# A STUDY ON VAGINAL DISCHARGE IN PATIENTS ATTENDING SEXUALLY TRANSMITTED DISEASE OUTPATIENT DEPARTMENT

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Dermatology, Venereology and Leprosy

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Certificate

Certified that this dissertation entitled “A STUDY ON VAGINAL DISCHARGE IN PATIENTS ATTENDING SEXUALLY TRANSMITTED DISEASES OUTPATIENT DEPARTMENT” is a bonafide work done by Dr R RATHY, Postgraduate student in MD Dermatology, Venereology and Leprosy, Madras Medical College, Chennai – 600 003, during the academic year 2006 to 2009. This work has not been formed previously the basis for the award of any degree.

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Contents

## Introduction:

### Abnormal Vaginal Discharge

### Definition

Vaginal discharge may be a subjective complaint or an objective finding. Patients may complain of excessive secretions, abnormally coloured or textured secretions, or malodorous secretions(13). In the absence of a complaint, the examiner may note abnormal secretions (asymptomatic to the patient). The term *vaginal discharge* is often used by patients to refer to any genital discomfort. The complaint must be verified by physical and laboratory examination to differentiate abnormal from physiologic discharge and to determine diagnosis and treatment.

Gonorrhea ascends to the upper tract post menses. Postmenopausal women are less likely to have candidiasis and more likely to have noninfectious causes. Pregnancy, Intra Uterine Contraceptive Devices and birth control pills predispose to candidal infections(29). If the discharge is acute, chronic, or frequently

recurrent. Discharges that patients claim "never go away" are likely to be bacterial vaginosis, if pathologic, or simply physiologic discharges.

Detailed clinical assessment specifically about pruritus, internal dysuria (felt inside the body), external dysuria (felt on the labia), dyspareunia, irritation, and offensive odour is essential(33). Internal dysuria suggests urinary infection, gonorrhea, or chlamydia. External dysuria suggests vulvovaginal irritation with secondary burn from urine. Candida is intensely pruritic, trichomoniasis less so and bacterial vaginosis rarely. Trichomoniasis and bacterial vaginosis can both cause dysuria, usually external. Bacterial vaginosis has a fishy odor; trichomoniasis, a foul one. The intense inflammatory reaction of candida or trichomonas can cause dyspareunia. Herpes can cause intense external dysuria and pruritus.

Attempt to characterize the discharge by color and consistency(34). Color may be white, gray, yellow, or brown (if mixed with blood). Consistency may be mucoid (thin), thick, frothy, or cheesy. Candida is often like cottage cheese. Bacterial vaginosis is often grayish white and homogeneous. Color and consistency alone cannot make a diagnosis, however(31).

The presence of fever, abdominal pain and mucopurulent discharge should be assessed. If present, think of gonorrhea, chlamydia, and upper genital tract infection, or of urinary tract infection. Primary herpes can also cause fever and malaise. Vaginitis should not have systemic symptoms.

As with all sexually transmitted diseases, it is important to know the sex of the patient's sexual partner(s), the number of partners, any recent change in partners, and whether the partner(s) have symptoms(32). Vulvovaginal candidiasis, trichomoniasis, bacterial vaginosis, and herpes can all be transmitted between lesbian partners; gonorrhea, very rarely. The prevalence of various sexually transmitted diseases varies depending on the population studied (emergency room, office-based practice, sexually transmitted disease clinic).

Elicit a history of douching, home remedies, over-the-counter remedies, or leftover treatments from past infections. Hygiene practices, such as frequent douching with commercial douches or scrubbing the genitals, can cause irritant dermatitis that may be the primary or secondary cause of the presenting problem. Recent medication use may alter the physical and laboratory examination.

Many patients believe all vaginitis to be fungal infections and use the term generically. Despite adequate treatment, bacterial vaginosis and candidiasis are often recurrent in some women(27).

A good history of underlying medical conditions, particularly those that predispose to candidiasis, is important. Recent antibiotic usage for other

conditions.

A comprehensive pelvic examination is necessary for the accurate diagnosis of vaginal discharge. Particular attention should be directed to looking for herpetic vesicles and contact dermatitis on the external genitalia. The vaginal walls should be checked for erythema and coating with discharge. Look for mucopus in the endocervix by cleaning the ectocervix with a swab, inserting a small sterile swab in the endocervix, and noting the presence of yellow pus on the swab. A bimanual examination should be done. Appropriate laboratory specimens should be obtained(29).

This study will highlight the importance of systematic approach, proper clinical examination, basic lab investigation, culture methods, co morbid illness, HIV status and demographic particulars of the patients.

**Review of Literature**

The current review of literature helps us to understand the difficult situation the health care system is facing in handling the patients suffering from this disorder. More sophisticated techniques, better information dissemination facilities; better educational levels of the patients have transformed the outlook of the

management of this rather difficult problem.

**Basic Science**

Normal genital secretions are a mixture of transudate through mucous membranes, secretions from glandular structures, and desquamated vaginal epithelial cells(32). Both the amount and consistency of cervical secretions and the desquamation of epithelial cells are hormone dependent and may increase during ovulation, premenstrually, with pregnancy, or with the use of oral contraceptives. Normal discharge is asymptomatic except for occasional complaints of excessive secretions. A physiologic discharge is usually clear to white, nonadherent to the vaginal wall, and pooled in the posterior fornix. It can appear nonhomogenous with clumps of desquamated epithelial cells. It has a pH of less than 4.5, no offensive odor, and an abundance of epithelial cells on saline

microscopy. The major causes of abnormal vaginal discharge are either vaginal or cervical infections. Causes of vaginal infections are *Gardnerella vaginalis, Trichomonas vaginalis,* and *Candida albicans.* Primary cervical infections causing vaginal discharge are *Neisseria gonorrhoeae, Chlamydia trachomatis,* and *Herpes simplex.* In the prepubertal girl, *N. gonorrhoeae* causes a vaginal rather than cervical infection(30).

Noninfectious causes of vaginal discharge include atrophic vaginitis, foreign body, malignancy, contact dermatitis, or other mechanical or chemical irritation. An intrauterine contraceptive device can sometimes cause vaginal discharge related to chronic irritant cervicitis or endometritis.

Bacterial Vaginosis

Bacterial vaginosis is the most common cause of vaginitis in women of childbearing age. The rate of occurrence depends on the population studied: 17 to 19 percent in family-planning or student health clinics, 24 to 37 percent in sexually transmitted disease clinics, and 10 to 29 percent among pregnant women(7).

Bacterial vaginosis represents a complex change in vaginal flora characterized by a reduction in the prevalence and concentration of hydrogen peroxide–producing lactobacilli and an increase in the prevalence and concentration of *Gardnerella vaginalis;* mobiluncus species; *Mycoplasma hominis;* anaerobic gram-negative rods belonging to the genera prevotella, porphyromonas, and bacteroides; and peptostreptococcus species. The transmissible nature of bacterial vaginosis was demonstrated by Gardner and Dukes in 1955, and the microorganisms may be transferred sexually(15). Transmission alone is not sufficient to cause disease, since most of the microorganisms are normally found in low numbers in the healthy vagina. Risk factors for bacterial vaginosis include the use of an intrauterine device, nonwhite race, and prior pregnancy.

The overgrowth of anaerobic microorganisms is accompanied by the production of proteolytic enzymes that act on vaginal peptides to release several biologic products, including polyamines, which volatilize in the accompanying alkaline environment to elaborate foul-smelling trimethylamine(14). Polyamines act to facilitate the transudation of vaginal fluid and exfoliation of epithelial cells, creating a copious discharge. Clue cells are formed when *Gardnerella vaginalis,* present in high numbers, adhere in the presence of an elevated pH to exfoliated epithelial cells.

Diagnostic criteria established by Amsel (Table A) have proved remarkably simple and useful in clinical practice. Since few clinicians are adequately trained to use microscopy, over diagnosis is common and therapy is frequently empirical. The presence of clue cells is the single most reliable predictor of bacterial vaginosis. Gram's staining of vaginal secretions is even more reliable than wet mount, with a sensitivity of 93 percent and specificity of 70 percent, but

it is underused. Although cultures for *G. vaginalis* are positive in almost all cases of bacterial vaginosis, *G. vaginalis* may be detected in 50 to 60 percent of healthy asymptomatic women(22). Accordingly, vaginal culture has no part in the diagnosis of bacterial vaginosis. DNA probes for *G. vaginalis* are expensive but may be useful to practitioners unable to perform microscopy.

Seven studies (two case–control and five cohort studies) have reported an increased risk of preterm birth in women with bacterial vaginosis(18). Studies conducted in diverse ethnic groups and economic strata detected increased relative risks of prematurity ranging from 2.0 to 6.9 that were directly attributable to bacterial vaginosis and linked to chorioamnionitis. It is estimated that 15 to 20 percent of pregnant women in the United States have bacterial vaginosis, enormous numbers of otherwise healthy women are thus at risk. In the future, it is possible that routine screening and treatment will become the standard of practice. The optimal time for this has not been defined, although two studies suggest that early screening in the first trimester may be more useful in predicting preterm delivery than later screening(23). It is unusual for bacterial vaginosis to develop in pregnant women after 16 weeks of gestation. Treatment trials of oral clindamycin, metronidazole alone, and metronidazole combined with erythromycin in high-risk women with asymptomatic bacterial vaginosis showed significant reductions in preterm labor. Recommendations for routine screening and treatment await the results of further interventional studies among unselected women with bacterial vaginosis.

Causal relations have also been established between bacterial vaginosis and pelvic inflammatory disease, plasma-cell endometritis, postpartum fever, post-hysterectomy vaginal-cuff cellulitis, and postabortion infection(9). Platz-Christensen et al. reported an association between clue cells detected on Papanicolaou smears and cervical intraepithelial neoplasia. It has been suggested that bacterial vaginosis is a cofactor for human papillomavirus; however, Peters et al. failed to confirm this relation in dyskaryotic cervical smears.

**Amsel's Diagnostic Criteria for Bacterial Vaginosis**

Three of four criteria must be met(34); establishes accurate diagnosis of

bacterial vaginosis in 90 percent of affected women. (* Highly significant criterion.)

- Homogeneous vaginal discharge (colour and amount may vary)
- Amine (fishy) odour when potassium hydroxide solution is added to vaginal secretions (commonly called the "whiff test")
- Presence of clue cells (greater than 20%) on microscopy*
- Vaginal pH greater than 4.5

The above table (Table A) shows the basic classification and clinical approach towards the disease conditions manifesting with abnormal vaginal discharge.

**Nugent Scoring(17)** was established by Nugent et al. A new scoring system that uses the most reliable morphotypes from the vaginal smear was proposed for diagnosing bacterial vaginosis. This scoring system was compared with the Spiegel criteria for diagnosing bacterial vaginosis. The scoring system (0 to 10) was described as a weighted combination of the following morphotypes: lactobacilli, Gardnerella vaginalis or bacteroides (small gram-variable rods or

gram-negative rods), and curved gram-variable rods. The below table shows the original factors instituted by Nugent et al. in diagnosing Bacterial vaginosis.

Candida Vulvovaginitis

Candida vaginitis occurs less frequently than patients or physicians believe. In one group of self-referred women who offered to be part of a study on chronic recurrent fungal infections, only 50% were found to have Candida vaginitis. When it occurs, the offending pathogen is usually *Candida albicans(8).* Again, it is controversial whether this is a normal colonizer of the vagina. Its pathogenicity is not related to its concentration in the vagina; small amounts can cause excruciating symptoms. Normal bacterial colonization has been thought to be important in the defense against *Candida* infection; for example, some lactobacilli inhibit the growth of Candida. However, women with *Candida* still have predominant lactobacilli on gram stain of vaginal fluid. This belief in the efficacy of lactobacilli has led to the home remedy of yogurt containing lactobacillus, used intravaginally with an applicator or as a douche, for treatment of vaginitis. Sexual transmission has not been proven to be important in most cases, although treating male partners may help in recalcitrant cases. Host factors (e.g., recent antibiotic treatment, pregnancy, oral contraceptives) all predispose to candidal infection(21). Diabetes mellitus out of control facilitates candidal growth in the vagina, but most women with recurrent candidiasis do not have diabetes. Women with diabetes are at risk for all forms of sexually transmitted diseases and must be examined and treated appropriately. Some women seem to be particularly predisposed to recurrent candida vaginitis without apparent reason, causing them considerable morbidity and expense. Candida vaginitis has the most characteristic history of the vaginitides, with pruritus being the most prominent symptom, often with sparse or no discharge. The discharge, when present, may resemble cottage cheese. Erythema and swelling of the vulva and vaginal walls are marked. Diagnosis is suggested by history and confirmed by physical examination and potassium hydroxide preparation or culture. The epidemiologic data on candida vulvovaginitis, a nonreportable disease, are incomplete. Prevalence estimates rely mainly on self-reported histories of diagnosis by a physician(12). Vulvovaginal candidiasis is routinely diagnosed without the benefit of microscopy or culture, and as many as half of the women given this diagnosis may have other conditions. The widespread use of over-the-counter

antimycotic drugs may make future epidemiologic studies very difficult. Although the condition is rare before menarche, by the age of 25 half of all college women will have had at least one physician-diagnosed episode of vulvovaginal candidiasis. It is less common in post-menopausal women. In other populations, at least one episode of vulvovaginal candidiasis is reported in up to 75 percent of premenopausal women.

*Candida albicans* is responsible for 80 to 92 percent of episodes of vulvovaginal candidiasis(10). Recently, an increased frequency of other candida species, particularly *C. glabrata,* has been reported, possibly due to widespread use of over-the-counter drugs, long-term use of suppressive azoles, and the use of short courses of antifungal drugs. Sporadic attacks of vulvovaginal candidiasis usually

occur without an identifiable precipitating factor, except in patients with uncontrolled diabetes. Some, but not all, women are prone to vulvovaginal candidiasis while taking antibiotics. The risk of vulvovaginal candidiasis may be higher in women who use oral contraceptives containing high levels of estrogen. Spermicide use has not been associated with vulvovaginal candidiasis, but the use of vaginal sponges and intrauterine devices has.

Vulvovaginal candidiasis is not traditionally considered a sexually transmitted disease, since it occurs in celibate women and since candida is considered part of the normal vaginal flora(21). This does not mean that sexual transmission of candida does not occur or that vulvovaginal candidiasis is not sexually associated. There is an increase in the frequency of vulvovaginal candidiasis at the time most women begin regular sexual activity. Individual episodes of vulvovaginal candidiasis do not appear to be related to lifetime numbers of sexual partners or the frequency of coitus but may be linked to orogenital sex.

**Trichomonas vaginalis:**

*Trichomonas vaginalis* is a flagellated protozoan that grows well at a pH of 6. Its role as a sexually transmitted organism has been well established. However, it is a common organism often found asymptomatically in sexually inactive

postmenopausal women. It can be associated with other sexually transmitted diseases, especially gonorrhea. Trichomonas infects squamous, but not columnar, epithelium. The urethra and Skene's glands are often involved,

explaining the need for systemic rather than local therapy. The ectocervix may be involved, with punctate hemorrhages producing the typical strawberry cervix and Colpitis macularis, but this is seen only 2 to 5% of the time(15). Discharge may be gray or greenish yellow and is not usually frothy, but is usually excessive. Trichomoniasis induces a polymorphonuclear leukocyte response easily seen in wet-mount preparations. Diagnosis is made by wet mount(26).

Garber et al. (6) have reviewed the epidemiology and the treatment modalities of Trichomoniasis across the globe. They have identified that Trichomonas vaginalis, a parasitic protozoa that causes the sexually transmitted infection trichomoniasis, is the sexually transmitted infection with the largest annual incidence, exceeding 170 million cases per year. The disease can be difficult to diagnose due to its heterogeneous presentation and problems with diagnostic testing.

The pioneering work done by Kissinger et al(1) has shown clear evidence that treating Trichomonas infection significantly reduced the HIV shedding from the vaginal mucosa. Hence forth identification and treatment of this infection to an extent reduce the transmission of the lethal HIV infection.

Patullo L et al (2) from Cincinatti, has done a large trial involving more than 1400 patients regarding the feasibility of the recent modalities in diagnosing Trichomonas vaginalis. Four primary TV tests (wet mount, culture, rapid and nucleic acid amplification tests (NAAT) were performed on vaginal swabs. The researchers have concluded that the wet mount and culture methods are the gold standard and the recent methods needs more extensive studies before standardization. The current guidelines are to proceed with more specific testing

when the patient continues to be symptomatic inspite of treatment.

El Moamly et al(3) has done a study on identification of the Trichomonas vaginalis Antigen assay using immunochromatographic (IC) capillary flow technology. The IC antigen improved T. vaginalis diagnosis, especially in screening, rapid, or point-of-care test, but in urine was less reliable than with vaginal smear.

Martin DH et al (4) from Louisiana USA has done a large randomised trial on the influence of HIV on the individuals with Trichomonas infection. They have found, repeated infections, resistant infections and re-infection of Trichomonas with a different strain were common in HIV positive individuals. Hence forth when there is a persistence of Trichomonas infection it is essential to do a HIV testing. The individuals who are positive for HIV along with Trichomonas infection are found to have multiple partners. These patients are to be identified early and to educated on the protection and prevention of spread of infection by following safe practices.

Vanderpol et al (5) from Indiana have done a very large study in Uganda. They have concluded that T. vaginalis infection is strongly associated with an increased risk for HIV infection in this general population of African women. Given the high prevalence of T. vaginalis infection in HIV-endemic areas, T. vaginalis control may have a substantial impact on preventing HIV acquisition among women.

Occasionally wet-mount examination of vaginal discharge yields only white blood cells with no evidence of trichomonas or of mucopus from the cervix(20). These women are usually at low risk for sexually transmitted diseases. Cervical ectopy with inflammation, rather than infection, may be the cause. The cause of this condition is not known, but all usual sources of vaginitis should be looked

for. Because of misuse of the term nonspecific vaginitis, it is probably best to call this simply "inflammatory vaginitis."

Over-the-counter douches, scented toilet paper, and contraceptive products are some of the more common etiologies for local irritation and contact dermatitis(11). Forgotten diaphragms and tampons must be looked for with malodorous discharges. Postmenopausal women with atrophic vaginal mucosa

may develop a watery, irritating, sometimes malodorous discharge secondary to local irritation, especially from intercourse. This may be mixed with blood, and can be mistaken for postmenopausal bleeding.

**Cervicitis:**

*Cervicitis* has been a poorly defined term used to refer to a variety of conditions including a pathologic diagnosis, cervical ectopy, and true cervical infection. It is to be hoped that the expanded interest in sexually transmitted diseases will lead to more precise criteria for its use. At present, the most important infectious cervical pathogens that can produce vaginal discharge include *N. gonorrhoeae, C. trachomatis*, and herpes simplex(28). Objective criteria have been developed for the diagnosis of mucopurulent cervicitis. Most women with mucopurulent cervicitis will have gonorrhea, chlamydia, or both. Both are pathogens of the cervix and upper female genital tract as well as the urethra, and require systemic treatment.

## AIMS AND OBJECTIVES

1.To determine the etiology for the abnormal vaginal discharge in women attending the Sexually Transmitted Diseases OP at Institute of Venereology, Madras Medical College, Chennai – 600 003.

2. To study the presenting features, co-morbidities, educational levels, employment particulars, clinical features, wet mount results and specialized culture techniques and their outcome.

3. To study the current status of the cause for abnormal vaginal discharge in patients presenting to the department and the influence of the comorbidities involved.

## Materials and Methods:

### Nature of the study:

This is a prospective experimental study to identify the etiology, comorbid conditions, clinical manifestations and laboratory methods of abnormal vaginal discharge in 200 patients attending the outpatient department of The Institute of Venereology, Madras Medical College, Chennai – 600 003 from January 2008 to August 2008.

### Collaborating Departments:

This study was undertaken in the Outpatient Department and the lab procedures were done in the Serology Department of the Institute of Venereology, Madras Medical College and Government General Hospital, Chennai – 600 003, India

### Questionnaire:

A standardised questionnaire was used to collect the background data, clinical details, comorbid conditions, Wet mount data, KOH preparation data and the

Specialised Culture Growth details. The sample copy of the questionnaire used

is attached as an appendix.

**Specimen Collection:**

Vaginal discharge was examined after adding one drop of normal saline for wet mount , 10% Potassium hydroxide one drop is added for KOH mount and Whiff's test.

**MICROSCOPY:**

**Wet Mount Examination:**

This is a simple diagnostic procedure used to visualise normal epithelial cells, motile trichomonads, clue cells, pus cells and also candidal hyphae.

**KOH Mount:**

This test is used for the diagnosis of genital candidiasis. Addition of KOH to vaginal discharge gives fishy amine odour in bacterial vaginosis.

**Gram Stain:**

A thin smear was prepared on a clean glass slide by rolling the swab on the slide. After air drying and heat fixing the smear, it was stained with gram stain(17). Smear was examined under microscope to look for the presence of epithelial cells, leukocytes, the intra and extracellular gram negative diplococcic, clue cells of bacterial vaginosis, candidal hyphae, spores and streptobacilli in school of fish appearance(25).

**pH of the discharge:**

The pH of the vaginal discharge was assessed using standard Litmus paper test. This gives a definite clue about the pathogenicity of the discharge.

**Media Details:**

Gonococcal culture media was with Modified Thayer Martin Medium. A cotton tipped swab is inserted into the cervical canal only 0.5 cm and Placed in a AMIES transport medium for gonorrhoea culture(19).

Trichomonas Culture: (Modified Diamonds Medium) A Vaginal specimen was obtained from the lateral vaginal wall with a cotton tipped swab.

Candida Culture: (Sabouraud's Dextrose Agar Medium)

A vaginal specimen was obtained from the lateral vaginal wall with a cotton tipped swab. A cervical smear was obtained from the cervical os(16).

The cultures were maintained by technicians who were specially qualified and experienced in handling these type of organisms in the most ideal conditions. They were read and interpreted at appropriate time by a qualified Microbiologist.

**Experimental Data:**

The clinical and laboratory data thus obtained were computerised and analysed using the statistical package of the Microsoft Office Excel 2007 Enterprise Edition. The thus accumulated data was transcripted as a master chart and is attached as appendix.

The data analysis on various heads are discussed on issue basis.

## Results and Discussion

## Age Group Analysis:

| Age Group | Total | % |
|---|---|---|
| 11-20 | **18** | 9 |
| 21-30 | **94** | 47 |
| 31-40 | **64** | 32 |
| 41-50 | **21** | 10.5 |
| 51-60 | **3** | 1.5 |
| **Total** | **200** | 100 |

The age group analysis of the study patients revealed 18(9%) of them in 11-20 years category, 94(47%) of them in 21-30 years category, 64(32%) of them in 31-40 years category, 21(10.5%) of them in 41-50 years category and 3(1.5%) in 51-60 years category. The pie diagram represents the above data.

**Occupational Status:**

The above table and the bar chart show the distribution of job grouping of the study patients. Of the two hundred patients studied, 32(18%) of them were Commercial sex workers, 91(45.5%) of them were homemakers, 18(9%) were unskilled workers and 59(29.5%) were skilled workers.

**Marital Status:**

On analysing the marital status of the study patients, 12(6%) of them were unmarried, 39(19.5%) of them were married for 1-5 years, 49(24.5%) of them were married for 6-10 years and 100(50%) of them were married for more than 10 years. The pie diagram graphically represents the analysed data.

**Number of Partners:**

The above table shows the number of sexual partners of the study group. 145(72.5%) of them had single partner and 55(27.5%) had multiple partners.

**Type of Discharge:**

| Discharge | Total | % |
|---|---|---|
| Mucoid | 111 | 55.5 |
| Mucopurulent | 64 | 32 |
| Curdy White | 25 | 12.5 |
| Total | 200 | 100 |

On analysing the type of abnormal discharge in the study group, 111(55.5%) of them had mucoid discharge, 64(32%) of them had mucopurulent discharge and 25(12.5%) had curdy white discharge.

**Discharge Volume:**

| Discharge Volume | Total | % |
|---|---|---|
| Scanty | 30 | 15 |
| Moderate | 154 | 77 |
| Profuse | 16 | 8 |
| Total | 200 | 100 |

The above table shows the analysis of the volume of discharge in the study group. 30(15%) of them had scanty discharge, 154(77%) of them had moderate discharge and 16(8%) of them had profuse discharge.

**Specific Cervix findings:**

The above analysis shows the status of cervix and associated findings in the study group. 77(38.5%) of them had cervical erosions, 48(24%) of them had normal cervix, 28 (14%) of them had hypertrophic cervix, 44(22%) of them had hypertrophic cervix with cervical erosions, 1 of them had strawberry cervix and 2 of them had hypertrophic cervix with nabothian follicle.

**KOH Study:**

| | Whiff's Test |
|---|---|
| | 70 |
| | 130 |

| | |
|---|---|
| [redacted] | 200 |

The above table gives the outcome of KOH study and candidal culture of the patients in the study group. 46(23%) of them were KOH study positive. The Whiff's test was positive in seventy patients.

**KOH Study Vs Candida Culture:**

The above table shows the comparison of KOH study positive patients and the status of the laboratory culture. Culture yield was more in two patients when compared to KOH study. 32 out of 33 KOH study positive patients were positive in lab culture in the Vulvovaginal candida group. The yield was almost 100% more(8

of 4 KOH positive) in the mixed infection group of Trichomonas and Candida infection group.

**Wet Mount Vs Culture Status Analysis( Trichomonas):**

| Status | Wet Mount | Culture |
|---|---|---|
| Positive | 35 | 41 |
| Negative | 11 | 8 |

(This table is computed from the 49 cases of Trichomonas vaginalis)

The culture group (41) yielded better results when compared to wet mount group(35).

**Vaginal Smear Study:**

| Type of Cells | Number of Patients |
|---|---|
| Clue Cells | 70 |
| Pus Cells | 45 |
| Secondary Organisms | 20 |

The vaginal smear study revealed clue cells in 70 patients, pus cells in 45 patients and secondary organisms in 20 patients.

**Cervical Smear Study:**

| Type of Cells | Number of Patients |
|---|---|
| Pus cells | 40 |
| Secondary Organisms | 18 |
| Intracellular Organisms | 0 |

Cervical smear study had revealed pus cells in 40 patients and secondary organisms in eighteen patients.

**.pH study**

| | |
|---|---|
| pH < 5 | 89 |
| pH>5 | 111 |

The pH evaluation of the vaginal discharge gives a clear distinction in differentiating between pathogenic and non-pathogenic discharge. This is a simple bedside test. It helps the clinician to plan for more specific investigations in the management of these patients.

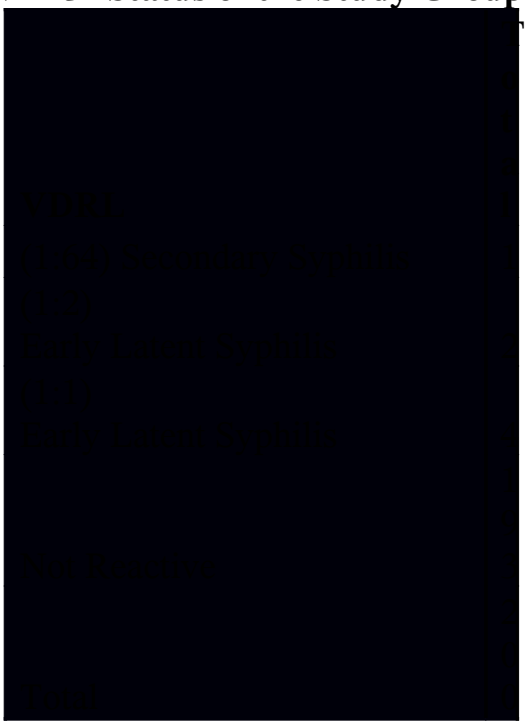
**Associated Herpes genitalis infection:**

There were six cases in the study who were co-infected with Herpes genitalis. Of which three of them were with candidal infection, two of them with Bacterial vaginosis and one with Trichomonas infection.

**Associated Human Immunodeficiency Virus Infection:**

There were seventeen(8.5%) patients in the study group who were positive for Human Immunodeficiency Virus Infection.

**VDRL Status of the Study Group:**




The study group had seven patients who were reactive to VDRL test. Of which 6 of them had early latent syphilis and 1 of them had secondary syphilis.

The following analysis were done taking into the data of individual diseases causing abnormal vaginal discharge. This helps us to have better understanding of more complex data and gives the policy makers a clear insight of the situation so as to decide about the future plans in managing these disorders.

**Age Group Analysis Vs Cause of Discharge :**

| Age Group | BV | CC+BV | NV | TV | VVC | BV/VVC | TV/VVC | BV/TV | Total |
|---|---|---|---|---|---|---|---|---|---|
| 11-20 | 5 | 0 | 3 | 1 | 2 | 0 | 1 | 0 | 12 |
| 21-30 | 21 | 11 | 8 | 10 | 10 | 8 | 3 | 2 | 84 |
| 31-40 | 28 | 4 | 5 | 5 | 10 | 2 | 2 | 3 | 64 |
| 41-50 | 2 | 1 | 1 | 2 | 6 | 0 | 0 | 0 | 22 |
| 51-60 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |
| Total | 58 | 16 | 17 | 18 | 28 | 11 | 6 | 5 | 185 |

The above table gives the data on age group vs cause of discharge analysis. One can appreciate the prime age group 21 to 40 forms the major population who suffer from these illness. 158 of 200 patients studied belonged to these age group thus forming 79% of the study population. The disturbing outcome of this analysis reveals 18 patients who belong to the 11 to 20 years category. These are the

patients who should be the target group for prevention. Going into disease wise analysis, Bacterial vaginosis, Trichomonas and Candidiasis affects the prime youth of these patients between 20 to 40 years. Most of them do not report their reproductive tract symptoms considering privacy. The taboo should be removed from the society to make these patients attend reproductive health clinics at the onset of the symptoms in order to avoid the morbidity involved in these potentially treatable conditions. Further analysis of the data also reveals the

presence of double infections more in these younger age group patients. Again one should also note that about 27 younger age group patients are diagnosed to have non infectious cause for the abnormal vaginal discharge. Adequate sexual education is important for these patients to have appropriate knowledge about the normal reproductive physiology and to quell the misconceptions about reproductive tract infections. Appropriate gynecologic counseling are mandatory for these patients to improvise the outcome.

## Marital Status Vs Cause of Discharge Analysis


The analysis of the data obtained on comparison of diagnosis versus marital status yielded the following results. On close interpretation of the data one can appreciate as the marital age of the patient increases the risk to genital infection. One hundred of the patients studied belonged to the “More than ten years of marital age” category.

About 49 of them were between 6-10 years, 39 of them were between 1- 5 years and 12 of the study group were never married and has acquired the infections on extra-marital contacts.

On evaluation of the data, one can appreciate all the incidence of diseases is

on the rise except for the non-infectious cause of vaginal discharge, Cervicitis. This again should be interpreted with caution as these patients need more intensive gynecology screening to exclude other causes of the disease per se. More intensive dissemination of the knowledge should be directed to the adolescent age group and commercial sex workers regarding the need for safer sex practices to avoid these type of sexually transmitted infections at an early age. Appropriate treatments to these patients and treatment to the partners are necessary to eradicate the infectious cause of abnormal vaginal discharge. Personal education and counseling are essential in the treatment of these patients and prevention of recurrent infections.

**Number of Partners Vs Cause of Discharge**

On analyzing the number of partners versus cause of abnormal vaginal discharge, 145 (72%) of them were monogamous and 55 of them were having multiple partners. One can also note, of this 55 only 32 are commercial sex workers. Looking in to the multiple partner strata, one could note 19 of them had bacterial vaginosis, twelve of them had Trichomonas and twelve had vulvovaginal candidiasis. It is also important to note the non infectious cause of abnormal vaginal discharge is only five of fifty five in the multiple partners group, when compared to 28 of 145 in the single partners group.

This data does not address to the number of partners to their male partners. A detailed study of that data will augment the outcome of this analysis. This was not done as most of the patients presented to the outpatient department without their partner/s.

**Type of Discharge Vs Cause of Discharge**

The analysis of the type of discharge and cause of discharge of the two hundred patients presented with the following data. 111 of the studied patients had mucoid discharge, 64 of them had mucopurulent discharge and 25 of them had curdy white discharge. Looking up the data of Bacterial vaginosis, thirty nine of them had mucoid discharge, thirty one of them mucopurulent and one had curdy white discharge. Of the noninfectious cause for vaginal discharge, twenty eight of them had mucoid and five of them had mucopurulent discharge. The Bacterial vaginosis patient with curdy white discharge was advised to come for

review after three weeks for a reevaluation. Rest of the patients were treated with appropriate medication.

## Cause of Discharge Analysis

On analysing the cause of abnormal vaginal discharge in the 200 patients studied, the following were observed. Seventy one of them suffered from Bacterial vaginosis, thirty six of them from Vulvovaginal candidiasis, thirty of them from Trichomonas vaginalis, thirteen of them had a mixed infection from Bacterial vaginosis and Trichomonas vaginalis, eleven of them had bacterial vaginosis and trichomonas infection, five had trichomonas and candidal infection and one of

them had trichomonas and candidal infection. Seventeen of them had normal physiological vaginal discharge and sixteen of them had vaginal discharge due to non infectious cervicitis. The pie diagram depicts the distribution of various causes of discharge amongst the two hundred patients studied. Of the studied population Bacterial vaginosis stood first, Vulvovaginal candidiasis second and

Trichomonas stood third as the top three causes of abnormal vaginal discharge in the study group.

The diagnosis of Bacterial vaginosis is made using Amsel’s criteria. 72 patients fulfilled 3 criteria and the remaining 23 patients fulfilled all the four criteria.

**Discharge Volume Vs Cause of Discharge Analysis**

| Discharge Volume | BV | CER V | CIN | TV | CVV | BV/TV C | TV/VV C | BV/TV C | Total |
|---|---|---|---|---|---|---|---|---|---|
| Moderate | 95 | 11 | 11 | 22 | 32 | 8 | 4 | 10 | 154 |
| Profuse | 6 | 0 | 0 | 5 | 0 | 1 | 2 | 2 | 16 |
| Scanty | 5 | 5 | 6 | 3 | 4 | 2 | 0 | 1 | 30 |
| Total | 21 | 16 | 17 | 30 | 36 | 11 | 6 | 13 | 200 |

Of the studied 200 patients, 154 of them had moderate discharge, thirty had scanty discharge and sixteen had profuse discharge. It is imperative to note that most of the patients do not report to the clinic when they have scanty discharge. More emphasis should be made in the health education to teach the general public to identify and quantify the abnormal vaginal discharge hence forth facilitating them to attend the health care facility early. Sixteen of them were suffering from profuse discharge of which almost all of them had a potentially treatable condition. In this group it is important to note that none of them had a physiological cause for profuse discharge. More emphasis should be laid upon to educate these patients, not to delay evaluation, treatment and to report to the hospital at an early stage to prevent the morbidity of the potentially treatable disease.

**Extra marital and premarital contact analysis:**

61 patients gave history suggestive of sexual contact out of marriage contract. Analysis done has revealed that 43 of them had extramarital contact and 18 of them had premarital contact. This history is a sensitive issue and good outcome is essentially dependent of developing better doctor patient relationship.

**HIV Status Vs Cause of Discharge Analysis**

The analysed data reveals seventeen of the study group had coexisting HIV infection.

Five of them were associated with Vulvovaginal candidiasis, four with Bacterial vaginosis, two with Trichomonas, two with Trichomonas and Bacterial vaginosis, one with Trichomonas and Vulvovaginal candidiasis, one with Bacterial vaginosis and Vulvovaginal candidiasis and two of them with cervicitis. These patients pose a higher risk to their sexual partners as they have more mucosal inflammation thus enhancing the spread of HIV to their partners. More emphasis should be laid upon these patients ensuring a complete cure from these diseases as they already suffer from immunocompromised status. These patients need an extended course of treatment when compared to HIV seronegative patients and are more prone

from recurrent infections. Appropriate counseling is manadatory for their sexual partners too.

**KOH Smear Status Vs Cause of Discharge**

The evaluation of the KOH smear status has produced the above data in these patients. One of the Trichomonas infected patient and one of the Trichomonas and Bacterial vaginosis patient were KOH smear positive. These patients need a closer followup. The possible causes may be an occult infection. They need more sophisticated evaluation for excluding coexisting Candidal infection. In this study evaluation with more specific culture for Candida failed to culture the pathogens. Hence these patients were advised to be on regular followup and repeat evaluation after three weeks. Thirteen of the KOH smear positive patients had a dual infection with other organisms. A more detailed examination and assessment of the immune status of these patients are mandatory to identify the reasons of co-existing other infections.

Limitations of the study:

The study is based on a n number of two hundred patients. A study of larger magnitude may have a better statistically significance.

The study done is based on the outcome of wet mount and laboratory culture for various organisms causing abnormal vaginal discharge. This was done over a period of time. Hence the lab situations may be varied over a period of time thus producing a mild difference in the outcome of the lab reports.

More specialized media and a stringent laboratory atmosphere with laminar airflow and controlled atmosphere may enhance the culture outcome.

The specimen is taken for analysis by various medical professionals. Specimen retrieval methods may have a mild variation thus producing an impact to the results.

Wet mount techniques are well standardized. The training and expertise of the personnel who read the slides are varied enough to produce a trivial variation in the outcome.

Other causes like Chlamydia sp. Infections should be looked in for. The present study do not employ laboratory methods for identifying Chlamydia in the vaginal discharge.

KOH method to read fungal elements is a fairly standardized technique, but user

variation can have a trivial impact in the results.

The genomic science is fast growing and proving it's improving ability to pick up the diagnosis in difficult cases where the other techniques fail. The ability of the genetic methods are so well refined that a DNA fragment is sufficient enough to amplify and clinch the diagnosis. Employing such methods may improvise the outcome of the diagnostic methods for these type of studies.

**The Problem of Persistent Discharge:**

It can be difficult to know what to do for women who complain of persistent vaginal discharge with repeated negative STI screen results and negative cervical cytology. When minimal discharge is evident on examination, it is worth discussing again personal hygiene practices and douching, the basis for physiological discharge, and inquiring whether there are psychosexual difficulties as a result of the patient's continued symptoms.

If use of spermicides and lubricants is contributing to symptoms, alternative contraception choices should be discussed. An extensive cervical ectropion can cause heavy mucoid discharge, which, if troublesome to a woman with normal

cervical smear test results, may be helped by intravaginal acetic acid. Some cases may warrant cryocautery to relieve symptoms.

After the menopause, atrophic vaginal changes may predispose women to infective vaginitis. Intravaginal oestrogen replacement, with pessaries or cream, gradually improves the condition of the vaginal epithelium and reduces the susceptibility to infection.

Underlying gynaecological disease must be considered in all women with unexplained persistent vaginal discharge. Gynaecological neoplasms, such as benign endocervical and endometrial polyps, can present with vaginal discharge, and malignancy needs to be excluded.

Referral to a gynaecologist allows for further investigations that may include transvaginal ultrasonography, endometrial sampling and hysteroscopy.

The patients with candidal infection were subjected to Urine examination and when they were positive for sugar a blood sugar test was also done. Incidentally this study picked up twenty new diabetic patients who presented with vulvovaginal candida infections.

## Conclusion:

It is imperative from the study that a significant amount of general population is suffering from the problem of abnormal vaginal discharge. Bacterial vaginosis, Trichomonas and Vulvovaginal Candidiasis are the principal cause for the abnormal vaginal discharge. This study has highlighted the prevalence of more than one infection in a single individual. This gives an important insight to the issue, that from now on clinicians should be diligent in picking up these individuals with multiple infections. A periodic study and review of this type will help the epidemiologist to identify the prevalence pattern of these type of infections. In the era of genome biology, it is a definite possibility of developing a single test which will identify most of the causative organism. More research should be done in reducing the laboratory time and is preferable to produce instantaneous results. These are the subsects of the patients who are still stigmatized by the society. Hence followup and review is always a problem in these patients. Due counseling, awareness education are mandatory for these patients to give them a cure and reduce the morbidity associated with.

The unidentified presence of HIV infection in the general population poses a potential risk for infection, spread and mutation of these organisms in

immunocompromised states. In future, these factors will pose the clinician with the tough task of treating the organisms which are resistant to the conventions of treatment.

Permissiveness, adventure, travel and transforming society has opened up a world of opportunity to the general population to experiment with sexuality. Worldwide various studies are reporting the reducing age of coitarche. It is time, that the policy makers and health professionals have a co-ordinated approach in providing adequate and appropriate health education at appropriate age.

The detailed evaluation of the obtained data from the clinical and laboratory assessment of abnormal vaginal discharge has given a clear insight of the problem. The outcome will help the health policy makers, Venereology Physicians and Venereal Microbiologists to give a better outcome in the approach, evaluation, laboratory methods and treatment of this disorder.

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**PROFORMA**

Serial No.
STD OP No.
Name
Age
Educational Qualification
Income
Marital Status
Duration of marriage
Occupation
Address
Presenting complaints
Genital discharge
Odour of discharge
Genital itching
Genital ulcer
Inguinal adenitis
Skin rash

Any genital growth
Dysuria
Lower abdominal pain
Obstetric history
No of children
Menstrual details
Obstetric history
Treatment history
Treatment taken so far for the present complaints
Past venereal disease and treatment
Exposure history
Recent exposure
Marital Contact
Premarital Contact
Extramarital Contact
Contact History
Partner Name and card no.
Significant history and investigation reports
Examination

General and systemic examination
Examination of Genitalia
Inguinal  nodes
External urethral meatus
Speculum examination
Genital – Soddening of vulva / wart / ulcer
Discharge:
Scanty/moderate/ profuse
Mucoid/mucopurulent/purulent
Homogenous/flocullar/curdy
Foul smell / no odour
Skin and mucous membrane
Bones and joints
Investigations
Wetmount
Saline
KOH
Smear
Vaginal

Cervical
Culture
Trichomonas vaginalis
Gonococcal
Candida
H I V Status
VDRL Status
Urine – albumin, sugar and deposits
Blood Sugar (In select cases)