



# PROSPECTIVE STUDY OF VAGINAL DISCHARGE AND PREVALENCE OF VULVOVAGINAL CANDIDIASIS IN A TERTIARY CARE HOSPITAL

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## ABSTRACT

**Objective:** To study the etiology of vaginal discharge and to detect prevalence of *Candida* in patients with vaginal discharge from patients attending at SMIMER medical college, Surat, Gujarat.

**Material & Methods:** The present study was carried out in the Department of Microbiology, SMIMER medical college, Surat during the period of July 2010 to October 2011. A total 410 suspected cases of vaginal discharge, attending Obstetrics & Gynaecology OPD were included in the study. Detailed history of all patients was taken. All women were subjected to gynecological examination, pH test and Whiff test. Two swabs were collected one for direct microscopy and one for culture and sent immediately to the laboratory for microbiological examination.

**Results:** The percentage of Bacterial vaginosis was the highest (47.31%) followed by *Candida* species (29.75%), *E. coli* (11.98%), Gram positive cocci (3.41%) and least was *Trichomonas vaginalis* (1.21%). The age group which was most prone to the infection was 26-35 years (41.68%), followed by 15-25 years (40.98%), 36-45 years (13.11%) and least in >46 years (4.23%). Among VVC various associated risk factors observed, like pregnancy (33.6%), OCPS (14.75%), Diabetes mellitus (13.93%) and HIV (5.73%).

**Conclusions:** In our study the most common pathogen in vaginal infections was Bacterial vaginosis (47.31%) followed by *Candida* species (29.75%). Distribution of *Candida* species among different age groups showed the highest incidence in reproductive age group of 26 – 35 years, followed by 16 – 25 years. VVC is more common with risk factors like pregnancy and Diabetes mellitus.

**Key Words:** RTIs, Bacterial vaginosis, VVC, *Candida* Spp., Vaginal discharge

## INTRODUCTION

Vaginitis is the commonest Reproductive tract infections (RTIs) in sexually active females.<sup>2, 12</sup> RTIs are the major public health problems among women especially in developing countries.<sup>2</sup> WHO estimates that approximately 340 million new cases of curable STIs (Sexually transmitted infections) occur every year and majority of them from developing countries.<sup>12,15</sup> Vaginitis is usually characterized by a vaginal discharge and/ or vulvar itching and irritation.<sup>4</sup> The three diseases most frequently associated with vaginal discharge are Bacterial Vaginosis (replacement of the normal vaginal flora by an overgrowth of anaerobic microorganisms, mycoplasmas, and *Gardnerella vaginalis*), Trichomoniasis (*T.vaginalis*) and Candidiasis (usually caused by *Candida albicans*).<sup>15,4</sup> Even in the modern advances in medicine, there is a rise

in the incidence of fungal infections especially those due to *Candida* species.<sup>1</sup>

Vulvovaginal candidiasis (VVC) affects up to 75% of reproductive-age women at least once, nearly half will experience recurrences, and 5%–8% have multiple episodes each year. VVC is diagnosed in up to 40% of females with vaginal complaints.<sup>4,22</sup> *Candida* species are the normal microbial flora within the gastrointestinal tracts, respiratory tracts, vagina and the mouth.<sup>23</sup> Under certain conditions, such as prolonged antibiotics therapy, use of contraceptives, malnutrition, pregnancy, diabetes, obesity, tissue transplant, use of immunosuppressant drugs, neutropenia *Candida* may become pathogenic and cause candidiasis. The majority of these infections are caused by *Candida albicans*.<sup>3</sup>

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**Received:** 13.11.2014    **Revised:** 08.12.2014    **Accepted:** 29.12.2014

Diabetes mellitus predisposes individuals to bacterial and fungal infections. Chronic recurring VVC may be a marker of diabetes.<sup>18</sup> It is reported that the increase in occurrence of VVC during pregnancy is due to increased levels of hormones such as estrogen and steroid hormones.<sup>4,8</sup> If the disease is not treated the baby can get infected (oral thrush) at birth which can be a serious health problem in premature babies.<sup>5,19,21</sup> Untreated vaginal infections can lead to pelvic inflammatory disease and infertility.<sup>5,19</sup> Sexual intercourse with an infected person is the most common mode of spread of genital candidiasis.<sup>12</sup> Clinical diagnosis is based on signs, symptoms and confirmation done by laboratory diagnosis. Vulvar pruritus with vaginal discharge are the dominant feature of vulvovaginal candidiasis.<sup>8</sup> The discharge is classically described as thick, adherent, and “cottage cheese-like” with a pH of 4.0 - 4.5.<sup>1, 20</sup>

To diagnose bacterial vaginosis, Amsel’s criteria is used worldwide. The criteria includes: (i) pH above 4.5; (ii) fishy odour with or without addition of 10 % KOH (Whiff test); (iii) homogenous, milky or creamy vaginal discharge; and (iv) presence of clue cells on microscopic examination. Presence of three out of four criteria is necessary for diagnosis of BV.<sup>7, 9</sup> Another criteria for diagnosis of BV is Nugent’s score.<sup>6, 17</sup>

The prevalence of *T.vaginalis* ranges from 0.4–27.4% in women. The characteristic frothy, purulent discharge, punctate haemorrhagic areas called “strawberry cervix”, lower abdominal pain and dyspareunia seen in infection with *T.vaginalis*.<sup>11</sup>

Many studies have reported the incidence of specific and non-specific organisms in their population. Gram Positive cocci (group B *streptococcus*) is a common organism to colonize the vagina. *Enterobacteriaceae* group of organisms are also isolated from culture of vaginal discharge in laboratory.<sup>24</sup>

## MATERIAL & METHODS

The present study was carried out in the Department of Microbiology, SMIMER medical college, Surat during the period of July 2010 to October 2011 (15/7/2010 to 15/10/2011). A total 410 patients of suspected cases of vaginal discharge, attending Obstetrics & Gynaecology OPD were included in the study. A detailed history was taken with particular reference to name, age, and address, OPD no., presence of predisposing factors, onset and duration of complaints, treatment taken. All patients were asked about a standard questionnaire on their symptoms (vaginal discharge, vulvovaginal itching, vulvovaginal burning sensation, dysuria and dyspareunia).

The amount, colour, character and smell of vaginal discharge were noted. Two sterile swabs were used for col-

lection of discharge from lateral and posterior vaginal walls: (i) First swab was used for Amine test, wet mount examination and for gram’s staining. (ii) Second was used for culture on Sabouraud’s dextrose agar, Blood agar and MacConkey’s agar.

Laboratory procedures done:

- a) Amine Test: A drop of 10% KOH was added to the vaginal secretions taken on a clean glass slide and fishy odour was noticed.
- b) Wet mount examination: The vaginal secretions taken on a clean glass slide and a drop of normal saline added, mounted with a cover slip. No of pus cells and clue cells counted. *Candida* was identified as highly refractile, round or oval budding yeast cells.
- c) Gram’s staining: Smears were prepared by the specimen and was fixed by flaming. Then the slide was stained by Gram’s Method and was examined under microscope for detection of gram positive budding yeast cells with or without pseudohyphae and any bacterial organisms.
- d) Culture: Culture was done on Blood agar, MacConkey’s agar and Sabouraud’s dextrose agar. Incubated at 37°C for 24 and 48 hours and colony morphology observed.
- e) Final Identification: In case of *Candida* the species identification was done based on gram staining, germ tube test and inoculation on CHROM agar following standard methods. In case of bacterial pathogen identification was done based on colony morphology, gram stain and biochemical reaction.

## RESULTS AND ANALYSIS

Among the 410 vaginal specimens collected from the patients attending Obstetrics & Gynaecology department 26 (6.34%) samples were negative for any pathogen. Among the positive samples the percentage of *Bacterial vaginosis* was highest (47.31%) followed by *Candida* species (29.75%), *E.coli* (11.98%), Gram positive cocci (3.41%) and least was *Trichomonas vaginalis* (1.21%) (Figure 1).

The age of patients was between 19 to 55 years in our study. The prevalence of *Candida* species was found to be more in reproductive age group, maximum in the age group of 26 to 35 years (41.68%) and 15 to 25 years (40.98%) followed by 36 to 45 years (13.11%) and least in 46-55 years (4.23%) (Figure-2).

Among 122 candidiasis case various associated risk factors like Pregnancy (33.60%, 41/122), OCP use (14.75%, 18/122), Diabetes mellitus (13.93%, 17/122) and PLWH (5.73%, 7/122) were observed (Table 1).

Among 122 patients with VVC various symptoms like vaginal discharge were seen in 59.84%(73/122), pruritus in 39.34% (48/122), burning sensation in 32.79%(40/122), dysuria in 19.67% (24/122) and dyspareunia in 31.15% (38/122)(Table 2).

Out of total 122 *Candida* isolates 78 isolates were germ tube test positive and 44 isolates showed germ tube test negative. All yeast isolates were also inoculated on CHROM agar (We had considered CHROMagar as a gold standard method). CHROMagar had shown 81 *C.albicans* (66.39%) while 41 as non albicans spp. (33.60%) (Table 3).

## DISCUSSION

Despite therapeutic advances, vulvovaginal Candidiasis remains a common problem worldwide, affecting all strata of society. Their epidemiological profile varies from country to country and from one region to another within a country depending upon demographic, Socio-economic and health factors.<sup>12</sup>

In our study we have found no any pathogen in 6.34% of cases. In Thulkar et al<sup>9</sup> 14.36% were of no growth. In our study we have found 11.98% of *E.coli* that is in correlation with 14% in Puri et al<sup>16</sup>, while 10% in Fauzia et al<sup>10</sup>.

In our study prevalence of gram positive cocci is 3.41%, while it is 8% in Fauzia et al<sup>10</sup>.

The incidence of bacterial vaginosis in our study (47.31%), while in Puri et al<sup>16</sup> 31% and in Thulkar et al<sup>9</sup> 39.01%.

Among 410 symptomatic women studied, the prevalence of *Candida* species were 29.75%. The similar pattern of isolation was found in Puri et al<sup>16</sup> 31% while Fauzia et al<sup>10</sup> found 40%.

The incidence of *Trichomonas vaginalis* in our study is 1.21%, which has good correlation with Puri et al<sup>16</sup>(2%).

The present study was carried out to isolate and characterize the *Candida* spp. from vaginal discharge of reproductive age. Maximum incidence of VVC in our study was in 26-35 yr. age group 41.68%, other studies showed little higher rate of candidiasis Okungbowa FI et al<sup>8</sup> 56.00% and Babin et al<sup>27</sup> 49.58%.

VVC is more likely to occur in pregnancy. In our study we found 33.6% patients with pregnancy while similar data in L.B et al<sup>25</sup> and in Nwadioha et al<sup>26</sup> are 44.8% & 40%, respectively. Diabetes mellitus is also another important risk factor in VVC. In present study, we observed 13.93% of VVC with D.M, whereas Nwadioha et al<sup>26</sup> observed

7.14%. Other risk factors like HIV/AIDS and OCPs users in our study were 5.73% and 14.75%, respectively while data in Nwadioha et al<sup>26</sup> 12.14% and 15% respectively.

In present study Various symptoms of VVC like vaginal discharge(59.84%), pruritus(39.34%), burning sensation(32.79%), dysuria(19.67%) and dyspareunia(31.15%) were found which are in good correlation with Lopes ME et al<sup>28</sup> study who found vaginal discharge(57.58%), pruritus(36.36%), burning sensation(45.45%), dysuria(24.24%) and dyspareunia(36.36%).

Sensitivity of GTT in our study is 96.2% which is quite comparable with J.E. Hoppe et al<sup>13</sup>(98.9%) and Arthur E. Crist et al<sup>14</sup>(94.7%).

## CONCLUSION

Proper diagnosis of cases of vaginal discharge is required to know the exact aetiological agent. Vaginal discharge, pruritus, burning sensation, dysuria and dyspareunia are the common complains. Such symptoms may occur due to candidiasis, non candidal pathogen and other factors. This study has shown that Bacterial vaginosis is the most predominant aetiology followed by *Candida* species. We concluded that discharge and pruritus were the most common symptoms of vulvovaginal candidiasis. Distribution of *Candida* species among different age groups showed the highest incidence in age group of 16 – 35 years. *Candidiasis* is more common in pregnancy and diabetic patients. Germ tube test will differentiate between albicans and non-albicans species of *Candida*. CHROMagar is an easy and reliable method for the identification of various species of *Candida*.

## ACKNOWLEDGEMENT

Authors would like to thank Dean and Medical Superintendent, SMIMER Medical College and hospital for allowing us to carry out this study and for providing the facilities and help.

They are also thankful to the Head of Department Obstetrics & Gynecology, SMIMER Medical College and hospital for allowing us to collect the specimens of their patients.

Authors would also like to extend their gratitude to authors whose articles are cited and included in the references of the present study.

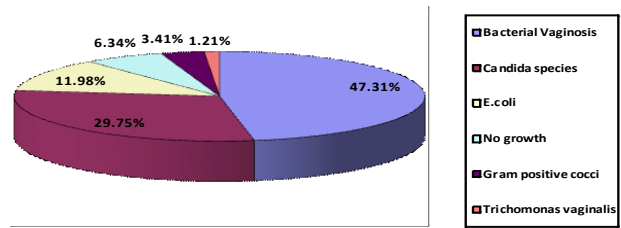
They are also grateful to authors/editors/publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

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**Table 1: Various Risk Factors associated with VVC**

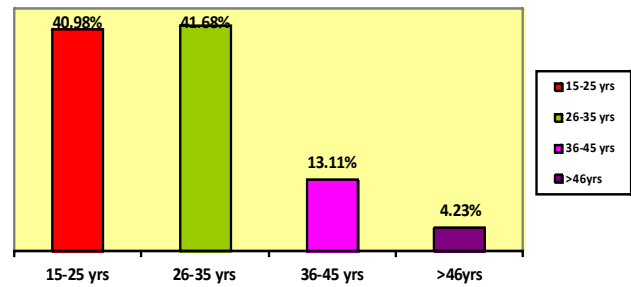
Risk factors	No. of Patients (122)	Percentage
Pregnancy	41	33.6
OCPs	18	14.75
Diabetes mellitus	17	13.93
PLWH	7	5.73



**Figure 1: Findings of Vaginal Discharge**

**Table 2: Various symptomatology in VVC**

Symptomatology	No. of Patients	Percentage
Discharge	73	59.84
Pruritus	48	39.34
Burning sensation	40	32.79
Dysuria	24	19.67
Dyspareunia	38	31.15



**Figure 2: Age-wise Distribution of Vaginal Candidiasis**

**Table 3: Results of Germ tube test for Candida species**

Species of Candida Based on Chromagar	Germ Tube Positive Total No.	Germ Tube Negative Total No.	Sensitivity of GTT
C.albicans (81)	78	04	96.20%
Non albicans (41)	0	44	