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PREVALENCE OF MICROORGANISMS IN HIGH VAGINAL SWABS FROM WOMEN PRESENTING WITH VAGINAL DISCHARGE IN OUTPATIENT CLINICS

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Abstract

Introduction: Consequently, the conclusions of this particular study corroborate the importance of performing microbiological analysis to recognize the root cause of the discharge. So, clinical signs and physical findings provide a clue to presumed pathogens, while clinical laboratory evaluation is essential for diagnostic confirmation of the etiologic agent. This is especially the case in clinical or diagnostic situations where patients display reinfections or chronic infections, and the microbial pathogen(s) responsible might not be apparent.

Objectives: To establish the prevalence and variety of microorganisms isolated in high vaginal swabs among women attending outpatient clinics with symptoms of vaginal discharge.

Materials and Methods: A cross-sectional study was performed at Department of Obstetrics & Gynaecology, Hayatabad Medical Complex Peshawar, Pakistan over a period of six months. The high vaginal swabs were then obtained from 200 nonpregnant, adult female attendees aged between 18-45 years with vaginal discharge. Culture and sensitivity were done in order to isolate and sensitively identify bacteria and their susceptibility to antimicrobial agents.

Results: Gardnerella vaginalis was the most frequently isolated pathogen, 32 %, with Candida albicans 25% and Escherichia coli 18%. Some of the other microorganisms included were Streptococcus species, Trichomonas vaginalis, and Neisseria gonorrhoeae.

Conclusion: Bacterial vaginosis and fungal infections are the common causes of vaginal discharge, as confirmed by microbiological examination.

Keywords: Vaginal discharge, bacterial vaginosis, Gardnerella vaginalis, Candida albicans, antimicrobial susceptibility, outpatient clinics.

INTRODUCTION

Vaginitis is one of the female reproductive health problems affecting women of childbearing age, and they bring along these symptoms to clinics or outpatients. That is one of the primary causes of gynecological visits. It has many types and various causes, including bacterial vaginosis (BV) and reproductive tract infections (RTIs) (1). Vaginal secretion is a homophonic physiological process that is closely connected with women's genitourinary system, the existence of which indicates an alternative pathological condition that has to be treated immediately (2). The acid-base ratio of the microorganisms of the vaginal tract is important for proper functioning and, when destroyed, can cause infections. Several bacterial, fungal, and at times, viral etiologic agents, including vaginitis, cervicitis, and Pelvic Inflammatory Diseases, can cause vaginal discharge.

A better understanding of the normal microbial plays of the vagina is that it is made of both symbiotic and pathogenic microbes. A normal vaginal flora states that a healthy vagina harbors Lactobacilli species that ensure the vagina acidity deters any possible 'pathogens.' However, alterations that may be a result of, for instance, a low number of Lactobacilli allow increased colonization of pathogenic bacteria together with other organisms such as Gardella vaginalis, Candida albicans, and several STDs (5). Some of them have postulated that bacterial vaginosis is the most prevalent in women with improperly distributed discharge and is commonplace among women of childbearing age (6). Moreover, other forms of vaginitis, particularly those of fungal origin, are typical of the eruption from Candida species, which manifest symptoms of itching, irritation, and the discharge of a pasty white substance (7). Other pathogens that cause vaginal infection include Chlamydia trachomatis, Neisseria gonorrhoeae, and Trichomonas vaginalis, among others (8).

Some researchers have examined microorganisms implicated in vaginal swabs and more so in women with vaginal discharge attending outpatient departments. A cross-sectional study in OPD patients confirms the prevalence of BV, Candida infection, and RTIs in Pakistani women (1). Another study from North India revealed community-associated acute cervicovaginal discharge in a significant number of women where nonviral causes predominated and the commonest agents isolated were bacterial and fungal (4). In Tanzania especially, other studies have focused on the high incidence of both STIs and other causes of non-STD-related vaginal discharge (9). However, pre and post-menopausal women also present with vulvovaginal symptoms, and the composition of the microbiota changes in response to hormones (3). Societal factors such as sexual activity, hygiene, the use of antibiotics, and sometimes even diseases like diabetes or immunosuppression help determine how frequent pathogens causing vaginal discharge will be (10). Second, pregnancy is known to increase vulnerability to bacterial vaginosis and Candida infections such that hormonal changes and immune system alterations are attributes of pregnancy (7). In women of childbearing age, sexually transmitted diseases continue to be a common cause of vaginal discharge and must be regularly screened and promptly treated to prevent sequelae such as pelvic inflammatory disease (11).

Vaginal swabs Act as a valuable tool for identifying the causal microbes that inform the proper treatment method. In clinical practice, the distinction of the various etiologic agents of vaginal discharge is important because each may be managed uniquely (5). Bacterial vaginosis can be treated by use of antibiotics such as metronidazole, while Candida infections require medications that are anti-fungal in nature (8). It is also an effective tool in cases where an infection recurs or persists. It may not respond to initial treatment promptly and may require longer courses of therapy or the use of adjunctive therapy (6). Further research from Egypt shows the significance of cervical and vaginal swabs in eradicating chronic RTIs, and, especially, discovering microorganisms that are untamed by many antibiotics.

Besides microbial pathogens, other factors that can influence the distribution of the microorganisms include age, sexual practices, and overall health of the individuals. For example, women who are infected with sexually transmitted diseases or women who are sexually active may have a higher density of pathogen load, such as Neisseria gonorrhoeae and Chlamydia trachomatis (12). Similarly,

literature has proved that women with wrong cleaning of their privacies or such women who use douches are at risk of developing disorders, including bacterial vaginosis, which changes the normal biosynthesis of the flora of the vagina (13). Secondly, bacterial vaginosis and aerobic vaginitis are not population-based, and there are differences in various risk factors and environmental factors prevailing with respect to microbiological flora in the female genital tract (14).

Finally, the concentration of microorganisms in the high vaginal swabs samples collected from women with vaginal discharge depends on numerous factors such as age and sexual history, personal hygiene, and health status. Cultural sensitivity is important in determining whether pathogenic bacteria should be treated appropriately. The knowledge acquired from the different studies that were conducted in different world parts can help in identifying the types of pathogens which cause vaginal infections and the risk factors which are so vital in the clinical management and prevention of these infections.

Objective: The objective of this study is to determine the prevalence and types of microorganisms found in high vaginal swabs from women presenting with vaginal discharge in outpatient clinics, aiding in effective diagnosis and treatment.

MATERIALS AND METHODS

Study Design: Cross-sectional.

Study setting: The present study was conducted at Department of Obstetrics & Gynaecology, Hayatabad Medical Complex Peshawar, Pakistan.

Duration of the study: The study was conducted for six months, from May, 2024 to October 2024.

Inclusion Criteria

The women diagnosed at OPD of Department of Obstetrics & Gynaecology, Hayatabad Medical Complex Peshawar, Pakistan with complaints related to profuse vaginal discharge only and who were available and willing to participate were included in the study. Exclusion criteria were pregnancy, age below 18 or above 45, and antibiotic consumption within the preceding two weeks of the study. The data was collected from only patients willing to be enrolled in the study and only those patients who signed written informed consent. Healthy sexually active women of childbearing potential with no known medical disorders that worsen the severity of the presented symptoms, including diabetes, immune suppression, and pregnancy, were also eligible.

Exclusion Criteria

Participants who were pregnant, who had been breastfeeding their babies, or who had any type of chronic systemic illness, for example, diabetes or any other autoimmune disease, were also not included in the study. Furthermore, women who were on antibiotics for any reason in the past three months, women using topical vaginal medications, or women who were douching were not enrolled in the study to avoid any bias when determining the participants' vaginal microbiota. Women who were unable or unwilling to give their informed consent were also excluded from the study.

Methods

The sample of the study was retrieved from high vaginal swabs of the women who sought treatment for vaginal discharge complaints at the outpatient Department of Obstetrics & Gynaecology, Hayatabad Medical Complex Peshawar, Pakistan. According to their individual volition, each participant provided fully informed consent and, therefore, took the clinical history and examination. These high vaginal swabs were later transported using aseptic procedures and promptly passed to the microbiology department for examination. These samples were cultured on selective media to grow specific types of microbes, with common bacterial types including Gardnerella vaginalis, Escherichia

coli, and Streptococcus species, while fungal types were Candidal species, especially Candida albicans. The microbial characterization was also done by gram staining, and the organisms' resistance to specific antimicrobials was also determined. Descriptive demographic data, clinical details, and results of investigations were collected on a pre-coded proforma, and after obtaining approvals for the study, variables were analyzed to determine the incidence and profile of microorganisms in women with vaginal discharge syndrome.

RESULTS

Two hundred females with vaginal discharge that fulfilled the inclusion criteria were recruited in the study. The age and clinical presentation of the participants are described in the demographics table 1. The study involved 60% of participants aged between 20 and 35 years, 25% of participants aged between 36 and 45 years, and 15% of participants below the age of 20 years. The majority of the participants had clinical-radiological abnormal Papanicolaou smear findings. Abnormal vaginal discharge was complained of by all the female participants in this study. Other related symptoms were rash at 52 percent, abdominal and pelvic pain at the 45 percent mark, and smelliness at 38 percent.

Table 1: Demographic Characteristics of Study Participants

Age Group (Years)	Number of Participants	Percentage (%)
Under 20	30	15%
20-35	120	60%
36-45	50	25%
Total	**200**	**100%**

According to the results of the microbiological examination, it was found that Gardnerella vaginalis prevailed among the pathogens which cause vaginal discharge and was detected in 32%, Candida albicans in 25%, and Escherichia coli in 18%. Other microorganisms isolated were Streptococcus species (10%), Trichomonas vaginalis (8%), and Neisseria gonorrhoeae (7%). The overview of microbial pathogens is given in Table 2. The high proportion of Gardnerella vaginalis indicates high cases of bacterial vaginosis among the participants of the study.

Table 2: Microbial Pathogens Isolated from High Vaginal Swabs

Microorganism	Number of Isolates	Percentage (%)
Gardnerella vaginalis	64	32%
Candida albicans	50	25%
Escherichia coli	36	18%
Streptococcus species	20	10%
Trichomonas vaginalis	16	8%
Neisseria gonorrhoeae	14	7%
Total	**200**	**100%**

The pathogens involved revealed that Gardnerella vaginalis was at the highest frequency in women in the age range of 20-35 years, representing 35% of the cases. Candida albicans were isolated most frequently among women aged 36-45 years, 30% of them. The prevalence of microbial pathogens according to the age group of patients is summarized in Table 3.

Table 3: Distribution of Microbial Pathogens by Age Group

Age Group (Years)	***Gardnerella vaginalis* (%)**	***Candida albicans* (%)**	***Escherichia coli* (%)**	***Streptococcus species* (%)**	***Trichomonas vaginalis* (%)**	***Neisseria gonorrhoeae* (%)**
Under 20	25%	23%	15%	8%	10%	5%
20-35	35%	22%	18%	12%	7%	6%
36-45	20%	30%	20%	15%	10%	5%
Total	**32%**	**25%**	**18%**	**10%**	**8%**	**7%**

We also conducted sensitivity testing, which showed that most of the bacterial isolates, namely Gardnerella vaginalis, Escherichia coli, Streptococcus species, etc, were seen to be sensitive to metronidazole as well as ciprofloxacin. There was mild resistance to erythromycin and moderate resistance to amoxicillin and clindamycin. High rates of sensitivity were observed among the examined fungal isolates with Fluconazole and Ketoconazole, which was most dramatic for Candida albicans. A considerable level of resistance was seen in a few isolates against regularly used antifungal drugs, stressing the strength of a proper treatment regimen based on the antifungal profile of the particular isolates. Finally, the study established a higher SE mean of bacterial and fungal pathogens among the women complaining of tacky vaginal discharge. Most commonly pathogens isolated were Gardnerella vaginalis, Candida albicans, Neisseria gonorrhoeae and Trichomonas vaginalis were isolated less frequently. These conclusions help to realize that microbiological examination is very important for making correct diagnosis of the causes of vaginal discharge and their treatment.

DISCUSSION

Aerobic and facultative anaerobic bacteria dominate the high vaginal swabs taken from outpatients with symptomatic women presenting with complaints of vaginal discharge. Normal vaginal discharge is a normal physiological process in women, and it is concerned with the process of clearing unwanted secretions and pathogenic microorganisms from the female genital organs, but at the same time, it is related to infection or change in the balance of microbes in the vagina. The objective of the present cross-sectional study was to find out the overall percentage and kind of microorganisms among female patients attending the outpatient Department of Obstetrics & Gynaecology, Hayatabad Medical Complex Peshawar, Pakistan. Some of the causes of vaginitis found in this study to be prevalent in affecting the woman's reproductive organs include Gardernella vaginalis, Candida albicans, and Escherichia coli. This distribution of pathogens concurs with other related studies in other countries where bacterial vaginosis and Candida infection are other well-established causes of vaginal discharge.

The highest manifestation in the current study was bacterial vaginosis with Gardnerella vaginalis and other anaerobic bacterium 32%. This finding is in agreement with the rest of the research conducted in other areas, such as India and Africa, where it was confirmed that bacterial vaginosis is the leading underlying cause of vaginal discharge (6, 7). The presence of Gardnerella vaginalis can be due to processes that impact hormonal tagging, sexual experience, and vaginal hygiene that replaced the impaired production of acidic ph, which usually prevents the germination of pathogenic bacteria.

Furthermore, two of the prior studies noted that bacterial vaginosis affected women with sexual activity, so it indicated the presence of sexually transmitted associations in this disorder (8, 9). Candida albicans, a fungal pathogen, came second in this study, with 25% of participant's samples harboring the organism. Other infections, such as candidiasis, are major contributors to vaginal discharge and are normally related to non-pregnancy women only. This observation agrees with other studies carried out in different countries, such as India and Ethiopia, where a high prevalence of Candida albicans was noted among women complaining of abnormal vaginal discharge (6, 12). Candida albicans were found to be more prevalent in women aged 36-45 years, and hormonal changes during this age period may predispose them to fungal infections. Some of the situations that make women more vulnerable to Candida infections include the use of antibiotics, diabetes, and HIV/AIDS, all of which will disrupt the normal balance of the vaginal microflora and thus promote growth of Candida albicans (10).

Secondly, the researchers also found Escherichia coli in 18% of the identified vaginal swabs. Even though E.coli is often connected with UTIs, its presence in the vaginal discharge suggests that this bacteria may be involved in the development of vaginitis or cervicitis. Many authors have described the finding of E.coli in vaginal infections, although some of them proposed that this bacterium could be introduced in the vaginal area from the rectum during intercourse or improper hygiene (11). These findings may be particularly relevant in women with a history of urinary tract infections since it has been linked with the E. coli vaginal infections. Additionally, E. coli is known to be relatively resistant to some antibiotics, and this complicates the treatment process, which requires antimicrobial susceptibility testing as a critical tool in clinical diagnoses (5).

The prevalence of STIs in this study was not very high, with Neisseria gonorrhoeae and Trichomonas vaginalis as the main STIs at 7% and 8%, respectively. This result differs from research that was conducted in sub-Saharan Africa and other parts of the world wherein STIs are linked with vaginal discharge (13). A lower rate of STIs could be observed in the current study due to the variation in demographic distribution, behavioral activities, and other related risk factors in different regions. In Pakistan, cultural practices and religious beliefs can be assumed to impact sexual behavior and the rates of STIs. However, it is crucial to point out that STIs remain a cause of vaginal discharge, even though they were less prevalent in this study than they were a year ago. The demographic study showed that the highest incidence of bacterial vaginosis was in women aged between 20-35 years. This is in accordance with other experiments that have found that bacterial vaginosis is more prevalent in younger women of reproductive age and who are sexually active (14). As for the bacterial vaginosis and other STIs, the unsafe sex and multiple sexual partnerships, behaviors which are capable of disrupting the vaginal flora, are frequently practiced by this age group. However, the higher frequency of Candida albicans in the 36–45 years age group could be explained by hormonal changes during the perimenopause period, which leads to a high contraction rate of fungi related to this state (15).

Consequently, the conclusions of this particular study corroborate the importance of performing the microbiological analysis to recognize the root cause of the discharge. So, clinical signs and physical findings provide a clue to presumed pathogens, while clinical laboratory evaluation is essential for diagnostic confirmation of the etiologic agent. This is especially the case in clinical or diagnostic situations where patients display reinfections or chronic infections, and the microbial pathogen(s) responsible might not be obvious. Additionally, proper identification of resistant organisms in the context of bacteremia requires antimicrobial susceptibility testing because this information determines the appropriate antibiotics or antifungals to be used (5). Last, these findings emphasize the high overall rate of bacterial vaginosis and Candida albicans in women with complaints of RVS in an outpatient clinic in Karachi. It emissions that microbial disturbances of the normal vaginal flora, which is determined by various factors, are the main predisposing factors to vaginal infections. The low detected prevalence of STIs in this study should not be used to undermine their significance, and the need for more research on the region-specific prevalence of STIs and their effect on vaginal health

should be encouraged. Due to the increased occurrence of antimicrobial resistance, subsequent research should also establish the resistance profile of conventional pathogens in order to inform the appropriate regimen to employ.

CONCLUSION

The current paper holds significant value in identifying the rate of VV and the species of bacterial/viral pathogens contributing to vaginal discharge in women attending a clinic in Karachi, Pakistan. The study showed that most of the pathogens isolated were associated with bacterial vaginosis, which is contributed by Gardnerella vaginalis, with Candida albicans coming in second. Other pathogens that were isolated less frequently but added to the burden of causing vaginal infection include Escherichia coli, Streptococcus species, and sexually transmitted infections, including Neisseria gonorrhoeae and Trichomonas vaginalis. Microbiologic testing is highlighted as a critical diagnostic technique as it was observed that treatment algorithms can be geared depending on the results, and the issue regarding antimicrobial resistance is raised. Moreover, it emphasizes the need for repeated testing of microbial references in various regions so as to enhance strategies for dealing with matters touching on the vaginal aspects in the field of health care. Appropriate diagnosis and treatment are paramount with regard to containing the impact of these infections on fertility in women.

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