

Assessment of Microbial Profile and its Usefulness in Indian Females with Symptomatic Vaginal Discharge

Lakshmi Irrinki¹, Sowjanya Moturi², Ch Pragati³, Namdeo M. Suryawanshi^{4*}

¹Associate professor, Department of Obstetrics and Gynaecology, GSL Medical College, Rajamundry, Andhra Pradesh, India

²Assistant professor, Department of Obstetrics and Gynaecology, GSL Medical College, Rajamundry, Andhra Pradesh, India

³Professor of microbiology, GSL medical college, Rajamundry, Andhra Pradesh, India

⁴Associate Professor Dept of Microbiology, Vilasrao Deshmukh Government Medical College, Latur, Maharashtra, India

Received: 15-08-2021 / Revised: 30-10-2021 / Accepted: 04-11-2021

Abstract

Background: Vaginal discharge in females can be normal and physiological that changes with the menstrual cycle. Pathologic Vaginal discharge leads to significant morbidity in young age group females. **Aims:** The present clinical trial was carried out to evaluate the symptomatic vaginal discharge incidence in females of different age groups and to assess microbiological profile in females with symptomatic vaginal discharge. **Materials and Methods:** In 80 females, vaginal swabs were collected for the microbiological evaluation followed by Wet mount preparation and Nugent's scoring system for microbial assessment. The collected data were subjected to the evaluation for results formation. **Results:** Nugent scores showed that 43.75% (n=35) females had bacterial vaginosis, Trichomonas, pus cells, and clue cells were respectively seen in 41.25% (n=33), 21.25% (n=17), and 8.75% (n=7) subjects. For vaginal candidiasis, two species seen were Candida parapsilosis and Candida Albicans which were respectively isolated from 17 (94.4%) and 2 (5.5%) subjects of vaginal candidiasis. Other organisms isolated and identified in study females were Staphylococcus Aureus, Pseudomonas Aeruginosa, E Coli, Coagulase Negative Staphylococcus, Enterococcus, Klebsiella, and Acinetobacter isolated from 8, 2, 19, 2, 12, 1, and 3 subjects respectively. **Conclusion:** Pathologic and excessive vaginal discharge in females can lead to significant morbidity, discomfort, and financial constraints in healthy females and require early diagnosis and microbial detection to ensure effective treatment modality.

Keywords: Bacterial vaginosis, candidiasis, Candida Albicans, vaginal discharge, Trichomonas

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Vaginal discharge in females can be normal and physiological that changes with the menstrual cycle. During ovulation, for a short period, the discharge becomes wet, stretchy, and clearer from the stick and thick, which is the consistency for most of the cycle. However, in females under oral contraceptives, such consistency change is not observed. In the physiological healthy state, the vaginal discharge has no strong smell, pain, or itching, whereas, it can be seen in large volumes [1].

Excessive vaginal discharge normally is termed leucorrhoea. The discharge may increase during sexual intercourse, puberty, ovulation, before menstruation, and with oral contraceptives. Discharge in the pathological state can differ in color, odour, consistency, and volume. Also, it can be associated with pain, itching, bleeding, dysuria, and/or soreness [2].

Pathological vaginal discharge can be associated with infectious and non-infectious conditions including infertility, urethral syndrome, pelvic inflammation, sexually transmitted diseases, endometriosis, pre-term labour, low birth weight, HIV, cuff cellulitis post-hysterectomy, premature membrane rupture, and lead to significant morbidity at young age group females.

The vaginal discharge constitutes one of the most common reasons to visit gynecologists by females of reproductive age group, approximately 5 to 10 million per year. In India, approximately 30% of females suffer from pathologic vaginal discharge [3].

The etiology of vaginal discharge commonly relates to the three most common conditions in 90% of cases including bacterial vaginosis, trichomoniasis, and candidiasis seen respectively in 33-47%, 8-10%, and 20-40% cases with pathologic vaginal discharge. Fallopian tubes and cervical canals are sterile in human females, whereas, normal flora at other vaginal areas in humans constituted by Bacteroids, streptococci, Ureaplasma, Clostridia, urealyticum, Gardnerella vaginalis, mobiluncus or listeria species. Detailed disease-related history, menstrual history, sexual history, and examination of subjects are needed to assess etiology and formulate a management plan for vaginal discharge [4]. The present clinical trial was carried out to evaluate the symptomatic vaginal discharge incidence in females of different age groups and to assess microbiological profiles in females with symptomatic vaginal discharge.

Materials and methods

The present clinical trial was carried out to evaluate the symptomatic vaginal discharge incidence in females of different age groups and to assess microbiological profiles in females with symptomatic vaginal discharge. The study was conducted at GSL medical college, Rajamundry, Andhra Pradesh and recruited the subjects visiting the Outpatient department, department of Obstetrics and Gynaecology with a complaint of symptomatic vaginal discharge.

*Correspondence

Dr. Namdeo M Suryawanshi

Associate Professor Dept of Microbiology, Vilasrao Deshmukh Government Medical College, Latur, Maharashtra, India.

E-mail: drsnamdev@gmail.com

The inclusion criteria for the study were females presenting to the Department of Obstetrics and Gynaecology with a complaint of symptomatic vaginal discharge, subjects with no other medical history or disease that could lead to vaginal bleeding, subjects under any prolonged medication, subjects signing the informed consent, and the subjects that were willing to participate in the study. The subjects excluded from the study were pregnant females, menstruating females, unmarried females, females who had sexual intercourse in the past 72 hours, subjects who took antifungal or antibiotics in the past 6 months, delivered in the past 6 months, underwent an abortion in past 6 months, subjects not willing to participate in the study, and subjects not in the mental state of providing the consent.

After the inclusion of subjects based on inclusion and exclusion criteria, 80 subjects comprised the study population, detailed disease-related history and physical examination of all the study subjects was carried out. The examination was done after inserting a speculum for vagina and cervix visualization, and any detected abnormality was recorded. Also, swabs were collected for the microbiological evaluation from the posterior vaginal fornix along with assessing the nature of the vaginal discharge. Following laboratory, examinations were also carried out including Wet mount preparation where vaginal discharge drop was mixed with saline and the slide was examined microscopically to see the presence of clue cells, pus cells, or Trichomonas. For bacterial vaginosis, Nugent's scoring [5] system was followed following microorganism morphology in magnification.

Following standard criteria and methods, identification of microorganisms was done depending on biochemical reactions, staining characteristics, cultural characteristics, colonial characteristics, and morphology. SDA or Sabouraud agar was used for inoculation and fungi identification by assessing characteristics, morphology, growth, structure, and source. Yeasts are also identified

by SDA culture via biochemical tests. The collected data were subjected to the evaluation for results formation.

Results

The present clinical trial was carried out to evaluate the symptomatic vaginal discharge incidence in females of different age groups and to assess microbiological profile in 80 females with symptomatic vaginal discharge. 80 females were within the age group of 20-49 years with the mean age of 32.1 years. The demographic and discharge-related characteristics of the study females are depicted in Table 1. It was seen that maximum study subjects (48.75%, 39) were within the age group of 20-29 years compared to the age of 30-39 years with 38.75% (n=31) and 40-49 years with 12.5% (n=10) subjects. 12.5% (n=10) study subjects were illiterate, whereas, 77.5% (n=62) of subjects were educated up to graduation or less, and only 8 females (10%) were educated till post-graduation. Concerning socioeconomic background, 68.75% (n=55) females were from the lower-income group, followed by the middle group with 28.75% (n=23) females, and 2 females (2.5%) from the upper-class group.

Concerning discharge characteristics, white curdy discharge and mucopurulent discharge on examination was seen in 18.75% (n=15) females, whereas, yellow frothy discharge was seen in 17.5% (n=14) study females, and in maximum, 45% (n=36) subjects homogenous discharge was observed. The associated symptom reported commonly by study females with discharge was foul smell in 27.5% (n=22) subjects, followed by itching in 25% (n=20) females, excessive vaginal discharge in 22.5% (n=18) subjects, abdominal pain in 11.25% (n=9) females, burning and painful micturition in 6.25% (n=5) subjects, vaginal bleeding in 5% (n=4) females, and backache in 2.5% (n=2) subjects (Table 1).

Table 1: Demographic and discharge characteristics of the study subjects

Characteristics	Percentage (%)	Number (n)
Age Groups		
20-29 years	48.75	39
30-39 years	38.75	31
40-49 years	12.5	10
Education		
Illiterate	12.5	10
Undergraduate or less	77.5	62
Postgraduate	10	8
Socioeconomic Background		
Lower	68.75	55
Middle	28.75	23
Upper	2.5	2
Discharge Color		
White (curdy)	18.75	15
Homogeneous	45	36
Frothy yellow	17.5	14
Mucopurulent	18.75	15
Symptoms with discharge		
Abdominal pain	11.25	9
Itching	25	20
Foul smell	27.5	22
Backache	2.5	2
Vaginal bleeding	5	4
Excessive discharge	22.5	18
Burning and painful micturition	6.25	5

On laboratory examination, concerning Nugent scores, it was seen that in 43.75% (n=35) females, the scores were in the range of 7-10 depicting bacterial vaginosis, followed by normal (0-3) scores in 33.75% females, and in only 22.5% (n=18) subjects intermediate scores of 4-6 were seen (Table 2). On wet mount examination under high resolution magnification, Trichomonas, pus cells, and clue cells were respectively seen in 41.25% (n=33), 21.25% (n=17), and 8.75% (n=7) subjects, whereas, the results were inconclusive in 28.75% (n=23) females (Table 2).

Table 2: Laboratory examination results in the study subjects

Laboratory Examination	Percentage (%)	Number (n)
Nugent Score		
Normal (0-3)	33.75	27
Intermediate (4-6)	22.5	18
Bacterial Vaginosis (7-10)	43.75	35
Wet Mount		
Inconclusive	28.75	23
Pus Cells	21.25	17
Clue Cells	8.75	7
Trichomonas	41.25	33

Concerning the microbial examination diagnosis, Bacterial Vaginosis was the most common diagnosis found in 42.5% (n=34) females, followed by vaginal candidiasis in 22.5% (n=18) subjects, normal vaginal flora in 11.255% (n=9) females, Trichomonas Vaginalis in 8.75% (n=7) females, and other microorganisms were seen in 15% (n=12) of study subjects. For vaginal candidiasis, two species seen were Candida parapsilosis and Candida Albicans which were isolated from 17 (94.4%) and 2 (5.5%) subjects of vaginal candidiasis respectively. Other organisms isolated and identified in study females were Staphylococcus Aureus, Pseudomonas Aeruginosa, E Coli, Coagulase Negative Staphylococcus, Enterococcus, Klebsiella, and Acnitobacter isolated from 8, 2, 19, 2, 12, 1, and 3 subjects respectively.

Table 3: Vaginal discharge diagnosis and other microorganisms identified in the study subjects

Diagnosis	Percentage (%)	Number (n)
Vaginal Candidiasis	22.5	18
Candida Parapsilosis	94.4	17
Candida Albicans	5.5	2
Normal Vaginal Flora	11.25	9
Bacterial Vaginosis	42.5	34
Trichomonas Vaginalis	8.75	7
Others	15	12
Other Identified Organisms		
Staphylococcus Aureus	-	8
Pseudomonas Aeruginosa	-	02
E Coli	-	19
Coagulase Negative Staphylococcus	-	02
Enterococcus	-	12
Klebsiella	-	01
Acnitobacter	-	03

Discussion

The present clinical trial was carried out to evaluate the incidence of symptomatic vaginal discharge which is the most common reason for gynecological visits in females of different age groups and to assess microbiological profile in 80 females with symptomatic vaginal discharge. 80 females were within the age group of 20-49 years with the mean age of 32.1 years. The study results showed that the maximum study subjects (48.75%, 39) were within the age group of 20-29 years compared to the age of 30-39 years with 38.75% (n=31) and 40-49 years with 12.5% (n=10) subjects. 12.5% (n=10) study subjects were illiterate, whereas, 77.5% (n=62) of subjects were educated up to graduation or less, and only 8 females (10%) were educated till post-graduation. Concerning socioeconomic background, 68.75% (n=55) females were from the lower-income group, followed by the middle group with 28.75% (n=23) females, and 2 females (2.5%) from the upper-class group. These findings were in agreement with the studies by Guntoory et al[6]. in 2017 and Patel V et al[7]. in 2206 where authors also showed the highest prevalence in young age females. This can be attributed to early marriage, childbearing, and lack of oral contraceptive knowledge. Choudhary V et al[8]. in 2012 had similar demographic results in their studies. Concerning discharge characteristics, white curdy discharge and mucopurulent discharge on examination was seen in 18.75% (n=15) females, whereas, yellow frothy discharge was seen in 17.5% (n=14) study females, and in maximum, 45% (n=36) subjects homogenous discharge was observed. The associated symptom reported commonly by study females with discharge was foul smell in 27.5% (n=22) subjects, followed by itching in 25% (n=20) females, excessive vaginal discharge in 22.5% (n=18) subjects, abdominal pain in 11.25% (n=9) females, burning

and painful micturition in 6.25% (n=5) subjects, vaginal bleeding in 5% (n=4) females, and backache in 2.5% (n=2) subjects. These findings were consistent with the findings of Masand DL et al[9]. in 2015 where authors reported homogeneous discharge in maximum study subjects followed by mucopurulent discharge.

The laboratory examination results showed that in 43.75% (n=35) females, the scores were in the range of 7-10 depicting bacterial vaginosis, followed by normal (0-3) scores in 33.75% females, and in only 22.5% (n=18) subjects intermediate scores of 4-6 were seen (Table 2). On wet mount examination under high resolution magnification, Trichomonas, pus cells, and clue cells were respectively seen in 41.25% (n=33), 21.25% (n=17), and 8.75% (n=7) subjects, whereas, the results were inconclusive in 28.75% (n=23) females. These findings coincided with the findings of Kamara P et al[10]. in 2000 where similar laboratory investigation results were reported by the authors. However, these results were contrasting to the study of Koumans EH et al[11]. in 2007 which may be due to the different geographical areas studied.

In the present study, Bacterial Vaginosis was the most common diagnosis found in 42.5% (n=34) females, followed by vaginal candidiasis in 22.5% (n=18) subjects, normal vaginal flora in 11.255% (n=9) females, Trichomonas Vaginalis in 8.75% (n=7) females, and other microorganisms were seen in 15% (n=12) of study subjects. For vaginal candidiasis, two species seen were Candida parapsilosis and Candida Albicans which were isolated from 17 (94.4%) and 2 (5.5%) subjects of vaginal candidiasis respectively. Other organisms isolated and identified in study females were Staphylococcus Aureus, Pseudomonas Aeruginosa, E Coli, Coagulase Negative Staphylococcus, Enterococcus, Klebsiella, and Acnitobacter

isolated from 8, 2, 19, 2, 12, 1, and 3 subjects respectively. These results were following the study of Khan N et al [12].in 2012 with a similar microbial profile and were contrasting to Vengopal S et al [13].in 2017 which can be due to different areas of investigation.

Conclusion

Symptomatic vaginal discharge in females remains one of the most common reasons for gynecological visits, morbidity, compromised self-confidence, and compromised professional life and also make an affected individual susceptible to infertility, inflammatory diseases, endometriosis, miscarriages, and/or urethral syndromes. The management of symptomatic vaginal discharge is based on targeting the causative microorganisms making microbial profiling an important aspect assisting in diagnosis. Timely diagnosis and treatment can help in managing subjects without causing morbidity. However, the present study had few limitations including a smaller sample size, short monitoring period, and geographical area biases. Hence, further longitudinal studies with a larger sample size and monitoring period are required to reach a definitive conclusion.

References

1. Lanis, A.; Talib, H.J.; Dodson, N. Prepubertal and adolescent vulvovaginitis: What to do when a girl reports vaginal discharge. *Pediatr. Ann.* 2020; 49:170–5.
2. Tortelli, B.A.; Lewis, W.G.; Allsworth, J.E.; Member-Meneh, N.; Foster, L.R.; Reno, H.E.; Peipert, J.F.; Fay, J.C.; Lewis, A.L. Associations between the vaginal microbiome and candida colonization in women of reproductive age. *Am. J. Obstet. Gynecol.* 2020;222:1-9.
3. Mehta, O.; Ghosh, T.S.; Kothidar, A.; Gowtham, M.R.; Mitra, R.; Kshetrapal, P.; Wadhwa, N.; Thiruvengadam, R.; GARBH-Ini study group; Nair, G.B.; et al. Vaginal microbiome of pregnant Indian women: Insights into the genome of dominant lactobacillus species. *Microb. Ecol.* 2020;80:487–99.
4. Marconi, C.; El-Zein, M.; Ravel, J.; Ma, B.; Lima, M.D.; Carvalho, N.S.; Alves, R.R.F.; Parada, C.; Leite, S.H.M.; Giraldo, P.C.; et al. Characterization of the vaginal microbiome in women of reproductive age from five regions in Brazil. *Sex. Transm. Dis.* 2020;47:562–9.
5. Schwabke JR, Hillier SL, Sobel JD, McGregor JA, Sweet RL. Validity of the vaginal gram stain for the diagnosis of bacterial vaginosis. *Obstet Gynecol* 1996;88:573–6.
6. Guntoory I, Tamaraba N R, Nambaru L R. Prevalence and sociodemographic correlates of vaginal discharge among married women of reproductive age group at a teaching hospital. *Int J Reprod Contracept Obstet Gynecol.* 2017;6:4840-6.
7. Patel V, Weiss HA, Kirkwood BR, Pednekar S, Nevrekar P, Gupte S et al. Common genital complaints in women: the contribution of psychosocial and infectious factors in a population based cohort study in Goa; India. *Int J Epidemiol.* 2006;35:1478-85.
8. Choudhary V, Kumar R, Agrawal VK, Singh A, Narula R, Sharma M. Prevalence and Determinants of Vaginal Discharge among Women of Reproductive Age Group in Tertiary Care Hospital of Northern India. *Natl J Community Med.* 2012;3:661-5.
9. Masand DL, Patel J, Gupta S. Utility of microbiological profile of symptomatic vaginal discharge in rural women of reproductive age group. *J Clin Diagn Res.* 2015;9:4-7.
10. Kamara P, Kong TH, Brathwaite A, et al. Vaginal infections in pregnant women in Jamaica: prevalence and risk factors. *Int STD and AIDS* 2000;11:516-20.
11. Koumans EH, Sternberg M, Bruce C, McQuillan G, Kendrick J, Sutton M, et al. The prevalence of bacterial vaginosis in the United States, 2001-2004; associations with symptoms, sexual behaviors, and reproductive health. *Sex Transm Dis.* 2007;34:864–9.
12. N. Khan, R. Kausar, C. Flach & L. Howard, Psychological morbidity in women presenting with vaginal discharge in Pakistan, *International Journal of Culture and Mental Health.* 2012;5:169-81.
13. Venugopal S, Gopalan K, Devi A. Epidemiology and clinico-investigative study of organisms causing vaginal discharge. *Indian J. Sex. Transm. Dis. AIDS* 2017;38:69-75.

Conflict of Interest: Nil

Source of support: Nil