NE, Hussain A. Reproductive tract infections and the risk of HIV among women in Moshi, Tanzania. Acta Obstet Gynecol Scand. 2002 Sep;81(9):886-93. doi: 10.1034/j.1600-0412.2002.810916.x.
6. Warren Levinson. Review of Medical Microbiology and Immunology; 13th edn. UK: McGraw-Hill Medical; 2015. Pp. 26-30.
7. Verhelst R, Verstraelen H, Claeys G, Verschraegen G, Van Simaey L, De Ganck C, et al. Comparison between Gram stain and culture for the characterization of vaginal microflora: definition of a distinct grade that resembles grade I microflora and revised categorization of grade I microflora. BMC Microbiology. 2005 October; 5: 61. doi:10.1186/1471-2180-5-61.
8. De Backer E, Verhelst R, Verstraelen H, Alqumber MA, Burton JP, Tagg JR, et al. Quantitative determination by real-time PCR of four vaginal Lactobacillus species, Gardnerella vaginalis and Atopobium vaginae indicates an inverse relationship between L. gasseri and L. iners. BMC Microbiology 2007 December; 7: 115. doi:10.1186/1471-2180-7-115.
9. Olowe O, Makanjuola O, Olowe R, Adekanle D. Prevalence of vulvovaginal candidiasis, trichomoniasis and bacterial vaginosis among pregnant women receiving antenatal care in Southwestern Nigeria. European Journal of Microbiology and Immunology. 2014; 4(4): 193–197.
10. Grigoriou O, Baka S, Makrakis E, Hassiakos D, Kapparos G, Kouskouni E. Prevalence of clinical vaginal candidiasis in a university hospital and possible risk factors. European Journal of Obstetrics, Gynecology, and Reproductive Biology 2006; 126(1): 121-125. doi: 10.1016/j.ejogrb.2005.09.015.
11. Disha T, Haque F. Prevalence and Risk Factors of Vulvovaginal Candidiasis during Pregnancy: A Review. Infect Dis Obstet Gynecol. 2022 Jul 20;2022:6195712. doi: 10.1155/2022/6195712.
12. Zhai Y, Liu J, Zhou L, Ji T, Meng L, Gao Y, et al. Detection of Candida species in pregnant Chinese women with a molecular beacon method. J Med Microbiol. 2018 Jun; 67(6): 783-789. doi: 10.1099/jmm.0.000740.
13. Eyong IM, Iwewe YS, Yangsi TT, Abas A, Katoua FN, Njamen TN. Vulvovaginal Candidiasis in Pregnant Women Attending the Garoua Regional Hospital (Cameroon) and Antifungals Susceptibility Profile of Isolates. Asian Research Journal of Gynaecology and Obstetrics. 2023; 6(1): 151-159, 2023.
14. Farr A, Effendy I, Frey Tirri B, Hof H, Mayser P, Petricevic L, et al. Guideline: Vulvovaginal candidosis (AWMF 015/072, level S2k). Mycoses. 2021 Jun; 64(6): 583-602. doi: 10.1111/myc.13248.
15. Gigi RMS, Buitrago-Garcia D, Taghavi K, Dunaiski CM, van de Wijgert JHHM, Peters RPH, Low N. Vulvovaginal yeast infections during pregnancy and perinatal outcomes: systematic review and meta-analysis. BMC Women's Health. 2023 Mar 21; 23(1): 116. doi: 10.1186/s12905-023-02258-7.
16. Ali GY, Algohary EH, Rashed KA, Almoghanum M, Khalifa AA. Prevalence of Candida colonization in preterm newborns and VLBW in neonatal intensive care unit: role of maternal colonization as a risk factor in transmission of disease. J Matern Fetal Neonatal Med. 2012 Jun ;25(6): 789-95. doi: 10.3109/14767058.2011.622005.
17. Bliss JM, Vasavigowda KP, Watson WJ. Vertical and Horizontal Transmission of Candida albicans in very low birth weight infants using DNA fingerprinting techniques. The Pediatric Infectious Disease Journal. 2008 March; 27(3): 231-5.
18. Sangare I, Sirima C, Bamba S, et al. Prevalence of vulvovaginal candidiasis in pregnancy at three health centers in Burkina Faso. Journal De Mycologie Medicale 2018 March; 28(1): 186-192.

    Sangare I, Sirima C, Bamba S, Zida A, Cisse M, Bazie WW, et al. Prevalence of vulvovaginal candidiasis in pregnancy at three health centers in Burkina Faso. J Mycol Med. 2018 Mar; 28(1): 186-192. doi: 10.1016/j.mycmed.2017.08.006.
19. Kinghorn GR. Vulvovaginal candidiasis. Journal of Antimicrobial Chemotherapy. 1991; 28: 59-66.