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STUDY OF VAGINAL DISCHARGE IN PATIENTS ATTENDING A TERTIARY CARE HOSPITAL, MUMBAI

Microbiology

Nishat Khan* Assistant Professor, TNMC & BYL Nair Ch. Hospital, Mumbai *Corresponding Author

Nirjhar Chatterjee Resident, TNMC & BYL Nair Ch. Hospital, Mumbai

Jayanthi S Shastri Professor and Head, TNMC & BYL Nair Ch. Hospital, Mumbai

Arpita Singh Medical Officer, STD Clinic

Padmaja Keskar Executive Officer, MCGM

ABSTRACT

Introduction: Abnormal vaginal discharge is most common complaint in female patients attending gynaecology outpatient department. It is most commonly caused due to bacterial vaginosis, vulvovaginal candidiasis and trichomoniasis. These infections also enhance the chance of acquisition and transmission of a range of sexually transmitted infections including HIV by two to five times. This study was conducted to analyse the prevalence of causative organisms of vaginal discharge in patients attending gynaecology OPD and in high risk groups attending STI clinic from January 2016 to December 2017.

Aims and Objectives

- To determine the prevalence of common causes of vaginal discharge.

Materials and method

- Retrospective study was carried out in RSTRRL, Department of Microbiology, TNMC & BYL Nair Ch. Hospital, funded by NACO.
- Gram staining for Nugent scoring and wet mount of the vaginal swabs was done.
- Culture and sensitivity was done for the *Neisseria gonorrhoeae*.
- VDRL, TPHA and HBV, HCV Antibody ELISA, ELISA for *Chlamydia trachomatis* were done as per National guidelines.

Results: In the time period total 2139 swabs were collected. On analysis maximum number (82%) of patients were from 25-44 years of age group. Prevalence of Bacterial vaginosis were found to be 53.30%, non- gonococcal cervicitis 33.90%, and Candidiasis 19.58%, Chlamydia 3.30%. *Neisseria gonorrhoeae* was isolated in 3 patients.

Conclusion: This study emphasizes the role of laboratory in etiological diagnosis in patients with vaginal discharge. There is a need for creating community awareness about health-care facilities and self-concern in women for their own health needs. Regular screening should be made mandatory.

KEYWORDS

Vaginal discharge, Nongonococcal cervicitis, Bacterial vaginosis, Vaginal candidiasis

INTRODUCTION

Abnormal Vaginal discharge is the commonest Reproductive tract infections (RTIs) in sexually active females.[1, 2] RTIs are the major public health problems among women especially in developing countries.[1] WHO estimates that approximately 340 million new cases of curable STIs (Sexually transmitted infections) occur every year and majority of them from developing countries.[2,3] The three diseases most frequently associated with vaginal discharge are Bacterial Vaginosis, Trichomoniasis (*T.vaginalis*) and Candidiasis (usually caused by *Candida albicans*).[2,4] Bacterial vaginosis can be defined by replacement of the normal vaginal flora by an overgrowth of anaerobic microorganisms, mycoplasmas, and *Gardnerella vaginalis*. Even in the modern advances in medicine, there is a rise in the incidence of fungal infections especially those due to Candida species. [5]

The prevalence of bacterial vaginosis ranges from 18.8-31.7%, [6] *Trichomonas vaginalis* ranges from 0.4–27.4% [7] and as for vaginal candidiasis it has been estimated that approximately 75% of women experience at least one episode of vulvovaginal candidiasis in their lifetime. [8]

These high incidences not only decrease the overall health status of the women all over the world but also pose a high burden on the health care set up. Majority of women bear the problems silently without seeking advice and treatment. Gynaecological disorders have substantial impact on female reproductive ability, mental health, and ability to work and to perform routine physical activities. [9] These infections also enhance the chance of acquisition and transmission of a range of sexually transmitted infections including HIV by two to five times. [10]

To diagnose bacterial vaginosis, Amsel's criteria [11,12] and microscopical criteria of Nugent's score [11,13,14] is used worldwide.

These RTIs may not always be sexually transmitted but it is commonly linked to sexual behavior. The rates of STIs are reported to be seven times higher in high risk groups than general population. This high prevalence of these infections in high risk group population may be the result of disturbance of vaginal microflora resulting from frequent sexual intercourse and the subsequent frequent washing with water and disinfectant. [15,16]

This study was conducted to analyse the prevalence of causative organisms of vaginal discharge in patients attending gynaecology OPD and in high risk groups attending STI clinic from January 2016 to December 2017.

AIM AND OBJECTIVES

To analyze the prevalence of common causes of vaginal discharge.

MATERIALS AND METHOD

A cross sectional study on hospital based prevalence of vaginal discharge, its determinants, was carried out in RSTRRL, Department of Microbiology, TNMC & BYL Nair Ch. Hospital.

This being a reference centre it provides services to general patients from RTI clinics as well as high risk patients from STI clinics. Endocervical and vaginal swabs were collected from patients with vaginal discharge. Detailed history of their sexual behaviour and clinical features are taken.

Laboratory procedures done:

1. Gram's staining: for primary idea of causative organism and nugent scoring
2. Culture: Culture was done on Blood agar, MacConkey's agar and Sabouraud's dextrose agar.
3. Final Identification: done by standard techniques.
4. Antimicrobial sensitivity was also done for *Neisseria gonorrhoeae*.
5. Serological tests: VDRL, TPHA, HbsAg and HCV Antibody ELISA were done as per National guidelines.

6. Rretrospective analysis of this data (from January 2016 to December 2017) was done.

RESULTS

A total of 2139 swabs were received, of which 27.19% (582/2139) patients are from high risk group and rest (72.81%) (1557/2139) are from low risk group.

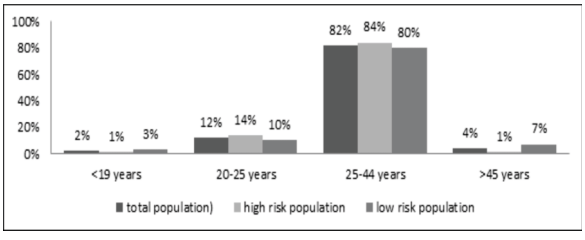
The patients were divided into four age groups that is <19 years, 20-25 years, 25-44 years and >45 years. Maximum patients were from the reproductive age group that is 25-44 years (1754/2139) (82%), followed by 20-25 years (257/2139) (12%) and >45 years age group (86/2139) (4%) and the least from <19 years (43/2139) (2%)

The same age distribution was seen in both the high and low risk age group. In high risk group maximum patients were from 25-44 years (84%), followed by 20-25 years (14%) and equal from age >45 and <19 years (1%). In low risk group also maximum patients were from 25-44 years (80%) followed by 20-25 years (10%), and >45 years (7%) and least patients were from <19 years age group (3%). (Table-1) (Figure-1).

Table-1: Age group wise distribution of patients

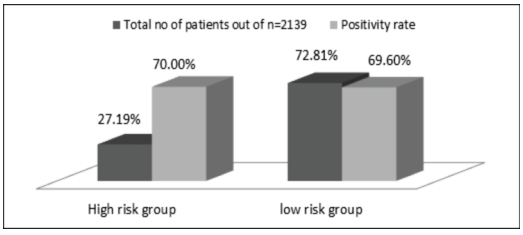
Age group (years)	Percentage of patient (%)		
	High risk population (n=582)	Low risk population (n=1557)	Overall total (n= 2139)
<19	1	3	2
20-25	14	10	12
25-44	**84**	**80**	**82**
>45	1	7	4

Figure-1: Age group wise distribution of patients (n=2139)



Smear microscopy was performed on all the 2139 swabs received in this time period of patients complaining about vaginal discharge. In our study 1456 (69%) smear showed abnormality of some kind, only in 663 (31%) smears microscopy failed to detect any pathogenic feature. Smear positivity was compared between the high risk and low risk group according to the history and it was found that smear positivity rate is approximately same (70%) (407/582) in high risk patients when compared to low risk group (69.60%)(1084/1557). (Figure-2)

Figure-2: Comparison of microscopy positivity rate



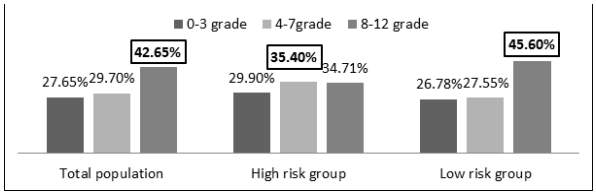
Nugent score of 8-12 indicating positive bacterial vaginosis was seen in 912 (42.65%) swabs, whereas a grading of 4-7 which is indicative of indeterminate bacterial vaginosis was seen in 635 (29.70%) smears. Grading of 0-3 which indicates no bacterial vaginosis is shown by 591 (27.65%) smears in this study.

In low risk population nugent score of 8-12 indicating positive bacterial vaginosis was seen in 710 (45.60%) swabs, grading of 4-7 that is indeterminate bacterial vaginosis was seen in 429 (27.55%) and grading of 0-3 was seen in 417 (26.78%) smears. Whereas In high risk group nugent score of 8-12 indicating positive bacterial vaginosis was seen in 202 (34.71%) swabs, and maximum swabs (206) (35.40%) had shown indeterminate bacterial vaginosis with a grading of 4-7. Grading of 0-3 indicating no bacterial vaginosis in low risk group was seen in 174 (29.90%) smears. (Table -2) (Figure-3)

Table-2: Distribution of patients according to Nugent scoring

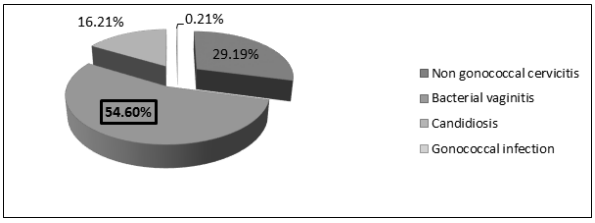
Nugent scoring grade	Percentage of patient (%)		
	High risk population (n=582)	Low risk population (n=1557)	Overall total (n= 2139)
0-3	29.90	26.78	27.65
4-7	**35.40**	27.55	29.70
8-12	34.71	**45.60**	**42.65**

Figure-3: Distribution of smears according to Nugent scoring



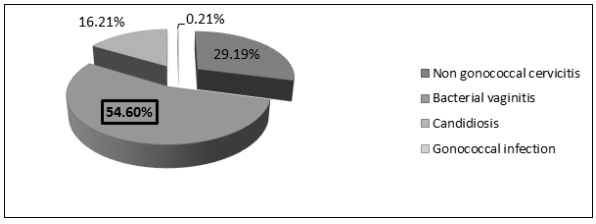
In the total population most common causative reason for vaginal discharge in our study was found to be bacterial vaginosis (54.60%) (795/1456). Budding yeast cells were seen in 16.21% (236/1456) cases indicating candidial infection. Non gonococcal cervicitis was seen in 29.19% (425/1456) patients. Only in 0.21% (3/1456) cases the causative agent was found to be Gonococcal infection. (Figure-4)

Figure-4: Distribution of causative organisms in total population (n= 1456, positive smears)



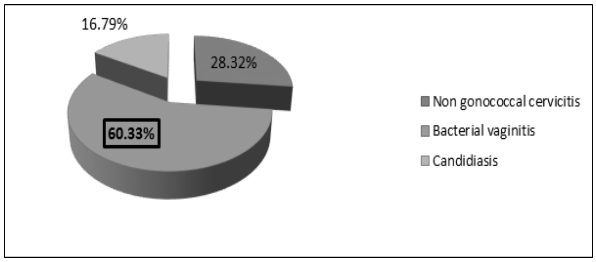
In the high risk population the most common causative agent was found to be NGC (44.23%) (180/407), followed by BV (36.36%) (148/407), and candidiasis (19.41%) (79/407). In our study all the Gonococcal infections (0.74%) (3/407) were isolated from this group. (Figure-5)

Figure-5: Distribution of causative agents in High risk group (n=407, smear positive)



In low risk group most common causative agent was found as BV (60.33%) (645/1084), followed by NGC (28.32%) (307/1084). Budding yeast cell implying vaginal candidiasis was seen in 16.79% (182/1084) smears. No gonococcal isolate from this population. (Figure-6)

Figure-6: Distribution of causative agents in Low risk group (n=1084, smear positive)

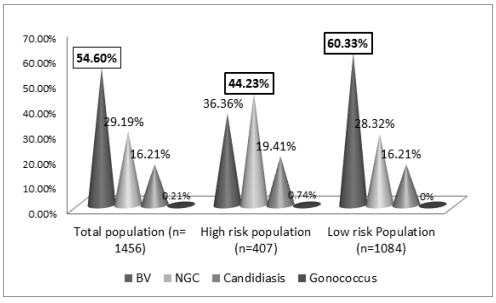


Following table and figure shows comparison between general population, high and low risk groups the causative agents found in our study. (Table-3) (Figure-7)

Table-3: Comparison of causative agents

Causative agent	Percentage of patient (%)		
	High risk population (n=407)	Low risk population (n=1084)	Overall total (n= 1456)
Bacterial vaginosis (BV)	36.36	**60.33**	**54.60**
Nongonococcal cervicitis (NGC)	**44.23**	28.32	29.19
Vaginal Candidiasis	19.41	16.79	16.21
Gonococcus	0.74	0	0.21

Figure-7: Comparison of causative agents



Multiple causative agents for vaginal discharge was also seen

- 5.86% patients had dual infection with Non gonococcal cervicitis (NGC) and bacterial vaginosis (BV)
- 2.78% patients were co infected with NGC and *Candida spp*.
- In 5.50% patients there were Coinfection with BV and *Candida spp*.
- 0.65% patients had multiple infections with NGC, BV and *Candida spp*.

Chlamidia trachomatis was found to be causative organism in 3 (3.30%) cases out of total 91 swabs processed for in this time period. *Trichomonas vaginalis* was not seen in any of the swabs.

The antimicrobial susceptibility pattern of all the three *Neisseria gonorrhoeae* isolates were found to be nearly same which was also confirmed by Apex laboratory in New Delhi. The antimicrobial susceptibility pattern was as follows

- All three organism (100%) were susceptible to Ceftriaxon, Cefuroxime and Azithromycin.
- Two organism out of three (66%) organism were susceptible to Gentamycine.
- Susceptibleity to Penicillin, Ciprofloxacin and Tetracycline was seen in only one (33%) organism.
- All the three organism (100%) came out as resistant to Nalidixic acid. (surrogate marker of ciprofloxacin resistance)
- Two out of three organism (66%) were resistant to tetracycline, ciprofloxacin and penicillin.

Correlation between serological positivity with increased risk of suffering from vaginal discharge was found in our study.

- There were four (0.27%) patients who were co-infected with syphilis and bacterial vaginosis
- Three (0.20%) patients were found to be seropositive with hepatitis B virus infection and bacterial vaginosis.
- Two patients had hepatitis C virus infection who were suffering from nongonococcal cervicitis.
- In three (0.20%) patients the patients had HIV along with bacterial vaginosis.

DISCUSSION

This cross sectional study of 2139 patients was conducted in women attending gynaecology outpatient department and RTI/STI clinic complaining of vaginal discharge at a Government Medical College Hospital, from January 2016 to December 2017.

The age wise distribution showed that the most common (82%) age group affected was the sexually active age group that is age 25-44 years which is similar to the study done by In Farhan AM et al where the mean age of the most commonly affected patients was 32±6 years (range: 20–45 years). [17]

The etiological diagnosis was reached in 69-70% of the patients included. In the remaining 30-31% of the patients, diagnosis could not be made with the microbiological diagnostic approach. Similarly other studied by Vijaya D et al showed that in19.52% of the patients complaining of vaginal discharge, diagnosis could not be reached using any of the diagnostic approaches under consideration. [18] This patients who were detected as apparently normal by microbiological examination probably may have vaginal discharge physiologically or less frequently due to causes which are not detected routinely like viral, aerobic/anaerobic vaginitis or vaginal lactobacillosis.

In our study when prevalence of causative agent for vaginal discharge was identified the most common reason in our study was found to be bacterial vaginosis (54.60%) in general population and low risk group (60.33%) which is comparable to the result found by Puri et al. (45%) and Kaur et al. (44%). [19,20]

But the most common causative agent in high risk group was found to be NGC (44.23%) which is comparable to the study done by Pollett et al. The reason commonly due to unhealthy sexual practices, use of douching, frequent use of spermicidal agents, unwilling heathcare seeking behaviour, incomplete treatment of previous infections, allergy to multiple condom usage which was also found in the study done by Pollett et al. [21]

Incidence of vaginal candidiasis in our study was found to be 16.21%, 19.41% and 16.79% in total population, high and low risk group respectively which is comparable to the result found by Kaur et al. (25%) but much lesser compared to results seen by Puri et al. (31%). [19,20]]

In our study non specific cause or non gonococcal cervicitis was found in 29.19% and 28.32% cases in total, low risk populations respectively claiming the position of second most common reason after bacterial vaginosis and 44.23% in high risk population claiming to be the most common cause which is in striking difference with both the studies ie, Puri et al. (14%) and Kaur et al. (14%). [19,20]

In our study only in 0.21% and 0.74% cases from total and high risk population respectively the causative agent was found to be Gonococcal infection this comparable to study done by Kaur et al. (3%) and Puri et al. (6%) In low risk group no cases of gonococcal infection was found. This low incidence of gonococcal incidence is most likely due to better knowledge about safe sexual practices and better antibiotics. [19,20]

No cases with trichomoniasis was found in our study, in comparison, in study done by Puri et al the incidence of trichomoniasis was also low (2%). In the study done by Kaur et al. the incidence was much higher (11%). [19,20]

Table-4: Comparison of prevalence of causative agents

Causative agent	Prevalence in present study (2018)			Prevalence in Study by Kaur et al [19]	Prevalence in Study by Puri et al [20]
	Total population	High risk population	Low risk population		
Bacterial vaginosis	54.60%	36.36%	60.33%	44%	45%
Candidiasis	16.21%	19.41%	16.79%	25%	31%
Non specific cause	29.19%	44.23%	28.32%	14%	19%
Gonococcal infection	0.21%	0.74%	0%	3%	6%
Trichomoniasis	0%	0%	0%	11%	2%

In our study Coinfection with BV and candida was diagnosed in 5.50% patients which is comparable to the result found out by Rekha et al (4%). [22]

The antimicrobial sensitivity pattern seen for *Neisseria gonorrhoeae* isolates in our study when compared to study done by Manjubala et al. [23] there is a discrepancy that can be seen in resistance pattern, in our

study resistance to tetracycline, ciprofloxacin and penicillin is seen in 66% isolates, whereas it was 37.6%, 89.7% and 53.3% respectively in the above mentioned study. This difference is most likely due to the lesser number of isolates found in our study limiting the data. Though the sensitivity pattern of our isolates were quite comparable as 100% sensitivity was seen for ceftriaxone and azithromycin in our study an d it was 95.8% and 98.5% respectively in the other study.

In our study when other serological reports of these patients are correlated it was found out that coinfection with syphilis and bacterial vaginosis was found in four patients (0.27%) which is much lesser (7.5-10.6%) than what is found out by study done by Mhlongo et al. Coinfection with HIV and bacterial vaginosis was seen in three patients (0.20%) in our study which is much lesser (43.5-52%) than the value found out by Mhlongo et al. [24]This discrepancy is may be due to behaviours like not coming for follow-up or reluctance to seek medical care. But there were cases who were suffering from vaginal discharge due to any of the causative agents along with showed seropositivity with HIV or Syphilis or Hepatitis virus infection simultaneously. This signifies the role of infections like BV, NGC or candidiasis in increasing the risk of other STI's.

WHO recommends empirical treatment to all women complaining of abnormal vaginal discharge with metronidazole and when candida noted, for candidiasis as well. This study showed that 31% of patients had no BV or candidiasis or per say any abnormality by the microbiological diagnostic approach. So, if blanket treatment without microbiology laboratory support was advocated to all the women complaining of abnormal vaginal discharge then approximately 50% of the women would receive metronidazole and 80% would receive antifungal therapy unnecessarily. Not only this over diagnosis and over treatment has financial consequences for the health system, but also carries the risk of possible social consequences in the community. [22]

The strength of our study includes standard laboratory techniques, timely maintained and properly collected data as it was carried out in Regional STI training, Research and Reference Laboratory (RSTRRL), Department of Microbiology, Mumbai and the large sample size.

The main limitation of our study is that this study was conducted in a tertiary care setup but to get the real gravity of the situation the study should be conducted in the community. There should be a strict protocol of proper collection and transport time gap of swabs.

CONCLUSION

Abnormal vaginal discharge not only affects the physical well-being of females struggling with this problem but also mental health of them. The burden of sexually transmitted diseases along with reproductive tract infection is increasing at a very high rate. So laboratory identification of the etiological agents can help in reducing the prevalence and hence the morbidity caused by them.

Timely management of abnormal vaginal discharge will help in reducing their complications along with the risk of getting other STDs. Lack of education makes the patient ignorant about their disease. So, It's important to make them aware about the symptoms, safe sexual practices, maintenance of proper hygiene and medical services available under national guidelines.

This study not only emphasizes the role of laboratory in etiological diagnosis in patients with RTI/STI but also highlights the increased positivity, difference of causative agents in high risk groups. Therefore, regular screening in RTI/STI clinics should be made mandatory among females with high risk behaviour attending gynecology clinic.

There is a need for creating community awareness about health-care facilities and self-concern in women for their own health needs. The study also recommends for creating community awareness about health care facilities and instills self concern in women for their own health needs.

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CONFLICT OF INTEREST

The authors don't have any conflict of interest to declare.

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