ORIGINAL RESEARCH PAPER

Obstetrics & Gynaecology

ABNORMAL VAGINAL DISCHARGE IN REPRODUCTIVE AGE GROUP WOMEN WITH SPECIAL IMPLICATION TO ANTIFUNGAL SUSCEPTIBILITY OF CANDIDA SPECIES

KEY WORDS: vaginal discharge, reproductive age, candida species, antifungal susceptibility

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ABSTRACT

Introduction And Background: Vaginal discharge is a common complaint in reproductive age group women2. Vaginal discharge is one of the common reasons in women of reproductive age group seeking gynecological consultation. It is the second most common clinical problem after menstrual disorders. Globally, it is estimated that one in ten women will present with vaginal discharge in the course of one year and approximately, ten million office visits each year are attributed to vaginal discharge complaints. The prevalence of vaginal discharge in India is estimated to be 30%3.

- Abnormal vaginal discharge predisposes to significant morbidity to the women in the form of pelvic inflammatory disease, infertility, endometriosis, cuff cellulitis, urethral syndrome, pregnancy loss, and preterm labour.5
- Certain conditions such as prolonged use of combined oral contraceptive, pregnancy, malnutrition, diabetes, neutropenia, prolonged antibiotic therapy, candida become pathogenic and causes candidiasis.8
- Isolation, identification, characterization, and susceptibility of candida species became critical management of fungal infections.9

Need For The Study: The study was done to emphasize the role of laboratory investigations in patients with vaginitis, as presumptive clinical diagnosis alone can lead to false interpretation and treatment mismanagement. **Methods:** The present study is a cross sectional observational study conducted from January 2019 to February 2020 for about a period of one year among 300 women aged 15-49 years with vaginal discharge attending gynecology OPD, Government Maternity Hospital, Tirupati. **Results:** This study included 300 subjects with a mean age of 30.4 ± 7.26 years. Nearly half of (49.33%) our study population was aged between 25 to 34years, a majority (47%) of women had bacterial vaginosis, followed by Candida in 39.33%, trichomonas vaginalis in 14.33%, mixed infections in 6.67% and 6% with no organisms. Among Candida species, 48.31% of participants had candida albicans, 23.73% had candida tropicalis, 19.49% had candida krusei, and 8.47% had candida glabrata, and of them 38.33% participants had voriconazole sensitivity, 32.33% participants had ketoconazole sensitivity, 26% participants had clotrimazole sensitivity, and 21.33% participants had fluconazole sensitivity. Among 118 candida infected 106 (89.83%) participants came for follow-up, of which symptoms subsided in 90 (84.91%) participants. **Conclusion:** In conclusion, our study with 300 women patients complaining of vaginal discharge found a majority of them belonging to the sexually active age group. Vaginal discharge was more prevalent in lower economic status and rural areas. Bacterial vaginosis was the most common and frequent etiology, followed by Candida. TV was the least common etiology for vaginal discharge.

INTRODUCTION

- Normal physiological white discharge is a white or clear, non-offensive discharge that varies with the menstrual cycle[1].
- Vaginal discharge is a common complaint in reproductive age group women[2].
- Vaginal discharge is one of the common reasons in women of reproductive age group seeking gynecological consultation. It is the second most common clinical problem after menstrual disorders. Globally, it is estimated that one in ten women will present with vaginal discharge in the course of one year and approximately, ten million office visits each year are attributed to vaginal discharge complaints. The prevalence of vaginal discharge in India is estimated to be 30%[3].
- Characteristics of Normal vaginal fluid[4]:

It is watery, white in color, non-odorous with a pH of around 4.0, which varies during different life phases and the menstrual cycle.

It is minimal in amount and increases just before menstruation, during pregnancy, and sexual excitement.

- **Leukorrhea**[4] is defined as an excessive normal vaginal discharge.
- The term leukorrhea should fulfill the following criteria.

1. The excess secretion is evident from persistent vulvar moistness or staining of the undergarments (brownish-yellow on drying) or the need to wear a vulvar pad.
2. It is non purulent and non-offensive.
3. It is nonirritant and never causes pruritus.

The excessive secretion[4] is due to
1. Physiologic excess.
2. Cervical causes (Cervical leukorrhea).
3. Vaginal causes (Vaginal Leukorrhea).

1 Physiologic excess: Normal vaginal secretion increases when the estrogen levels are high Physiological excess is seen during puberty, during ovulation and premenstrual phase of menstrual cycle, pregnancy and sexual excitement.

2. Cervical cause: Non infective cervical lesions may produce excessive secretion. Such lesions are — cervical ectopy, chronic cervicitis, mucous polyp, and ectropion (cervical glands are exposed to the vagina).

3. Vaginal cause: Vaginal causes are due to increased vaginal transudation. It is seen in uterine prolapse, acquired retroverted uterus, chronic pelvic inflammation, 'pill' use, and vaginal adenosis. Ill health is one of the underlying causes of excessive discharge. It produces excess exfoliation of the superficial cells.

- Inflammation of the vagina leads to vaginitis. If untreated, excessive vaginal discharge predisposes to pelvic inflammatory diseases, infertility, endometriosis, urethral syndrome, pregnancy loss, preterm labour.[2]
- Pathological causes of vaginal discharge, bacterial

vaginosis is the frequent cause, followed by candidiasis and trichomoniasis.[2]

- Purulent cervicitis is caused by Gonococci, chlamydia trachomatis, Herpes simplex virus.
- The commonest cause of pathological vaginal discharge is bacterial vaginosis (33-47%)[5], followed by vaginal candidiasis (20-40%) and trichomonas vaginalis (8-10%).[6] These three conditions account for 90% of all etiologies of abnormal vaginal discharge.[6]
- Multiple infections can also co-exist, but these three conditions account for most etiologies of abnormal vaginal discharge.[7]
- Many times, a presumptive diagnosis is made based on the discharge nature, which is often inaccurate and incomplete (clinical diagnosis). This eliminates the laboratory component leading to treatment mismanagement.[2]
- Abnormal vaginal discharge predisposes to significant morbidity to the women in the form of pelvic inflammatory disease, infertility, endometriosis, cuff cellulitis, urethral syndrome, pregnancy loss, and preterm labour.[5]
- Certain conditions such as prolonged use of combined oral contraceptive, pregnancy, malnutrition, diabetes, neutropenia, prolonged antibiotic therapy, candida become pathogenic and causes candidiasis.[8]
- Isolation, identification, characterization, and susceptibility of candida species became critical management of fungal infections.[9]

Need For The Study:

The study was done to emphasize the role of laboratory investigations in patients with vaginitis, as presumptive clinical diagnosis alone can lead to false interpretation and treatment mismanagement

Table 1: Characteristics And Clinical Manifestations Of Common Infections Associated With Abnormal Vaginal Discharge[5]

Sl. no	Characteristics	Physiological	Bacterial Vaginosis	Trichomoniasis	Candidiasis
1	Symptoms	None	Profuse, Malodorous ±, irritation, Fishy /seminal odor	Profuse, malodorous, ± Irritation ± pruritis	Pruritis, thick white discharge, No odor
2	Vulva	Normal	Normal	± edema	Erythema ±, Fissure, pustules
3	Discharge at os	White	Gray	Gray yellow to green	White
4	Consistency	Curdy	Homogenous	Homogenous	Curdy
5	Viscosity	High	Low	Low	High
6	Vaginal distribution	Dependant	Adherent	Adherent	Adherent
7	pH	3.8-4.5	> 4.5	> 4.5	<4.5
8	Diagnosis		Wet Mount Clue cells Amine odor on KOH	Wet Mount Motile organisms	KOH Pseudohyphae or Spores

AIMS

The study aims to identify women with abnormal vaginal discharge, its microbial evaluation, and susceptibility of candida organisms to antifungal drugs.

OBJECTIVES

- To determine the prevalence of abnormal vaginal discharge in reproductive age group women.
- To evaluate the frequency of bacterial, protozoal, and candida infection among these women with vaginal discharge.
- Antifungal susceptibility of various candida organisms isolated.
- Treating the condition based on the organism obtained.

Inclusion Criteria:

1. Reproductive age group women with complaint of vaginal discharge attending gynecological OPD (15-49 years).
2. Those who have not taken antibiotic and antifungal agents 7 days prior to collection of samples.

Exclusion Criteria:

1. All women who are postmenopausal.
2. All women who are unmarried.
3. All women who are pregnant.
4. Patients underwent cervical biopsy or operative procedures.
5. Clinically obvious carcinoma-ulcer, cauliflower growth.
6. Those who underwent douching of their vagina with chemicals.

SUBJECTS AND METHODS

Study Design

A cross sectional observational study

Study Time

From January 2019 to February 2020 for about a period of one year

Study Subjects

300 women aged 15-49 years with vaginal discharge attending gynecology OPD, Government Maternity Hospital, Tirupati.

MATERIALS AND METHODS

Sample Source: Vaginal discharge

Materials Required:

- Sterile dacron swabs, Clean glass slides, pH indicator strips, Sterile glass test tubes, Chemicals and reagents like normal saline, potassium hydroxide, gram staining reagents

Media Required:

- Sabouraud's Dextrose Agar, Muller Hinton agar with 2% glucose and methylene blue, HiCHROMagar for Candida

Antifungal Discs

Fluconazole (10µg), Voriconazole (1µg), Clotrimazole (10µg), Ketoconazole (10µg)

Statistical Methods:

- White discharge PV was considered as a primary outcome variable. Age, Candida, Bacterial Vaginosis, and Trichomonas Vaginalis were considered as a primary explanatory variable.
- Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency, and proportion for categorical variables. Data was also represented using appropriate tables
- Categorical outcomes were compared between study groups using the Chi-square test /Fisher's Exact test (If the overall sample size was < 20 or if the expected number in any one of the cells is < 5. Fisher's exact test was used.)
- P-value < 0.05 was considered statistically significant. IBM SPSS version 22 was used for statistical analysis. (1)
- 1. IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.

RESULTS:

This study included 300 subjects with a mean age of 30.4 ± 7.26 years. Nearly half of (49.33%) our study population was

aged between 25 to 34years, followed by 22.33% aged between 35-44years and 22% aged between 18-24years and 6.33% aged greater than equal to 45 years.

About 44.33% of the study population belonged to lower socioeconomic status, followed by 31.33% in the upper-lower socioeconomic status, 12.33% in the lower middle socioeconomic status, and 9.67% in the upper-middle socioeconomic status, and 2.33% in the upper socioeconomic class. A majority (58.33%) of the participants were from rural areas, and 41.67% were from urban areas.

A majority (97%) of the study participants had normal menstruation, whereas only 3% had an irregular menstrual cycle. A greater proportion (93.33%) of our study population were married, followed by 2% separated and 1.67% were divorced.

A majority (72.2%) of our study participants had white discharge, followed by 14.08% with profuse discharge, 11.55% with malodorous discharge, 2.17% with malodourous and profuse discharge.

The most common clinical symptom presented by the study population was white discharge (72.2%) followed by dysuria in 20.67%, vulvar itching in 14.33%, lower abdominal pain in 12%, dyspareunia in 2.33%, and infertility in 1%.

A majority (47%) of women had bacterial vaginosis, followed by Candida in 39.33%, trichomonas vaginalis in 14.33%, mixed infections in 6.67% and 6% with no organisms.

In women with bacterial vaginosis (n=133), most of them presented with vaginal discharge. 18.05% had malodorous discharge, 25.56% had profuse discharge, and 4.51% had malodourous with profuse discharge.

Out of 41 women with trichomonas vaginalis, 63.41% had white dischargePV, 17.07% had malodorous discharge, 14.63%) had profuse discharge, and 4.88% had a malodorous and profuse discharge.

Out of 106 women with Candida, a majority had (96.19%) white discharge PV, 2.86% had malodorous discharge, and 0.95% had a profuse discharge.

Among Candida species, 48.31% of participants had candida albicans, 23.73% had candida tropicalis, 19.49% had candida krusei, and 8.47% had candida glabrata.

Among the study population(118), 106 (89.83%) participants came for follow-up, of which symptoms subsided in 90 (84.91%) participants.

Table 2: Descriptive Analysis Of Organism Isolated In The Study Population (N=300)

Organism isolated	Frequency	Percentages
Bacterial vaginosis	141	47.00%
Candida	118	39.33%
Trichomonas vaginalis	43	14.33%
Mixed Infections	20	6.67%
No Organisms	18	6.00%

Table 3: Descriptive Analysis Of Candida In The Study Population (N=118)

Candida	Frequency	Percentages
Albicans	57	48.31%
Tropicalis	28	23.73%
Krusei	23	19.49%
Glabrata	10	8.47%

Table 4: Descriptive Analysis Of Antifungal Susceptibility In The Study Population (N=118)

Antifungal susceptibility	Frequency	Percentages
Voriconazole	115	38.33%
Ketoconazole	97	32.33%
Clotrimazole	78	26.00%
Fluconazole	64	21.33%

DISCUSSION:

Health is multidimensional. Vaginal discharge is a frequent symptom presented by most women in the reproductive age group due to several causes. Vaginal discharge is the 2nd most common symptom presented after menstrual disturbances.[10] One among ten females suffer from vaginal discharge in a year. Nearly 10 million OP visits of women per year are due to vaginal discharge complaints.[10]

The vagina and cervix are susceptible to several pathogens, reliant on the epithelial lining and other microenvironment factors.[11] The vagina and ectocervix are lined by stratified squamous epithelium, which is susceptible to infections with Candida and trichomonas vaginalis.[11] Whereas the endocervix lined by columnar epithelium is vulnerable to *Neisseria gonorrhoeae* and Chlamydia trachomatis.[11] Herpes simplex virus may infect both types of epithelium.

Infections caused by any of these organisms can lead to vaginal discharge.[10] Recognizing its specific cause can be challenging because many pathogens cause vaginal and cervical infections, and several conditions may coexist.[10] Our study was a cross-sectional observational study aimed to find the prevalence of various etiologies of vaginal discharge in women aged 15 to 49 years of age.

Table 5: Comparison Of Prevalence Of Different Pathogens Of Vaginal Discharge Across Various Studies To Present Study.

	Agrawal et al.,[12]	Vijayalakshmi et al.[2]	Yusuf M et al.,[11]	Venugopal et al.,[10]	Videhi Mehta et al[13]	Present study
Bacterial vaginosis	39.1 %	53%	29.2%	27%	4.08 %	47%
Candida	35.9 %	25.5%	53.6%	22%	54.3 %	39.33%
Trichomonas vaginalis	6.3%	3%3	10.8 %	25%	2.88 %	14.33%
Mixed infections	18.7 %	-	Gonorrhea 1.2%	3%	-	6.67%
No organisms	-	-	5.2%	23%	-	6%

Table 6: Comparison Of Prevalence Of Different Strains Of Candida Across Various Studies To Present Study

Study	C tropicalis	C. krusei	C. glabrata	C. guillier mondii	C albicans
Lavanya V,Pavani P et al[14]	8.9%	35.1%	12.5%	-	42.8%
Sasikala G,Udayasri B[15]	3.3%	5.5%	43.9%	-	46.1%
Roopa C et al. [16]	28.6%	13.9%	5.8%	0.73%	50.7%
Videhi J Mehta et al.[13]	6.19%	15.9%	4.4%	-	73.4%
Present study	23.73%	19.49%	8.47%	-	48.31%

In conclusion, our study with 300 women patients complaining of vaginal discharge found a majority of them

belonging to the sexually active age group. Vaginal discharge was more prevalent in lower economic status and rural areas. Bacterial vaginosis was the most common and frequent etiology, followed by Candida. TV was the least common etiology for vaginal discharge. The common symptoms noticed by the study population was white discharge, malodourous and or profuse discharge, itching, dysuria, lower abdominal pain, dyspareunia.

Hence it is recommended that prevention, early diagnosis, and prompt treatment of abnormal vaginal discharge, especially among reproductive age group women, should be done to avoid complications and reduce the risk of HIV transmission. There is a need for community awareness about healthcare facilities and self-concern in women for their own health needs. Hence the study was done to emphasize the role of laboratory investigations in patients with vaginitis, as presumptive clinical diagnosis alone can lead to false interpretation.

Limitation And Recommendations:

- Smaller sample size and the hospital-based study were significant limitations of the present study. During the time frame of the study, the findings could have been subjected to selection bias.
- Therefore, the results might not be generalized to the whole population.
- The study recommends creating community awareness about health care facilities and instills self-concern in women for their own health needs. Built-in service component and confidentiality may improve self-reporting of reproductive morbidity in the survey.

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