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## Original article

# Prevalence of vaginal yeast infections in pregnant and non-pregnant women attending at Gynecology and Obstetrics Department of the tertiary care center in Central region of Nepal

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## ABSTRACT

**Background:** *Candida albicans* represents the most abundant opportunistic strain. *Candida tropicalis*, *Candida glabrata*, *Candida krusei*, *Candida parapsilosis* and *Candida lusitanae* may also mount infection under opportunistic conditions. The presence of candidal infection in the vagina is specified as a vaginal candidiasis. During pregnancy, vaginitis is more common, and there is a high chance of recurrent infection. In pregnancy, higher level of estrogen enhances the attachment of yeast cells to vaginal mucosa due to which woman are more susceptible to yeast infection. **Aim:** The aim of the study was to determine the fungal burden of candidiasis in pregnant and non-pregnant ladies at a tertiary care centre in central region of Nepal. **Methods:** The study was conducted after receiving the approval from the Institutional Review Committee of Chitwan Medical College and Teaching Hospital (CMCTH). The recent study was carried in 150 women of child bearing age group visiting the Department of Gynecology and obstetrics at CMCTH during a period of 6 months from October 2020 to January 2021. The isolates were subjected to microscopy, culture and identification. **Results:** Among 150 samples processed in our microbiology laboratory during the study period, 41.7% of non-pregnant ladies were found to be positive for *Candida* sp. and 55.5% of the pregnant ladies were positive for *Candida* species. **Conclusions:** The ladies of child bearing age group are at high risk of vaginal candidiasis in Central region of Nepal. The present study shows that age and pregnancy both influences the colonization of fungi in women.

## Introduction

A healthy vagina embodies some bacteria and a few yeast cells like *Candida*. *Candida* species inhabit the mucous membranes, skin, gut, throat and lower genital tract as a normal flora in almost most of the healthy asymptomatic women. [1]. But the yeast cells multiplies when the imbalance occurs between bacteria and yeast because of some hormonal changes, pregnancy, stress, etc. [2]. The presence of candidal infection in the vagina is

specified as a ‘vaginal yeast infection’, “vaginal candidiasis,” “vulvovaginal candidiasis,” “candidal vaginitis” or vaginitis.

Other predisposing factors of candidiasis encompasses trauma, surgery, underlying disease (diabetes mellitus, Addison’s disease), medications (corticosteroids, antibiotics, oral contraceptives), immunodeficiency (HIV/AIDS), pregnancy, age (elderly, infancy), and malnutrition [3,4].

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Overgrowth of candida causes vaginal candidiasis [VC] that leads to genital problems like intense pruritus, dysuria, dyspareunia, white, cheesy discharges, redness and inflammation of labia minora in females [5] while in men, the mycotic infection causes intense pruritus, swelling and inflammation of the tip of the penis, and balanoposthitis [1]

*Candida albicans* represents the most abundant opportunistic strain [6]; *Candida tropicalis*, *Candida glabrata*, *Candida krusei*, *Candida parapsilosis* and *Candida lusitanae* may also mount infection under opportunistic conditions [7].

Normal vaginal discharge usually do not have a strong odour nor it creates any type of itchiness or pain [8]. vaginal yeast infections, bacterial vaginosis, and sexually transmitted infections causes change in vaginal discharge [9] and reflect infection or other pathological processes [10,11].

During pregnancy, vaginitis is more common, and there is a high chance of recurrent infection [12]. In pregnancy, higher levels of estrogen enhances the attachment of yeast cells to vaginal mucosa due to which woman are more susceptible to yeast infection [13]. Hence, pregnant women suffering from vaginitis are in the risk of premature labor and delivery.

**Nelson et al.** showed that the 3rd trimester had the highest number of patients followed by 2nd trimester and least number of patients in first trimester [3].

Early treatment of vaginitis prevents infection-related preterm birth, as in early pregnancy there is a great risk for the establishment of inflammatory responses to low virulence organisms that increase the risk of preterm birth [14-18].

Laboratory diagnosis of the candidiasis is initiated by Gram staining of the smears, followed by culture and other tests. Proper treatment avoids the complications in the women and risk in neonates. So this study was carried to find out the prevalence of VC in pregnant and non-pregnant women attending the Gynecology Department of Chitwan Medical College.

## Materials and Methods

**Study site:** A cross sectional study was conducted in 150 women of child bearing age group visiting the

Department of Gynecology and obstetrics at Chitwan Medical College and Teaching Hospital (CMCTH) during a period of 6 months from October 2020 to January 2021.

**Study population and patient involvement:** The study population consisted of pregnant women and non-pregnant women attending for antenatal care in the tertiary care centre. All the pregnant and non-pregnant patients attending for antenatal care who consented willingly to participate in the study were included irrespective of their trimester, age, parity and socio-economic status. The participants were simply convinced about the infection, aim of the study and the benefits of the study. The results of laboratory investigations of the participants were used as data in this research.

**Sample collection:** Probability sampling technique was applied to collect the samples from 150 women based upon their convenience. Vaginal swabs were collected from 90 pregnant ladies and 60 nonpregnant ladies of child bearing age group who visited CMCTH with a symptoms having burning sensation, vaginal itching, disgusting smell, abnormal vaginal discharge and pain or discomfort during urination. Vaginal swabs were collected by the medical officers and the gynecologists with a sterile cotton tipped swab [19]. The clinical symptoms of the participants were noted. The samples were labeled with patients name, age, hospital number, date of sample collection and immediately transported in the transport media to the laboratory for analysis.

**Inclusion criteria:** The women of reproductive age group having symptoms like burning sensation, vaginal itching, and pain/discomfort during urination, abnormal vaginal discharges and odor were included in the study.

**Exclusion criteria:** Patients without any symptoms were excluded in this study.

**Identification:** The samples were cultured in Sabouraud Dextrose Agar (SDA) and aerobically incubated at 37°C over a period of 24-72 hours. The white creamy coloured colonies were observed on blood agar plates. On SDA cream colored pasty colonies were observed after 24-48 hours incubation at 25-37°C. The colonies on SDA had a distinctive yeast smell. In Gram stained smears of the colonies obtained from SDA, Candida appeared as Gram positive budding yeast along with pseudohyphae showing regular points of constriction. Wet mount

technique was performed for the colony from each positive cultured plate which revealed the presence of fungal hyphae. Potassium hydroxide (KOH) mount technique revealed the presence of mycelial tangles and spores. Lactophenol cotton blue stain was also performed for the identification of *Candida albicans* and the results were recorded [20].

**Germ tube test:** Blood sample was collected from each patient. With a sterile pasteur pipette a colony was touched and emulsified in 0.5 ml of serum which was incubated at 37°C for 2 – 4 hours. After the incubation period, a drop of serum was transferred to the slide for microscopic examination. A short filament was observed arising from the yeast cell with a minute constriction at the origin which resembled like a germ tube and confirmed the presence of *Candida albicans* [20]

#### Data analysis

The data obtained for the study was analysed by using SPSS software.

#### Ethical considerations

This study was allowed to conduct after receiving ethical considerations from the Institutional research committee of CMCTH.

#### Results

Among 90 pregnant ladies, 50 (55.5%) of them were positive for *Candida* species and 40 (44.5%) of them were negative for the *Candida* species as shown in **table (1)**.

Among 60 non-pregnant ladies, 25 (41.7%) of them revealed positive for *Candida* species and 35 (58.3%) of them revealed negative for the *Candida* species as shown in **table (1)**.

Among the 50 positive isolates in pregnant ladies, the higher number of isolates were observed in age group of 26-35 followed by the age group 36-45 and 16-25 consecutively as shown in **table (2)**.

Among the 25 positive isolates in non-pregnant ladies, the higher number of isolates were observed in age group of 26-35 followed by the age group 16-25-45 and 36-45 consecutively as shown in **table (2)**.

The symptoms like burning sensation, vaginal itching, pain/discomfort during urination, abnormal vaginal discharges and odor was found to be more in pregnant ladies than the non-pregnant ones as shown in **table (3)**.

**Table 1.** Percentage of isolated *Candida* among pregnant and non-pregnant women.

Number	Number of pregnant ladies (90)		Number of non pregnant ladies (60)	
	Positive	Negative	Positive	Negative
Number	50	40	25	35
Percentage	55.5	44.5	41.7	58.3

**Table 2.** Percentage of isolated *Candida* among age groups.

Age group	Number of positive isolates in pregnant ladies (50)		Number of positive isolates in non pregnant ladies (25)	
	Number	Percentage	Number	Percentage
16-25	8	16	7	28
26-35	30	60	15	60
35-45	12	24	3	12
Total	50	100	25	100

**Table 3.** Percentage of symptoms among pregnant and non-pregnant women with positive isolates.

symptoms	Pregnant ladies (50)		Non-pregnant ladies (25)	
	Number	Percentage	Number	Percentage
Burning sensation	45	90	15	60
Vaginal itching	40	80	21	84
Pain/discomfort during urinating	41	82	22	88
Abnormal vaginal discharge	48	96	21	84
Odour	48	96	21	84

### Discussion

Vulvo-vaginal candidiasis is considered to be the most common gynaecological problems in the women of child bearing age group. Such ladies usually have vaginal discharges with characteristic odor. Most of them have burning sensation in their genitalia along with itching sensation and some of them might have pain or discomfort during urination.

Several host factors like hormonal changes, pregnancy, weak immune status, immunosuppressed diseases such as diabetes and HIV, genetic factors, use of glucocorticoides and antibiotics facilitates the invasion and recurrences of *Candida* species within the vaginal area. Besides these host factors, some of the behavioral risk factors like the intake of oral contraceptives [21], use of spermicidal agents and condoms, intrauterine device, hygienic practices during and after menstruation, clothing and sexual practices all contribute to the colonization of candida within the vaginal area. Alteration in the vaginal flora and use of contraceptives too allows the candida to proliferate within the vagina. Male contraceptives like spermicidal agents increase the chances of candida to attach on the vaginal area, because of which the normal flora too gets altered. Thus, these physiological and non-physiological changes aids in the invasion, attachment and colonization of candida in the vaginal region.

The characteristics of the vaginal discharge like odour and colour might represent the presence of candidiasis [22]. So, the physical examination and the history direct the physician to carry out the treatment of the VC. Usually, topical antifungal regimens are used for the therapy of the infected candidiasis patients.

Besides, *Candida albicans*, *Candida glabrata* also is the increasing cause of vaginitis. The study carried out by **Denning et al.** shows that the candidiasis is highly prevalent in the women of age group 25-34 years which is in correlation to this study [23]. The study done by **Mbakwem-Aniebo et al.** shows that the VC is more prevalent in the age group of 20-29 years which is also complementary to the findings of the present study [24]. The study carried out by **Rati et al.** [25] and **James et al.** [26] also states that the vulvovaginal candidiasis is more prevalent in the age group 20-29 years which resembles to the present study.

Hence, the present study narrates the risk group age of vaginal candidiasis and the symptoms associated with it.

### Conclusion

Candidiasis is one of the prevailing fungal infections in the central region of Nepal. The high frequency of candidiasis observed among the women in this territory represents a major health problem. The present study also validates that age and pregnancy both influences the colonization of fungi in women. This study also demonstrates that fungal burden varies among different age groups whereas host immune status, host factors and behavioral factors, physiological and non-physiological changes all contribute to the vaginal colonization of candida. Women of both reproductive and non-reproductive age group should avoid the condition that influences the fungal burden in them. Regular medical check-ups, sufficient antenatal services and continuous screening for candidiasis with antifungal susceptibility test are recommended to reduce the fungal burden among Nepalese women.

**Ethical approval:** The ethical approval was confessed by the Institutional review committee of the Chitwan Medical College.

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**Competing interests:** The authors declare that they have no any competing interests. Both the authors of this study have equally bestows in carrying out this research.

**Authors contributions** The corresponding author of this research has directly involved in Sample processing. Moreover, the research was carried out on the sample that was submitted for the routine diagnosis. She has given her full effort in giving a conceptual and intellectual design to the study. She has directly involved in the literature review, manuscript preparation and editing, data analysis and submission too.

The co-author involved in this study has also equally participated in clinical studies of the manuscript, manuscript review, data analysis, statistical analysis and submission.

Both the authors have participated sufficiently in the intellectual content, conception and design of the manuscript, analysis and interpretation of the data, as well as writing of the manuscript taking a public responsibility.

**Disclosure:** The contents are the sole responsibility of the authors participated in this study.

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