National Board of Examinations - Journal of Medical Sciences
Volume 4, Issue 1, Pages 38–48, January 2026
DOI 10.61770/NBEJMS.2026.v04.i01.006

ORIGINAL ARTICLE

A Descriptive Study to Evaluate the Causes of Abnormal Vaginal Discharge by Clinical and Microbiological Examination in Reproductive and Post-Menopausal Women

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Accepted: 17-December-2025 / Published Online: 5-January-2026

Abstract

Background: Abnormal vaginal discharge is one of the commonest gynaecological problems reported among women, specifically in the reproductive and post-menopausal age groups. Most of the time abnormal vaginal discharge is associated with multiple infectious and non-infectious aetiologies, and it significantly contributes to morbidity and impairs their quality of life. **Objectives**: To evaluate women presenting with abnormal vaginal discharge using clinical and microbiological methods and to identify the underlying etiological profile. **Methods**: This study was a hospital-based cross-sectional study that was conducted among women attending the gynaecology clinic as out-patients at Sri Muthukumaran Medical College and Research Institute between January–December 2023. A semi-structured questionnaire is used to collect necessary data, followed by clinical examination, and laboratory investigations such as vaginal pH, wet mount, KOH test, Gram stain, NAAT for gonorrhoea/chlamydia, Pap smear, and culture when indicated. Collected data were analysed using descriptive statistics and chi-square tests. **Results**: A total of 160 women were evaluated and their mean age was observed as 41.87 ± 9.5 years, with most of them 73.2% belonging to the 30–49-year age group. Among 50% of the study participants white discharge was the most common presentation, followed by profuse discharge was observed among 41.3%. Diagnosis in our study showed that bacterial vaginosis, vulvovaginal candidiasis, trichomoniasis, and other mixed infections as commonest causes. Sociodemographic and reproductive factors such as SES, education, marital status, sexual activity, and contraception practices were presented with distinguished patterns which helps us in arriving appropriate diagnosis. **Conclusion**: Abnormal vaginal discharge, a common conditions diagnostic accuracy can be improved with appropriate clinical evaluation with targeted microbiological assessment. Bacterial vaginosis and candidiasis remain the predominant causes.

Keywords: abnormal vaginal discharge, bacterial vaginosis, candidiasis, trichomoniasis, reproductive tract infections

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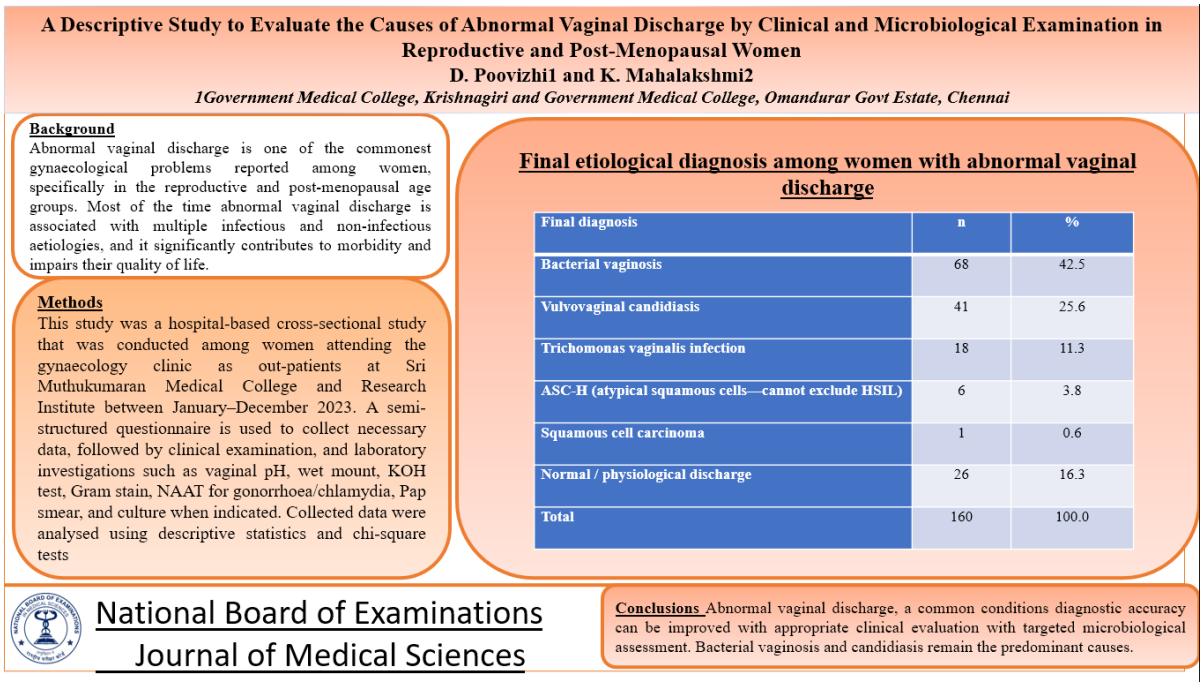
Graphical Abstract



Introduction

Vaginal discharge is considered as a normal physiological process that is essential for maintaining vaginal health through lubrication, epithelial turnover, and microbial homeostasis [1]. Abnormal vaginal discharge is a common condition seen in women is usually characterized with changes in colour, consistency, odour of the discharge and it may be associated with other symptoms such as pruritus, burning, or dyspareunia, usually indicating underlying pathology [2]. Globally, around 30% of the women were affected with bacterial vaginosis particularly in the reproductive-age [3], along with that most of the sexually transmitted infections occur among individuals aged between 15–49 years [4]. Candidiasis affects nearly 75% of women at least once in their lifetime [2]. In India, due to poor menstrual hygiene, sociocultural factors, early marriage, and poor access to healthcare system they contribute to a high prevalence of reproductive tract infections. In Tamil Nadu, the prevalence of symptomatic vaginal discharge is close to 30% [5], and gynaecology clinics reported that bacterial vaginosis as the predominant etiology in health care facilities [6]. National data (NFHS-5) show 12.1% prevalence of abnormal vaginal discharge in the preceding three months [7].

Abnormal vaginal discharge is commonly due to infectious causes include bacterial vaginosis, vulvovaginal candidiasis, and other sexually transmitted infections such as trichomoniasis, gonorrhoea, and chlamydial cervicitis [8]. In some articles they report that non-infectious etiologies like atrophic vaginitis, foreign bodies, and malignancy may also contribute [9–12]. Usually, it is associated with multiple behavioural and biological risk factors influence susceptibility, including sexual practices [13], antibiotic exposure [8], hormonal variations [10], and douching [9]. When such conditions go untreated, these infections can also result with either pelvic inflammatory disease,

infertility, ectopic pregnancy, chronic pelvic pain, and adverse pregnancy outcomes [12]. So, early recognition and microbiological diagnosis helps us to provide targeted therapy and prevents complications.

Given these clinical implications, the present study evaluates the causes of abnormal vaginal discharge through integrated clinical and microbiological approaches among women in a tertiary care setting.

Aims and Objectives

1. To evaluate women presenting with abnormal vaginal discharge using clinical and microbiological methods and to identify the underlying etiological profile

Materials and Methods

This was a hospital-based cross-sectional study conducted in the Department of Obstetrics and Gynaecology, Sri Muthukumaran Medical College and Research Institute, among women attending the gynaecology outpatient department with complaints of abnormal vaginal discharge. The study was carried out over one year, from January 2023 to December 2023, after obtaining approval from the Institutional Human Ethics Committee. The sample size was calculated using a prevalence of abnormal vaginal discharge of 11.8% [16], with a 95% confidence interval and 5% absolute error, yielding a sample size of 160; a consecutive sampling technique was then employed until this sample size was achieved.

Women with complaints or clinical signs of abnormal vaginal discharge who were willing to participate were included, while those on oral contraceptive pills, pregnant or menstruating women, those who had received antimicrobial or antifungal drugs in the preceding month, postpartum or post-abortal women within six weeks, post-hysterectomy patients, women below 19 years, unmarried or unconsummated females, and those unwilling to consent were excluded.

After informed written consent, data were collected using a semi-structured questionnaire capturing sociodemographic details, menstrual and sexual history, obstetric and medical history, and characteristics of the vaginal discharge. Each participant underwent general, systemic, pelvic, speculum and bimanual examination.

Microbiological evaluation included measurement of vaginal pH (pH <4.5 suggestive of candidiasis and >4.5 suggestive of bacterial vaginosis), wet mount in saline for Trichomonas vaginalis, 10% KOH mount for fungal elements, Gram staining for bacterial vaginosis and gonococci, nucleic acid amplification tests (NAAT) for Neisseria gonorrhoeae and Chlamydia trachomatis, Pap smear for abnormal cervical cytology and culture and sensitivity for Candida, Trichomonas and gonococci in selected cases.

Confidentiality was maintained and participation was voluntary. Data were entered in Microsoft Excel, analysed using SPSS version 17 and appropriate descriptive statistics were generated.

Results

The study included 160 women presenting with complaints of abnormal vaginal discharge to the gynaecology outpatient department. The mean age of the study population was 41.87 ± 9.5 years, with a clear predominance of women in the reproductive and perimenopausal age groups. Majority of the study participants

36.9 % of them belonged to the 40–49 years followed by 36.3% of them were in 30–39 years and 5.6% were in the 60–69-year group, which indicates that symptomatic discharge was most frequently reported in mid-reproductive and early menopausal age group (Table 1).

Table 1. Socio-demographic and reproductive characteristics of women presenting with abnormal vaginal discharge (n = 160)

Characteristic	**Category**	**n**	**%**
Age (years)	20–29	10	6.3
	30–39	58	36.3
	40–49	59	36.9
	50–59	24	15.0
	60–69	9	5.6
Educational status	Illiterate	18	11.3
	Primary education	19	11.9
	High school	37	23.1
	HSC / Diploma	37	23.1
	Undergraduate	37	23.1
	Postgraduate	12	7.5
Occupation	Employee	49	30.6
	Health-care worker	7	4.4
	Homemaker	83	51.9
	Self-employed	21	13.1
Residence	Urban	125	78.1
	Rural	35	21.9
Socio-economic class (Modified BG Prasad)	Lower	3	1.9
	Lower-middle	36	22.5
	Middle	33	20.6
	Upper-middle	46	28.8
	Upper	42	26.3
Menstrual status	Regular cycles	105	65.6
	Irregular cycles	37	23.1

	Post-menopausal	18	11.3
Marital status	Married	144	90.0
	Divorced/Separated/Widow	15	9.4
	Single / Never married	1	0.6
Sexual activity (current)	Sexually active	122	76.3
	Sexually not active	35	21.9
	Occasionally active	3	1.9
Contraception use (ever/current)	Tubectomy	117	73.1
	Condom	22	13.8
	IUCD	4	2.5
	Chaya pills	1	0.6
	None	16	10.0
Past history of similar discharge	Present	59	36.9
	Absent	101	63.1

In our study the educational status of the study participants were observed and one-tenth of the women in our study group were illiterate with 11.3%, 11.9% of them reported with primary education, and high school, higher secondary/diploma, and undergraduate education each contributed 23.1%, and 7.5% had postgraduate qualifications. This educational status distributions reflects that abnormal vaginal discharge affected women across all educational groups (Table 1).

In terms of occupation, approximately half of the women were homemakers, about one-third were employed, and a small proportion were healthcare workers, suggesting that both domestic and working women commonly sought care for this complaint (Table 1).

Clinically, patients presented with variable characteristics of discharge; the colour, consistency and quantity were documented systematically, with white discharge being the commonest type and profuse or moderate discharge reported in a large proportion of cases, underscoring its impact on daily comfort and quality of life. Microbiological work-up using pH testing, saline and KOH wet mounts, Gram stain, NAAT and culture identified a spectrum of etiologies including bacterial vaginosis, vulvovaginal candidiasis, trichomoniasis, cervicitis due to sexually transmitted pathogens and mixed infections (Tables 2 and 3). These etiological diagnoses, as detailed across the microbiology tables addresses the study objective of characterising both the clinical and microbiological profile of abnormal vaginal discharge in this cohort, and demonstrated that bacterial vaginosis and candidiasis were the leading infectious causes, with other STIs and non-infectious conditions contributing to a smaller but clinically relevant proportion of cases (Tables 4).

Table 2. Clinical profile of abnormal vaginal discharge (n = 160)

Clinical feature	Category	n	%
Colour of discharge	White	80	50.0
	Yellow	23	14.4
	Dirty white	24	15.0
	Colourless	13	8.1
	Grey	6	3.7
	Greyish white	8	5.0
	Curdy white	3	1.9
	Brownish white	1	0.6
	Milky white	1	0.6
Quantity	Profuse	66	41.3
	Moderate	61	38.1
	Scanty	33	20.6
Odour	Foul-smelling	52	32.5
	Odourless	108	67.5
Consistency	Mucoid	69	43.1
	Watery	57	35.6
	Curdy	28	17.5
	Thick	6	3.7
Associated itching	Present	67	41.9
	Absent	93	58.1
Blood-stained discharge	Present	6	3.8
	Absent	154	96.2
Urinary symptoms	Present	30	18.8
	Absent	130	81.3

Table 3. Microbiological investigation findings (n = 160)

Investigation	Finding	n	%
Wet mount preparation	Clue cells seen	37	23.1
	Fungal hyphae	35	21.9
	Motile organisms seen	18	11.3
	Few epithelial cells seen	12	7.5
	Normal / Not done	58	36.3
Gram stain	Clue cells seen	33	20.6
	Gram-negative rods seen	13	8.1
	Fungal hyphae seen	5	3.1
	Normal / Not done	109	68.1
Culture & sensitivity	Candida species	34	21.3
	Gardnerella vaginalis	31	19.6
	Trichomonas vaginalis	14	8.8
	Normal / Not done	81	50.6
Vaginal pH (by age group) [Mean ± SD]	20–29 years	5.61 ± 1.36	
	30–39 years	5.53 ± 1.23	
	40–49 years	5.40 ± 1.27	
	50–59 years	4.90 ± 1.19	
	60–69 years	5.18 ± 0.78	
	Overall	5.37 ± 1.23	

Table 4. Final etiological diagnosis among women with abnormal vaginal discharge (n = 160)

Final diagnosis	n	%
Bacterial vaginosis	68	42.5
Vulvovaginal candidiasis	41	25.6
Trichomonas vaginalis infection	18	11.3

ASC-H (atypical squamous cells—cannot exclude HSIL)	6	3.8
Squamous cell carcinoma	1	0.6
Normal / physiological discharge	26	16.3
Total	160	100.0

Discussion

In the present study, the mean age of the participants was 41.87 years, and the majority belonged to the 30–49 year age group. This pattern closely aligns with the findings of Guntoory et al. [13], who also reported that 74% of their participants were between 25–44 years. Similar age clustering was seen in studies by Patil et al. [14], who identified 25–29 years as the most affected age group, and Nigerian research [15], where the highest prevalence of vaginal discharge was observed between 26–30 years. Das et al. [16] in their article reported that 26–35 years as the commonest group whereas, Usharani et al. [5] in their article they observed that 74% of their study population were in 25–44-year age group. Collectively all these observations suggests that reproductive-aged women are the most vulnerable group for symptomatic vaginal discharge, as they have active sexual life, hormonal influences, and higher exposure to risk factors.

Educational status observed in our study showed that 23.1% of them had high-school education, 23.1% had higher secondary/diploma, 23.1% were undergraduates, whereas 11.3% were illiterate. Patil et al. [14], in their article reported that 43% of them had only primary education, and from Guntoory et al. [13] and Das et al. [16], both authors observed illiteracy rates around 42–56% in their observation. Usharani et al. [5] also reported high illiteracy among participants. These observations contrast our study finding and highlights that abnormal vaginal discharge affects women irrespective of their educational background.

In our study 51.9% of the women were homemakers, followed by 30.6% of them were employed and 4.4% of them work as healthcare workers. Das et al. [16] in their study they have observed similar proportions, with 45.6% being homemakers. This might be due to limited access to health information and lack of independence in seeking care and it might be a reason for the higher burden of symptomatic vaginal discharge in this group.

The socio-religious distribution in our study shows that 81.3% of women were Hindus, followed by 11.9% Muslims and the remaining Christians. Patil et al. [14] reported contrasting findings, with a majority of participants being Muslims, whereas Das et al. [16] observed higher prevalence among Hindus, similar to the present study. These patterns may be due to the local population demographics rather than any causal religious association.

Socioeconomic status was also considered as an important determinant in our study as 28.3% belonged to the upper middle class and 26.3% to the upper class,

with only 3.6% being from the lower class as per Modified BG Prasad's classification. In contrast, Guntoory et al. [13] and Usharani et al. [5] reported that 70% of their participants belonged to either middle or lower-middle socioeconomic groups. These differences show the epidemiological difference between various geographical and social populations, and it also highlights that vaginal discharge is not restricted to low-income groups.

Microbiological profiles reported that 42.5% of them had bacterial vaginosis and 25.6% of them had vulvovaginal candidiasis, followed by 11.3% with trichomonas vaginalis, it is also observed that 16.3% of them had normal physiological discharge, similar observations were made by Konadu et al. [17] from Ghana, where the observed prevalence rates of vulvovaginal candidiasis with 36.5%, bacterial vaginosis in 30.9%, and trichomoniasis among 1.4%, which is slightly similar to our etiologic distribution. Other large retrospective analyses [18] have confirmed that bacterial vaginosis and trichomoniasis as significant contributors to symptomatic discharge. Usharani et al. [5] also identified Bacterial vaginosis among 21%, candidiasis in 10%, and trichomoniasis among 3% of their study population as the major etiologies. Studies from East Africa have similarly reported bacterial vaginosis as the most common isolate, along with concerning levels of antimicrobial resistance, reinforcing the need for laboratory confirmation and susceptibility testing in symptomatic women.

The observations state that abnormal vaginal discharge is a complex condition which may be influenced by age, education, occupation, socioeconomic status, and sexual behaviour. The consistent higher prevalence of bacterial vaginosis and candidiasis across multiple regional and international studies highlights the significance of integrating clinical assessment with microbiological testing for accurate diagnosis and effective management.

Conclusion

Abnormal vaginal discharge remains a complex and yet common condition with clinically significant complaint. Our study demonstrated that by combining clinical evaluation with microbiological confirmation it drastically improves diagnostic precision. Bacterial vaginosis and vulvovaginal candidiasis are the commonest etiologies observed among women attending tertiary health care. Systematic assessment, timely treatment, and preventive counselling are essential to reduce reproductive morbidity.

Limitations

This was a single-center, hospital-based descriptive study, and the findings may not be generalizable to the wider community and the results are specific to women attending this tertiary care institute and may differ in community settings. The cross-sectional design also precludes the assessment of causal relationships.

Author Contributions

Author 1 has contributed to the conceptualization and definition of the intellectual content of the manuscript, design of the study, data analysis, and statistical analysis, Author 2 contributed to the literature search, data acquisition, manuscript editing, and manuscript review. Author 1 will serve as the corresponding author / guarantor of the manuscript

Data availability statement

The datasets generated and analysed in this study are available from the corresponding author on reasonable request. They are not publicly shared because they contain sensitive information that could indirectly identify participants.

Ethical committee approval

This study has been approved by the Institution Ethics Committee – Sri Muthukumaran Medical College Hospital and Research Institute carrying approval number 28/03/IEC/2022 dated 02.09.2022.

Consent from

Written informed consent was obtained from all participants after explaining the study procedures, potential risks and benefits. Consent covered both participation and publication of anonymised findings, with assurance of confidentiality and data privacy.

Conflicts of interest

The authors declare that they do not have conflict of interest.

Funding

No funding was received for conducting this study.

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