

## Microbiological Profile of High Vaginal Swabs of Symptomatic Women of Reproductive age-group in a tertiary care hospital; RIMS, Ranchi.

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### Abstract:

**Introduction-** Microbiological flora of the female genital tract is dynamic, complex example of microbial colonisation, the regulation of which is not fully understood. Vaginal infection is very common in women of reproductive age group all over the world especially in developing countries. It is caused by an imbalance of the organisms naturally existing in the vagina. It can be due to bacterial vaginosis, candidiasis and trichomoniasis.

**Aims&Objective-** To evaluate the microbiological profile of symptomatic vaginal discharge of female of reproductive age group, who attended the Obs. & Gynae department of RIMS, Ranchi during July 2016 to June 2018. **Material & methods-** A total of 200 high vaginal swabs (HVS) were collected from female of reproductive age group. For each patient one swab was used for smear preparation and Gram's staining and second swab was subjected to aerobic culture on blood agar and Mac Conkey agar. **Results-** Out of total 200 HVS sample; 93 (46.5%) were found pathogenic, 34 (17%) were normal vaginal flora, 73 (36.5%) does not showed any growth. In our study among pathogenic bacteria, E. Coli were found 26 (27.96%) followed by Staphylococcus aureus -19 (20.43%), Candida- 20 (20.44%), Klebsiella- 15 (16.11%) and others were Enterococcus- 3, CONS - 2, Streptococcus-2, Pseudomonas -2 and Proteus- 1. **Conclusion-** Our study indicated that proper laboratory diagnosis should be done to identify the causative organism for optimal therapeutic outcome. In our study pathogenic bacteria were found more frequently than candida. Hence the practice of empirical antifungal therapy without taking high vaginal swab needs to be changed. The use of appropriate antibiotics along with antifungal drugs may be beneficial.

**Keywords-** vaginal swab, vaginal discharge, bacterial vaginosis, candidiasis, trichomoniasis

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### I. Introduction

Microbiological flora of female genital tract is dynamic, complex example of microbial colonisation, the regulation of which is not fully understood.<sup>(10) (15)</sup> Our knowledge about bacterial composition of female genital tract is derived from qualitative and descriptive studies. Lactobacillus is the most common commensal in the vagina. This bacillus maintains the acidic pH of vagina.<sup>(10)</sup>

The normal vaginal pH of women of reproductive age group is acidic ( $\leq 4.5$ ) which gives protection to the vaginal mucosa. Alongwith lower pH lactobacilli also produce hydrogen peroxide to show bacterial antagonism properly. Many other microorganism may be present in lower concentrations include Staphylococcus aureus, Enterococcus species, beta haemolytic streptococcus, Neisseria species, E. Coli, Klebsiella species and Candida species.<sup>(11)</sup>

Approximately 50% have no symptoms. Common cause of infectious vaginitis is bacterial vaginosis, vulvovaginal candidiasis and trichomoniasis.<sup>(10) (11)</sup> Multiple infections can also coexist.<sup>(6)</sup> Sometimes etiological diagnosis may not be established in case of vaginitis and such type of abnormal vaginal flora has been kept under intermediate flora.<sup>(10) (19)</sup>

Bacterial vaginosis is the most common cause of vaginal complains for the women of reproductive age groups. It is caused by an imbalance of the microflora of vagina that naturally exist. These are Gardenellavaginalis, Mobiluncus species, Prevotella species, Mycoplasma hominis, atobiumvaginae.<sup>(5) (12)</sup> Bacterial vaginosis increases the risk of preterm labour and delivery, chorioamnionitis, post caesarianendometritis, post abortion pelvic inflammatory disease and cervicitis.

## II. Methods and Materials

The present study was conducted in the department of microbiology, RIMS, Ranchi for a period of 2 years from July 2016 to June 2018. It was a prospective type of study conducted on samples collected during a period of two years between July 2016 to June 2018 in the Dept. of microbiology, RIMS, Ranchi. Vaginal swabs were collected from females in the reproductive age group of 15-45 years with symptomatic vaginal discharge attending in our gynaecology OPD.

Processing of samples → from each patient 2 high vaginal swabs were collected using sterile cotton swabs, then immediately processed in the laboratory. The first swab was used for gram stain examination under 400X (for determining AV score) and 1000X magnification (for identification of organism). The AV score was calculated by determining the presence or absence of healthy lactobacilli, number of leukocytes, type of vaginal flora and parabasal epithelial cells under 400X magnification according to a modified Donder's score. An AV score of <3 was taken as "no signs of aerobic vaginitis", 3-4 as light AV, 5-6 as moderate AV >6 as severe AV. Aerobic vaginitis (AV) was diagnosed if smears were deficient in lactobacilli, positive for cocci or coarse bacilli, positive for parabasal epithelial cells and positive for vaginal leukocytes.

The second swab was inoculated into MacConkey's agar, blood agar and chocolate agar. The aerobically incubated bacterial growth was identified by standard biochemical reactions. The antibiotic sensitivity of aerobic bacterial isolates was performed by standardised Kirby-Bauer disc diffusion technique as per the CLSI guidelines.

## III. Results

A total of 200 vaginal swabs were collected from the patients with suspicion of vaginitis were sent from the Gynae department to the lab for cultures, out of which 127 showed growth, where as 73 showed no growth. Out of 200 samples 73 (36.5%) gram smear findings were normal and no growth in culture. 34 (17%) had normal vaginal flora i.e. with gardenella morphotype, gram negative curved rods, fusiforms and lactobacilli were absent / present in low numbers (1-2+). The smear was interpreted as consistent with BV. 20 (10%) had the growth of Candida species. In the remaining 93 samples, the gram stain findings had only vaginal epithelial cells with lactobacilli but the culture under aerobic condition had the growth of pathogenic bacteria and candida. Hence the prevalence of aerobic vaginitis in the study was 46.5%.

The study group includes women in the reproductive age group i.e. between 15-45 years. Maximum number of aerobic vaginitis (AV) fell in the age group of 26-30 yrs with 32.25% followed by female of age group 21-25 yrs with 25.8% followed by the age group 31-35 yrs with 20.15%.

**Table 1.-** Age wise distribution of AV cases.

Age group (in years)	No. of positive cases (n=93)
15-20	5 (5.37%)
21-25	24 (25.8%)
26-30	29 (31.1%)
31-35	18 (19.3%)
36-40	17 (18.27%)
41-45	5 (5.37%)

**Table 2-** Distribution of AV cases among pregnant and non pregnant women

Category	Total no. of women (n=200)	No. of positive cases (n=127)
Pregnant	62	17 (27.42%)
Non pregnant	138	110 (79.71%)

The prevalence of AV cases was higher among non-pregnant i.e. 79.71% compared to pregnant one i.e. 27.42%.

**Table 3-** Nature of vaginal discharge among AV cases

Discharge	No. of cases (n=200)	Percentage
Homogenous	98	49%
Curdy white	34	17%
Muco-purulent	52	26%
Yellowish green	16	8%

**Table 4-** Severity of Aerobic vaginalis (AV)

Severity	No. of positive cases (n= 127)	Percentage
Light AV	105	82.67%
Moderate AV	17	13.38%
Severe AV	5	3.9%

In this study out of 127 positive cases; 105 (82.67%) were observed as light AV: 17 (13.38%) as moderate AV and only 5(3.9%) with severe AV were detected.

Among 127 isolates 26 were gram positive bacteria, 44 were gram negative bacteria, 20 were candida isolates;in which 16 (20%) are candida albicans and 4 (20%) are non albicans and trichomonas vaginalis were 3.

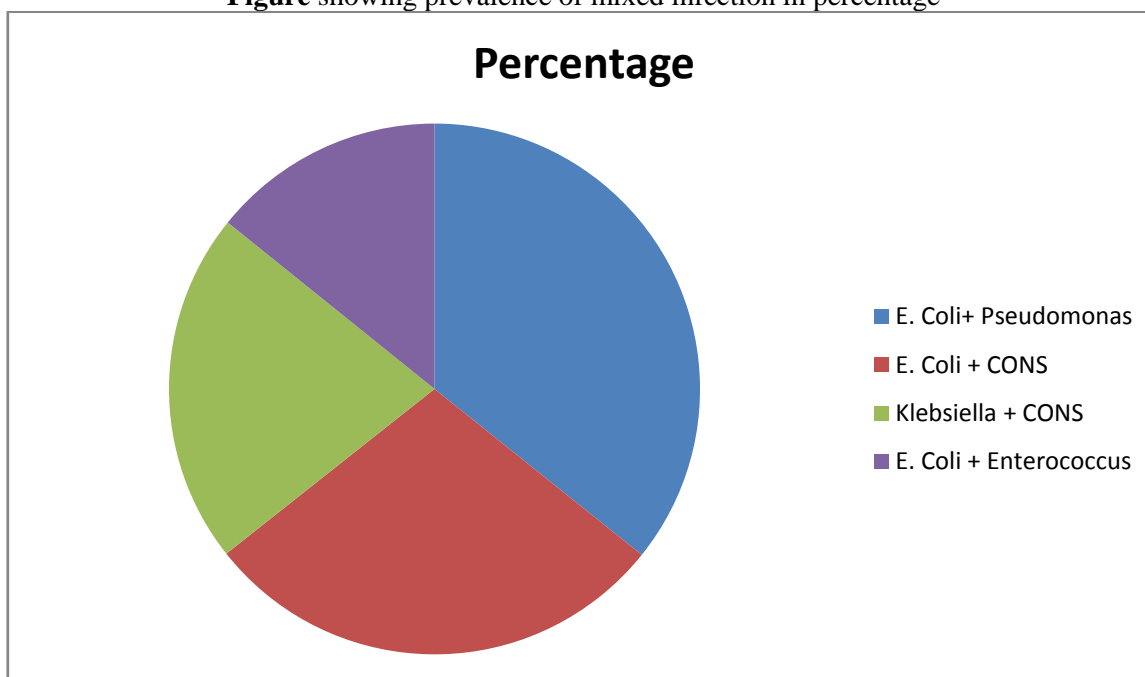
**Table 5-** Distribution of Aerobic vaginal pathogens from higher vaginal swabs.

Organism	No. of Isolates (n=93)	Percentage
E. coli	26	27.96%
Staph aureus	19	20.43%
T. vaginalis	3	3.2%
Candida spp.	20	20.44%
Enterococcus	15	16.11%
CONS	3	3.22%
Streptococcus	2	2.15%
Pseudomonas	2	2.15%
Proteus	1	1.075%

**Distribution of AV cases with single and mixed organisms-**

Among total 93 isolates, 79 were with single organism and 14 were with more than single i.e. mixed organism.

**Figure showing prevalence of mixed infection in percentage**



**IV. Discussion**

The microbial ecology of vagina plays a crucial role in the prevention of any vaginal infection in women. Lactobacillus is mainly responsible for maintaining the acidic vaginal pH (<4.5) and thereby preventing the multiplication of potentially pathogenic microorganism. (10) The presence of lower genital tract infections posses a great threat to the health of women. Reproductive tract infections are one of the most serious public health issues in both developed and developing countries. About 1,50,000 cases of reproductive tract infection in southeast Asia. (5) (18)

In our study 200 cases were studied. Mean age was 33.4 years. Maximum cases of symptomatic vaginal discharge were observed between 26-3 years of agei.e. 31.1%. Similar peak age incidence is noted in other studies done by Rekha et al (13); Singh et al (20) and Madhivanan et al (14).

Out of 200 cases homogenous discharge was most prevalent (49%), followed by mucopurulent discharge (26%). Symptom wise 39% of women presented with malodorous vaginal discharge; other symptoms were burning micturition (12%); pain in abdomen (24%); low backache (20%) and dyspareunia(5%). Our study concerning discharge and symptoms simulates with study of Rekha S. Etal (13), Choudhary Poonam etal (6) and Deepalokwani et al (5).

Bacterial vaginosis has yet to be shown as an independent risk factor for pelvic inflammatory disease, infertility and miscarriage in the absence of sexually transmitted infections.<sup>(5)</sup>

In the present study prevalence of pathogenic microorganism is 46.5% which simulates with the findings of Gopal kumar et al<sup>(3)</sup> but higher than the study of Sandhya R et al<sup>(10)</sup> and Anna Cherlan et al<sup>(1)</sup> (18%).

In our study E. Coli was the most prevalent vaginal pathogen (27.16%) followed by staph aureus (20.43%) which simulates with the study of Gilbert et al and Gopal kumar et al<sup>(3)</sup> but differs from the study of Sandhya R et al<sup>(10)</sup>; Deepalokwanimasand et al<sup>(5)</sup> and N. Ravishankar et al<sup>(2)</sup>.

Third most common pathogenic bacteria in our study is Klebsiella (16.11%) which is higher than the findings of Anna cherian<sup>(1)</sup> (4.5%) and N. Ravishankar et al<sup>(2)</sup> (13.88%).

Prevalence of candida species in our study is 20.44% with third most common microorganism whereas in a study done by Anna cherian et al its prevalence was 53%<sup>(1)</sup> whereas in study done by Siti et al and Doddariah et al and Mohanty et al it's prevalence was 17.2%, 17.7% and 18.5% respectively.<sup>(4)(7)(17)</sup>

In our study prevalence of candida albicans were 80% and non albicans were 20% whereas in Siti et al prevalence of candida albicans were 27%<sup>(4)</sup>.

Prevalence of Trichomonas vaginalis in our study is 3.2% whereas in study of Deepalokwanimasand et al 6.1%<sup>(5)</sup> and Malhotra et al 2.8%<sup>(9)</sup>. Trichomonas vaginalis may play a critical and under recognised role in amplifying HIV transmission.

Prevalence of group B streptococcus is 2.5% whereas in study of Anna cherian et al was 12%<sup>(1)</sup> and that of study of Maitie et al was 26%<sup>(8)</sup>.

The streptococcus species are associated with second trimester miscarriage.<sup>(10)(21)</sup>

E. coli which has a strong association with preterm delivery, very low birth weight infant and can cause neonatal disease such as sepsis, meningitis etc. During passage through the birth canal E. coli can invade the chorioamnion or amniotic fluid and can lead to complications.<sup>(1)</sup>

## V. Conclusion

As vaginal infections are common gynaecological problem in our country, symptoms should be investigated thoroughly. Some common predisposing factors are poor hygiene, low socioeconomic status, early sexual activity and multiple partners. Although HVS remains the mainstay of management but there are no universally accepted guidelines on how to process HVS samples and this appears to be reflected by variability in processing and reporting between laboratories. In our studies pathogenic bacteria were found more frequently than candida. Therefore, practice of empirical antifungal therapy without taking high vaginal swab needs to be revised. The use of appropriate antibiotics along with antifungal drugs may be beneficial.

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