Content available at: https://www.ipinnovative.com/open-access-journals

IP International Journal of Medical Microbiology and Tropical Diseases

Journal homepage: https://www.ijmmtd.org/

Original Research Article

Microbiological study of vaginitis among women of reproductive age group

Shankari P[1], **Usha MG**[1,*]

[1] *Dept. of Microbiology, JJM Medical College, Davanagere, Karnataka, India*

ARTICLE INFO

Article history:
Received 13-07-2022
Accepted 18-07-2022
Available online 06-09-2022

Keywords:
Vaginitis
Bacterial vaginosis
Vulvovaginal Candidiasis
Trichomoniasis

ABSTRACT

Background: Vaginitis is the most common health problem among women of reproductive age group, which is associated with gynaecological and obstetrical complications and also increases the transmission of HIV and other sexually transmitted diseases.

Objectives: This study aimed at estimating the various etiological agents causing vaginitis, different laboratory methods for its diagnosis, isolation of different *Candida* species and antibiotic susceptibility pattern of aerobic bacterial isolates.

Materials and Methods: In present study, 104 clinically suspected cases of vaginitis attending gynaecology OPD was included after obtaining informed consent and various data were collected using via questionnaire. Three high vaginal swabs collected from each patient and subjected to PH, Whiff test, Microscopic examination (Grams staining, KOH mount, Acridine orange staining (AO), Saline wet mount) Culture and Biochemical reactions following standard protocols. Aerobic isolates were subjected to antibiotic susceptibility testing as per CLSI guidelines.

Result: Out of 104 Clinically suspected cases most common type of vaginitis were Bacterial vaginosis (BV)51.9% followed by Candidiasis 41.3%, Trichomoniasis 3.9%. Most common species isolated in vulvovaginal Candidiasis is *C.albicans* 32.5%. Majority of Gram positive organisms were susceptible to Linezolid and Gram negative organisms to Azithromycin.

Conclusion: Bacterial vaginosis, Candidiasis and Trichomoniasis are common problem in women of reproductive age, therefore screening of vaginal infection in women of reproductive age should be implemented. Culture and sensitivity should be mandatory and treatment should be based on invitro susceptibility testing. So that misuse of antibiotics will be avoided.

This is an Open Access (OA) journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

Vaginitis is a medical term given to women presenting with abnormal vaginal discharge with vulval burning, irritation or itching.[1] The vaginal flora is a dynamic ecosystem that can easily be altered. The vagina, ectocervix and endocervix are all susceptible to various pathogens depending upon the type of epithelium present and other factors in the microenvironment. The squamous epithelium of vagina and ectocervix is susceptible to infection with Candida species and *Trichomonas vaginalis* and *Gardenerellavaginalis*.[2,3]

Bacterial vaginosis is the commonest form of vaginitis and it is polymicrobial aetiology involving *Gardenerellavaginalis* and other facultative and anaerobic organisms.[4] However these organisms colonizes the vagina of approximately 40% of normal women.[5] But It's identification is important cause it is associated with complications of pregnancy, preterm labour and post caesarean endometritis.[6,7]

Vulvovaginal Candidiasis is the second most common form of vaginitis after bacterial vaginosis. Incidence of

* *Corresponding author*.
E-mail address: drshankarivmmc@gmail.com (Usha MG).

https://doi.org/10.18231/j.ijmmtd.2022.045
2581-4753/© 2022 Innovative Publication, All rights reserved.

vaginal Candidiasis almost doubled from 1980 to 1990. It is mostly associated with overuse of antibiotics, pregnancy, diabetes mellitus and immunosuppression. Most common *Candidal* strains isolated from women with vaginal candidiasis is *C.albicans* and the next common non albicans is *C .glabrata*.[8]

Trichomoniasis is the common sexually transmitted disease caused by flagellated protozoan *Trichomonasvaginalis* with worldwide prevalence of million cases annually.[7] A recent interest in the diagnosis and control of disease was after its association with complications in pregnancy, association with cervical cancer and predisposes with HIV infection.[5]

The present study was undertaken to know the most frequently occurring infectious agents causing vaginal discharge in our setup and also usefulness of simple diagnostic methods for giving specific treatment for complete cure and also to ensure a rational choice of both empirical and definitive antibiotic therapy of vaginal discharge.

2. Materials and Methods

The present study was conducted in Department of Microbiology J.J.M.M.C for the period of one and half years. Institutional ethical committee approval was obtained. Informed consent was taken. The study included 104 patients attending OPD of gynaecology, Bapuji Hospital and Chigateri General Hospital Davangere with complaints of vaginal discharge associated with vaginal discomforts like pruritus, lower abdomen pain, dyspareunia and dysuria and other demographic details of patients were also collected.

Inclusion criteria;women between 20-40 years of age who are sexually active with symptoms such as vaginal discharge of different types, pruritus, lower abdomen pain, dyspareunia and burning micturition.

Women above 40 years of age, antenatal cases, any form of vaginal bleeding, patients who received antibiotics and antifungal in the preceding six weeks, who refused vaginal examination, patients with cervical discharge, H/o of genital prolapse were all excluded from the study.

Three high vaginal swabs were collected from the posterior fornix, pH was recorded by touching the lateral vaginal wall using pH strips. First swab was used for microscopic examinations.[8,9] Gram stain smears were evaluated using Nugents score.[10] Second swab was taken for culture.[11] In addition, third swab was collected for CPLM and InPouch TV culture for Trichomonads.SDA media was used for *Candida* isolation. Speciation of *Candida* isolates were done using Germ tube test, Corn meal agar, Hichrome agar, sugar fermentation test, other biochemical reactions and culture was done as per standard protocols. Cultivation of bacteria other than Gardenerella were subjected to standard procedures and antibiotics susceptibility testing as per CLSI guidelines.

3. Results

Out of 104 clinically suspected cases of vaginitis, highest distribution of type of vaginitis was Bacterial vaginosis.(Table 1) Majority of the women in this group belonged to age group between 31-40 years were more affected (Table 2). Most (57.6%) of the women in this study group were illiterates.(Table 3)

Leucorrhoea was the most common symptom in both Bacterial vaginosis (53.7%) and Trichomoniasis(50%) and Leucorrhoea with pruritus is the common symptom Candidiasis (67.4%). White colour discharge was seen in 43(100%) of Candidiasis cases and 27(50%) Bacterial vaginosis cases. Greyish discharge was seen in 26(48.2%) of Bacterial vaginois cases.Typical green colour discharge was seen in all four cases of Trichomoniasis.

Among 43 isolates of *Candida*, *C.albicans* was the most common species which is 32.5%(14) (Table 4). Out of three different screening methods for diagnosis of Candidiasis, KOH mount was found to be more sensitive method. Coagulase negative staphylococcus (40.7%) was isolated in this study. Most Gram positive organisms were susceptible to Linezolid and other Gram negative organisms were sussceptible to all antibiotics except Azithromycin.

4. Discussion

In this study highest distribution is seen in Bacterial vaginosis followed by vulvovaginal candidiasis and Trichomoniasis, which were comparable with Anisahamed et al[12] Bacterial Vaginosis 53.5%, K J Puri et al Bacterial vaginosis 45%[2] and some studies showed low incidence of Bacterial vaginosis like Bansal et al(26%),[13] Olubenga et a(2%).[14] These differences may be due to various etiologies studied, different techniques used in the diagnosis of vaginitis, different patient groups and geographical area involved. Our study showed less number of Trichomoniasis cases was consistent with reports of K J Puri et al(2%)[2], Shazia et al (4%)[15] and the contrary Usha Kataria et al(14%)[16] showed highest incidence, this could be due to variation in personal hygiene practice, socioeconomic status and cultural factors, environment of study participants.

Age group between 31-40 showed highest incidence in all three etiology of vaginitis, these results were consistent with Bhalla et al[17] Sangeeta et al.[18] Various studies showed more incidence in the age group 21-30. These differences occur when age of the patient increases it cause decrease in the level of estrogen harmone which makes the environment favourable for pathogenic organisms, weakening of immunity, use of OCP's.

In this study majority of the participants were illiterates 57.6%. 65.5% in Candidiasis, 53.7% in Bacterial vaginosis and 75%in Trichomoniasis cases. These reports were

Table 1: Distribution of type of vaginitis among study group

	Incidence	
Conditions	**No of cases**	**Percent**
Candidiasis	43	41.3
B vaginosis	46	44.2
Trichomoniasis	4	3.9
No growth	11	10.6
Total	104	100

Table 2: Age wise distribution of vaginitis cases

Age	**Candidiasis**		**B.vaginosis**		**T.vaginalis**	
	No of Cases	**Percent**	**No of Cases**	**Percent**	**No of Cases**	**Percent**
21-30	21	45.7	24	44.4	0	0
31-40	25	54.3	30	55.6	4	100.0
Total	46	100.0	54	100.0	4	100

Table 3: Literacy status of study group

Literacy	**Candidiasis**		**B vaginosis**		**T.vaginalis**	
	No of cases	**Percent**	**No of cases**	**Percent**	**No of Cases**	**Percent**
< 10th std	14	30.4	19	35.2	1	25
> 10th std	3	6.6	6	11.1	0	0
Illiterate	29	63.0	29	53.7	3	75
Total	46	100.0	54	100.0	4	100

Table 4: Distribution of *candida* species in vaginal candidiasis

Species	**Candidiasis**	
	No of cases	**Percent**
C.albicans	14	32.5
C.glabrata	5	11.6
C.guilliermondii	1	2.3
C.krusei	12	27.9
C.kefyr	2	4.8
C.tropicalis	9	20.9
Total	43	100.0

correlating with study conducted by Bhansal et al 62.5%,[11] Varsha et al 60.1%.[19] In this study prevalence of vaginitis is low in participants above 10^{th} standard. This shows illiteracy is having direct relationship with increase in prevalence. This was also due to less education leads to lack of awareness, poor personal hygiene and poor health seeking behaviour.

Leucorrhoea was the commonest complaint (42.3%). It is 30.2% cases of candidiasis and 53.7% cases of Bacterial vaginosis which is similar to that of Anuradhanarayankedhkar et al[20] (96.4%) and some studies showed leucorrhoea were not common. In this study leucorrhoea with pruritus vulvae were seen in *candidal* cases 67.4%, itching is the most common symptom in candidiasis, but in this study itching was also seen in Bacterial vaginosis cases (18 cases) which is 33.3%. So that clinical diagnosis based on clinical symptoms alone will not provide proper etiology hence laboratory investigations are necessary to make proper diagnosis.

Deepalokhwani et al reported 52% of white discharge were seen in candidial cases and 23% of mucopurulent whitish to yellow discharge in Bacterial vaginosis cases. Maitranandita et al 69.4% white homogeneous discharge in Bacterial vaginosis, curdy white in 66.8% candidiasis and green frothy in 69.1% Trichomoniasis. In the present study 100% of curdy white discharge in Candidiasis, green frothy in 100% of Trichomoniasis, Greyish in 48.2% and whitish in 50% of Bacterial vaginosis. Hence curdy white and green frothy discharge are accurate indicators for the diagnosis of Candidiasis and Trichomoniasis. But in cases of Bacterial vaginosis it is less accurate.

In this study, *Candida* albicans was the most common species isolated 32.5%, similar results were observed in study conducted by Amar sajjan et al,[21] savitasharma et al 46%[22] But other studies done by Jason et al,[23] M Dan et al,[24] isolated *Candida* glabrata as the common species. This difference may be due to the reason that our study did not include asymptomatic cases, as *Candida glabrata* is

more commonly seen in asymptomatic type of vaginitis and symptoms produced by *Candida albicans* is severe hence patients seek medical attention. We observed similar results in speciation of *Candida* species, using both Conventional and Rapid (CHROM AGAR) methods. In some studies, like sumitra et al observed CHROM AGAR is less sensitive, several other studies like Amar C S et al,[21] Vijaya D et al.[25] showed similar results like present study. But conventional methods are labor intensive and time consuming compared to rapid method.

In the diagnosis of Candidiasis, KOH was considered best screening method compared to Gram staining, Acridine orange staining. All 46 cases of Candidiasis were detected by KOH and 3 showed no growth.

Among Gram positive organisms *Coagulase Negative Staphylococcus*(40.7%) was isolated in this study, Followed by *S.aureus, Enterococcus* species, these results were similar to Sangeeta et al, Tansari et al CoNS (41.7%(73). Among Gram negative bacilli *E.coli* and *Pseudomonas* sp were isolated. Out of 15 *S.aureus* 8 were *MRSA* and 7 were *MSSA*. All *MRSA* strains were 100% susceptible to Linezolid. In this *MR CoNS* did not show any multi drug resistance. This shows that invitro susceptibility testing should be done for all isolates and irrational use of antibiotics should be avoided.

In the present study, Trichomoniasis is low, so comparison of laboratory techniques and finding better technique was not possible.

5. Conclusion

Bacterial vaginosis, Candidiasis and Trichomoniasis still remains as the most common problem in the reproductive age group. Health education is necessary to increase the awareness of women about vaginitis and its prevention. So patients with suspected vaginitis needs thorough screening and basic microbiological investigation. Multidrug resistant strains are on the rise, so irrational use of antibiotics should be avoided. Every hospital should make their own antibiotic policy depending on the local susceptibility pattern and this will be helpful for clinicians for choosing empirical antibiotic therapy.

6. Ethics Statement

This study was approved by Institutional Ethical committee, J.J.M.M.C Davangere.

7. Authors Contribution

All authors contributed to conception and design of the study and conducted the experiments, analyzed the data and also approved the final version of the manuscript and agree to be held accountable for the content.

8. Acknowledgement

None.

9. Conflicts of Interest

The authors declare that there is no conflicts of interest.

10. Source of Funding

None

References

1. Williams Gynaecology, Benign General Gynaecology. Gynaecology infection Ch 3. 3rdn. McGraw-Hill Education.
2. Puri KJ, Madhan A, Bajaj K. Incidence of various causes vaginal discharge among sexually active females in age group 20-40 years. *Indian J Dermatol Venereol Leprol*. 2003;69(2):122–5.
3. Abdul-Aziz M, Mahdy MAK, Abdul-Ghani R, Alhilali NA, Al-Mujahed L, Alabsi SA, et al. Bacterial vaginosis, vulvovaginal candidiasis and trichomonal vaginitis among reproductive-aged women seeking primary healthcare in Sana'a city, Yemen. *BMC Infect Dis*. 2019;19(1):879. doi:10.1186/s12879-019-4549-3.
4. Işik G, Demirezen Ş, Dönmez HG, Beksaç M. Bacterial Vaginosisin association with spontaneous abortion and recurrent pregnancy losses. *J Cytol*. 2016;33(3):135–40. doi:10.4103/0970-9371.188050.
5. Tille PM. Bailey & Scott's Diagnostic Microbiology (Diagnostic Microbiology (Bailey & Scott's)) 13th Edition. Mosby; 2013.
6. Xie HY, Feng D, Wei DM, Chen H, Mei L, Wang X, et al. Probiotics for vulvovaginal candidiasis in non pregnant women. *Cochrane Database Syst Rev*. 2012;11(11):1–18.
7. Preeti V, Mandal J, Halder A, Parija SC. Trichomoniasis: An Update. *Trop Parasitol*. 2011;1(2):73–5. doi:10.4103/2229-5070.86934.
8. Chander J. Textbook of Medical mycology. 3rd Edn. New Delhi: Mehta Publishers;. p. 267–83.
9. Cheesebrough M. District laboratory practice in Tropical countries. In: Microbiological tests. 2nd Edn. New York: Cambridge University Press;. p. 45.
10. Nugent RP, Krohn MA, Hiller SL. Reliability of diagnosing Bacterrialvaginosis improved by standardized method of gram stain interpretation. *J Clin Microbiol*. 1991;29(2):297–304.
11. Levi MH, Torres J, Piña C, Klein RS. Comparison of the InPouchTV Culture System and Diamond's Modified Medium for Detection of Trichomonasvaginalis. *J Clin Microbiol*. 1997;35(12):3308–10. doi:10.1128/jcm.35.12.3308-3310.1997.
12. Ahmad A, Khan AU. Prevalence of Candida species and potential risk factors for vulvovaginal candidiasis in Aligarh, India. *Eur J Obstet Gynecol Reprod Biol*. 2009;144(1):68–71. doi:10.1016/j.ejogrb.2008.12.020.
13. Bansal KM, Singh K, Bhatnagar S. Prevalence of Lower RTI Among females in the reproductive age group(15-45). *Health Popul- Perspect Issues*. 2001;24(3):157–63.
14. Olowe OA, Makanjuola OB, Olowe R, Adekanle DA. Prevalence of Vulvovaginal candidiasis, Trichomoniasis, and bacterial vaginosis among pregnant women receiving antenatal care in South western Nigeria. *Eur J Microbiol Immunol*. 2014;4(4):193–7.
15. Khan SA, Amir F, Altaf S, Tanveer R. Evaluation of common organisms causing vaginal discharge. *J Ayub Med Coll Abbottabad*. 2009;21(2):91–3.
16. Kataria U, Siwach S, Chhillar D. Study of the causes of vaginal discharge among sexually active females in age group of 20-45 years. A Hospital based study in B P S Government Medical College, Haryana, India. *IAIM*. 2015;2(4):1–4.
17. Bhalla P, Chawla R, Garg S, Singh MM, Raina U, Bhalla R, et al. Prevalence of bacterial vaginosis among women in Delhi, India. *Indian J Med Res*. 2007;125(2):167–72.
18. Sangeetha KT, Golia S, Vasudha CL. A study of aerobic bacterial pathogens associated with vaginitis in reproductive age group women

15-45 years and their sensitivity pattern. *Int J Res Med Sci*. 2015;3(9):2268–73.
19. Chaudhry V, Kumar R, Agrawal V, Singh A, Narula R, Sharma M, et al. Prevalence and determinants of vaginal discharge among women of reproductive age group in tertiary care hospital of North India. *Natl J Community Med*. 2012;3(4):616–66.
20. Anuradhanarayankahedkar A, Hodiwala A, Mane A. Clinicoetiological Characterization of Infectious Vaginitis amongst Women of Reproductive Age Group from Navi Mumbai, India. *J Sex Transm Dis*. 2014;p. 817092. doi:10.1155/2015/817092.
21. Sajjan AC, Mahalakshmi VV, Hajare D. Prevalence and Antifungal Susceptibility of Candida Species Isolated From Patients Attending Tertiary Care Hospital. *IOSR J Dent Med Sci*. 2014;13(5):44–9.
22. Sharma S, Gupta BP. The prevalence of reproductive tract infections and sexually transmitted diseases among married women in the reproductive age group. *Indian J Community Med*. 2009;34(1):62–4. doi:10.4103/0970-0218.45376.
23. Mintz JD, Martens GM. Prevalence of Non albicansCandida Infections in Women with Recurrent Vulvovaginal Symptomatology. *Adv Infect Dis*. 2013;3(4):238–42. doi:10.4236/aid.2013.34035.
24. Dan M, Poch F, Levin D. High rate of vaginal infections caused by non albicans Candida species among asymptomatic women. *Med Mycol*. 2002;40(4):383–6. doi:10.1080/mmy.40.4.383.386.
25. Vijaya D, Dhanalakshmi TA, Kulkarni S. Changing trends of vulvovaginal candidiasis. *J Lab Physicians*. 2014;6(1):28–30. doi:10.4103/0974-2727.129087.

Author biography

Shankari P, Post Graduate https://orcid.org/0000-0002-0886-3498

Usha MG, Professor

Cite this article: Shankari P, Usha MG. Microbiological study of vaginitis among women of reproductive age group. *IP Int J Med Microbiol Trop Dis* 2022;8(3):232-236.