

How to Cite:

Rout, R. R. ., Das, R., Madhavi, C., Mohapatra, J., Tiwari, H. D., & Parhad, P. (2022). Prevalence of trichomonas vaginalis and candida species among women of reproductive age group. *International Journal of Health Sciences*, 6(S5), 1090–1098. <https://doi.org/10.53730/ijhs.v6nS5.8823>

Prevalence of trichomonas vaginalis and candida species among women of reproductive age group

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Abstract--Background: Vaginal infections are common among women of reproductive age. They can be caused by sexually transmitted microorganisms or by some disorder resulting in the proliferation of endogenous microbiota. Among the more frequent microorganisms are the protozoan *Trichomonas vaginalis* (*T. vaginalis*) and *Candida albicans* (*C. albicans*). Aim of this study to find out the Prevalence of *Trichomonas vaginalis* & *Candidia* species (primary) and

socio-demographic profile and different clinical presentations (secondary) in women of Reproductive Age Group with vaginal discharge. Methods: Total 140 sexually active females age group of 18-45 yrs with meeting the eligibility criteria complain of vaginal discharge. High vaginal swabs (HVS) were collected from the patients and processed for microscopy and culture. Comparative study was done by using chi-square test. Result: The prevalence of *Candida* species and *Trichomonas vaginalis* is calculated to be 27.8% and 4.3% respectively. Total 67% belong to rural population in candidiasis where 83% belong to urban population in Trichomoniasis. Maximum number (77%) in Candidiasis and all cases (100%) in Trichomoniasis were belonging to low socio economic status. Multiparous women were more prone for both candidiasis and trichomoniasis infection. In both infections, majority were using OCP as contraceptive measure. Total 43% patients were having symptoms of vaginal discharge + pruritus + dysuria in candidiasis and 66% patients were having vaginal discharge only in Trichomoniasis. Around 54% of total candidiasis was Diabetic which is highly significant. Conclusion: The prevalence of Candidiasis and Trichomoniasis in my study is 27.8% and 4.3% respectively. Diabetes mellitus is imposed as a major risk factor for *Candida* species infection.

Keywords---High vaginal Swab (HVS), Oral contraceptive pill (OCP), *trichomonas vaginalis*.

Introduction

Vaginal infections are common among women of reproductive age. They can be caused by sexually transmitted microorganisms or by some disorder resulting in the proliferation of endogenous micro biota. Among the more frequent microorganisms are the protozoan *Trichomonas vaginalis* (*T. vaginalis*) and *Candida albicans* (*C. albicans*).¹ *Trichomonas vaginalis*, is an anaerobic flagellated protozoan parasite, that infects the human urogenital tract. Infection in women can cause vaginitis, urethritis, and cervicitis. The disease encompasses a broad range of symptoms ranging from a state of severe inflammation and irritation with a frothy malodorous discharge to a relatively asymptomatic carrier state. Trichomoniasis is associated with adverse reproductive sequelae including preterm birth, pelvic inflammatory disease, and infertility in women.² This parasite has also been implicated as a cofactor in the transmission of the human immunodeficiency virus (HIV) and other nonulcerative STD agents. In addition, a relationship between *T. vaginalis* infection and cervical cancer has recently been suggested. According to the World Health Organization, *T. vaginalis* is the most common curable sexually transmissible infection (STI) worldwide, with 170 million to 190 million new cases each year.³ Vulvovaginal candidiasis (VVC) is an opportunistic fungal infection of the female lower genital tract caused by *Candida* species.⁴ Numerous studies showed that *Candida albicans* is the common pathogen in 80-90% of cases but *Candida non-albicans* species are gaining importance as pathogens over the past few decades.⁵ It is clinically characterized by curd like discharge, itching, dyspareunia, dysuria, oedema and vulvovaginal

erythema. The manifestations of VVC may range from asymptomatic colonization to severe acute symptomatic infection.⁶ Vaginal candidiasis if untreated can lead to chorioamnitis with subsequent abortion and prematurity in pregnant women, congenital infection of the neonate and pelvic inflammatory disease resulting in infertility in non-pregnant women.⁷ Vulvovaginal candidiasis has been associated with considerable direct and indirect economic costs, enhanced susceptibility to HIV infection, and is being investigated for a potential relationship with preterm birth.⁸ As reduction of HIV transmission and of adverse birth outcomes remain public policy priorities in India – the aim of our study is to focus on the prevalence of *T. vaginalis* and *Candida* infection in non-pregnant women and also to verify the co-existence of these two agents and other social and demographic variables.

Aims & Objective

Primary Objective

To find out the Prevalence of *Trichomonas vaginalis* & *Candidia* species in Women of Reproductive Age Group with vaginal discharge.

Secondary Objective

To find out socio-demographic profile of women presenting with vaginal discharge. To find out different clinical presentations in women presenting with vaginal discharge.

Material & Methods

A hospital based cross-sectional study was conducted in the Department of Obstetrics & Gynaecology, VSSIMSAR, Burla from November 2017 to October 2019, in collaboration with Department of Microbiology to find out the prevalence of *Trichomonas vaginalis* & *Candidia* species in reproductive age group women with complaint of vaginal discharge. Married women of childbearing period (18-49 yrs) with complain of vaginal discharge of any type and other symptoms such as itching, burning sensation or both, dysuria, inflammation of the genital tract, vaginal malodor and willing to provide written informed consent, were included in the study. Those patients who were unmarried, pregnant, were menstruating, had received antibiotics in the past 3wks were excluded from the study. Under aseptic precautions per speculum examination were carried out and three high vaginal swabs were collected from upper part of vagina. Specimen transported at room temperature was processed immediately. In case of delay in processing the specimen were stored at 4.C for upto 48 hours. If culture inoculation is expected to be delay more than 24 hours, then it was stored at -70°C until culture. The swabs were examined macroscopically before processing and the finding were recorded. Sample were examined for any specific colour and odour, curdy white discharge was suggestive of candidiasis, greenish frothy discharge was found in trichomoniasis, grayish white foul smelling discharge in cases of bacterial vaginosis. First swab was used for wet mount examination under microscope, saline wet mount examination was done under low and high power microscope to detect the presence of motile trophozoites of *Trichomonas vaginalis*, pus cell and budding yeast cells. Second swab was used for gram staining, smear was made from second swab over a clean glass slide and stained using gram's staining

technique. The smear was examined in 100x for presence of clue cells, budding yeast cells, polymorphs and *Trichomonas vaginalis*. Clue cells are squamous epithelial cells covered with small gram variable bacilli as described by Gardner & Dukes (1955). The third swab was used for culture of microorganisms. The data were collected from the patients and the findings from Microbiology Department were recorded in a predesigned structured format. The collected data were entered in excel spread sheet. Data cleaning was done and data were processed in **SPSS V.16 software** for analysis. The results were presented in percentages and proportion. Chi square test was applied to find out the strength of association among two categorical variables. The study was approved by Institute Ethics Committee and the confidentiality of the study participants were maintained during the study.

Results & Observation

Table – 1: prevalence of candida species & trichomonas vaginalis (N=140)

Species	No. of cases	Prevalence
Candida species	39	39/140(27.8%)
Trichomonas vaginalis	6	6/140(4.3%)

Table – 2: residence distribution of study group (N=140)

Residence	No. of cases		Total	No. of cases		Total
	Candida positive	Candida negative		Trichomonas positive	Trichomonas negative	
Rural	26(67%)	65(64%)	91(65%)	1(17%)	90(67%)	91(65%)
Urban	13(33%)	36(36%)	49(35%)	5(83%)	44(33%)	49(35%)
Total	39(100%)	101(100%)	140(100%)	6(100%)	134(100%)	140(100%)

$\chi^2 = 0.066$ at $df = 1$, $P > 0.05$ (not significant)
(highly significant)

(For Candida species)

$\chi^2 = 4.4087$ at $df = 1$, $P < 0.05$

(For Trichomonas)

Table – 3 educational status (N=140)

Education status	No. of cases		Total	No. of cases		Total
	Candida positive	Candida negative		Trichomonas positive	Trichomonas negative	
Illiterate	10(26%)	21(21%)	31(22%)	4 (67%)	27 (20%)	31(22%)
Literate	29 (74%)	80 (79%)	109(78%)	2 (33%)	107 (80%)	109(78%)
Total	39(100%)	101(100%)	140(100%)	6(100%)	134(100%)	140(100%)

$\chi^2 = 0.3837$ at $df = 1$, $P > 0.05$ (not significant)
(highly significant)

(For Trichomonas)

$\chi^2 = 4.7625$ at $df = 1$, $P < 0.05$

(For Candida species)

Table – 4: socio economic status of study group (N=140)

Status	No. of cases		TOTAL	No. of cases		TOTAL
	Candida positive	Candida negative		Trichomonas positive	Trichomonas negative	
High	9 (23%)	29 (29%)	38 (27%)	0 (0%)	38 (28%)	38 (27%)
Low	30 (77%)	72 (71%)	102 (73%)	6 (100%)	96 (72%)	102 (73%)
Total	39 (100%)	101 (100%)	140(100%)	6 (100%)	134 (100%)	140(100%)

$\chi^2 = 0.4519$ at $df = 1$, $P > 0.05$ (not significant)

as the value of one of the cell is zero

(For Trichomonas)

χ^2 cannot be calculated

(For Candida species)

Table – 5: occupation (N=140)

Occupation	No. of cases		No. of cases	
	Candida positive	Candida negative	Trichomonas positive	Trichomonas negative
Service Holder	5 (13%)	8 (8%)	0 (0%)	13 (10%)
Student	1 (2%)	5 (5%)	1 (17%)	5 (4%)
Daily wage worker	11 (28%)	25 (25%)	2 (33%)	34 (25%)
Housewife	19 (49%)	45 (44%)	1(17%)	63 (47%)
Business	3 (8%)	18 (18%)	2 (33%)	19 (14%)
Total	39 (100%)	101 (100%)	6 (100%)	134 (100%)

$\chi^2 = 3.263$ at $df = 4$, $P > 0.05$ (not significant)

be calculated as the value of one of the cell is zero

(For Candida species)

(For Trichomonas)

χ^2 cannot

Table – 6: clinical presentation of study group (n=45)

Clinical features	No. of cases	
	Candida spp	Trichomonas vaginalis
Vaginal discharge (VD) only	14 (38%)	4 (66%)
VD + Pruitus+ Dysuria	18 (43%)	0
VD+ Pruritus+Low abdominal pain	1 (3%)	1 (17%)
VD+Low abdominal pain	4 (11%)	1 (17%)
VD+Dysuria+Dyspareunia	2 (6%)	0
Total	39 (100%)	6 (100%)

χ^2 cannot be calculated as the value of one of the cell is zero

Table – 7: coassociation of other risk factors (N=140)

Diabetes Mellitus	No. ofCases	
	Candida positive	Candida negative
Present	21(54%)	9(9%)
Absent	18(46%)	92(91%)
Total	39	101

$\chi^2 = 33.7423$ at $df = 1$, $P < 0.05$ (highly significant)

Discussion

High vaginal swabs were collected from 140 patients and processed for microscopy and culture. For serological test 10ml of blood were collected from all patients. The observations made from the study are described below. The prevalence of Candida species is calculated to be 27.8% (95% was that of Candida albicans and 5% that of non-albican candidiasis) and the prevalence Trichomonas vaginalis is calculated to be 4.3% in my study. A study was conducted by K.R.Swaminathan et al.⁹ (2017) where the prevalence of vulvovaginal candidiasis was found to be 37.3% (60% was that of Candida albicans and 40% that of non-albicans candidiasis. A. Narayankhedkar et al.¹⁰(2015) was conducted a study in which the prevalence of Candida species was found to be 30% which is similar to that of our present study. In the same study the prevalence of Trichomonas vaginalis was found to be 17.3% which is much higher than that of our study. Mateus De Paula Glehn et al.¹ (2016) was conducted a study where the prevalence of Candida albicans was found to be 20% and that of Trichomonas vaginalis was 16%. Puranjoy Saha et al.¹¹ (2018) was conducted a study where the prevalence of Candida species was found to be 37.81% and that of Trichomonas vaginalis was 2.49%. A Study conducted by Meena Salvi¹² (2018) where the prevalence of Candida species was found to be 31.6% which is similar to that of our study. B. Anuradha et al. ¹³(2015) found that prevalence of Trichomonas vaginalis was 22% which is much higher than that of our study. According to residence wise distribution out of total 39 Candida species positive cases 26 cases (67%) belong to rural population and 13 cases (33%) belong to urban population. But out of total 6 Trichomonas vaginalis positive cases 1 case (17%) belong to rural population and 5 cases (83%) belong to urban population with $\chi^2 = 4.4087$ at $df = 1$, P value = 0.01 [< 0.05 (highly significant)]. It implies that in our study there is significance in high prevalence of Trichomonas vaginalis in urban population. According to educational status of study group sample out of 39 Candida species positive cases 10 cases (26%) were illiterate and 29 cases (74%) were literate with $\chi^2 = 0.3837$ at $df = 1$, P value = 0.53 [> 0.05 (not significant)]. It implies that in our study there is no significance between the prevalence of Candida species & educational status of the patient. A study done by S.Rathod et al.⁸ showed no significant difference in prevalence of Candida species between illiterate and literate population (prevalence varies from 6.6% to 7% in illiterate & literate population respectively. A study done by Aniebue et al¹⁴ showed that the residence, occupation, and educational level posed almost no effect on the prevalence of Candida species. According to educational status of study group sample out of total 6 Trichomonas vaginalis positive cases 4 cases (67%) were illiterate and 2 cases (33%) were literate with $\chi^2 = 7.2082$ at $df = 1$, P

value=0.007 [<0.05 (highly significant)]. It implies that *Trichomonas vaginalis* is more prevalent in illiterate population. Maximum number of *Candida* species positive cases i.e 30 cases (77%) were belong to low socio economic status in my study. Study conducted by SD Rathod et al.⁸ showed no significant difference in prevalence of Candidiasis between low and high socioeconomic population. And in case of *Trichomonas vaginalis* positive cases all were belong to low socio economic status. According to occupation wise distribution maximum number of *Candida* species positive were housewives i.e 49 % (19cases) then daily wage workers i.e 28 % (11cases). A study was conducted by K. R, Swaminathan et al⁹ showed that among *Candida* species positive cases most of the women (68.3%) are unemployed, 26.6% are employed. And in case *Trichomonas vaginalis* positive cases maximum numbers were daily wage workers and business holder i.e 33% (2 cases). Study done by Purnima Madhivanan et al.¹⁵ where the prevalence of *Trichomonas vaginalis* is found to be 8.3% in housewives, 8.6% in unskilled population. It was found maximum number *Candida* species positive cases were multiparous women i.e 18 cases (46%) and then primiparous i.e 12 cases (31%). A study conducted by Meena Salvi¹² showed that prevalence of vulvovaginal candidiasis was found to be high in women who had a parity of more than 2 (40%) and lower in nulliparous (25.4%). And in case of *Trichomonas vaginalis* positive cases maximum number were multiparous women 3 cases (50%). In my study *Candida* species positive patients, oral contraceptive pill and IUCD use are present as risk factors in 23% & 36% of cases respectively. Study conducted by Meena Salvi showed that in *Candida* species positive patients , oral contraceptive pill use and IUCD use are present as risk factors in 28% & 40% of cases respectively. And in case of *Trichomonas vaginalis* positive cases tubal ligation and oral contraceptive are present as risk factors in 36% & 36% of cases respectively in my study. Out of total 39 *Candida* species positive cases 14 cases (38%) have symptoms of vaginal discharge only, 18 cases (43%) have symptoms of vaginal discharge + pruritus + dysuria, 1 case (3%) has symptom of vaginal discharge + pruritus + lower abdominal pain, 4 cases (11%) have symptoms of vaginal discharge + lower abdominal pain and 2 cases (6%) have symptoms of vaginal discharge + dysuria + dyspareunia. A study conducted by K.R, Swaminathan et al⁹ showed that the commonest symptoms of women with Candidiasis had been a combination of curdy white discharge, genital itching (pruritus) and redness in 28.3% of the women. 5.8% of the women had no symptoms at all. Puranjay Saha et al.¹¹(2018) was conducted a study where the commonest symptoms of women with Candidiasis had been a combination of vulval itching (28.95%), vaginal discharge (9.21%), vaginal malodour (22.37%), burning sensation in genitalia(21.05%), dyspareunia (15.79%) and lower abdominal pain (2.63%). Out of total 6 *Trichomonas vaginalis* positive cases 4 cases (66%) have symptoms of vaginal discharge only, 1 case (17%) has symptom of vaginal discharge + pruritus + lower abdominal pain and 1 case (17%) has symptoms of vaginal discharge + lower abdominal pain. Purnima Madhivanan et al.¹⁵ was conducted a study where commonest symptoms of women with Trichomoniasis had been a combination of vaginal discharge (40%), vulval itching(20%), vaginal malodour (20%). Around 54% of total candidiasis were Diabetic which is highly significant in my study. Study conducted by Puranjay Saha et al.¹¹ was found that only 15.79% of total candidiasis cases were diabetic. Meena Salvi¹² was found that diabetes mellitus was a risk factor for *Candida* species in 56% of cases.

Conclusion

The prevalence of *Candida* species vaginitis and *Trichomonas vaginalis* in my study is 27.8% and 4.3% respectively. Diabetes mellitus is imposed as a major risk factor for *Candida* species infection. Because of small sample size in my study some statistical parameters of my study came as insignificant. Constant health education, sensitization, adequate investigation and treatment will prevent adverse outcome of genital infections.

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