



RESEARCH ARTICLE

VULVOVAGINAL CANDIDIASIS- PREVALENCE AND ANALYSIS OF ASSOCIATED RISK FACTORS AMONG WOMEN OF REPRODUCTIVE AGE GROUP IN VINDHYA REGION

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Abstract

Background: Although it can affect all groups, vaginitis remains one of the most common ambulatory problems to occur in women of reproductive age group. It accounts for 5-10 million office visits per year throughout world. In India prevalence of vaginitis is approximately 30%. Vaginitis has substantial impact on various aspects of female reproductive health, mental health, work ability and routine physical activity. It is also associated with various obstetrical and gynecological complications. Vulvovaginal candidiasis is common form of vaginitis. So, we aim to find out prevalence and analyze risk factors associated with vulvovaginal candidiasis at tertiary care hospital in Rewa, Madhya Pradesh India.

Method: An observational cross-sectional study was conducted at Department of Obstetrics and Gynecology, Shyam Shah Medical College Rewa for 18 months from January 2021 to June 2022 on 1000 women of reproductive age group, visiting routine Gynae OPD of department of Obstetrics & Gynecology.

Results: Prevalence of vulvovaginal candidiasis in present study was found to be 12%. Various associated risk factors were OCP use, use of cloth during menses, douching/cleanliness habit, rural area of residence, middle and lower socioeconomic class and various occupations like factory workers and farmers.

Conclusion: As it is evident that vaginitis will never be completely prevented, but incidence can be reduced. Much of the morbidity and complications can be reduced by identification and prevention of modifiable risk factors and interventional strategies directed mainly on high-risk behaviors in day-to-day life.

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Introduction:-

Reproductive morbidity is a broad concept that encompasses health problems related to reproductive organs and their functions. It is estimated that reproductive and sexual ill-health accounts for 20% of global¹⁻².

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Healthy Vagina is an ecosystem balance between various microbiomes but is dominated by lactobacillus. Vaginitis is an inflammation of vagina often associated with various symptoms like vaginal discharge which can be normal or foul smelling, pruritis, dyspareunia, burning micturition etc.

Symptomatic vaginal discharge in reproductive age group leads to approx 5- 10 million OPD visits per year throughout the world³. The prevalence of vaginal discharge in India is estimated to be 30%. Females are more prone to urinary and vaginal infections owing to short urethra and due to anatomical and functional proximity to the anal canal. Causative organisms for vaginitis can be endogenous, iatrogenic or sexually transmitted. Many women believe that such infections are normal and do not seek care due to shame or lack of information. Subsequently, these gynaecological disorders have substantial impact on female reproductive health, mental health, work ability and routine physical activities.

The most common causes of vaginitis are of infectious origin and include bacterial vaginosis, vulvovaginal candidiasis, and trichomoniasis. Out of this, vulvovaginal candidiasis accounting for **20% to 25%** of cases. Non-infectious causes, including atrophic, irritant, allergic, and inflammatory vaginitis, are less common and account for **5% to 10%** of vaginitis cases.

55% of females will have an episode by age 25 & 9% of women report four or more episodes yearly. In the United States, vulvovaginal candidiasis is the 2nd most common type of vaginal infection after bacterial vaginal infections.⁴ An estimated 1.4 million outpatient visits occur annually. Vulvo-vaginal candidiasis affects around 75% of women in reproductive age-group with a 2nd attack in 40-50%. Sobel et al stated that vulvovaginal candidiasis to be common cause of morbidity and health related problems in young women.⁵ The vaginal tract is colonized with the *Candida* from the adjacent peri-anal region. *C. albicans* adhere more strongly to vaginal epithelial cells than non-*C. albicans*.⁶⁻⁷

Vulvovaginal candidiasis presents as pruritus (50%), vaginal discharge (24%) and dysuria (33%) other symptoms are burning or stinging sensations but these are non-specific symptoms. Signs include vulvar edema, fissures, excoriations, and thick curdy white vaginal discharge.

The treatment option varies according to the aetiology but unfortunately, many women seek to over the counter drugs⁸ instead of visiting a gynaecologist due to social taboo and stigma. This leads to inadvertent use of antimicrobials leading to their resistance. Therefore, proper diagnosis of vaginal infections and causative agent should be done to prevent the unjudicial use of chemotherapeutic agents to avoid further complications.

Moreover, attention should be given to identify and prevent/modify risk factors associated with vaginitis. Various risk factors include multiple sex partners, use of OCP, unhygienic menstrual habit, douching habits, use of hormonal contraceptives, medical conditions like uncontrolled diabetes mellitus, use of steroids, immunosuppressives, low socio-economic status, illiteracy, lack of awareness regarding vaginitis and its complications, cigarette smoking etc.

Due to its disease burden, repetitive medical attention, inadvertent use of antimicrobials and money in part, impact on daily routine and physical activities of women, various obstetric and gynaecological complications and burden on economy, it is essential to identify various risk factors associated with vaginitis.

This study is aimed to determine prevalence of vaginal candidiasis, common causative agent in general for vaginitis and potential risk factors associated with it. Successful identification and evaluation of common causes and contribution of various risk factors will help in curbing the disease burden, preventing complications and will contribute to better quality of life.

Method:-

The present study is an observational, hospital based study conducted in Gynae OPD at Department of Obstetrics & Gynaecology, S. S. Medical College, Rewa (M.P.) over a period of 18 months from January 2021 to June 2022 for which ethical clearance was granted by ethical committee of the institute.

Study Population

Women of reproductive age group (18-45yr of age) attending Gynae OPD of Department of Obstetrics & Gynaecology, with complaints of vaginitis were randomly enrolled in the study.

Sample size

1000 women of reproductive age group with features of vaginitis.

Study area

This is a tertiary care centre which provides health facilities to a large population of urban & rural areas of Rewa division.

Selection of cases

The women were selected on the basis of following criteria-

Inclusion Criteria

1. Married.
2. Age 18 to 45 years.
3. Non-pregnant.
4. Presenting with features of vaginitis.

Exclusion Criteria

1. Unmarried women.
2. <18 years
3. >45 years
4. Didn't give written consent for the study or not willing to participate in the study.

Methods of study:-

After taking well informed written consent, women who fulfilled above mentioned criteria were interviewed on the basis of pre-structured questionnaire for interview(proforma). Questionnaire was predesigned into three sections, first section inquired into demographic & socioeconomic background of women: age, residence, educational status, socio-economic status by modified Kuppaswamy classification, no. of living children etc.; second section inquired into personal hygiene, sexual practices, diet, cigarette smoking, alcohol or tobacco abuse, douching habits, family planning method used, use of cloth or pad during menses etc. Third section consisted of symptoms they complained of; nature, amount, colour, odour of discharge, itching in private part, associated abdominal pain, dysuria, dyspareunia etc. Then patients were examined per abdomen for any associated pain or tenderness, per speculum for characteristics of discharge and per vaginum for any mass or tenderness etc.

Diagnosis was made by history taking, clinical & physical examination and laboratory tests (pH, High vaginal swab, microscopy, culture).

1. pH strip used to test vaginal fluid pH
2. Three high vaginal swabs taken and sent to institute's microbiology lab
 - a) One swab used for wet mount preparation
 - b) Second swab for KOH mount and Whiff test
 - c) Third swab for Gram staining & culture.

3. Pap smear taken.

Other tests done

4. Urine for routine and microscopy

Data collected on the basis of detailed history and clinical evaluation of women presenting with symptoms of vaginitis.

All information was recorded in a pre-structured proforma, entered in MS Excel spread sheet & analysed by appropriate statistical method.

Ethical consideration

The proposal was cleared by Institutional Ethical Committee (S. S. Medical College, Rewa) before starting the study. After ethical approval study was started and patients were enrolled after their informed written consent. Confidentiality and privacy of the participants were maintained. All the data was kept in strict confidentiality with access to only the researcher & mentor.

Statistical analysis

Qualitative and quantitative data analysed and explained as percentage method using bar chart and pie chart.

Results:-

A Total 1000 participants were enrolled in the study according to inclusion & exclusion criteria. Prevalence of candidiasis was found to be 12% in present study.

Table 1:- Socio-demographic profile of cases diagnosed with VVC.

Variable	Details	Number (N=120)	Percentage
Age (in years)	18-25 year	48	40%
	25-35 year	61	50.8%
	35-45 year	11	9%
Area of residence	Rural	62	51.6%
	Urban	58	48.3%
Status of literacy	Illiterate	16	13.3%
	Primary school	56	46.6%
	Secondary school	43	35.8%
	College	5	4.16%
Employment status	Housewife	57	47.5%
	Factory worker	46	38.3%
	Farmer	13	10.8%
	Others	4	3.33%
Socio-economic status	Upper	33	27.5%
	Upper middle	25	20.8%
	Lower middle	26	21.6%
	Upper lower	24	20%
	Lower	12	10%

Table 1 shows most common age group affected by VVC is 25-65 years (50.8%), followed by 18-25 years (40%) and least in 35-45 years (9%). Rural area of residence is most commonly affected (51.6%). VVC is most commonly seen in patients with primary school level of education (46.6%) and decreases with increasing education status as evident in Table 1. Illiterates were 13.3%. Majority of participants were housewives (47.5%) followed by factory workers (38.3%), farmers (10.8%) and others (shopkeepers, laborers, vendors etc) were 3.33%. Maximum cases belonged to middle socio-economic class (41.6%), followed by lower group (30%) and least in upper group (27.5%).

Table 2:- Distribution of symptoms in cases of VVC.

Symptoms	Number (N=120)	Percentage
Itching/Soreness	114	95%
Discharge from genitals	100	83.3%
Foul smelling discharge	2	1.6%
Associated abdominal pain	18	15%
Dysuria	85	70.8%
Dyspareunia/ Discomfort during intercourse	1	0.83%

Table 2 shows most common symptom in cases of VVC was itching or soreness over genitalia (95%). Second most common symptom was discharge per vaginum (83.3%). This was followed by dysuria (70.8%), associated abdominal pain (15%). Least common symptoms were foul smelling discharge which was seen in 1.6% and dyspareunia seen only in 0.83% cases.

Table 3:- Risk factors for VVC.

Risk factors	Number	Percentage
Cleanliness/Douching	120	100%
Use of cloth during menses	116	96.6%

OCP use	111	92.5%
Wearing tight clothing	78	65%
Frequency of intercourse >5 a week	66	55%
Rural area	62	51.6%
Factory worker	46	38.3%
Farmer	13	10.8%
Smoking	8	6.6%
IUCD	6	5%
Multiple sex partner	5	4.16%

Table 3 shows various risk factors associated with causation and/or proliferation of VVC. Most common risk factor was cleanliness or douching which was seen in all cases. Second most commonly associated risk factor was use of cloth during menses (96.6%). OCP use was found to be a risk factor for VVC and seen in 92.5% of cases. Wearing tight clothes was present in 65% of cases. Frequent sexual intercourse with a frequency of >5/week was seen in 55% of cases. Rural area of residence seen in 51.6%. Various occupations like factory workers (38.3%) and farmers (10.8%) were also associated with VVC. Smoking was present in 6.6% participants. IUCD use seen in 5% and history of multiple sexual partners seen in 4.16% of participants.

Discussion:-

Genital infection is a wide spread problem among females of reproductive age group. It is the second most common problem after menstrual disorders⁹. An estimated of one in ten women will present with vaginal discharge in 1 year course¹⁰.

Vulvovaginal Candidiasis (VVC) occurs frequently in women, yet the associated risk factors are poorly understood. This study aims to find out the disease burden of VVC and associated risk factors. Women with VVC receive different advises from physicians and other healthcare providers like varied pharmaceutical remedies along with lifestyle modifications, such as medication and clothing, in an attempt to gain control over VVC. Yet data suggest the impacts of these changes are inconsistent.

Prevalence of VVC in our study found to be 12% which is similar to study conducted by Hemin Muheddin Kareem et al¹¹ (16%), Sadiya Shekh et al¹² (21.62%), Basanta Kumar Pati et al¹³ (22%), Swetha Venugopal et al¹⁴ (22%), lower than Anuradha Narayankhedkar et al¹⁵ (30%) and higher than study conducted in Yemen by Maha Abdul Aziz et al¹⁶ (6.6%). Most common age group affected by VVC was 25-35 years (50.8%) in present study. This is similar to studies conducted by Basanta Kumar Pati et al where most commonly affected age groups were 25-35 years and 18-25 years. Women of child bearing age were more affected. This may be due to effects of factors such as altered menstrual status, hormonal changes, sexual activity, contraceptive use, vaginal deliveries and various procedures like dilatation curettage etc which are common in females of these age groups which may have contributed for higher risk of vaginal infection. Also, in our country trends of women getting married and enter in married life earlier and end reproduction earlier too which can be the cause of reduced prevalence in 35 years or more age group.

Majority of the patients were from rural area (51.6%). Women are generally not aware of risk factors of vaginitis in rural areas, so they visit health facility only until alarming symptoms develop or when it affects their daily household or work ability. Maximum cases seen in middle (42.4%) and lower class (30%). These outcomes clearly indicate that the disease prevalence is higher in population with middle and lower socioeconomic status, while women in upper groups were less affected. Maximum cases were having primary school level of education (46.6%), secondary education in 35.8% and only 5 were having college level education. Illiterates were 13.3%. Reproductive health is generally a curriculum of secondary schooling or above which is lacking in patients with primary school education so more cases in later group. Also, women with higher education were unlikely to come down with VVC. The possible explanation for this outcome maybe that highly educated women is believed to had mastered the knowledge regarding candidal vaginitis and protective factors from VVC infection but are still exposed to many other risk factors like tight clothing, colored tissue papers and antibiotic use etc. Same applies for its prevalence in middle class also.

Factory workers (38.3%) and farmers (10.8%) were particularly affected occupations. This can be attributed to unhygienic toilets, hot environment, sexual practise with more than 1 partner and smoking or tobacco chewing

during or in between work hours in factory workers. Farmers also work in hot environment, may not be taking regular bath, tight clothing or can also be affected by pesticide sprays etc.

Multiple sex partners seen in 4.16%. This can be explained by controversial fact of penile colonization with *Candida* that has been reported¹⁷⁻¹⁹. Women with frequency of intercourse >5/week were also found to be more affected (55%). High prevalence of vaginitis with sexual activity may be result of disturbance of vaginal microflora due to frequent sexual intercourse and the subsequent frequent washing with water or water with soap. Also, seminal fluids tend to raise vaginal pH which is a further risk factor for vaginal infections. Transfer of perineal and peri-anal microbes also takes place during sexual intercourse.

Most commonly used contraceptive was OCP (92.5%). Findings are consistent with study conducted in Nigeria by Edom Ndifreke Edem et al²⁰ (77%). This can be due to change in vaginal flora, pH and estrogen level which may contribute to infections by creating hyper estrogenic state. It is a well known fact that physiological and pharmacological hyperestrogenemia causes higher yeast colonization in the vagina. Increase in estrogen levels causes increase in vaginal glycogen, the reduction of vaginal pH and easier adhesion of fungi to epithelial cells. Also, OCP disrupt body's natural balance of estrogen and progesterone. *Candida* attaches itself to estrogen. This prevents body from using the estrogen and eventually drives estrogen levels down. During this time progesterone levels may increase providing *Candida* adequate environment to flourish. IUCD used in 5%. Ascent of infections can take place in IUCD users.

Use of cloth during menses was common risk factors seen in 96.6% cases in our study. In India, particularly in rural practise, women mostly use cloth napkin which are washed, sundried and reused multiple times for subsequent cycles. Cloth used is mostly dried in damp and indoor places due to social taboos and restrictions which compel females in drying cloth pad indoors, away from sunlight and open air generally in lack of proper sunlight. Many a times they are either not washed properly leading to collection of various harmful bacteria and fungi which causes various infections when used again and again. Also, Das P et al²¹ reported menstrual hygiene practices and risk of urogenital infections in women in their study.

Smoking seen in 6.6% of cases and found to be risk factor in present study. Smoking cigarette causes depletion of hydrogen peroxide producing lactobacilli, therefore increasing the risk of vaginal infections. Vaginal metabolites that differ between smokers and non-smokers also do exist. Biogenic amines which are elevated in smokers, have roles in anaerobic bacterial proliferation, immune and stress resistance. Also, smoking acts by depletion of Langerhans cell in cervical epithelium, macrophages which act in natural defence mechanism thus leading to local immune-suppression and causing vaginal infections. Additionally, smoking decreases estrogen levels, causing less glycogen production leading to raised pH which is already a risk factor for vaginitis.

Cleanliness of genitals/ douching seen in all cases in present study. Douching/Cleanliness removes normal protective vaginal flora, decreasing their number and thus permitting the overgrowth of pathogens. It may also act as a pressurized fluid vehicle for transport of pathogens and infections in lower genital tract to ascend above the cervix into the uterus, fallopian tubes, or abdominal cavity. Douching reduces the density of normal vaginal flora therefore predisposing to colonization by sexually transmitted pathogens. Furthermore, douching may cause vaginal irritation and vaginitis. Hence douching is not recommended as vagina cleans itself by secreting mucus.

In present study, most common symptom in patients of VVC was itching or pruritis (95%). Second most common symptom was discharge from genital organs (83.3%). This was followed by dysuria or burning micturition (70.8%). Dysuria differentiated from UTI by doing urine culture and routine, microscopy results. Associated abdominal pain seen in 15% of cases. Other causes of abdominal pain like pelvic inflammatory diseases, urethritis etc should be ruled out. Dyspareunia was least common symptom seen in only 1 case. These facts can be contributed to salient characteristic features of VVC.

In present study pH < 4.5 seen in all cases which is in agreement with Caillouette et al²² who demonstrated that pH value in aerobic bacterial infection is higher than that obtained from patients with either normal flora or yeast infection.

65% women enrolled in study had habit of wearing tight clothes. This probably is attributed to the fact that wearing tight clothes seems to foster friction and maceration, thereby increasing the local acidity and therefore the fungal

infection. Also females tend to wear binding or tight fitting undergarments made of pantyhose, nylon panties, and tights, which increase the local temperature and humidity, all of which encourage the growth of candida species.

Conclusion:-

The results show that women are frequently and acutely victimized by candidiasis infection due to their sexual, poor hygienic situation, both domestically and environmentally. The government should take effective control on how to eradicate or eliminate candidiasis in order to protect health and life generally to the masses. Health education interventions are recommended to raise women's awareness of vaginitis and its prevention. In addition, regular monitoring of VVC among women, educating them on effective preventive measure should be conducted. Normal sanitary pad should be used with avoidance of improper wears. Besides, risk factors such as use of oral contraceptive remarkably linked with females having VVC. Also, occupational risk may be found in factory workers and farmers. Douching/Cleanliness habit, by removing beneficial microbiota enhances chances of VVC. The study recommends the need of creating awareness and organizing educational programs concerning reproductive health and hygiene for females particularly in rural areas and lower socio-economic status.

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