

## Vaginitis in women of reproductive age group: A hospital-based study from North India

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### ABSTRACT

**Background:** Vaginal discharge is a common problem faced by women of the reproductive age group seeking consultation in the gynecology outpatient department (GOPD). If not treated, it can lead to pelvic inflammatory disease, infertility and further complicate pregnancy. **Objective:** The present study explores the etiology and clinical presentations of vaginal discharge among women of reproductive age presenting to the GOPD of our tertiary care hospital. **Materials and Methods:** The study group comprised of 200 sexually active women of age group  $\geq 18$  years attending our GOPD. Four vaginal swabs were taken from the posterior fornix under aseptic condition. Direct wet mount microscopy, gram stain, and culture on Sabaroud's dextrose agar and Kupferberg media were carried out. **Results:** Prevalence of vulvovaginal candidiasis, bacterial vaginosis, trichomoniasis, and mixed infection was 30%, 20%, 2%, and 2%, respectively. *Candida albicans* were present in 55% patients and non-albicans *Candida* in 45%. The most common associated presenting symptom of patients presenting with the discharge was lower abdominal pain. **Conclusion:** Simple diagnostic techniques such as microscopy and culture help in diagnosis and the precise management process of such women presenting with discharge and thus circumvent impending complication.

**Key words:** Bacterial vaginosis, Trichomoniasis, Vulvovaginal candidiasis

Vaginitis is one of the most common causes for consultation in the gynecology outpatient department (GOPD) with vaginal discharge as the most common presentation. Vaginal discharge can be due to physiological changes of hormonal imbalance or may be due to infectious etiology caused by an imbalance in the microenvironment of vaginal flora, predominantly formed by *Lactobacillus*. The common infectious causes of vaginal discharge include bacterial vaginosis (BV), vulvovaginal candidiasis (VVC), and trichomoniasis [1]. The associated symptoms of such conditions include pruritus, malodor discharge, dysuria, lower abdominal, and back pain. BV is associated with increased pH and replacement of vaginal *Lactobacilli* with an anaerobic organism such as *Gardnerella vaginalis*, *Mobiluncus* spp., *Bacteroides* spp., and *Prevotella* spp. Clinically, it is diagnosed by the presence of homogenous gray-white vaginal discharge and fishy odor when subjected to Whiff's test [2]. It is associated with an increased risk of pre-term birth, premature rupture of membrane, and miscarriage in women of reproductive age group [3-5]. In non-pregnant female, it increases risk of pelvic inflammatory disease (PID) and acquisition of HIV infection [6,7].

VVC affects up to 75% of women of reproductive age group, at least once during their lifetime [8]. Although, *Candida albicans* is the most common species isolated so far, however, more recently

non-albicans are recovered with increasing frequency which is known for their variable resistance to azole group of drugs [9,10]. Untreated disease can lead to chorioamnionitis, prematurity in pregnant females, and PID in non-pregnant women [8,9]. Trichomoniasis in symptomatic females is characterized by copious yellow-greenish vaginal discharge, pruritus, dysuria, dyspareunia or lower abdominal pain, and sometimes with a punctate hemorrhagic lesion on the cervix known as "strawberry cervix." Trichomoniasis is also associated with adverse pregnancy outcomes such as pre-operative rupture of membrane, pre-term birth, and low birth weight babies [11]. It can also lead to infertility and PID in women of the reproductive age group [12]. Literature suggests an association between *Trichomonas vaginalis* (TV) and cervical neoplasia [13].

Since these infections have nonspecific symptoms with a similar clinical presentation, diagnosis without laboratory confirmation can often lead to inappropriate treatment of the patients. The present study explores the etiology and clinical presentations of vaginal discharge among women of reproductive age presenting to the GOPD.

### MATERIALS AND METHODS

After approval from the institutional ethics committee, the present study was conducted over a period of 16 months from January

2018 to April 2019. The study group comprised 200 sexually active women aged  $\geq 18$  years, attending GOPD of our tertiary care hospital in north India with complaints of vaginal discharge. Women who had recently douched or used spermicidal agents within 72 h before testing, menstruating women at the time of examination or those who had taken a course of antibiotics within the past 3 weeks were excluded from the study. Upon obtaining informed consent, a detailed history, complete physical, and per speculum examination were carried out.

Four vaginal swabs were taken from the posterior fornix under aseptic condition. The first swab was used for direct wet mount examination using 0.85% physiological saline. The second vaginal swab was placed into the Kupferberg culture medium (Hi-Media, India) in a screw-capped test tube and incubated under the anaerobic condition at 37°C. The cultures were examined microscopically until 1 week for the presence of motile TV. The trophozoites of TV were identified by their size (10–20  $\mu\text{m}$ ), oval shape, and characteristic twitching motility on  $\times 40$  magnification of the light microscope.

Smear made from the third vaginal swab was subjected to gram stain. Nugent's criteria were used to evaluate BV on the basis of the presence of Gram-positive bacilli (*Lactobacilli*), small Gram-negative bacilli (*Gardnerella*), and curved Gram-negative bacilli (*Mobiluncus*). A Nugent's score  $\geq 7$  was considered as positive for BV [14]. The fourth vaginal swab was inoculated on the slope of Sabaroud's dextrose agar (SDA) for the isolation of yeasts and incubated at 37°C for 72 h. Isolated yeast were characterized by germ tube test and temperature tolerance test for identification of *C. albicans* or non-albicans Candida. Germ tube formation is characteristic of *C. albicans* or *Candida dubliniensis* [15]. As *C. albicans* grows at 42°C, the yeast were also subcultured on SDA and incubated at 42°C for 24–48 h to differentiate between *C. albicans* from *C. dubliniensis* [15].

## RESULTS

In the present study out of 200 women of reproductive age group who participated with complaints of vaginal discharge, a total of

100 (50%) participants were found to be infected. All the patients enrolled in the study were married and did not have a history of multiple sexual partners except one. Most of the patients presenting primarily with vaginal discharge belonged to the age group of 21–30 years. The mean age of the patients was  $30.93 \pm 0.49877$  years. The age-wise distribution of discharge etiology is depicted in Table 1.

Patients with primary symptoms of discharge revealed either homogenous gray-white/yellowish-green/curdy white discharge on per speculum examination (Table 2). The homogenous gray-white discharge was predominantly seen in BV cases and curdy white and yellowish-green discharge were commoner in patients with VVC and TV, respectively. Additional presenting features other than vaginal discharge were foul-smelling discharge (13.5%), dysuria (21.5%), intense pruritus (32.5%), and lower abdominal pain (59%). Apart from vaginal discharge, the most common associated presenting symptom of the patients was lower abdominal pain which was significantly (Chi-square test) associated with BV and VVC (Table 3).

BV was diagnosed by Nugent score of  $\geq 7$  on the gram stained slide of a vaginal smear. BV was found in 20% (36 single + 4 mixed = 40/200) of patients. VVC was diagnosed by isolation of yeast on SDA culture. Wet mount microscopy detected yeast cells in 28 patients, gram staining in 35 while culture on SDA detected yeast cells in 30% (57 single + 3 mixed = 60/200). *C. albicans* were present in 33 (55%) and non albicans Candida (NAC) in 27 (45%) patients. Wet mount microscopy and culture in Kupferberg media detected TV in the same 2% (3 single + 1 mixed = 4/200) patients. One patient had a red inflamed cervix with hemorrhagic spots (typical strawberry cervix) on speculum examination along with the yellowish-green frothy discharge. Some degree of inflammation was noted in all four patients of trichomoniasis. Among the total of 100 infected patients, mixed etiology was seen in 4 cases (BV+TV = 1 and VVC+ BV=3; Fig. 1).

## DISCUSSION

In the present study, a total of 100 (50%) participants were found to be infected with  $\geq 1$  bacterial, fungal or parasitic agents. This

**Table 1: Age-wise distribution of BV, VVC, TV, and mixed infection in patients attending gynecology outpatient department**

Age group	No. of cases studied (n=200)	No. of positive cases of BV n=36 (%)	No. of positive cases of VVC n=57 (%)	No. of positive cases of TV n=3 (%)	No. of positive cases of mixed infection n=4 (%)
<20	4	1 (2.7)	1 (1.7)	0	0
21–25	45	12 (33.3)	14 (24.5)	1 (33.3)	0
26–30	72	8 (22.2)	20 (35)	0	2 (50)
31–35	35	9 (25)	10 (17.5)	0	0
36–40	22	2 (5.5)	3 (5.3)	1 (33.3)	2 (50)
41–45	22	4 (11.1)	9 (15.7)	1 (33.3)	0

BV: Bacterial vaginosis, VVC: Vulvovaginal candidiasis, TV: *Trichomonas vaginalis*

**Table 2: Distribution of BV, VVC, and TV with the type of discharge**

Type of discharge (n=200)	No. of cases BV (n=36)	No. of cases of VVC (n=57)	No. of cases of TV (n=3)	No. of mixed infection (n=4)
Gray-white (134)	35	7	0	0
Curdy white (56)	1	50	0	3
Yellowish-green (10)	0	0	3	1

BV: Bacterial vaginosis, VVC: Vulvovaginal candidiasis, TV: *Trichomonas vaginalis*

Table 3: Clinical features of patients infected with BV, VVC, and TV

Clinical features	Participants(%) n=200	BV (p value) n=36	VVC (p value) n=57	TV (p value) n=3	Mixed infection(p value) n=4
Lower abdominal pain					
Yes	118 (59%)	16 (0.0499)	15 (0.0001)	3 (NA)	3 (0.5110)
No	82	20	42	0	1
Pruritus					
Yes	65 (37.5%)	8 (0.1461)	19 (0.8738)	3 (NA)	1 (0.7463)
No	135	28	38	0	3
Dysuria					
Yes	43 (21.5%)	5 (0.2196)	09 (0.2146)	2 (0.0550)	1 (0.0550)
No	157	31	48	1	3
Foul smell discharge					
Yes	27 (13.5%)	4 (0.6432)	06 (0.4372)	3 (NA)	1 (0.4966)
No	173	32	51	0	3

BV: Bacterial vaginosis, VVC: Vulvovaginal candidiasis, TV: *Trichomonas vaginalis*

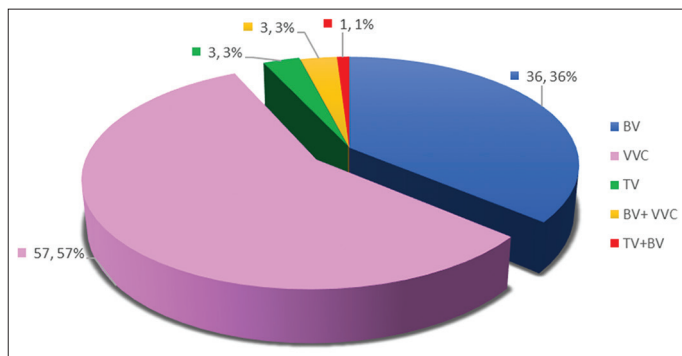


Figure 1: Etiology of vaginitis

finding is similar to the study by Sivaranjini *et al.* from Puducherry, who found 51.7% of vaginitis [16]. On the contrary, a higher infection rate has been reported in a study at Rajasthan (89%) [17] and lower in a study conducted at Yemen (37.6%) [18]. The most common cause of vaginitis in our study was VVC (30%) followed by BV (20%) and least common was TV (2%) which is comparable to studies by Sood and Sud [19] from North India (BV-21.5% and TV-1.5%) and Narayankhedkar *et al.* [20] from Maharashtra (BV-17.3%; VVC-30%; and TV-1.8%). However, a lower prevalence of VVC has been documented from Puducherry (15.5%) [16], Rajasthan (14%) [17], and Yemen (6.6%) [18]. Rajasthan's study also reports a higher prevalence of BV (53%).

In the present study (2%) is comparable to studies conducted in Puducherry (5.5%) [16] and Maharashtra (6.36%) [20], whereas Himachal Pradesh describes much higher mixed infection rate (34.5%) [19]. The etiology of mixed infection is comparable to study from Maharashtra but contrasts with the maximum etiology of BV+TV from Puducherry. As with the report documented from Maharashtra, TV+VVC did not present as a mixed infection, even in the present study [20]. In the present study isolation of *C. albicans* in 55% and NAC in 45% is much the same as reported by Anuradha *et al.* [20] Contrasting reports by Namarata *et al.* (NAC-53% and *C. albicans* -47%) [21] and Lakshmi *et al.* (NAC-78% *C. albicans* -22%) [22] documents NAC as their prevalent etiology of VVC.

The most common type of discharge seen in patients of BV was gray-white in the present study which is comparable to study by Sood and Sud [19] and Masand *et al.* [17]. We found that lower abdominal pain was significantly associated with patients of BV and VVC contrast to study documented from Maharashtra [20] and Yemen [18], where pruritus was the significantly associated symptom with VVC. Typical strawberry cervix was seen in 20% cases of trichomoniasis which is in accordance with studies conducted in Maharashtra (11%) [23] and Sri Lanka (16%) [24].

Given that only symptomatic patients presenting to GOPD were included in the study, the prevalence observed in the present study may not depict the true picture of these infections. Moreover, asymptomatic carriers being the most common spreaders of Trichomoniasis by the sexual route, hence, choosing a control population would have been better. Further, probably being symptom free, patients did not turn up for follow up and hence success or failure of treatment could not be assessed.

## CONCLUSION

In the reproductive age group women presenting to GOPD with vaginal discharge, 50% patients were found to be infected with  $\geq 1$  bacterial/fungal/parasitic agents. Of these, VVC was the most common infection found in 30% patients who mostly presented with curdy white discharge followed by BV in 20% patients having most commonly grayish-white discharge. The least common was trichomoniasis in 2% patients. Lower abdominal pain was a significant symptom in patients with BV and VVC. Establishing the diagnosis of vaginitis is utmost importance in the successful treatment of these patients. Establishing a conclusive diagnosis of vaginitis is vital in the successful treatment of these patients, which abets in prevention of adverse pregnancy outcome and other impending problems in nonpregnant women.

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