



Comparative Study On Clinico-Epidemiological Profile Of Symptomatic Vaginal Discharge Among Hiv Infected And Noninfected Women

Dr. B.S Sindhu^{1*}, Dr. G. Baby Shalini², Dr.B. Lokesh³

^{1,2,3}Assistant Professor,

¹Department Of Dermatology And Venereology,

²Department Of Obstetrics & Gynaecology,

³Department Of General Surgery,

Apollo Institute Of Medical Sciences & Research, Chittoor, Andhra Pradesh, India

***Corresponding Author:**

Dr. B.S Sindhu

Assistant Professor, Department Of Dermatology And Venereology,

Apollo Institute Of Medical Sciences & Research, Chittoor, Andhra Pradesh, India

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Introduction: Vaginal discharge is considered as a common gynaecological symptom affecting reproductive age group women. The risk of acquisition and transmission of HIV increases with the presence of vaginal discharge. Due to the presence of HIV infection, the clinical presentation of vaginal discharge, its course and complications, response to treatment can be modified resulting in increased morbidity of the patients.

Aim of the study: To compare the prevalence, socio-demographic variables and infectivity pattern of vaginal discharge between HIV infected and non-infected women.

Materials & Methods: The study population comprised of 200 women with complaints of vaginal discharge attending the Institute of dermatology & Venereology, Apollo Institute Of Medical Sciences & Research, Chittoor, Andhra Pradesh, India between July 2020 to August 2021 were included in the study. All the patients underwent a complete physical examination and genital examination. Except antenatal women and women during menstruation, other patients were examined with Cusco's bivalved self retaining vaginal speculum. All these patients were clinically analyzed for the genital manifestations and supported by laboratory diagnosis. Sera from all the participants were VCTC for screening HIV after informed consent and providing pre and post test counselling. In patients who were found to be HIV positive, blood was collected for CD4 count analysis. Serological tests for syphilis including blood VDRL and TPHA were performed. Blood was also collected for HBsAg and Anti HCV antibodies.

Results: In HIV positive women, the most common cause of abnormal vaginal discharge was vulvovaginal candidiasis (41.2%) followed by bacterial vaginosis (23.5%) and trichomoniasis (11.8%). Whereas, in HIV negative women, the commonest cause was bacterial vaginosis (39.9%) followed by candidiasis (27.9%) and trichomoniasis (15.8%). Cervicitis was found to be more common in HIV infected women (17.6%) than HIV uninfected women (3.8%). Mixed infection in HIV negative (1%) were relatively less compared to HIV positive women (5.9%).

Conclusion: More emphasis should be laid upon patients who are HIV sero-positive, ensuring a complete cure from these diseases as they already suffer from immunocompromised status. These patients need an extended course of treatment and are more prone for recurrence.

Keywords: Vaginal Discharge, Bacterial Vaginosis, Trichomoniasis, Vulvovaginal Candidiasis

Introduction

Vaginal discharge is considered as a common gynaecological symptom which is affecting women of reproductive age group and one of the common problem to seek medical attention¹. The perception of women to the cause of vaginal discharge can influence her choice of treatment. Prior to the consultation of her doctor, most of the women would have tried self-treatment using over the counter drugs². This can often lead to unsuccessful outcome. Some women may feel embarrassed or have fear in view of sexual transmission as a cause for vaginal discharge, which often leads to delay in consultation and treatment³. To overcome this problem effectively, it becomes necessary to establish the etiological organisms causing vaginal discharge to get appropriate output⁴. Mixed genital infections caused by more than one organism at the same time can compound the presentation⁵. This is particularly true in high risk persons and Human Immunodeficiency Virus (HIV) infected patients⁶. An understanding of this association between vaginal discharge and HIV infection is critical for the formulation of HIV prevention measures. Acquired immunodeficiency syndrome (AIDS) is considered as a global pandemic with cases virtually reported from all the countries. The main factors that have resulted in India’s vast HIV affected population can be due to labour migration, low literacy rates in some of the rural population causing lack of awareness and disparity. Due to the presence of HIV infection, especially the immunodeficiency of AIDS, the clinical presentation of vaginal discharge, its course and complications, its response to treatment can be modified resulting in increase in morbidity of the patients⁷. The risk of acquisition and transmission of HIV increases with the presence of vaginal discharge⁸. Screening and treatment of vaginal discharge is regarded as an immanent component of health care in those patients infected with HIV.

Materials & Methods: The study population comprised of 200 women with complaints of vaginal discharge attending the Institute of dermatology & Venereology, Apollo Institute Of Medical Sciences & Research, Chittoor, Andhra Pradesh, India between July 2020 to august 2021 were included in the study. All the patients underwent a complete physical examination and genital examination. Except antenatal women and women during menstruation, other patients were examined with Cuscos bivalved self retaining vaginal speculum. All these patients were clinically analyzed for the genital manifestations and supported by laboratory diagnosis. Sera from all the participants were VCTC for screening HIV after informed consent and providing pre and post test counselling. In patients who were found to be HIV positive, blood was collected for CD4 count analysis. Serological tests for syphilis including blood VDRL and TPHA were performed. Blood was also collected for HBsAg and Anti HCV antibodies From vaginal smear, the following tests were done, pH of the discharge, Whiff test by adding few drops of 10% KOH (Potassium hydroxide) to the genital discharge. Wet film with one drop of normal saline for Trichomonas vaginalis and clue cells. 10% KOH wet mount preparation for Candida albicans and culture with SDA (Saborauds Dextrose Agar) for suspective cases. Grams stain to identify Neisseria gonorrhoea from endocervix, Lactobacillus, clue cells and Candida hyphae from vaginal discharge. In addition to the routine examination of urine, culture of Neisseria gonorrhoea from urine specimen and endo cervix was done. Routine baseline laboratory analysis including complete blood count, urine for albumin, sugar deposits, ultra sound abdomen were done for all patients. Liver function test, Renal function test, Random blood sugar, chest x-ray, ECG, sputum smear for AFB, Mantoux test, blood and urine culture sensitivity were also done for the needed patients.

Results

TABLE :1 HIV STATUS OF PARTICIPANTS

HIV	No of patients n=200 (%)
-----	-----------------------------

Positive	17 (8.5%)
Negative	183 (91.5%)

Among 200 women studied, 17 (8.5%) were confirmed to be HIV positive and 183 (91.5%) were HIV negative. Comparison of variables between HIV positive and HIV negative women having vaginal discharge were listed below.

Table :2 COMPARISON OF AGE GROUP WITH HIV STATUS

Variable		Age group (years)			
		<=20	21 - 30	31- 40	>41
HIV	+ve	1 (5.9%)	3 (17.6%)	11 (64.7%)	2 (11.8%)
	-ve	8 (4.4%)	79 (43.2%)	58 (31.7%)	38 (20.8%)
Chi- square value (Fischer Exact) – 8.094 p value 0.04 (statistically significant)					

On comparing HIV negative and HIV positive participants having vaginal discharge with age group, maximum number of HIV positive and negative women were in the age group of 31-40 years (64.7%) and 21-30 years (43.2%) respectively. This is found to be statistically significant (p=0.04).

Table :3 COMPARISON OF DISTRIBUTION OF PAST STDs WITH HIV STATUS

Variable		Distribution of past STD		
		Genital Ulcer Disease (GUD)	Vaginal Discharge Syndrome (VDS)	Others
HIV	Positive	5 (45.5%)	5 (45.5%)	1 (9.1%)
	Negative	8 (12.3%)	54 (83.1%)	3 (4.6%)
Chi- square value (Fischer Exact) – 8.116 p value 0.020 (statistically significant)				

The above data shows that, vaginal discharge and genital ulcer disease were equally present (45.5%) among HIV positive women, and 83.3% had vaginal discharge, 12.3% had genital ulcer disease and 4.6% had other STIs in HIV non infected category.

Table :4 COMPARISON OF NATURE OF VAGINAL DISCHARGE WITH HIV STATUS

	Nature of Discharge

Variable		Curdy white	Mucoid	Mucopurulent
HIV	+ve	5 (29.4%)	6 (35.29%)	6 (35.29%)
	-ve	27 (14.7%)	136 (74.3%)	20 (30.10%)
Chi- square value (Fischer Exact) –1.874 p value 0.440 (not statistically significant)				

On analysing the type of abnormal vaginal discharge, 5 (29.4%) of them had curdy white discharge. Mucoid and mucopurulent discharge were seen in 6 (35.29%) patients each in HIV positive group. In that, 1 patient had frothy vaginal discharge. In HIV negative category, more than of the patients (74.3%) had mucoid discharge, 20 (30.1%) were with mucopurulent discharge and 14.7% with curdywhite discharge. Among these, frothy discharge was seen in 4 patients.

Table :5 COMPARISON OF AMOUNT OF VAGINAL DISCHARGE WITH HIV STATUS

Amount of discharge	HIV status	
	Positive	Negative
Scanty	5 (29.4%)	27 (14.7%)
Moderate	6 (35.2%)	136 (74.3%)
Profuse	6 (35.2%)	20 (10.9%)
Chi square (Fischer exact) 12.52 p value 0.001 (statistically significant)		

Among 17 HIV positive women, 5 (29.4%) had scanty vaginal discharge, 6 (35.2%) had moderate and profuse vaginal discharge each. In HIV negative group, 27 (14.7%) had scanty discharge, 136 (74.3%) had moderate and 20 (10.9%) had profuse discharge.

Table :6 COMPARISON OF SYMPTOMS WITH HIV STATUS

Symptoms		HIV status		Chi square (Fischer exact) p value
		Positive	Negative	
Vulval itching	Present	9 (52.9%)	109 (59.5%)	0.28 0.595 (not significant)
	Absent	8 (47.1%)	74 (40.4%)	
Dysuria	Present	8 (47.1%)	56 (30.6%)	1.936 0.164 (not significant)
	Absent	9 (52.9%)	127 (69.3%)	
	Present	3 (17.6%)	32 (17.4%)	0.0003

Dyspareunia	Absent	14 (82.3%)	151 (82.5%)	0.986 (not significant)
Lower abdominal pain	Present	2 (11.8%)	21 (11.4%)	0.0013
	Absent	15 (88.2%)	162 (88.6%)	0.971 (not significant)

Vaginal itching was found to be the most common symptom in addition to vaginal discharge irrespective of the HIV status (52.9% in HIV positive versus 59.5% in HIV negative). Dysuria was present more commonly in HIV positive women (47.1%) compared to negative women (30.6%). Dyspareunia and lower abdominal pain was present in same number of women in relation to their HIV status.

Table :7 COMPARISON OF VULVAL EXAMINATION WITH HIV STATUS

Vulval Examination		HIV status		Chi square (Fischer exact) p value
		Positive	Negative	
Erythema	Present	7 (41.1%)	33 (18%)	5.20
	Absent	10 (58.8%)	150 (82%)	0.022 (significant)
Soddening	Present	6 (35.3%)	42 (22.9%)	1.299
	Absent	11 (64.7%)	141 (77.1%)	0.254 (not significant)
Excoriation	Present	4 (23.5%)	16 (8.7%)	3.77
	Absent	13 (76.5%)	167 (91.3%)	0.052 (not significant)

41.1% and 18% were found to have erythema on examination of genitalia in HIV positive and negative women respectively. This was found to be statistically significant. Soddening was present in 35.3% of HIV infected and 22.9% of uninfected women. 23.5% HIV positive and 8.7% HIV negative women had excoriation on local examination.

Table :8 COMPARISON OF CERVIX FINDINGS WITH HIV STATUS

Variable		Cervix				
		Healthy	Erosion	Ectopy	Hypertrophic cervix	Strawberry cervix
HIV	+ve	7 (41.2%)	6 (35.3%)	3 (17.6%)	1 (11.1%)	0 (0%)
	-ve	141 (77%)	25 (13.7%)	8 (4.4%)	8 (4.4%)	1 (0.5%)
Chi- square value (Fischer Exact) –12.55 p value 0.008 (statistically significant)						

The above analysis shows the appearance of cervix on speculum examination in the study group. Both categories showed healthy cervix as the most common presentation (41.2% in HIV infected versus 77% in non-infected). Whereas, cervical erosion was more in case of HIV infected (35.3%) than in non-infected (13.7%). Only 1 (0.5%) of the participant was found to have strawberry cervix in HIV negative group and none of the HIV positive women showed strawberry cervix.

Table :9 COMPARISON OF WHIFF TEST WITH HIV STATUS

Variable		Whiff test	
		Positive	Negative
HIV	+ve	4 (23.5%)	13 (76.5%)
	-ve	65 (35.5%)	118 (64.5%)
Chi- square value (Fischer Exact) –0.990 p value 0.428 (not statistically significant)			

About 23.5% were positive for whiff test (on adding 10% potassium hydroxide to the vaginal discharge) in HIV infected cases and 35.5% were positive in HIV uninfected patients.

Table :10 COMPARISON OF pH STUDY WITH HIV STATUS

Variable		pH	
		< 5	>=5
HIV	+ve	9 (52.9%)	8 (47.1%)
	-ve	79 (43.2%)	104 (56.8%)
Chi- square value (Fischer Exact) –0.603 p value 0.456 (not statistically significant)			

pH of less than 5 was seen in 9 (52.9%) patients out of 17 HIV infected women and 79 (43.2%) patients in HIV uninfected cases.

Table :11 COMPARISON OF MICROSCOPIC EXAMINATION OF VAGINAL SMEAR WITH HIV STATUS

Variable		Microscopy							
		Pus cells	Clue cells	Clue cells + PSH	Pseudohyphae	TV	TV + PSH	Secondary organisms	Negative
	+ve	2 (11.8%)	4 (23.5%)	1 (5.9%)	7 (41.2%)	2 (11.8%)	0 (0%)	1 (5.9%)	0 (0%)

HIV	-ve	4 (2.2%)	73 (39.9%)	1 (0.5%)	51 (27.9%)	27 (14.8%)	1 (0.5%)	3 (1.6%)	23 (12.6%)
Chi- square value (Fischer Exact) – 21.372 p value 0.021 (statistically significant)									

Out of 17 HIV positive women, the vaginal smear study revealed, clue cells in 4 (23.5%) patients, pseudohyphae in 7 (41.2%), trichomonas in 2 (11.8%), pus cells in 2 (11.8%) and secondary organisms in 1 (5.9%) patient. 1 (5.9%) patient showed both clue cells and pseudohyphae in gram stain. Among 183 HIV negative women, gram stain showed clue cells in 73 (39.9%) patients, 10% KOH showed pseudohyphae in 51 (27.9%), wet mount showed trichomonas in 27 (14.8%) patients. Co-infection like trichomonas and pseudohyphae, pseudohyphae and clue cells were seen in 1 (0.5%) case each. No organisms were found in 23 (12.6%) women.

Table :12 COMPARISON OF MICROSCOPIC EXAMINATION OF CERVICAL SMEAR WITH HIV STATUS

Variable		Microscopy	
		> 30 Pus cells	Negative
HIV	+ve	3 (17.6%)	14 (82.4%)
	-ve	7 (3.8%)	176 (96.2%)
Chi- square value (Fischer Exact) – 6.256 p value 0.042 (statistically significant)			

Cervical smear study had revealed, more than 30 pus cells in 3 (17.6%) cases of HIV infected women and 7 (3.8%) cases of HIV uninfected women. None of them showed intracellular organisms in microscopic examination of cervical smear.

Table :13 COMPARISON OF CULTURE OF VAGINAL DISCHARGE WITH HIV STATUS

Variable		Culture				
		Candida albicans	Candida nonalbicans	Trichomonas (TV)	Trichomonas (TV) + Candida nonalbicans	Negative
	+ve	2 (11.8%)	6 (35.3%)	2 (11.8%)	0 (0%)	7 (41.2%)

HIV	-ve	10 (5.5%)	42 (23%)	29 (15.8%)	1 (0.5%)	101 (55.2%)
Chi- square value (Fischer Exact) –2.842 p value 0.376 (not statistically significant)						

Candida non albicans was the most common organism isolated in culture of vaginal discharge in both HIV positive (35.3%) and negative women (23%). Only 5.5% of Candida albicans was present in culture of vaginal discharge of HIV negative women.

Table :14 COMPARISON OF ETIOLOGICAL DIAGNOSIS WITH HIV STATUS

Variable		Diagnosis						
		Bacterial Vaginosis (BV)	BV+VVC	Trichomoniasis (TV)	Vulvo vaginal candidiasis (VVC)	TV +VVC	Cervicitis	Others
HIV	+ve	4 (23.5%)	1 (5.9%)	2 (11.8%)	7 (41.2%)	0 (0%)	3 (17.6%)	0 (0%)
	-ve	73 (39.9%)	1 (0.5%)	29 (15.8%)	51 (27.9%)	1 (0.5%)	7 (3.8%)	21 (11.5%)
Chi- square value (Fischer Exact) –14.615 p value 0.031 (statistically significant)								

Vulvovaginal candidiasis (41.2%) was the most common cause of abnormal vaginal discharge in HIV infected women followed by bacterial vaginosis and trichomoniasis compared to HIV uninfected women, where bacterial vaginosis (39.9%) was the common cause. Cervicitis was seen in 17.6% of HIV positive and 3.8% of HIV negative women. Out of 183 HIV negative patients, 21 (11.5%) were found to have no organisms and diagnosed as normal vaginal discharge. Whereas, all the HIV infected patients with vaginal discharge were found to have infective etiology.

Table :15 COMPARISON OF VDRL RESULTS WITH HIV STATUS

Variable		VDRL	
		Reactive	Non-reactive
HIV	Positive	1 (5.9%)	16 (94.1%)
	Negative	4 (2.2%)	179 (97.8%)
Chi- square value (Fischer Exact) – 0.872 p value 0.362 (not statistically significant)			

Out of 17, 1 (5.9%) was found to be reactive for VDRL in HIV positive category. And 4 (2.2%) patients were reactive in HIV negative category.

Table :16 COMPARISON OF TPHA RESULTS WITH HIV STATUS

Variable		TPHA	
		Positive	Negative
HIV	Positive	1 (5.9%)	16 (94.1%)
	Negative	6 (3.3%)	177 (96.7%)
Chi- square value (Fischer Exact) – 0.312 p value 0.468 (not statistically significant)			

TPHA was found positive in 1 patient who was also reactive for VDRL in HIV sero-positive category and 6 patients showed positive TPHA in HIV sero- negative category. From VDRL and TPHA results, it is concluded that, 1 HIV positive women had secondary syphilis. In HIV uninfected women with vaginal discharge, 2 patients were found to have late latent syphilis and 4 patients had early latent syphilis.

Table :17 COMPARISON OF CD4 COUNT WITH ETIOLOGICAL DIAGNOSIS

Variable		Diagnosis				
		BV	BV+VVC	TV	VVC	Cervicitis
CD4	<200	0 (0%)	(0%)	2 (100%)	0 (0%)	0 (0%)
	201-500	2 (40%)	1 (20%)	0 (0%)	1 (20%)	1 (20%)
	>500	2 (20%)	0 (0%)	0 (0%)	6 (60%)	2 (20%)
Chi- square value (Fischer Exact) – 21.12 p value 0.033 (statistically significant)						

This table shows that, all the patients with trichomoniasis were having CD4 count of less than 200. Half of the patients with bacterial vaginosis had CD4 count between 200-500 and remaining half of them had less than 500 counts. Vulvovaginal candidiasis was found in 6 patients with CD4 count >500 compared to 1 patient with CD4 count between 200-500.

Discussion

The analysis of age in women with vaginal discharge shows that mean age for HIV positive women was 33 years, with majority of women in the age group of 31-40 years. women that were heavily infected are those that are found between the age group of 21-30 and 31-40 years. This shows that vaginal discharge was more common among sexually active and childbearing age group.[9] The analysis also reveals that 9 (4.5%) patients belong to 18-20 years of age. These are the patients who should be the target group

for prevention. More than half of the women (64.7%) were illiterate in HIV positive category, which explains the lack of awareness about safe sexual practices. The prevalence of vaginal discharge was low in women who had higher education, irrespective of their HIV status. Majority of women were housewives, irrespective of their HIV status. About 17.6% of HIV positive women were commercial sex workers. More intensive dissemination of the knowledge should be directed to the commercial sex workers regarding the need for safer sex

practices.[10] Majority of the women in this study were married (HIV positive - 47.1% versus HIV negative - 85.2%), which leads to increase in spread of infections in their partners. HIV positive women were more likely to be divorced or separated (41.2%) than the HIV negative women (5.5%). This shows that they would have contracted infections from extra-marital contacts. In this study, 41.3% of HIV positive women were having multiple partners compared to 17.5% in HIV negative women. There was statistically significant difference between the two groups of women with regards to marital status ($P = 0.027$). This shows that increased number of partners increases the chance of getting vaginal infections. Among 7 HIV positive women having multiple partners, 4 of them were having extra marital contact and 3 of them had pre-marital contact. On comparing the last sexual contact between HIV positive and negative women, 58.8% of HIV positive women had their last sexual contact in less than a week ago, while majority of HIV negative women had contact between 1 week – 1 month (48.1%). This implies that most of the HIV positive women were sexually active recently, which can lead to high rates of transmission of infections. The commonest mode of sex was normal peno vaginal route (100%) in both HIV positive and negative women having vaginal discharge.[11] Unnatural mode of sex like peno-oral and peno-anal route were practised more commonly by HIV positive women (11.7% and 5.8%). Anal sex is the riskiest sexual behaviour for transmitting and acquiring HIV. Safer sex practices should be advised in these patients to avoid other sexually transmitted infections. In our study, 64.7% were reported to have past history of STI in HIV positive group and 35.5% in HIV negative group.[12] On evaluation of the data, genital ulcer disease was much more common among women infected with HIV than women not infected with HIV (45.5% versus 12.3%). Therefore, it is imperative to treat genital ulcers, as it increases the transmission of HIV and other sexually transmitted infections. Mucoïd discharge was found to be the most common nature of vaginal discharge seen in both HIV infected (58.8%) and non-infected women (50.8%). This emphasizes the need for more intensive dissemination of knowledge in differentiating normal from abnormal vaginal discharge among women of reproductive age group.[13] On analysing the amount

of vaginal discharge, moderate and profuse discharge were equally seen in HIV positive women (35.2%). Profuse discharge was seen only in 10.9% of women without HIV. None of the women had a physiological cause for profuse discharge. More emphasis should be laid upon to educate these patients, not to delay evaluation, treatment to prevent the morbidity of the potentially treatable disease. The majority of women with vaginal discharge had another coexisting complaint. In our study, the most common symptom reported in addition to vaginal discharge is vaginal itching followed by dysuria and dyspareunia.[14] On examination of genitalia, erythema was significantly more common among HIV positive women (41.1% versus 18%) and soddening was seen more among HIV negative women (35.3% versus 22.9%). 35.3% of HIV positive women with vaginal discharge had cervical erosions on speculum examination, while only 13.7% HIV negative women had cervical erosions. On further analysis, it was found that strawberry cervix was found only in one HIV non infected patient.[15] Patients with cervical erosion were sent to gynaecology department for Pap smear study to rule out carcinoma in situ and were followed up if necessary. [16] About 23.5% were positive for whiff test in HIV infected cases and 35.5% were positive in HIV uninfected patients. pH of more than 5 was seen in 8 (47.1%) patients out of 17 HIV infected women and 104 (56.8%) patients in HIV uninfected cases. 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. On analysing the microscopic findings of vaginal smear, women infected with HIV were more likely to have pseudohyphae (41.2%) than women not infected with HIV (27.9%). On comparing microscopic finding of cervical smear with HIV status, HIV sero-positive women (17.6%) had significantly more number (>30) of pus cells compared to HIV sero-negative women (3.8%).[17] On analysing the cause of abnormal vaginal discharge, the following were observed. In HIV positive women, vulvovaginal candidiasis (41.2%) was observed to be the most common cause of abnormal vaginal discharge. This is in close agreement with Sharma et al study, where the most

common cause was candidiasis (34%). [18] Bacterial vaginosis was seen in 4 (23.5%) patients, trichomoniasis in 2 (11.8%), cervicitis in 3 (17.6%) patients. Mixed infection (bacterial vaginosis and trichomoniasis) were seen in 5.9% of women. In our study, in case of HIV negative women, it was seen that the most common cause of vaginal discharge was bacterial vaginosis (39.9%). This was followed by candidiasis (27.9%), trichomoniasis (15.8%), cervicitis (3.8%) and mixed infection (1%). Cervicitis was found to be more common in HIV infected women than HIV uninfected women (17.6% versus 3.8%). 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. Mixed infection in HIV negative were relatively less compared to HIV positive women (1% versus 5.9%). [19] The study group had 5 patients who were reactive to VDRL test and 7 patients who were positive for TPHA test. 1 HIV positive patient had secondary syphilis. In HIV uninfected women with vaginal discharge, 2 patients were found to have late latent syphilis and 4 patients had early latent syphilis. All the women irrespective of their HIV status showed negative results with serological tests for Hepatitis B and Hepatitis C. [20] On analysing CD4 count with etiological diagnosis, trichomoniasis was significantly associated with low levels of CD4 count (<200), showing that low levels of CD4 count are associated with significant trichomonas vaginalis infection due to epithelial barrier disruption and by changes in innate and adaptive immunity in the female genital tract. [21] Most of the partners screened for HIV were found to be positive in HIV infected women category (35.5%) compared to 6% in uninfected group. Among 140 partners who were screened, 24 Partners were found to have candidal balanoposthitis and 2 had trichomoniasis. Thus, partner screening should be emphasised as vaginal inflammation due to abnormal vaginal discharge can increase the vaginal shedding of HIV, thereby transmitting it to their partners. [22,23,24,25].

Conclusion

It is imperative from the study that a significant amount of HIV positive patients are suffering from abnormal vaginal discharge. Bacterial vaginosis, Trichomoniasis and Vulvovaginal Candidiasis are the principal causes for the abnormal vaginal discharge. More emphasis should be laid upon

patients who are HIV sero-positive, 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 mandatory for their sexual partners too. The detailed evaluation of the obtained data from the clinical and laboratory assessment of abnormal vaginal discharge in HIV positive and negative patients 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 these diseases.

References

1. Quan M. Diagnosis and management of infectious vaginitis. *The Journal of the American Board of Family Practice*. 1990 Jul 1;3(3):195-205.
2. Ferris DG, Nyirjesy P, Sobel JD, Soper D, Pavletic A, Litaker MS. Over-the-counter antifungal drug misuse associated with patient-diagnosed vulvovaginal candidiasis. *Obstetrics & Gynecology*. 2002 Mar 1;99(3):419-25.
3. O'dowd TC, Parker S, Kelly A. Women's experiences of general practitioner management of their vaginal symptoms. *Br J Gen Pract*. 1996 Jul 1;46(408):415-8.
4. Sivaranjini R, Jaisankar TJ, Thappa DM, Kumari R, Chandrasekhar L, Malathi M, Parija SC, Habeebullah S. Spectrum of vaginal discharge in a tertiary care setting. *Tropical parasitology*. 2013 Jul;3(2):135.
5. Landers DV, Wiesenfeld HC, Heine RP, Krohn MA, Hillier SL. Predictive value of the clinical diagnosis of lower genital tract infection in women. *American journal of obstetrics and gynecology*. 2004 Apr 1;190(4):1004-8.
6. Schaaf VM, Perez-Stable EJ, Borchardt K. The limited value of symptoms and signs in the diagnosis of vaginal infections. *Archives of Internal Medicine*. 1990 Sep 1;150(9):1929-33.
7. Minkoff HL, Eisenberger-Matityahu D, Feldman J, Burk R, Clarke L. Prevalence and incidence of gynecologic disorders among women infected with human immunodeficiency

- virus. American journal of obstetrics and gynecology. 1999 Apr 1;180(4):824-36.
8. Clottey C, Dallabetta G. Sexually transmitted diseases and human immunodeficiency virus. Epidemiologic synergy?. Infectious disease clinics of North America. 1993 Dec;7(4):753-70.
 9. Berek JS. Genitourinary infections and sexually transmitted diseases. Novak's gynecology. 13th ed. 2002. 453-471.
 10. Sweet RL, Gibbs RS. Gynecologic and obstetric infections. Infectious diseases of the female genital tract, 3rd ed.1995.321-428.
 11. Doderlein A. Die scheidensekretuntersuchungen. Zentralbl Gynakol. 1894;18:10-4.
 12. Giorgi A, Torriani S, Dellaglio F, Bo G, Stola E, Bernuzzi L. Identification of vaginal lactobacilli from asymptomatic women. Microbiologica. 1987 Oct;10(4):377-84.
 13. Bartlett JG, Onderdonk AB, Drude E, Goldstein C, Anderka M, Alpert S, McCormack WM. Quantitative bacteriology of the vaginal flora. Journal of Infectious Diseases. 1977 Aug 1;136(2):271-7.
 14. Hillier SL, Krohn MA, Rabe LK, Klebanoff SJ, Eschenbach DA. The normal vaginal flora, H₂O₂-producing lactobacilli, and bacterial vaginosis in pregnant women. Clinical Infectious Diseases. 1993 Jun 1;16(Supplement_4):S273-81.
 15. Brown WJ. Microbial ecology of the normal vagina. The Human Vagina. 1978:407- 22.
 16. Hillier SL, Lau RJ. Vaginal microflora in postmenopausal women who have not received estrogen replacement therapy. Clinical infectious diseases. 1997 Sep 1;25(Supplement_2):S123-6.
 17. Morison L, Ekpo G, West B, Demba E, Mayaud P, Coleman R, Bailey R, Walraven G. Bacterial vaginosis in relation to menstrual cycle, menstrual protection method, and sexual intercourse in rural Gambian women. Sexually transmitted infections. 2005 Jun 1;81(3):242-7.
 18. Calzolari E, Masciangelo R, Milite V, Verteramo R. Bacterial vaginosis and contraceptive methods. International Journal of Gynecology & Obstetrics. 2000 Sep 1;70(3):341-6.
 19. Onderdonk AB, Delaney ML, Hinkson PL, DuBOIS AM. Quantitative and qualitative effects of douche preparations on vaginal microflora. Obstetrics and gynecology. 1992 Sep;80(3 Pt 1):333-8.
 20. Salerno LJ. Leukorrhea. In: Sciarra JJ, McElin TW, editors. Gynecology and obstetrics. revised ed. Hagerstown, MD: Haper & Row Publishers; 1981: 1-5.
 21. Morris MC, Rogers PA, Kinghorn GR. Is bacterial vaginosis a sexually transmitted infection?. Sexually transmitted infections. 2001 Feb 1;77(1):63-8.
 22. Krohn MA, Hillier SL, Eschenbach DA. Comparison of methods for diagnosing bacterial vaginosis among pregnant women. Journal of clinical microbiology. 1989 Jun 1;27(6):1266-71.
 23. Lapage SP. Haemophilus vaginalis and its role in vaginitis. Acta Pathologica Microbiologica Scandinavica. 1961 Sep;52(1):34-54.
 24. Greenwood JR, Pickett MJ. Transfer of Haemophilus vaginalis Gardner and Dukes to a New Genus, Gardnerella: G. vaginalis (Gardner and Dukes) comb. nov. International Journal of Systematic and Evolutionary Microbiology. 1980 Jan 1;30(1):170-8.
 25. Liversedge NH, Turner A, Horner PJ, Keay SD, Jenkins JM, Hull MG. The influence of bacterial vaginosis on in-vitro fertilization and embryo implantation during assisted reproduction treatment. Human Reproduction. 1999 Sep 1;14(9):2411-5.