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A Correlational Study between Clinical Findings and Bacteriological Patterns of Leucorrhoea at a Tertiary Care Center

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Abstract: ***Introduction: Gynecological morbidity is essential to women's health. Leucorrhea is one of the most common issues encountered in gynecological practice. It may be caused by physiological factors, followed by vaginal infections, cervical erosion, and atrophic vaginitis. Vaginitis is an aesthetically significant disease that contributes to psychosexual issues. The key to effective management of vaginal infections lies in the diagnostic strategy, which is based on culture and sensitivity. Clinical evaluation plays a vital role in the initial stages. The study's main aim is to learn about vaginal infections in the reproductive age group, analyze the clinical mode of presentation and use simple methods to evaluate etiology and diagnosis. Aim: To evaluate the correlation between clinical and bacteriological findings of leucorrohea. Materials And Methods: This prospective study was conducted in the Outpatient Department of Obstetrics and Gynecology, Rangaraya Medical College Hospital for 2 years. A hundred women with vaginal discharge were selected for the study, and comprehensive history, general examination, and gynecological examination were conducted. The inclusion criteria for vaginal discharge included all women of varying ages and varied natures, with formal consent. Exclusion criteria included pre - pubertal and post - menopausal age groups, previous treatment, menstruating, and suspicious lesions. Clinical findings and laboratory tests are combined to form a final diagnosis. Results: There was a minor difference in clinical diagnosis and microbiological confirmation in bacterial vaginosis and vulvovaginal candidiasis. The incidence of trichomoniasis was similar in both methods. A significant difference is observed in suspected mixed infections. Nonspecific infections comprised less than five percent. In the pregnant population, bacterial vaginosis was found in the highest number, followed by vulvovaginal candidiasis, trichomoniasis, mixed infections, and nonspecific infections. Conclusion: This study investigated the causes of leucorrhea and its prompt diagnosis by clinical and microbiological evaluation. It found that successful management of abnormal vaginal discharge lies in clinical evaluation and microbiological confirmation, which enables exact diagnosis and treatment. Blanket therapy of symptomatic vaginal discharge with antimicrobial and antifungal drugs has a limited role in view of the development of drug - resistant strains.***

Keywords: Leucorrohea, Vaginal Discharge, Bacetriological Patterns, Correlation, Clinical Evaluation, Vaginal Infections, Microbiological Confirmation, Reproductive Age Group.

1. Introduction

There is a growing recognition that gynecological morbidity is an important health issue among all women in India. Gynecological morbidity in women can range from life - threatening diseases such as malignancies to debilitating and psychologically distressing leucorrhea. Mostly leucorrhoea is physiological, next follow vaginal infections due to bacteria, fungi, and parasites. Other causes include secondary infections due to foreign bodies, cervical erosion, and atrophic vaginitis.

Discharge from the vagina can vary in consistency and may be thick or thin, clear, cloudy or colored, and odorless or foul odor. Having some amount of vaginal discharge is normal, especially in the childbearing age. Glands in the cervix produce a clear discharge, which varies with different phases of the menstrual cycle. Vaginal discharge that suddenly differs in color, consistency, and odor, and a significant increase or decrease in amount, may indicate an underlying abnormality of which infections are most common. Trichomoniasis, Bacterial vaginosis, and Candidiasis are common genital infections. Vaginitis causes vaginal itching; local sourness leads to dyspareunia and emotional upsets. It also contributes to various pregnancy complications like preterm labor, the premature rupture of membranes, and chorioamnionitis.

The secret of the successful management of vaginal infections is in the diagnostic approach. Proper diagnosis facilitates apt treatment. Although the crux of the diagnosis of vaginal infections depends on culture and sensitivity, clinical evaluation plays a preliminary vital role.2

2. Aims and Objectives

1) To study the prevalence of vaginal infections in hundred women of reproductive age group.
2) To analyze the clinical mode of presentation and to correlate them microbiologically.
3) To use simple, rapid, inexpensive methods like pH estimation, wet mount, KOH mount, Amine test, and Gram staining in evaluating the etiology of vaginal infections.
4) To do culture and sensitivity for confirmation of diagnosis and to prove its superiority over clinical examination, and institute appropriate treatment in recurrent cases.

3. Materials and Methods

3.1 Study Design

This is a prospective study done in the Outpatient Department of Obstetrics and Gynecology, Rangaraya Medical College & Hospital. A hundred women with vaginal discharge, in the reproductive age group who fulfilled the inclusion and exclusion criteria were selected for the study after explaining the procedure and taking consent from them.

Inclusion Criteria

1) All the women of varying ages (including pregnant women) presented with vaginal discharge, with or without associated vaginal discomfort, pruritus, and burning sensation.
2) The nature of discharge varied from thin homogenous to frothy and foul smelling to thick curd - like discharge. The discharge may be in dependent areas or adherent to the vaginal wall.
3) Formal consent was taken prior to collection of the specimen for investigation

Exclusion Criteria:

a) Patients in pre - pubertal and post - menopausal age groups.
b) Patients who had undergone treatment for the same symptoms within the prior48 hours.
c) For patients who are menstruating, suspicious lesions like carcinomas

Study Period; 2yrs - October 2012 to October 2014.

Study Methods

For the present study, 100 women in varying age groups, with complaints of vaginal discharge were selected during the study period from October 2012 to October 2014. An examination of external genitalia was done. Using aseptic precautions vaginal speculum was introduced and the nature of vaginal discharge was observed. The color, viscosity, consistency, and adherence to the vaginal wall were noted.

Table: Clinical features

	Normal	Bacterial Vaginosis	Trichomoniasis	Candidiasis
External genitalia	Normal	Normal	Excoriation +	Excoriation +
Dischargeat introitus	No	Yes	Yes -	No
Color	White	Grey	Greenish yellow	White
Viscosity	High	Low	Low	High
Consistency	Flocculent	Homogenous	Homogenous	Curdy
Presence in vagina	Dependent to the vaginal wall	Adherent to the vaginal wall	Adherent tothe vaginal wall	Not adherent to the vaginal wall

A final diagnosis is given correlating these with the other laboratory investigations, giving more importance to the microscopic findings.

Sample collection:

Two high vaginal swabs were collected with sterile swabs from the posterior Fornix by using a Sim's speculum / Cusco's speculum.

A battery of tests like pH, Amine test, KOH test, wet mount, gram stain, culture, and antibiotic sensitivity tests are performed.

4. Observations & Results

The majority of patients (50%) fall into the age group of 20 - 30 yrs and (65%) belong to low socio - economic status. In our study, the following observations were made – pregnant (80%) pregnant (20%), diabetic (20%), women with IUCD (24.3%) OCPS users (19.2%), and tubectomised women (56.4%). This obviously shows vaginal infections have more prevalence in the age group of 20 - 30 yrs, low socio - economic status (65%), IUCD users, Diabetics, and during pregnancy.

Vaginal discharge was one of the commonest symptoms encountered in the OPD. Discharge with associated symptoms like dysuria (37%), and pruritus (36%) were dominating symptoms, followed by odor (27%), followed by dyspareunia (24%). On examination, excoriation of external genitalia (23%), cervical hypertrophy (35%), and strawberry spots on the cervix and vagina (4%) were noted.

Bacterial vaginosis was the most common cause of abnormal vaginal discharge followed by candidiasis and Trichomoniasis. In our study, clinically diagnosed cases constituted 32% Bacterial vaginosis, 24% Vulvovaginal candidiasis, 5% Trichomoniasis, 20% suspected cases of mixed infections, and 19% of the patients were found with no obvious pathology clinically.

For confirmation of diagnosis, simple rapid, and inexpensive investigations were undertaken. Alterations in vaginal pH play an important role in the incidence of infections, pH of > 4.5 in 69% of cases. A positive amine test is specific for Bacterial vaginosis which was seen in 33% of cases. The saline mount was done in all cases, clue cells which are characteristic of Bacterial vaginosis were found in 26% of cases, Candida mycelia are identified in 39% & motile Trichomonas vaginalis in 7%. But according to the symptomatology and clinical findings, the diagnosis was overdiagnosed. This proves the superiority of microbiological examination.

Fungal hyphae were identified as Candida albicans by the presence of true and pseudo hyphae, chlamydospores, and blastospores on KOH mount in 39% of cases.

All the cases were subjected to Gram's staining and results were scored according to Nugent's Score. The results were analyzed and found to have normal flora with few

commensals seen in 45% of women, intermediate score in 33%, and Bacterial vaginosis in 22%, on contrary clinically Bacterial vaginosis was diagnosed in 32% of cases. Candida hyphae were seen in 39% of cases in gram staining which contradicted with the clinical diagnosis (24%).

All the hundred smears recruited for the study were cultured and bacterial growth was seen in 31%, Candida in 26%, mixed growth in 14%, normal vaginal commensals in 18%, and no growth in 11%. The various bacteria identified were G. Vaginalis (41.86%), Staphylococcus (20.93%), Streptococcus (13.95%), and E. coli (23.25%).

Diagnosis of Vulvovaginal candidiasis in a symptomatic patient was based on the finding of normal vaginal pH, positive KOH mount, and positive culture.

Kirby - Bauer's Disc Diffusion method was used to assess drug sensitivity and the results were as follows:

Staphylococcus aureus showed sensitivity to Vancomycin in all 9cases, clindamycin in 5, and Azithromycin in 1 case.

Streptococcus showed sensitivity to Bacitracin in 3 cases, Clindamycin in 2 cases and Cefixime in 1 case.

E. coli was sensitive to Nitrofurantoin in 2 cases, Bacitracin in one case and Ciprofloxacin in 1 case, Amikacin in 5 cases.

G. vaginalis showed sensitivity to Clindamycin in 7 cases, Azithromycin in 2 cases, Bacitracin in 2 cases, Ciprofloxacin in 1 case, Clotrimoxazole in 2 cases, Amikacin in 2 cases and Ampicillin in 1 case.

Candida albicans were sensitive to Fluconazole in 75% and Ketoconozole in 25% of cases.

Having done all the above investigations, the diagnosis was confirmed as Bacterial vaginosis (31%), Vulvovaginal Candidiasis (25%), Trichomoniasis (5%), mixed infections (14%) physiological leucorrhoea (18%), and nonspecific infections (5%).

Of 14% of mixed infections, Bacterial vaginosis with Vulvovaginal candidiasis (86%) dominated, and Vulvovaginal candidiasis with Trichomoniasis was identified in 14%. Finally, after all the clinical evaluation and microbiological confirmation, Bacterial vaginosis was diagnosed in 31% of cases, vulvovaginal candidiasis in 25%, Trichomoniasis in 5%, mixed infections in 14%, physiological discharge in 18% and nonspecific infections in 5% cases.

5. Discussion

Vaginal discharge in the reproductive age group is the most common complaint encountered every day both by Gynecologists and General Practitioners Symptomatic Vaginal Discharge is caused by Inflammation due to infection of Vaginal Mucosa.
Table: indicates the maximum incidence of vaginal infections among various age groups of various studies.

Table: Age distribution – maximum incidence

Studies	Age in years
Sarah Hawkes et al 1999[3]	28 - 32
Fang Xueqiang et al 2007[4]	35 - 38
E. O. K. Nwankwo et al 2010[5]	20 - 29
Khawaja T Mahmood et al 2011[6]	25 - 34
Verma - A et al 2013	26 - 30
Lavanya - D et al 2014	21 - 30
Present study	21 - 30

In the Present study, the incidence of Leucorrhoea was maximum in the age group 21 to 30 years, correlating with that of E. O. K. Nwankwo et al 2010, Lavanya - D et al 2014 where the maximum number was seen in the age group 20 - 29 yrs[86].

Table: Socio - Economic Distribution

Study	Low	High
V. Patel et al 2006[8]	69.4%	30.6%
Bhalla et al 2007	53.2%	38.6%
Lavanya D et al 2014	66.4%	33.6%
Present study	65%	35%

In our study, 65 % of the recruited population belongs to low socioeconomic status & 35 % to high socioeconomic status. These figures are consistent with the above - mentioned studies.

Vaginal infections are characterized by abnormal discharge with varying amounts and associated symptoms like Malodour, Pruritus, Dysuria, and Dyspareunia. The presenting symptoms are likely to vary with each and every individual depending on the frequency of various infections.

In the present study, the dominant symptom was Dysuria (37%) followed by Pruritus (36%), Malodourous discharge (27%), and Dyspareunia (24%) which are consistent with Verma A et al studies 2013.

Table: Clinical Features

Study	Malodour	Pruritus	Dysuria	Dyspareunia
Wathne et al 1994[7]	23%	23%	34%	- -
Sarah Hawkes et al 1999[3]	31%	55%	- -	- -
Puri KJ et al 2003	69%	49%	17%	31%
Khawaja T Mahmood et al 2011[6]	66.8%	59.4%	18.2%	- -
Verma A et al 2013	17%	- -	22%	7.4%
Present Study	27%	36%	37%	24%

The incidence of vaginal infections in pregnant women in our study was about 20%. This incidence is consistent with that of the study by E. O. K Nwankwo et al 2010 and Verma A et al 2013. Of these pregnant women, 6 had bacterial vaginosis, 5 had vulvovaginal candidiasis.2 had trichomoniasis, 1 with mixed infections, and 1 with Non - Specific infections. There appeared to be no obvious pathology in 5 pregnant women with complaints of vaginal discharge.

Table: Incidence of vaginal infections in Pregnancy

Study	Pregnant	Non - Pregnant
Fang Xueqiang et al 2007[4]	1.7%	98.3%
E. O. K. Nwankwo et al 2010[5]	25.1%	74.9%
Verma A et al 2013	5.8%	94.2%
Present Study	20%	80%

Contraceptive methods used have an important role in preventing infections. IUCDs have an increased risk of transmission whereas barrier methods prevent the transmission of infections. OCPs are known to make the cervical mucous hostile not only tosperm but also to infectious organisms.

Table: Vaginal infections & Contraceptive usage

Study	Tubectomy	IUCD	OCP's
A. Parashar et al 2006	50.6%	45.6%	3.8%
Fang Xueqiang et al 2007[4]	18.2%	70.1%	0.3%
E. O. K. Nwankwo et al 2010[5]	1%	6.4%	19.5%
Present Study	56.4%	24.3%	19.2%

Of the 100 women studied excluding Pregnant & Nulliparous women 44% were Tubectomised, 19 % using IUCD, and 15 % using OCPs.

The incidence of vaginal infections in those with different contraception is studied by Various authors. The maximum percentage (56.4%) were Tubectomised which is consistent with the study of A. Parashar et al (51%). As expected, other studies showed IUCD usage is associated with an increased incidence of vaginal infections (70% & 45.6). In our study also this is proved IUCD (25.6%) Vs OCP usage (19%).

The method of contraception used varied depending on the geographical area, educational status, social costumes, economic status, and awareness in the population.

Diabetes is known for making any individual prone to infections.

Table: Incidence of Diabetes & Vaginal infections

Study	Tubectomy
Khawaja T Mahmood et al 2011[6]	4%
E. O. K. Nwankwo et al 2010[5]	4%
Present Study	20%

In the present study, the association of diabetes among women with vaginal infections was found to be 20 % which is contrary to the above - mentioned studies. This can be attributed to the increased prevalence of Diabetes per se in our population. After taking thorough history and clinical examination of the patient into consideration, cases were diagnosed clinically.

In the present study, the prevalence of vaginal infections as diagnosed by clinical examination is Bacterial vaginosis 32%, Vulvovaginal candidiasis 24%, Trichomoniasis 5%, 20% were suspected to have mixed infections & 19% of women were found to have no obvious clinical pathology. So, they were considered physiological discharges.

Study	BV %	VVC %	Trichomoniasis %	Mixed %
V. Chandeying et al 1998	38	22	4	- -
V. Patel et al 2006[8]	17.8	8.5	4.2	- -
Shobeiri et al 2006	28.5	17.2	18.1	- -
P. Bhalla et al 2007	32.8	16.9	2.8	- -
Fang Xueqiang et al 2007[4]	5.9	3.1	2.8	- -
E. O. K. Nwankwo et al 2010[5]	24.5	70	5.5	- -
Khawaja T Mahmood et al 2011[6]	32.5	12	4	- -
Present Study	32	24	5	20

The present study correlates with studies done by V. Chandeying et al 1998, Khawaja T Mahmood et al 2011, P. Bhalla et al 2007 and S. Rekha et al 2010.

In other studies, different rates are ranging from 5% to 70%. These variations in the rates could be related to geographical distribution and the criteria taken for the study.

6. Conclusion

1) Due to the high prevalence of vaginal discharge in the reproductive age group and its complications, this study was designed to investigate the causes of leucorrhoea and its prompt diagnosis by clinical and microbiological evaluation.
2) The present study suggests that successful management of abnormalvaginal discharge lies in clinical evaluation and microbiological confirmation which enables exactdiagnosis & treatment.
3) Vulvovaginal infections are one of the commonest reasons why women seek professional help and thus Proper diagnosis by trained personnel would enable women to get timely and efficient treatment. Side effects of inadequately treated disease and unnecessary anxiety can be prevented by precise diagnosis and treatment.
4) Reproductive tract infections are associated with adverse outcomes both in Obstetrics and Gynecological conditions and increased vulnerability to HIV/AIDS.
5) Women with Bacterial vaginosis and Trichomoniasis have an increased risk of acquiring human immunodeficiency virus (HIV) because of decreased levels of protective lactobacilli and the presence of inflammation this increased risk is independent of behavioral factors, further supporting the benefit of accurate diagnosis and treatment of vaginitis.
6) A pelvic examination should be performed along with the determination of vaginal pH at bedside. A normal pH is inconsistent with the presence of Bacterial vaginosis or Trichomoniasis.
7) Microbiological evaluation is often diagnostic.
8) In our study, the incidence of Bacterial vaginosis was high followed by Vulvo vaginal candidiasis, mixed infections, Trichomoniasis, and nonspecific infections.
9) The most ideal approach is microbiological confirmation of the clinical diagnosis in symptomatic women.
10) Blanket therapy of symptomatic vaginal discharge with antimicrobial and antifungal drugs has a limited role in view of the development of drug - resistant strains.
11) To conclude, the successful management of abnormal vaginal discharge lies in the diagnostic approach. Most of the time, a presumptive diagnosis is made based on the

clinical approach, which is often inaccurate and incomplete and leads to mismanagement. So, microbiological diagnosis eliminates this, enabling exact diagnosis and treatment.

12) An accurate diagnosis of this simple but distressing complaint of a woman would alleviate her anxiety and also prevent untoward occasional morbidity.

Figures

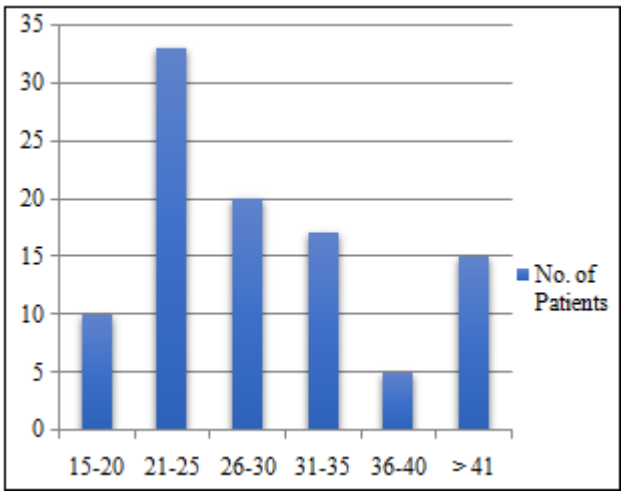

Figure: Age Distribution

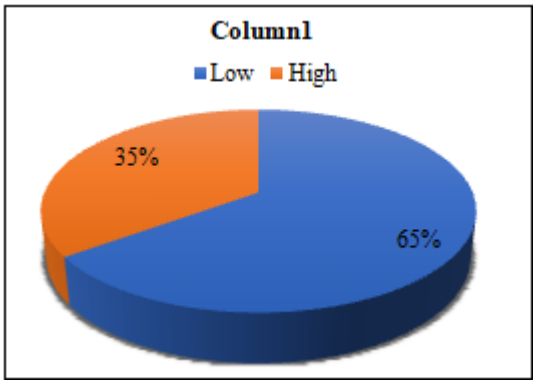

Figure: Socioeconomic status

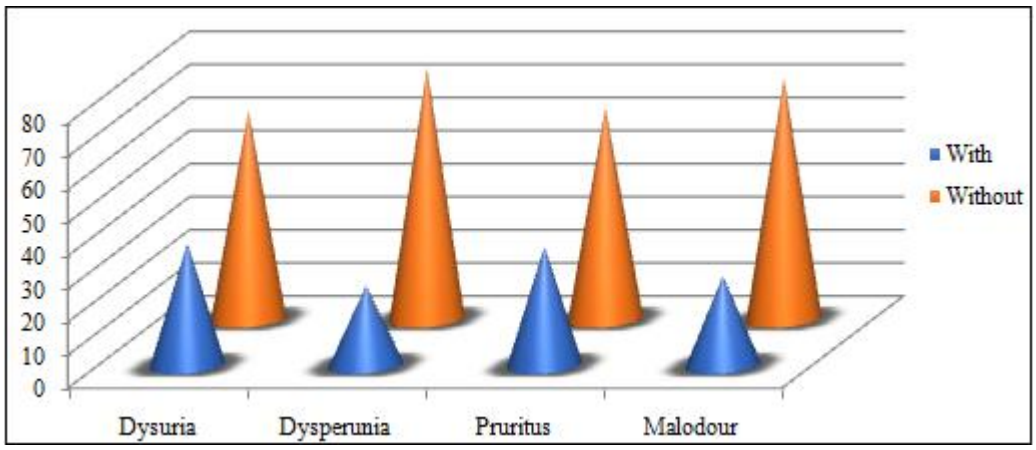

Figure: Associated symptoms – Pruritis, Dysuria, Dyspareunia, Odour

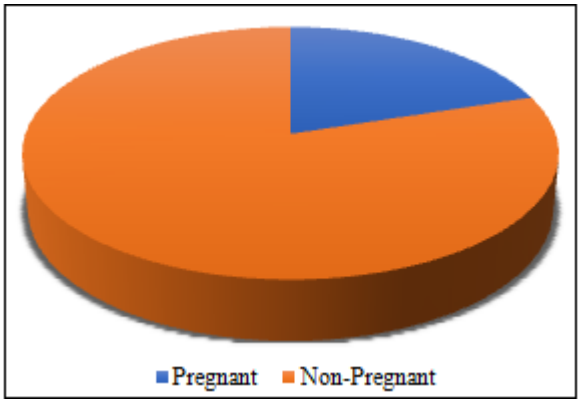

Figure: Incidence in Pregnant women

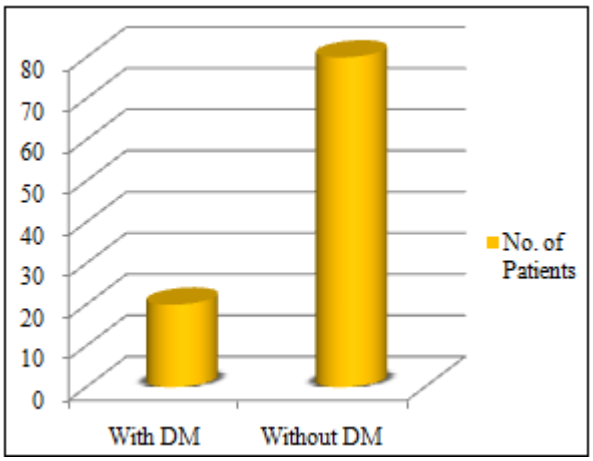

Figure: Incidence among Diabetics

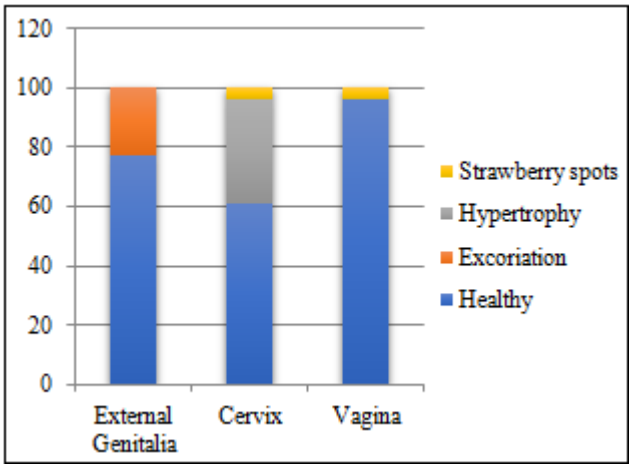

Figure: Local Examination

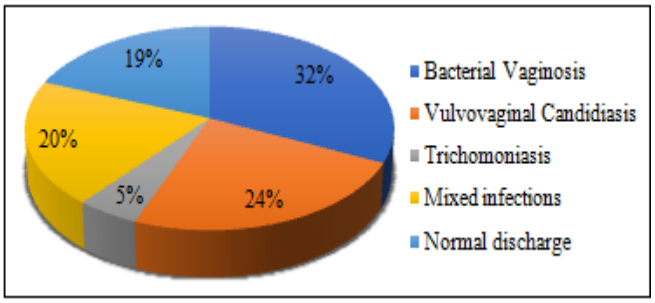

Figure: Clinical Diagnosis

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