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Original Research Article

Clinical and etiological aspects of vulvovaginitis: a prospective and cross-sectional study from North India

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ABSTRACT

Background: Vulvovaginitis is the inflammation and infection of the vulva and vagina, which commonly presents with itching, vaginal discharge and burning. It accounts for more than 30% of cases in healthcare clinics. Most common vaginal infections include bacterial vaginosis, trichomoniasis and vulvovaginal candidiasis. Accurate assessment of risk factors and diagnosis of vulvovaginitis are essential key to initiate effective management, thereby alleviating associated complications. This study was aimed to study the clinical and etiological aspects of vulvovaginitis.
Methods: This was a tertiary care hospital based prospective cross-sectional study conducted on 250 women presenting with vulvovaginitis from January 2023 till August 2023. All patients presenting with vulvovaginitis were selected. Detailed history was taken. Demographic variables were assessed. Diagnosis was established based on clinical examination, microscopy, culture techniques and molecular assays.
Results: Vulvovaginitis was seen commonly in married, multiparous women of reproductive age group, mostly in lower class strata. Common risk factors encountered were diabetes, douching, sanitary napkin reuse and amongst OCP users. Most common characteristics of vaginal discharge were greyish white, thin, scanty and associated with malodour. The most common cause leading to vulvovaginitis was bacterial vaginosis followed by vulvovaginal Candidiasis and Trichomoniasis.
Conclusions: The reproductive age group was more susceptible to vulvovaginitis. Predisposing factors leading to vulvovaginitis included diabetes, multiple sexual partners, douching and sanitary napkin reuse. Bacterial vaginosis was the leading cause of vulvovaginitis (43.2%). Molecular tools may aid in the diagnosis of vulvovaginitis with unknown etiology. Primary prevention and timely diagnosis can avert complications and initiate treatment earlier.

Keywords: Bacterial vaginosis, Trichomoniasis, *Vulvovaginal candidiasis*, Vulvovaginitis

INTRODUCTION

Vulvovaginitis is defined as the inflammation or infection of vagina and vulva and is associated with a variety of symptoms, including inflammation, irritation, vulvovaginal itching, "fishy" vaginal odor, dyspareunia, burning and abnormal vaginal discharge.[1] The prevalence of vulvovaginitis accounts for 30% of women in reproductive age group.[2,3] *Lactobacilli*, which are part of the normal vaginal flora, colonizes the vaginal epithelium and it has a role in defense against infection. It maintains the normal vaginal pH between 3.8-4.4. When microorganisms other than lactobacilli dominate over the normal vaginal flora, the resulting imbalance precludes vaginosis/vaginitis.[4] Abnormal vaginal discharge may result in significant morbidity in the form of the pelvic inflammatory syndrome, infertility, co-infections, obstetric complications such as preterm labour, premature rupture of membranes, chorioamnionitis and so on.[4] The predominant etiology of symptomatic vaginal discharge is

bacterial vaginosis, which is responsible for 33%-47% of cases, vaginal candidiasis is diagnosed in 20-40% of cases and trichomoniasis in 8-10% of cases, which accounts for 90% of all etiologies of women of reproductive age.[4,6] Bacterial vaginosis is caused by a complex change in the vaginal microflora that favor the proliferation of anaerobic bacteria such as *Mobiluncus* species, *Gardnerella vaginalis* and Mycoplasma sp. *Vulvovaginal candidiasis*, the second most prevalent cause of infectious vaginitis is caused by an overgrowth of yeasts, primarily *Candida albicans*, whereas trichomoniasis is caused by a flagellated protozoan parasite known as *Trichomonas vaginalis*.[6] Other factors that predispose to infectious vaginitis include smoking, pregnancy, use of antimicrobial agents, immunodeficiency, diabetes and so on.[5,6]

Accurately assessing the prevalence and risk factors for infectious vaginitis is crucial for the development of effective interventions to improve women's reproductive health.[6] The current study was undertaken with the aim of understanding the etiologies and risk factors associated with vulvovaginitis in a tertiary care hospital.

METHODS

This was a hospital-based, Prospective cross-sectional study conducted on 250 women presenting with vulvovaginitis in the Department of Obstetrics and Gynaecology at Dayanand Medical College and Hospital, Ludhiana (Punjab), a tertiary care hospital from January 2023 till August 2023.All patients fulfilling the inclusion criteria were selected. Patients presenting with vulvovaginitis with one or more of the symptoms change in colour and odour of vaginal discharge, vaginal itching and burning and vulval itching/irritation were selected. A detailed history was taken and a clinical examination was done after obtaining informed consent. Using a structured questionnaire, sociodemographic factors, associated factors and relevant clinical information were collected.

This study was approved by the Institutional Ethical Committee and Faculty of Medical Sciences.

Inclusion criteria

Sexually active females between 18-60 years, able to provide vaginal specimens with any of vaginal discharge, vaginal itching, vaginal burning, vulval itching/irritation.

Exclusion criteria

Menstruating women, age>60 years, age<18 years, unmarried. H/O antibiotic therapy in past 2 weeks.

Methods of collection of data

Clinical examination

Local examination and sterile per speculum examination were done for the characteristics of vaginal discharge (colour, consistency, amount, odour). Then, vaginal pH was measured using pH paper.

Sample collection and microscopy

Three vaginal samples were collected using sterile cotton-tipped swabs and transported immediately to the laboratory. The first sample was spread onto three slides. Slide 1- Wet mount, Slide 2- KOH smear, Slide 3- Gram stain, Second sample- High Vaginal Swab for culture. Third sample (optional)- CBNAAT for CT/NG in cases in which no other common infectious agent causing vulvovaginitis was found.

Laboratory identification techniques

KOH smear, wet smear preparation and gram stain

Wet mount

Trichomonas vaginalis was identified by its characteristic pear-shaped trophozoite morphology and characteristic jerky motility on saline wet mount microscopy examination under bright field microscopy at40x objective. Clue cells along with PMN were seen in the case of bacterial vaginosis.

10% KOH smear

The presence of budding yeast-like cells and pseudo hyphae denotes fungal infection. Bacterial vaginosis had a characteristic fishy odour after the addition of 10% KOH. Gram stain showed the presence of pseudohyphae in VVC. Normal vaginal flora was seen as gram-positive bacilli. Trichomoniasis showed flagella with axostyle. Bacterial vaginosis showed gram-negative coccobacilli.

Culture techniques

A second vaginal swab was inoculated on blood agar and McConkey agar plates were incubated at 35-37 degree Celsius for 18-24 hours aerobically. Plates with no growth after 24 hours were re-incubated for a further 24 hours. Vaginal culture confirmed the presence of candida or secondary bacterial infections.

CBNAAT (optional)

It was done for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in which no other common infectious agent was found. It is the most recent molecular tool employed for resistant or recurrent vulvovaginitis. Bacterial vaginosis was diagnosed using Amsel's criteria. *Vulvovaginal candidiasis* was diagnosed using a 10% KOH smear or gram stain or vaginal swab culture. *Trichomoniasis* was detected on wet mount microscopy. Mixed infections were diagnosed when >1 organisms were present. CBNAAT for CT/NG was done in which other common infectious organisms were not found.

Statistical analysis

Data were described in terms of range; mean±standard deviation (±SD), frequencies (number of cases) and relative frequencies (percentages) as appropriate. For comparing categorical data, the Chi square ($\chi 2$) test was performed and the Fisher exact test was used when the expected frequency was less than 5. A probability value (p value) less than 0.05 was considered statistically significant. All statistical calculations were done using (Statistical Package for the Social Science) SPSS 21.0 version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

RESULTS

Out of 250 females who participated in the study, Demographic data and history of risk factors were recorded. Characteristics of vaginal discharge was noted. Local and per speculum examination along with point of care tests such as vaginal pH, vaginal culture, Wet mount, Gram stain and CBNAAT were done. Etiology was recorded as bacterial vaginosis, vulvovaginal candidiasis, trichomoniasis, mixed infections and other causes. Majority of study group (48.4%) were between 26-35 years of age, 22% between 18-25 years and 19.6% between 36-45 years. The mean age of the study population was 32years. 97 (38.8%) were multiparous, 78 (31.2%) were nulliparous and 75 (30%) were primiparous. Most of cases were from the upper lower class, n=84 (33.6%), followed by n=60 (24%) from the lower class. Out of 250 cases, 44 (17.6%) were from lower middle class, 32 (12.8%) and 30 (12%) were from upper middle and upper class respectively. Multiple sexual partners (54.4%), diabetes (58.4%) and douching (71.2%) were the major risk factors.

The various characteristic feature of vaginal discharge found in our study showed about 108 cases (43.2%) had greyish white discharge, 82 cases (32.8%) had curdy white followed by greenish-yellow in 26 cases (10.4%), altered colour (7.6%) and blood stained discharge (6.0%) The discharge was thick in 47.6%. 192 cases (76.8%) out of 250 had scanty discharge and the rest 23.2% had profuse discharge. Vulval itching was associated with 41.6% (n=104). Malodored discharge was seen in 63.6% (n=159) cases. The study revealed 43.2% incidence of bacterial vaginosis, 34.8% vulvovaginal candidiasis, 9.6% trichomoniasis, 3.6% BV+VVC+trichomoniasis, 2% BV+VVC, 6.8% other causes.

Table 1: Demographic data of cases in study.

Demographic characteristics	No. of cases	%
Age group (in years)		
18-25	55	22.0
26-35	121	48.4
36-45	49	19.6
46-55	20	8.0
56-60	5	2.0
Parity		
Multiparous	97	38.8
Nulli	78	31.2
Primi	75	30.0
Socio-economic status		
Lower class	60	24.0
Lower middle	44	17.6
Upper class	30	12.0
Upper lower	84	33.6
Upper middle	32	12.8

Table 2: Risk factors for vulvovaginitis.

Risk factors	No. of cases	%
Number of sexual partners		
Multiple	136	54.4
Single	114	45.6
Diabetes		
No	104	41.6
Yes	146	58.4
Douching		
No	72	28.8
Yes	178	71.2

Table 3: Characteristics of vaginal discharge and symptoms.

Color	No. of cases	%
Altered color	19	7.6
Blood stained	15	6.0
Curdy white	82	32.8
Greenish yellow	26	10.4
Greyish white	108	43.2
Consistency		
Thick	119	47.6
Thin	131	52.4
Amount		
Profuse	58	23.2
Scanty	192	76.8
Vulval itching		
No	146	58.4
Yes	104	41.6
Malodor		
No	91	36.4
Yes	159	63.6

Table 4: Diagnosis of vulvovaginitis.

Diagnosis	No. of cases	%
Bacterial vaginosis	108	43.2
Vulvovaginal candidiasis	87	34.8
Trichomoniasis	24	9.6
BV+VVC	5	2.0
BV+VVC+Trichomoniasis	9	3.6
Others	17	6.8

DISCUSSION

Vulvovaginitis can significantly affect the quality of life and effective management of vaginitis hinges upon accurate diagnosis and patient education. By exploring the epidemiological trends, risk factors and clinical presentations, it will highlight the importance of accurate diagnosis and comprehensive preventive strategies in order to alleviate its broader implications. In the study, we observed that the mean age amongst the study population was 32.92 years.

Similar results were observed by Shankari et al in which the majority of the women presenting with vulvovaginitis belonged to the age group of 31-40 years.[7] Various studies show a significant prevalence of vulvovaginitis in women aged 26-30 years, emphasizing that this demographic is important, as it includes sexually active women who have a high rate of exposure to genital infections.

In the study, vulvovaginitis was commonly seen in the upper lower class. A study done by Nishi et al also stated a majority of the patients presenting with vulvovaginitis belonged to a lower socioeconomic class or below (class 2 or below).[4] A study by Altaf et al also emphasized that vulvovaginitis exhibits a higher prevalence among individuals from lower socioeconomic status.[8] This can be explained because of limited access to healthcare services, crowded living conditions and inadequate hygiene practices with higher levels of stress which can predispose lower-class strata to vulvovaginitis.

The study demonstrated that vulvovaginitis was predominantly observed in individuals with diabetes. Diabetes contributes to increased vulvovaginitis by reducing the protective lactobacillus species and increasing susceptibility to pathogenic bacteria and 85 yeast. In a similar study in 2019, an increased incidence of vulvovaginal candidiasis was seen in diabetics owing to hydrolytic enzymes and biofilm formation leading to resistance to host immune response.[9]

In a study done in Uganda in 2023, the association of sexual behaviour with multiple sexual partners was linked with infectious vaginitis.[6] Similar results were seen in the present study. Various other studies have also cited the augmented risks of vulvovaginitis in patients who engage with multiple sexual partners.[10] It can be due to increased exposure to the pathogens, altered vaginal microbiome, inconsistent use of protection and hygiene practices and increased inflammatory response. The study showed characteristics of vaginal discharge as greyish white, thin,

scanty and malodor, less associated with itching. In a study conducted by John in 2023, the most common complaint was vaginal discharge associated with vulval itching.[11] Various other studies have also quoted that thin, scanty malodorous vaginal discharge is predominantly associated with vulvovaginitis.

The study concluded maximum incidence of vulvovaginitis due to bacterial vaginosis followed by vulvovaginal candidiasis and trichomoniasis respectively and mixed infections and other causes in sequence. Comparable results were seen in a study done by Jayaluxmi et al concluding the highest percentage of cases with bacterial vaginosis followed by VVC, trichomoniasis and mixed infections in order.[5]

Similar results were seen in a study by Archana et al in 2022 concluding BV was most commonly 88 detected followed by VVC and trichomoniasis.[12] A study by Bahram A, also showed an increased prevalence of bacterial vaginosis followed by trichomoniasis and VVC.[13] In a similar study by Sharon et al common causes of vulvovaginitis were BV, VVC and *trichomoniasis* followed by co-infections and other causes.[14]

Equivalent findings were also seen in a study by Sung-His Huang, bacterial vaginosis and *vulvovaginal candidiasis* were the common causes leading to vulvovaginitis followed by mixed infections.[15] In contrast, a study done by Abdullah et al in 2020 showed an increased prevalence of VVC followed by bacterial vaginosis. The possible explanation for variations in the etiological agent varies with geographical location, education, personal hygiene and economical status.[16] Furthermore, differences in the diagnostic methods and criteria used across different research settings can result in differences in the etiological agents responsible for vulvovaginitis.

CONCLUSION

To conclude, this study shows increased prevalence of Vulvovaginitis amongst the age group of 26-35 years with a standard deviation of 9.04 years. The commonest etiology encountered was bacterial vaginosis. Other etiologies noted were vulvovaginal candidiasis and trichomoniasis. It is very crucial for women of reproductive age to undergo comprehensive health evaluations to facilitate early diagnosis and initiation of appropriate treatment.

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