

# Etiological diagnosis of reproductive tract infections by laboratory tests in women presenting with different syndromes

Surabhi Saharan<sup>1</sup>, Jaya Choudhary<sup>2\*</sup>, Aakarsh Sinha<sup>3</sup>

<sup>1</sup>Senior Resident, Department of Obstetrics and Gynaecology, PDU Medical College, Churu-331001, Rajasthan, INDIA.

<sup>2</sup>Professor, Department of Obstetrics and Gynaecology, Mahatma Gandhi Medical College and University, Jaipur, Rajasthan, INDIA.

<sup>3</sup>Senior Resident, Department Of Obstetrics And Gynaecology, Madhubani Medical College Andhospital, Madhubani, Bihar, INDIA.

Email: [spiffingsurbhi@gmail.com](mailto:spiffingsurbhi@gmail.com)

## Abstract

**Background:** Reproductive tract infections (RTIs) pose as a threat of major health problem around the world. They are more common in developing countries like in India. In etiological approach diagnosis of RTIs done by identification of etiological agents by various laboratory tests. **Aim:** To employ etiological approaches for the diagnosis of reproductive tract infections. **Material and Methods:** In this prospective study 300 patients with reproductive tract infections patients who were included. Diagnosis of RTIs was done by various laboratory tests such as vaginal pH, Whiff test, wet Mount, Gram staining, vaginal swab cultural and sensitivity, pap smear and serological tests. **Results:** Out of 300 cases, 147 (49%) cases were normal, bacterial vaginosis was diagnosed in 21% cases, candidiasis in 20.33%, 6.67% cases had mixed infection and 3% were of Trichomonas. Whiff test was positive in 83(27.67%) cases. Most of the cases 210 (70%) were observed normal on vaginal swab culture. Candida species were present in 27% cases while Trichomoniasis were present in 3% cases. **Conclusion:** The treatment may be initiated on the basis of signs and symptoms, however, it is essential that the treatment is modified as and when laboratory test results become available.

**Key Words:** Reproductive tract infections, etiological diagnosis, vaginal culture, serological tests

## \*Address for Correspondence:

Dr Jaya Choudhary, Professor, Department of Obstetrics and Gynaecology, Mahatma Gandhi Medical College and University, Jaipur, Rajasthan, INDIA.

Email: [spiffingsurbhi@gmail.com](mailto:spiffingsurbhi@gmail.com)

Received Date: 20/04/2020 Revised Date: 12/06/2020 Accepted Date: 27/07/2020

DOI: <https://doi.org/10.26611/10121537>

This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/). 

## Access this article online

Quick Response Code:



Website:

[www.medpulse.in](http://www.medpulse.in)

Accessed Date:  
17 September 2020

## INTRODUCTION

Reproductive tract infections (RTIs) pose as a threat of major health problem around the world.<sup>1</sup> They are more common in developing countries like in India.<sup>2</sup> These infections cause suffering and distress for both women and men around the world.<sup>3,4</sup> These account for the second

most important cause for morbidity and mortality in women of reproductive age due to the lack of medical facilities available. In etiological approach diagnosis of RTIs done by identification of etiological agents by various laboratory tests such as vaginal pH, Whiff test, wet Mount, Gram staining, vaginal swab cultural and sensitivity, pap smear and serological tests for HIV, syphilis, hepatitis and also for other reproductive tract infections. In contrast to this, syndromic diagnosis is done by signs and symptoms, where there are advanced laboratory facilities are not available. The purpose of this study was to employ etiological approaches for the diagnosis of reproductive tract infections.

## MATERIAL AND METHODS

In this prospective study 300 patients with reproductive tract infections patients who were included for the selection criteria. The study was conducted at Department

of Obstetrics and Gynecology of a tertiary care teaching hospital over a period of two years. Institutional Ethical Committee permission was taken prior to the commencement of the study. Informed consent was taken from all the included patients.

**Inclusion criteria**

- Women of reproductive age group (20-45 years)
- Women presenting with various symptoms and signs of RTIs such as vaginal discharge, pain in lower abdomen and genital ulcer.

**Exclusion criteria**

- Unmarried women.
- Women with pregnancy and any uterine pathology.
- Patient with bleeding per vagina.
- Diagnosed genital malignancy.
- Patient not given valid consent.

**Methodology**

Detailed history including menstrual, obstetric and sexual history of the patients were taken and general, physical and local examination was done and clinical symptoms and sign were noted. All reproductive tract infection patients were subjected for clinical examination based on symptoms and sign and use the flow chart describe by WHO. On per speculum examination, vaginal culture from posterior fornix was taken with sterile swab stick and send for culture and sensitivity. P<sup>H</sup> of vaginal discharge noted by P<sup>H</sup> strips dipped in vaginal discharge, change in color was noted. Discharge collected on the posterior blade of speculum was taken on the different glass slides for the preparation of different tests (wet mount, KOH mount-whiff test, Gram’s staining) and pap’s smear taken with help of ayre’s spatula. The odour of the discharge was noted and also did whiff test (bacterial vaginosis), and types of color and nature of discharge also noted. Wet smear examination was done for *Trichomonas vaginalis*, mycelium and yeast cells, presence of clue cells. Serological tests such as HBsAg, VDRL and HIV were done. Internal examination (per vaginal) was done to find out the size, shape of uterus and rule out the tenderness and masses in the fornix and all patients underwent USG to rule out the pelvic pathology.

**RESULTS**

A total of 300 women fulfilling the criteria were included in the study. Of these 300 women, majority of the women 145 (48.33%) were in the age group 31-40 years while 43% in age group 20-30 years and 8.67% in age group >40 years. the mean age of the study group was 31.52±6.085 years. With regard to their education, 31.7% were educated till secondary, 20% were having primary education, 15.3%

were illiterate and higher education holder were 17.7%. Out of 300 women, 285 (95%) were married, while 4% had divorcee and only 1% were widow. The present study showed that the rural women were more suffered than urban (60% vs 40%). Maximum number of patients 99 (33%) were para 2 and 30.33% patients were multiparous women (>P3), 68 (22.67%) patients were primipara women while 14% patients had no children (nulliparous) (Table 1).

**Table 1: Characteristics of the studied cases**

Characteristics	No. of patients	Percentage (%)
<b>Age in years</b>		
20 to 30	129	43.00%
31 to 40	145	48.33%
>40	26	8.67%
<b>Locality</b>		
Rural	180	60%
Urban	120	40%
<b>Marital status</b>		
Married	285	95%
Divorcee	12	4%
Widow	03	1%
<b>Parity</b>		
Nulliparity	42	14%
Primi	68	22.7%
Para 2	99	33%
Multiparity	91	30.3%

Out of 300 patients, 296 (98.67%) presented with vaginal discharge while 40% patients had pain in lower abdomen, 20% patient with pruritus vulva, 18% patient with dyspareunia and 1.33% patients presented with foul smelling. On per vaginal examination out of 300 cases 249(83%) were normal, 10.33% cases presented with Normal uterus with tenderness in fornix and 6.67% cases presented with bulky uterus with tenderness in fornix. Tenderness were present in 17% cases. Whiff test was positive in 83(27.67%) cases and negative in 217(72.33%) cases. Wet mount findings were normal in 147(49%) cases, hyphae and pseudohyphae were seen in 25% cases, Clue cells in 23% cases while flagellated protozoa were seen in 3% cases. Gram staining was normal in 217 (72.3%) cases, pus cells, gram positive bacteria were seen in 14.7% cases. Pus cells, gram negative bacteria were seen in 15% cases. Overall gram positivity seen in 83 cases (27.66%). Most of the cases 210 (70%) were observed normal on vaginal swab culture. Candida species were present in 27% cases while Trichomoniasis were present in 3% cases. On ELISA test, HbsAg was positive in 9 (3%) cases, VDRL positive in 1.67% and HIV positive in 0.67% cases.

**Table 2: Etiological examination by laboratory tests**

Tests	No. of patients	Percentage (%)
<b>Whiff test</b>		
Negative	217	72.3%
Positive	83	27.7%
<b>Wet mount</b>		
Normal	147	49%
Hyphae and Pseudoepithelium	75	25%
Clue cells	69	23%
Flagellated trophozoan	09	3%
<b>Gram staining</b>		
Normal	217	72.3%
Pus cells, gram positive bacteria	41	13.7%
Pus cells, gram negative bacteria	42	14%
<b>Vaginal swab culture</b>		
Normal	210	70%
Candida spp.	81	27%
Trichomoniasis	09	3%
<b>Serological tests</b>		
HBsAg	09	3%
VDRL	05	1.7%
HIV	02	0.7%

Out of 300 cases most commonly diagnosed syndromes were vaginal discharge syndrome (54%) followed by lower abdominal pain syndrome (17.33%). No cases of genital ulcers and genital warts were reported.

**Table 3: Distribution of the cases according to Pap Smear**

Pap smear	No. of cases	Percentage (%)
Normal	186	62%
Inflammatory	97	32.33%
Inflammatory, bacterial vaginosis	6	2%
Inflammatory, candidiasis	7	2.33%
Inflammatory, trichomoniasis	2	0.67%
low grade squamous epithelial lesion (LSIL)	2	0.67%
Total	300	100%

Table 4 showed distribution of cases according to etiological diagnosis, out of 300 cases 147 (49%) cases were normal, Bacterial vaginosis was diagnosed in 21% cases, candidiasis was observed in 20.3%, 6.67% cases had mixed infection and 3% were of trichomonas.

**Table 4: Distribution of the cases according to Final (Etiological) Diagnosis**

Etiological Diagnosis	No. of cases	Percentage (%)
Normal	147	49%
Bacterial	63	21%
candidiasis	61	20.3%
Mixed infection	20	6.7%
Trichomonas	9	3%
Total	300	100%

## DISCUSSION

Reproductive tract infections are most common gynecology complaint among women in reproductive age group. Vaginal discharge is often reported to be the most frequent RTI among women.<sup>5</sup> In our study, out of the 300 women, 296 (98.7%) presented with vaginal discharge. This is due to the fact that awareness related to RTIs and health seeking behavior is inadequate among them. Excessive vaginal discharge was reported, due to

menstrual disorders and unhealthy cervix leading to cervical erosion and infections leading to abdominal pain. Abdominal pain can be explained by associated pelvic congestion. Also the presence of backache and pain abdomen indicates the presence of sub clinical involvement of surrounding tissues or irritation of para-cervical nerves by chronic infections. Hawkes *et al.*<sup>6</sup> in their study 94% women reported with abnormal vaginal discharge, Patnaik *et al.*<sup>7</sup> concluded that vaginal discharge

syndrome is the most commonly diagnosed syndromic diagnosis. Shethwala *et al.*<sup>8</sup> showed that the most common symptom reported was vaginal discharge 147 (98%), Bote *et al.*<sup>9</sup> found in their study that major symptom reported was vaginal discharge. On per vaginal examination, in our study, out of 300 cases, 249 (83%) were normal, 10.3% cases presented with normal size uterus and tenderness in fornix and 6.7% cases presented with bulky uterus and tenderness in fornix. Fornicial tenderness was present in cases 17%. In women tenderness was most common with lower abdominal pain. This indicated that awareness of RTIs and health seeking behavior is inadequate in those women. Excessive vaginal discharge was because of erosion of cervix, pain in abdomen, back pain and menstrual disorders. Presence of back ache and pain in abdomen indicated the possibility of sub clinical involvement of surrounding tissues or irritation of para-cervical nerves by chronic infections. Pain in abdomen can be explained by associated pelvic congestion and tenderness. Ray *et al.*<sup>1</sup> in their study observed lower abdominal tenderness in 13.5% of women. Chauhan V *et al.*<sup>10</sup> in this study, cervical motion tenderness and nabothian follicles were observed in cases of cervicitis, bacterial vaginosis and trichomoniasis.

Out of 300 cases, whiff test was positive in 83 (27.7%) cases. Whiff test confirmation of bacterial vaginosis if fishy smell present then whiff test positive. According to wet mount findings were normal in 147 (49%) cases, Hyphae and pseudohyphae seen in 25% cases, Clue cells seen in 23% cases, while flagellated protozoa were seen in 3% cases. Wet mount is confirmation of bacterial vaginosis, candidiasis and trichomonas. In bacterial vaginosis clue cells are seen in wet mount and Hyphae and pseudohyphae are seen in candidiasis and flagellated protozoa are seen in trichomoniasis. Out of 300 cases, most of the cases 210 (70%) were sterile on vaginal swab culture. candida species were present in 27% cases while Trichomoniasis were present in 3% cases. Swab culture is confirmatory diagnosis of candida and trichomonas. Vasantha *et al.*<sup>11</sup> in their study whiff test, wet mount and vaginal swab culture showed by laboratory diagnosis which was 52%. In present study, out of 300 patients, gram staining was found normal in 211 (70.3%) cases, pus cells, gram positive bacteria were seen in 14.7% cases. Pus cells, gram negative bacteria were seen in 15% cases. Gram staining is confirmatory diagnosis of bacterial vaginosis and diagnosis for gram positive and gram negative bacteria. Bohara *et al.*<sup>12</sup> found in their study that thirteen percent had trichomoniasis and 7% had gonorrhoea identified in Gram stained smears and cultures. Aggarwal *et al.*<sup>2</sup> found that out of 234 Gram stained smears, 70 (29.9%, 95% CI = 24.4-36.0%) showed presence of >5 pus cells/OIF. On ELISA

test, HbsAg was positive in 9 (3%) cases, VDRL positive cases were in 1.7% and HIV positive were 0.67% cases. Aggarwal *et al.*<sup>2</sup> only two women were HIV positive; one showed VDRL reactivity, though the VDRL titre was low (1:4), she was also reactive by TPHA test. On pap smear finding, out of 300 cases, 186 (62%) cases were reported normal, 32.3% cases were inflammatory, 2% bacterial vaginosis, 2.33% candidiasis, 0.67% trichomoniasis and 0.67% were low grade squamous epithelial lesion (LSIL). Prabha *et al.*<sup>5</sup> pap smear showed 32.9% inflammatory changes and 0.25% low grade squamous intraepithelial lesion. Garg *et al.*<sup>13</sup> Pap smear showed 32.9% inflammatory changes and 0.25% low grade squamous intraepithelial lesion. Microbiologically, 33.14% were positive for at least one organism. On etiological diagnosis, out of 300 cases, 147 (49%) cases were normal, bacterial vaginosis was diagnosed in 21% cases, candidiasis was observed in 20.3%, 6.7% cases had mixed infection and 3% were of trichomonas. Endogenous infections are more prevalent (Bacterial vaginosis, candidiasis) followed by trichomoniasis. Most commonly bacterial vaginosis is diagnosed by laboratory test. Patnaik *et al.*<sup>7</sup> The most commonly infections identified by laboratory diagnosis was bacterial vaginosis (14.3%). Ray *et al.*<sup>1</sup> found that laboratory diagnosis of patients most common etiology was candida albicans. In a study by Shethwala *et al.*<sup>8</sup> out of 150 patients, 34 (22.6%) had bacterial vaginosis, 27 (18%) had candidiasis whereas, 24 (16%) were found to have HSV-II. 4 (2.7%) patients were having positive test for syphilis. In a study of Aggarwal *et al.*<sup>2</sup> most common cause was bacterial vaginosis (positive= 21.4%, 95% CI= 16.6-27.1%; intermediate score= 17.5%, 95% CI= 13.2-22.9%), followed by candidiasis (13.7%, 95% CI= 9.8-18.7%) and trichomoniasis (0.4%, 95% CI=0-2.6%). No etiological diagnosis for vaginal discharge could be established in approximately half of the women. Only two women were HIV positive; one was reactive by VDRL and TPHA tests. Prabha *et al.*<sup>5</sup> found prevalence of reproductive tract infections/sexually transmitted infections by laboratory diagnosis of 33.1%. Most common infection diagnosed by laboratory test was bacterial vaginosis (14.3%). In a study by Shah M *et al.*<sup>14</sup> out of 183 (78.54%) pregnant females had vaginal discharge on clinical examination and *Candida albicans* was the most common clinical diagnosis among them. Of 183 cases diagnosed clinically as vaginal discharge syndrome, 38 (20.7%) were tested positive in laboratory investigations. Out of 50 clinically negative cases, 9 (18%) were detected positive for one of the STIs on laboratory testing.



## CONCLUSION

The treatment may be initiated on the basis of signs and symptoms, however, it is essential that the treatment is modified as and when laboratory test results become available. The laboratory services need to be strengthened to ensure accurate and standardized availability of diagnostic services.

## REFERENCES

1. Ray K, Muralidhar S, Bala M, Kumari M, Salhan S, Gupta SM, Bhattacharya M. Comparative study of syndromic and etiological diagnosis of reproductive tract infections/sexually transmitted infections in women in Delhi. *International Journal of Infectious Diseases*. 2009 Nov 30;13(6):e352-9.
2. Aggarwal P, Bhattar S, Sahani SK, Bhalla P. Utility of Laboratory Diagnosis for Confirmation of the Syndromic Case Management in Married Indian Women with Vaginal Discharge. *International journal of health sciences*. 2016 Oct;10(4):516.
3. World Health Organization. Prevention and control of sexually transmitted infections: draft global strategy: report by the Secretariat. In: *Prevention and control of sexually transmitted infections: draft global strategy: report by the Secretariat* 2006.
4. World Health Organization. Reproductive health strategy to accelerate progress towards the attainment of international development goals and targets. 2004, Geneva:14-19.
5. Prabha MLS, Sasikala G, Bala S. Comparison of syndromic diagnosis of reproductive tract infections with laboratory diagnosis among rural married women in Medak district, Andhra Pradesh. *Indian J Sex Transm Dis*. 2012;33(2):112-5.
6. Hawkes S, Morison L, Foster S, Gausia K, Chakraborty J, Weeling R, Mabey D. Reproductive-tract infections in women in low-income, low-prevalence situations: assessment of syndromic management in Matlab, Bangladesh. *The Lancet*. 1999 Nov 20;354(9192):1776-81.
7. Patnaik L, Sahu T, Sahani NC. Syndromic diagnosis of RTI/STI among women of reproductive age group. *Indian J Community Med* 2008;4(1).
8. Shethwala N, Mulla S. Study on reproductive tract infection among the female patients attending the gynecology OPD in a teaching hospitals of Gujarat-India. *Int J Med Sci Public Health* 2014;3(1):123-125.
9. Bote MM, Bedre RC, Solanki HB, Shenoy AG, Suryawanshi SR. Syndromic Diagnosis vs. Laboratory Diagnosis of Reproductive Tract Infections among Married Women of Reproductive Age Group in Urban Slum of Mumbai. *Community Med* 2015;6(4):513-8.
10. Chauhan V, Shah M, Thakkar S, Patel SV, Marfatia Y. Sexually transmitted infections in women: A correlation of clinical and laboratory diagnosis in cases of vaginal discharge syndrome. *Indian dermatology online journal*. 2014 Nov;5(Suppl 1):S1.
11. Vasantha L, Leela S. Comparison of Laboratory Diagnosis and Syndromic Approach in the Management of Symptomatic Vaginal Discharge. *International Journal of Science and Research (IJSR)* 2013.
12. Bohara MS, Joshi AB, Lekhak B, Gurung G. Reproductive tract infections among women attending gynaecology outpatient department. *International Journal of Infection and Microbiology*. 2012 Oct 9;1(1):29-33.
13. Garg S, Bhalla P, Sharma N, Sahay R, Puri A, Saha R, Sodhani P, Murthy NS, Mehra M. Comparison of self-reported symptoms of gynaecological morbidity with clinical and laboratory diagnosis in a New Delhi slum. *Asia Pacific Population Journal*. 2001;16(2):75-92.
14. Shah M, Deshmukh S, Patel SV, Mehta K, Marfatia Y. Validation of vaginal discharge syndrome among pregnant women attending obstetrics clinic, in the tertiary hospital of Western India. *Ind J Sex Transm Dis* 2014 Jul;35(2):118.

Source of Support: None Declared  
Conflict of Interest: None Declared