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Original Research Article

THE INCIDENCE AND ETIOLOGY OF VAGINAL DISCHARGE IN REPRODUCTIVE AGE WOMEN ATTENDING CHHATTISHGARH INSTITUTE OF MEDICAL SCIENCE BILASPUR, CHHATTISHGARH: A CROSS SECTIONAL OBSERVATIONAL STUDY

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ABSTRACT

Background: Vaginal discharge is one of the most common gynaecological complaints among reproductive-age women and may result from physiological or pathological causes. Accurate etiological diagnosis is essential for appropriate management and prevention of complications. **Aim:** To determine the incidence, clinical profile, and etiological pattern of vaginal discharge among reproductive-age women attending a tertiary care centre in Chhattisgarh. **Materials and Methods:** This cross-sectional observational study was conducted in the Department of Obstetrics and Gynaecology at Chhattisgarh Institute of Medical Sciences over a period of six months. A total of 200 reproductive-age women presenting with vaginal discharge were included. Detailed history, clinical examination, and per speculum examination were performed. Vaginal discharge samples were subjected to pH testing, wet mount microscopy, Gram staining with Nugent scoring, KOH mount, and whiff test. Data were analysed using IBM SPSS Statistics, and $p < 0.05$ was considered statistically significant. **Results:** The mean age of participants was 30.23 ± 4.53 years, with the majority belonging to the 26–30 years age group (30.5%). Most participants were married (91%) and from rural areas (87%). Itching (28.5%) and foul-smelling discharge (26.5%) were the most common associated symptoms. Homogeneous white discharge (82%) and thin consistency (40%) were the predominant discharge characteristics. Wet mount examination revealed clue cells in 32.5% and Trichomonas vaginalis in 6.5% of patients. According to Nugent scoring, bacterial vaginosis was identified in 45% of women. Final diagnosis showed bacterial vaginosis in 45% of cases, vulvovaginal candidiasis in 20.5%, non-specific vaginitis in 13%, trichomoniasis in 6.5%, and normal vaginal flora in 15%. Significant associations were observed between diagnosis and symptoms, discharge characteristics, and laboratory findings ($p < 0.05$), whereas sociodemographic variables were not significantly associated with diagnosis. **Conclusion:** Bacterial vaginosis was the most common cause of vaginal discharge in reproductive-age women, followed by vulvovaginal candidiasis. Clinical symptoms alone were insufficient for accurate diagnosis, highlighting the importance of laboratory investigations for appropriate identification and management of vaginal infections.

INTRODUCTION

Vaginal discharge is one of the most frequently encountered gynaecological complaints among women of reproductive age, with reported prevalence ranging from 20–60% depending on demographic profile, sexual behaviour, hygiene practices, and accessibility to healthcare facilities.[1] In urban gynaecology outpatient settings, abnormal vaginal discharge remains a major reason for consultation, highlighting the increased vulnerability of reproductive-age women to disturbances in the

vaginal microenvironment. Women between 18 and 35 years of age are particularly susceptible because physiological and behavioural factors such as menstruation, sexual activity, pregnancy, contraceptive usage, and personal hygiene practices significantly influence vaginal flora and secretions.[2,3] In several healthcare systems, vaginal discharge is considered an important indicator of reproductive tract infections and sexually transmitted infections (STIs), thereby serving not only as a clinical manifestation but also as a marker of women's reproductive health status. Furthermore, factors such as poor awareness regarding reproductive health, social stigma associated with gynaecological complaints, and inadequate healthcare access contribute substantially to delayed diagnosis and recurrent infections, especially in low-resource populations.[4] Hence, the high occurrence of vaginal discharge reflects the combined effect of physiological variations, lifestyle practices, and infectious exposures, emphasizing the need for proper evaluation and awareness among reproductive-age women.

The causes of vaginal discharge are diverse and may be physiological, infectious, or non-infectious in nature.[5] Physiological leukorrhea is commonly observed due to oestrogen-mediated enhancement of cervical mucus secretion and increased shedding of vaginal epithelial cells, usually presenting as a clear or whitish, non-offensive discharge without associated irritation. Such discharge commonly varies during different phases of the menstrual cycle and increases during ovulation and pregnancy owing to elevated hormonal levels. However, infectious causes account for most abnormal vaginal discharge cases.[6] Among these, bacterial vaginosis (BV) is the most prevalent condition and results from replacement of the normal Lactobacillus-predominant vaginal flora by anaerobic organisms such as Gardnerella vaginalis and other mixed anaerobes. Clinically, BV is characterized by thin greyish-white discharge with a fishy odour and is associated with factors such as multiple sexual partners, new sexual relationships, vaginal douching, and inconsistent condom use. Vulvovaginal candidiasis, predominantly caused by Candida albicans and occasionally by non-albicans Candida species, typically presents with thick curdy discharge, pruritus, and vulvovaginal inflammation. Predisposing factors include pregnancy, diabetes mellitus, prolonged antibiotic therapy, corticosteroid use, and immunocompromised states. Trichomoniasis, caused by Trichomonas vaginalis, is a sexually transmitted protozoal infection producing frothy yellow-green discharge and vaginal erythema, and is associated with an increased risk of pelvic inflammatory disease and HIV transmission.[7,8]

Other infectious etiologies include cervicitis caused by Chlamydia trachomatis and Neisseria gonorrhoeae, which often presents with mucopurulent discharge, pelvic pain, or postcoital bleeding. Emerging evidence also implicates Mycoplasma genitalium in persistent cervicitis and chronic vaginal discharge syndromes. Non-infectious causes, though comparatively less common, are clinically relevant.[9] Irritant or allergic vaginitis may result from exposure to soaps, detergents, lubricants, spermicides, condoms, or sanitary products, leading to watery discharge accompanied by irritation or burning sensation.[10] Atrophic vaginitis may occasionally occur in reproductive-age women during temporary hypoestrogenic states such as the postpartum period, lactational amenorrhea, or hormonal therapy use. Retained foreign bodies such as tampons or pessaries may also produce foul-smelling discharge due to secondary infection and inflammation. Cervical pathologies including ectropion, cervical polyps, and malignant lesions can manifest as persistent or blood-stained discharge. Additionally, inflammatory dermatological conditions of the vulva, such as lichen sclerosus and lichen planus, may lead to secondary vaginal discharge.[11]

Thus, the etiology of vaginal discharge in reproductive-age women is multifactorial and reflects the delicate balance between vaginal flora, hormonal influences, sexual practices, hygiene behaviour, and underlying pathological conditions. A comprehensive understanding of these causes is essential for accurate diagnosis, individualized treatment, prevention of recurrence, and reduction of complications such as pelvic inflammatory disease, infertility, adverse pregnancy outcomes, and sexually transmitted infections. In view of these considerations, the present study was undertaken to determine the incidence and etiological profile of vaginal discharge among reproductive-age women attending a tertiary care centre in Chhattisgarh.

MATERIALS AND METHODS

This cross-sectional observational study was conducted in the Department of Obstetrics and Gynaecology at Chhattisgarh Institute of Medical Sciences over a period of six months. The study included reproductive-age women presenting with complaints of vaginal discharge in the gynaecology outpatient department (OPD). The study population comprised women of reproductive age attending the gynaecology OPD with complaints of vaginal discharge during the study period.

Inclusion Criteria

Women of reproductive age presenting with vaginal discharge and attending the Department of Obstetrics and Gynaecology OPD were included in the study.

Exclusion Criteria

Pregnant and lactating women, unmarried women who were not sexually active, women who had used topical or systemic antibiotics or antifungal medications within the preceding two weeks, women with a history of hysterectomy, and those unwilling to provide informed consent were excluded from the study.

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Sample Size

All eligible patients fulfilling the inclusion and exclusion criteria during the study period were included consecutively in the study.

Data Collection Procedure

Data were collected using a predesigned and prestructured questionnaire. After obtaining written informed consent, detailed history taking, general physical examination, and gynaecological examination were performed for all participants.

Clinical Examination

Following the initial assessment, a provisional clinical diagnosis was made. Per speculum examination was carried out using a sterile vaginal speculum to visualize the vagina and cervix. Abnormalities such as vaginitis, cervicitis, cervical erosion, and characteristics of vaginal discharge including colour, quantity, consistency, and odour were documented.

Sample Collection

Vaginal discharge samples were collected using five sterile swabs from the upper anterior fornix, posterior fornix, bilateral lateral fornices, and cervix under aseptic precautions.

Laboratory Investigations

The collected samples were sent to the Department of Microbiology for further analysis. The following investigations were performed:

- Measurement of vaginal pH using indicator paper strips ranging from pH 2 to pH 10.
- Wet mount microscopy for detection of motile Trichomonas vaginalis.
- Gram staining for identification of clue cells and gonococci.
- Potassium hydroxide (KOH) mount for detection of Candida species.
- Enzyme-linked immunosorbent assay (ELISA) for herpes simplex virus testing using 5 mL venous blood samples.

Statistical Analysis

The collected data were entered into Microsoft Excel and analysed using IBM SPSS Statistics. Quantitative variables were expressed as mean ± standard deviation or median with interquartile range, whereas qualitative variables were presented as frequencies and percentages. Appropriate statistical tests were applied to determine associations between variables. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee prior to commencement of the study. Written informed consent was obtained from all participants before enrolment. Confidentiality of participant information was strictly maintained throughout the study, and no personal identifiers were disclosed. Participation in the study was entirely voluntary, and no additional risk was imposed on participants as all investigations formed part of routine clinical evaluation.

Funding

No external funding was obtained for the study. All investigations were performed as part of routine patient care.

RESULTS

A total of 200 women presenting with complaints of vaginal discharge and fulfilling the inclusion and exclusion criteria were enrolled in the present study. The age-wise distribution revealed that the majority of patients belonged to the 26–30 years age group, accounting for 30.5% (n = 61), followed by 27.5% (n = 55) in the 18–25 years age group. Patients aged 31–35 years constituted 17% (n = 34), while 15.5% (n = 31) belonged to the 36–40 years age group. Only 9.5% (n = 19) patients were in the 41–45 years age group. The mean age of the study participants was 30.23 ± 4.53 years. One-way ANOVA demonstrated no statistically significant association between age and diagnosis, $F(4,195) = 0.43$, $p = 0.789$.With respect to educational status, the largest proportion of patients had attained higher secondary education, comprising 26% (n = 52) of the study population. Graduates or women educated above graduation accounted for 16.5% (n = 33), while 15% (n = 30) had middle school education and 13% (n = 26) had studied up to high school. Primary education was observed in 11.5% (n = 23), whereas 18% (n = 36) of women were illiterate. No statistically significant association was observed between education and diagnosis ($\chi^2 = 23.25$, $p = 0.276$). According to socioeconomic status, the majority of patients belonged to the lower socioeconomic class, accounting for 37% (n = 74), followed by 23% (n = 46) from the lower middle class. Middle-class patients constituted 18.5% (n = 37), while 15% (n = 30) belonged to the upper middle class. Only 6.5% (n = 13) patients were from the upper socioeconomic class. The association between socioeconomic status and diagnosis was not statistically significant ($\chi^2 = 17.89$, $p = 0.330$). Most of the participants were married, representing 91% (n = 182) of the study population, whereas unmarried women constituted only 9% (n = 18). No significant association was observed between marital status and diagnosis ($\chi^2 = 1.78$, $p = 0.776$).

Regarding residential status, the majority of patients were from rural areas, accounting for 87% (n = 174), while only 13% (n = 26) were from urban areas. Residential status also showed no statistically significant association with diagnosis ($\chi^2 = 3.97$, $p = 0.409$).

Among the associated symptoms, itching was the most common complaint, reported by 28.5% (n = 57) of patients, followed by foul-smelling discharge in 26.5% (n = 53). Abdominal pain was present in 16.5% (n = 33), burning micturition in 7% (n = 14), and low backache in 5.5% (n = 11) of patients. Chi-square analysis demonstrated statistically significant associations between diagnosis and itching ($\chi^2 = 56.96$, $p < 0.001$), foul-smelling discharge ($\chi^2 =$

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105.69, $p < 0.001$), abdominal pain ($\chi^2 = 38.45$, $p < 0.001$), burning micturition ($\chi^2 = 17.12$, $p = 0.002$), and low backache ($\chi^2 = 21.53$, $p < 0.001$).Assessment of vaginal discharge characteristics showed that scanty discharge was most common, observed in 55% (n = 110) of patients, followed by copious discharge in 30% (n = 60) and moderate discharge in 15% (n = 30). Homogeneous white discharge was noted in 82% (n = 164) of patients, whereas yellowish-green discharge was seen in 10% (n = 20) and off-white discharge in 8% (n = 16). Thin discharge consistency was observed in 40% (n = 80) of patients, thick or curdy discharge in 31.5% (n = 63), and mixed consistency in 28.5% (n = 57). Significant associations were found between diagnosis and amount of discharge ($\chi^2 = 112.73$, $p < 0.001$), colour of discharge ($\chi^2 = 225.25$, $p < 0.001$), and consistency of discharge ($\chi^2 = 142.14$, $p < 0.001$). Wet mount examination revealed clue cells in 32.5% (n = 65) of patients, suggesting bacterial vaginosis as a common etiology. Pus cells were observed in 20% (n = 40), while Trichomonas vaginalis was identified in 6.5% (n = 13) of cases. Wet mount findings were inconclusive in 41% (n = 82) of patients. According to Nugent scoring, bacterial vaginosis (score 7–10) was identified in 45% (n = 90) of patients, representing the largest diagnostic category. Normal vaginal flora (score 0–3) was observed in 28% (n = 56), while intermediate scores (4–6) were seen in 27% (n = 54) of patients. The whiff test was positive in 49% (n = 98) of patients and negative in 51% (n = 102). Final diagnosis revealed bacterial vaginosis as the most common condition, diagnosed in 45% (n = 90) of patients, followed by vaginal candidiasis in 20.5% (n = 41). Normal vaginal flora was observed in 15% (n = 30), non-specific vaginitis in 13% (n = 26), and trichomoniasis in 6.5% (n = 13) of patients.

Table 1: Sociodemographic Characteristics of Study Participants (n = 200)

Variable	Frequency (n)	Percentage (%)
Age Group (years)		
18–25	55	27.5
26–30	61	30.5
31–35	34	17.0
36–40	31	15.5
41–45	19	9.5
Educational Status		
Illiterate	36	18.0
Primary	23	11.5
Middle School	30	15.0
High School	26	13.0
Higher Secondary	52	26.0
Graduate or Above	33	16.5
Socioeconomic Status		
Upper	13	6.5
Upper Middle	30	15.0
Middle	37	18.5
Lower Middle	46	23.0
Lower	74	37.0
Marital Status		
Married	182	91.0
Unmarried	18	9.0
Residential Status		
Rural	174	87.0
Urban	26	13.0

Table 2: Clinical Symptoms Associated with Vaginal Discharge (n = 200)

Symptom*	Frequency (n)	Percentage (%)
Itching	57	28.5
Foul-smelling discharge	53	26.5
Abdominal pain	33	16.5
Burning micturition	14	7.0
Low backache	11	5.5

**Multiple responses were possible.*

Table 3: Characteristics of Vaginal Discharge Among Study Participants (n = 200)

Characteristic	Frequency (n)	Percentage (%)
Amount of Discharge		
Scanty	110	55.0
Copious	60	30.0
Moderate	30	15.0
Colour of Discharge		
Homogenous white	164	82.0
Yellowish green	20	10.0
Off white	16	8.0
Consistency of Discharge		
Thin	80	40.0

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Thick/Curdy	63	31.5
Mixed	57	28.5

Table 4: Laboratory Findings and Final Diagnosis of Study Participants (n = 200)

Variable	Frequency (n)	Percentage (%)
Wet Mount Findings		
Clue cells	65	32.5
Pus cells	40	20.0
Trichomonas vaginalis	13	6.5
Inconclusive	82	41.0
Nugent Score		
Normal (0–3)	56	28.0
Intermediate (4–6)	54	27.0
Bacterial vaginosis (7–10)	90	45.0
Whiff Test		
Positive	98	49.0
Negative	102	51.0
Final Diagnosis		
Bacterial vaginosis	90	45.0
Vaginal candidiasis	41	20.5
Normal vaginal flora	30	15.0
Non-specific vaginitis	26	13.0
Trichomoniasis	13	6.5

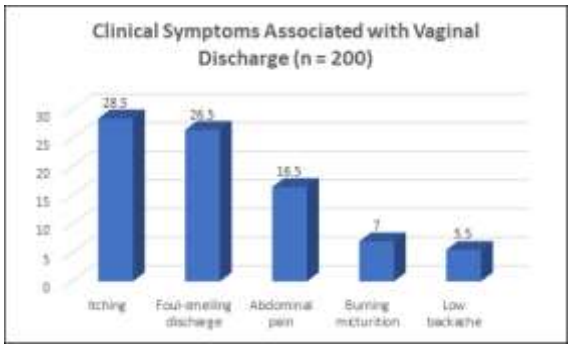

Figure 1: Clinical Symptoms Associated with Vaginal Discharge (n = 200)

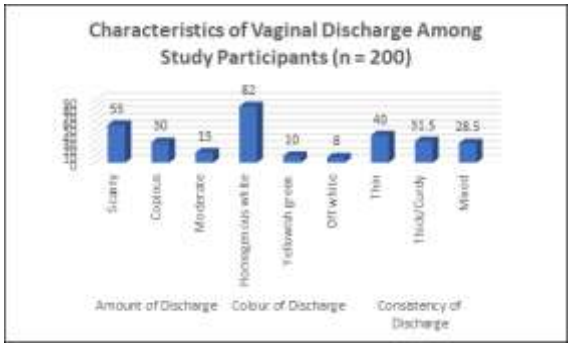

Figure 2: Characteristics of Vaginal Discharge Among Study Participants (n = 200)

DISCUSSION

Vaginal discharge is one of the most common gynaecological complaints among women of reproductive age and may represent physiological secretion or infectious pathology. The present cross-sectional study conducted at Chhattisgarh Institute of Medical Sciences evaluated 200 women presenting with vaginal discharge and analysed their sociodemographic profile, symptomatology, discharge characteristics, laboratory findings, and microbiological diagnosis. The findings demonstrated that bacterial vaginosis was the most common etiology, followed by vulvovaginal candidiasis and trichomoniasis, which is comparable with several Indian and international studies.

In the present study, the mean age of participants was 30.23 ± 4.53 years, with the majority belonging to the 26–30 years age group (30.5%), followed by 18–25 years (27.5%). Similar findings were reported by Shanmugam et al. (2023),[12] who observed most women in the reproductive age group, while Paigwar et al. (2025),[13] reported that 54% of women with vaginal discharge were between 18 and 30 years of age. The predominance of reproductive-age women may be related to increased hormonal activity, sexual exposure, and alterations in vaginal flora. However, age did not show a statistically significant association with final diagnosis in the present study (p=0.789), indicating that bacterial vaginosis, candidiasis, and trichomoniasis may occur throughout the reproductive years without marked age-specific clustering. Regarding educational status, 26% of women had higher secondary education, 16.5% were graduates, and 18% were illiterate. Similar observations have been reported in Indian studies where women with at least secondary education constituted the majority of clinic attendees.[14] Although education may improve awareness and healthcare-seeking behaviour, no statistically significant association was found between educational status and diagnosis (p=0.276). Likewise, women from lower socioeconomic groups formed the majority of the study population, with 37% belonging to the lower class and 23% to the lower middle class. John et al. (2023),[15] similarly reported predominance of lower socioeconomic status among women attending STI clinics. Poor menstrual hygiene, overcrowding, and delayed healthcare access may contribute to higher infection burden in such populations. However, socioeconomic status also did not show significant association with microbiological diagnosis (p=0.330).

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The majority of women in the present study were married (91%) and belonged to rural areas (87%), findings comparable with John et al. (2023).[15]

This reflects sociocultural patterns where married women are more likely to seek gynaecological consultation. Neither marital status nor residential status demonstrated significant association with diagnosis, possibly due to the relatively homogeneous study population. Among associated symptoms, itching was the most common complaint (28.5%), followed by foul-smelling discharge (26.5%) and abdominal pain (16.5%). Venkateshvaran et al. (2023),[16] and John et al. (2023),[15] reported higher prevalence of itching among symptomatic women. Significant associations were observed between diagnosis and itching, foul smell, abdominal pain, burning micturition, and low backache ($p<0.05$). Huang et al. (2023),[17] similarly observed that itching was more common in vulvovaginal candidiasis, whereas dysuria was more frequently associated with trichomoniasis. Paigwar et al. (2025),[13] also reported that bacterial vaginosis commonly presented with malodorous non-pruritic discharge. These findings indicate that symptom patterns may provide important clinical clues, although symptoms alone are insufficient for definitive diagnosis. With respect to discharge characteristics, scanty discharge was observed in 55% of women, while homogenous white discharge (82%) and thin consistency (40%) were the predominant findings. Similar observations were reported by Paigwar et al. (2025),[13] who documented white discharge in 83.3% and thin consistency in 40.6% of women. Significant associations were noted between diagnosis and amount, colour, and consistency of discharge ($p<0.001$). Agarwal et al. (2025),[18] reported that thin homogeneous discharge was strongly associated with bacterial vaginosis, whereas thick curdy discharge was characteristic of candidiasis, findings that correspond well with the present study.

Wet mount microscopy revealed clue cells in 32.5% of patients, pus cells in 20%, and Trichomonas vaginalis in 6.5%, while 41% of samples were inconclusive. The presence of clue cells strongly supports bacterial vaginosis and correlates with the high prevalence of BV in the study population. Similar trichomonas detection rates have been reported in comparable clinic-based studies Anandan V et al.(2022).[19] The high proportion of inconclusive wet mounts highlights the limited sensitivity of direct microscopy and emphasizes the need for supplementary investigations such as Gram staining, culture, or molecular testing where feasible. According to Nugent scoring, 45% of women had bacterial vaginosis, 27% had intermediate flora, and 28% had normal flora. These findings are comparable to Shanmugam et al. (2023),[12] who documented BV in 42.3% of symptomatic women. The whiff test was positive in 49% of women, which closely correlated with the proportion diagnosed with BV. Since a positive amine test forms part of Amsel's criteria, these findings further support the predominance of anaerobic vaginal flora disruption among symptomatic women. In the present study, bacterial vaginosis was the most common diagnosis (45%), followed by vulvovaginal candidiasis (20.5%), nonspecific vaginitis (13%), normal vaginal flora (15%), and trichomoniasis (6.5%). Similar findings were reported by Shanmugam et al. (2023),[12] Anandan et al. (2022),[19] and Huang et al. (2023),[17] all of whom identified bacterial vaginosis as the leading cause of pathological vaginal discharge. The comparatively lower prevalence of trichomoniasis observed in the present study also corresponds with findings from recent clinic-based studies.

CONCLUSION

The present study demonstrated that bacterial vaginosis was the most common cause of vaginal discharge among reproductive-age women, followed by vulvovaginal candidiasis and trichomoniasis. Clinical symptoms such as itching, foul-smelling discharge, abdominal pain, and discharge characteristics showed significant association with the final diagnosis, whereas sociodemographic factors were not significantly related. The findings highlight that clinical examination alone is insufficient for accurate etiological diagnosis and should be supported by laboratory investigations such as wet mount microscopy, Gram staining, Nugent scoring, and whiff testing. Early and accurate diagnosis along with appropriate treatment and patient education is essential to reduce recurrence, prevent complications, and improve reproductive health outcomes

Limitations

The present study was conducted at a single tertiary care centre over a limited duration, which may restrict the generalizability of the findings to the wider population. Diagnostic evaluation primarily relied on microscopy and routine laboratory methods, while advanced molecular tests for organisms such as Chlamydia trachomatis and Mycoplasma were not performed, which may have resulted in underestimation of certain infections. In addition, wet mount microscopy has limited sensitivity for detecting trichomoniasis and candidiasis.

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