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STUDY ON PRESENCE OF ABNORMAL VAGINAL DISCHARGE IN PREGNANT WOMEN AND ITS OUTCOME: PROSPECTIVE STUDY IN A TERTIARY CARE HOSPITAL

Manohar Ganapathi Revankar[1], Vijaya Manohar Revankar[2*], Shreenivas Revankar[3], Niveditha Manjunath[4], Ananya M Revankar[5]

[1]Professor and Head, Department of Pharmacology, Kanachur Institute of Medical Sciences, Deralakatte, Mangalore.
[2*]Professor and Unit Head, Department of Obstetrics and Gynecology, K S Hegde Medical Academy, Mangalore.
[3]Associate Professor, Shimogga Institute of Medical Sciences, Shimogga.
[4]Kasturba Medical College, Mangalore
[5]K S Hegde Medical Academy, Mangalore.

***Corresponding author:** Vijaya Manohar Revankar
*Email: manohar.revankar@gmail.com

Abstract:
Vaginal discharge (VD) is a common symptom in women during the reproductive period, especially during pregnancy. Pathological VD during pregnancy is an important public health concern because it has a socio-psychological impact on women and influences feto-maternal outcomes. The study aims to estimate the prevalence of abnormal vaginal discharge in pregnant women, also focuses on the demographic profile and various risk factors associated with pathological VDs and their consequences on fetal and maternal health. A prospective observational study was conducted in the Department of Obstetrics and Gynecology in a tertiary care center in Mangalore. A total of 250 pregnant women with complaints of VD in the second and third trimesters with confirmation on speculum examination were recruited and evaluated for the etiology of discharge. Patients were followed until delivery and data regarding feto-maternal outcomes was collected. The prevalence of pathological VD among enrolled women was 39.33% and various etiologies were candidiasis (15.33%), bacterial vaginosis (10.66%), aerobic vaginitis (8.67%), and trichomoniasis (4.67%). These infections were significantly related to pre-term delivery and pre-term pre-labor rupture of membranes. Furthermore, the incidence of prematurity, and low birth weight neonates requiring neonatal intensive care unit care was significantly high in babies born to mothers with pathological VD. Vaginal infections affect both maternal and neonatal health, thus, increasing the likelihood of poor perinatal outcomes. Hence, we propose that routine screening for pathological VD for all pregnant women should be introduced into standard antenatal care.

Key Words: Candidiasis, trichomoniasis, psychological, pregnancy, antenatal

Introduction:

A vaginal infection refers to an infection that affects the vagina, typically caused by bacteria, yeast, or other pathogens. The symptoms and causes can vary, but common types of vaginal infections include:1. Yeast Infection (Candidiasis): Caused due to overgrowth of the fungus *Candida*, which is

normally present in small amounts in the vagina. Symptoms include Itching, thick white discharge (often described as resembling cottage cheese), redness, swelling, and irritation. Antifungal medications, available in oral, topical, or suppository forms. 2. Bacterial Vaginosis (BV): Caused due to imbalance of the normal bacteria in the vagina, often involving an overgrowth of *Gardnerella vaginalis*. Symptoms include thin, grayish or white discharge with a strong fishy odor, itching, and burning during urination. It is treated with Antibiotics, typically metronidazole or clindamycin. 3. Trichomoniasis: Caused due to a sexually transmitted infection caused by the parasite *Trichomonas vaginalis*. Symptoms include Frothy, yellow-green discharge with a strong odor, irritation, and sometimes discomfort during urination or sex. it is Treated with Antiprotozoal medications like metronidazole.4. Vaginal Atrophy (Atrophic Vaginitis): Caused by thinning and inflammation of the vaginal walls, often due to decreased estrogen levels (commonly during menopause). Symptoms are Vaginal dryness, itching, painful intercourse, and urinary issues. Treated by Estrogen therapy (topical or systemic), vaginal lubricants. 5. Chlamydia and Gonorrhea: Caused by bacterial infections that can be transmitted through sexual contact. Often asymptomatic, but may cause discharge, painful urination, pelvic pain, or abnormal bleeding. Treatment: Antibiotics (such as azithromycin for chlamydia, ceftriaxone for gonorrhea). 6. Human Papillomavirus (HPV): Caused by HPV is a viral infection that can affect the genital area, sometimes leading to genital warts or more severe complications like cervical cancer. Many strains have no symptoms, but some can cause warts or abnormal cell changes (detected through a Pap smear). There is no cure for HPV itself, but warts can be treated, and vaccines are available for prevention. Symptoms to watch for include: unusual discharge (color, consistency, or odor), Itching or burning, sensations, Pain during intercourse or urination and swelling or redness in the vaginal area.[1,2]

Vaginal discharge during pregnancy is common and can vary in type and amount. However, abnormal or untreated vaginal discharge can lead to complications that affect both the mother and the baby. Below are some key complications that can arise from vaginal discharge during pregnancy:[3,4]

Complication	**Causes**	**Impact**
Pre term labour and birth	bacterial vaginosis, Trichomoniasis, Chlamydia, Gonorrhea)	Preterm birth, low birth weight, developmental issues, and other health problems for the baby
Low Birth Weight	Chlamydia, Gonorrhea	Babies born with low birth weight may face feeding difficulties, respiratory problems, and increased susceptibility to infections.
Pelvic Inflammatory Disease (PID)	Chlamydia or Gonorrhea	scarring of the reproductive organs, which increases the risk of infertility, ectopic pregnancy, and complications in future pregnancies
Neonatal Infections	B Streptococcus (GBS), Candida, or STIs (e.g., Herpes, Gonorrhea)	Infections such as pneumonia, sepsis, or neonatal herpes, which can lead to severe complications like brain damage or death.
Urinary Tract Infections (UTIs)	UTIs, especially if there is vaginal irritation or bacterial imbalance.	Kidney infections (pyelonephritis), preterm labor, and increased risk of fetal complications.

Cervical Insufficiency	BV and Chlamydia can cause inflammation in the cervix, leading to weakened cervical tissue	Cervical insufficiency can cause preterm birth or miscarriage, especially in the second trimester.
Increased Risk of HIV Transmission	Trichomoniasis and other STIs, can increase the risk of acquiring or transmitting HIV during pregnancy.	Increase the likelihood of transmitting the virus to the baby during delivery.
Postpartum Infections	Untreated infections during pregnancy, such as BV or STIs, can increase the risk of postpartum infections.	Postpartum infections can lead to complications like endometritis
Vaginal Bleeding	STIs or yeast infections) can cause light bleeding or spotting.	Vaginal bleeding during pregnancy complications such as miscarriage or preterm labor if associated with other risk factors.
Fetal Infections	Group B Streptococcus, Cytomegalovirus (CMV), or Herpes Simplex Virus (HSV),	congenital infection, hearing loss, vision impairment, or developmental delays

Preventing Complications: Early Detection: Routine prenatal care, including testing for STIs and screening for vaginal infections, can help identify and treat infections early, reducing the risk of complications. Antibiotic Treatment: Prompt treatment of bacterial infections like BV or STIs can help prevent preterm labor, infections, and other complications. Good Hygiene: Maintaining proper hygiene (e.g., wiping front to back, avoiding douching) and wearing breathable clothing can help prevent infections. Safe Sexual Practices: Using condoms during pregnancy can reduce the risk of STIs and infections that may lead to complications.

Microbiological investigations in vaginal discharge during pregnancy are crucial for diagnosing the cause of abnormal discharge, identifying potential infections, and managing risks to both the mother and the baby[5]. These investigations typically involve a combination of clinical assessment and laboratory testing to identify bacterial, viral, or fungal pathogens. The choice of microbiological investigation for vaginal discharge in pregnancy depends on the clinical symptoms, suspected infection, and available resources. Key tests include: Microscopy (for clue cells, yeast, and motile organisms), Culture (for bacterial, yeast, and Trichomonas species), PCR and NAAT (for detecting STIs like Chlamydia, Gonorrhea, and Trichomonas), Vaginal pH testing (to suggest BV or yeast infection), Viral testing and serology (for herpes, CMV, etc.)[5,6]

Materials and methods:

The study was a hospital based prospective study on pregnant women attending outpatient department and labour ward in Lady Goshen hospital and Kasturba Medical College, Attavar, Mangalore. The study was conducted for duration period of august 2017 to September 2018. The sample size was calculated based on formula, a sample of 250 cases included. Inclusion criteria was pregnant women with all types of vaginal infections attending OPD in Lady Goshen hospital and KMC Attavar. Patients with genital tract malignancy, cervical polyps, vesico vaginal fistula and premature rupture of membranes were excluded.

Materials required for microbiological investigations: wet mount microscopy direct microscopy potassium hydroxide preparation ordinary culture special media, blood agar, Mac Conkey agar and Sabouraud dextrose agar

Methodology:
It was a hospital based prospective study conducted in Lady Goshen hospital and Kasturba Medical College, Attavar in coordination with department of microbiology for duration of one year from august 2018 to September 2018. Women of all socio-economic classes within the reproductive age group attending outpatient department with symptoms of abnormal vaginal discharge and associated symptoms were included in the study. Vaginal discharge was labeled as abnormal if it was of abnormal consistency (homogenous of frothy) excessive in volume (adherent to vaginal walls or present at the introitus) or associated with vulvar itching, erythema or dyspareunia. After collection of information regarding demographic values detailed history was taken regarding symptoms inspection and examination of external genetalia and inner thighs was done. By speculum examination the character of vaginal discharge, colour, viscosity, consistency, pH, Stickiness to vaginal epithelium was noted. Three high vaginal swabs were obtained from each patient by gynecologist and sent to the laboratory within hour of collection.

Sample processing:
Samples submitted to microbiology laboratory processed immediately for isolation and identification of pathogenic organisms. Out of three vaginal swabs one sample was inoculated immediately into blood agar, Mac Conkey agar, Sabouraud agar and incubation aerobically at 37 degree for 48 hours while inoculated chocolate blood agar plate incubated aerobically at 20% CO_2. The second vaginal swab was used for preparing smear for gram staining. The third sample was used for direct microscopic examination of trichomonas vaginalis,[6,7]
Diagnosis of bacterial vaginosis: Based on AMSELS clinical criteria[8] vaginal pH >4.5, presence of clue cells in vaginal fluid, milky homogenous vaginal discharge and whiffs test positive or amine odour test after adding 10%KOH to a sample of vaginal discharge.
Direct gram stain by nuggets scoring system[9]: 0-3 normal (lactobacillus predominant); 4-6 intermediate cells (mixed flora with decreased lactobacilli). 7-10 =bacterial vaginosis (pathogenic mixed flora without lactobacilli)

Microscopic examination:
Wet preparation of vaginal swab was examined microscopically for the presence of yeast cells, clue cells and T. vaginalis. The gram smear examination for the following morphocytes: Large gram-positive rods: Lactobacilli; Small gram variable rods: suggestive of gardneralla vaginalis; Curved gram variable rods: suggestive of mobiluncus; Gram positive cocci: suggestive of streptococci/staphylococci; Gram negative cocci: suggestive of N gonorrhea
The study is prospective with convenience sample. Descriptive analysis and comparison of proportions performed using SPSS statistical software version 12.0.1 statistically significant when p value was found to be < 0.05 was considered.

Results:
Out of 250 subject's majority 94 were in the age group of 21-25 years followed by 91 in the age group of 26-30 years. The mean age was 26.17+4.24 years with a range from 19 to 38 years (Table 1), 99 had completed middle school followed by 64 had completed primary school 41 had completed high school (Table 2). Itching was commonest symptom found in 167 women followed by white discharge in 91, dysuria in 81, pain abdomen in 59, dyspareunia in 21 respectively (Table 3). Only 182 pregnant women had past history of vaginal discharge and remaining 68 did not had past history of vaginal discharge (Table 4). Vaginal infection was highest in primigravida i.e. 131 women followed by gravid 2 with 73 women and gravid 3 with 36 women (Table 5).
Out of 250 pregnant women 212 of them were in the gestational age of more than 28 weeks followed by 16 in the gestational age group 13-26 weeks and 22 in the gestational age group of <12 weeks respectively (Table 6). In these pregnant women 178 had significant past medical history 94 had diabetes mellitus, 35 were anemic 31 were hypertensive, 9 had psychosomatic disorder and 9 were

malnourished (Table 7). 137 pregnant women had UTI which was confirmed by urine culture (Table 8). Among them 34 women were positive for urine culture (Table 9). 100 pregnant women had history of anemia and remaining 150 did not have anemia (Table 10).

Out of 250 pregnant women who were tested for HIV, HBsAg and VDRL 13 women were positive for HIV, 3 women for HBsAg and 3 women for VDRL status (Total 11). Individuals were noted to have more than one symptom. Majority i.e. 116 women had white discharge followed by 63 women had mucoid discharge 36 women had yellow discharge 33 women had yellowish white discharge and 16 women had greenish discharge respectively (Table 12). Study subjects are grouped depending on the type of causative organism (Table 13). Pregnant women 118 were delivered by LSCS, 110 women had vaginal delivery and 22 women had abortions (Table 14).

Out of the 250 subjects 169 women developed complications of which majority i.e. 62 women developed threatened pre term labour, 59 women had preterm delivery 18 women had Chorioamnionitis and 22 women aborted and 8 women developed endometritis (Table 15). Out of 228 deliveries, 119 neonates developed complications of which 42 neonates were very low birth weight 26 babies developed neonatal sepsis 19 babies had neonatal jaundice and 18 neonates developed RDS and 14 babies were having weight less than 2.5 kgs (Table 16). In our study 105(46.04%) babies had NICU admissions compared to Rathod et al had 76(8.9%). Higher percentage of NICU admission were noted in babies of mothers who were positive growth culture it was statistically significant compared to Rathod et. al. (Table 17)

Table 1: Respondents Age group

Age In Years	Number	Percentage (%)
<20	26	10.4
21-25	94	37.6
26-30	91	36.4
31-35	32	12.8
>35	7	2.8
Total	250	100

Table 2: Respondents educational qualification

Education	Number	Percentage (%)
Graduate or above	1	0.4
Pre university	14	5.6
High school	41	16.4
Middle school	99	39.6
Primary school	64	25.6
Illiterate	31	12.4
Total	250	100

Table 3: Distribution of subjects according to symptoms

Symptoms	Number	Percentage (%)	P Value (Compared With 0)
Itching	167	66.8	<0.001, HS
White discharge	91	36.4	<0.001, HS
Dysuria	81	32.4	<0.001, HS
Pain abdomen	59	23.6	<0.001, HS
Dyspareunia	21	8.4	<0.001, HS
Redness	7	2.8	<0.001, HS
Bleeding per vagina	5	2	<0.05 SIG

Table 4: Past history of vaginal discharge in respondents		
Past history of vaginal discharge	**Number**	**Percentage (%)**
Present	182	72.8
Absent	68	27.2
Total	250	100

Table 5: Distribution of study subjects according to obstetric score		
Obstetric score	**Number**	**Percentage (%)**
PRIMI	131	52.4
GRAVIDA2	73	29.2
GRAVIDA3	36	14.4
GRAVIDA4	10	4
TOTAL	25	100

Table 6: Distribution of subjects according to gestational age		
Gestational age	**Number**	**Percentage (%)**
<12 weeks	22	8.8
13-28 weeks	16	6.4
More than 28 weeks	212	84.8
Total	25	100

Table 7: Distribution of subjects according to past medical history		
Significant past medical history	**Number**	**Percentage (%)**
Diabetes mellitus	94	52.8
Hypertension	31	17.4
Psychosomatic disease	09	5.1
Anemia	35	19.6
Malnutrition	09	5.1

Table 8: Distribution of subjects with history of urinary tract infection (UTI)		
UTI	Number(n=250)	Percentage (%)
Present	137	54.8
Absent	113	45.2

Table 9: Distribution of women based on urine culture report		
Urine	Number(n=137)	Percentage (%)
Culture positive	34	24.8
Culture negative	103	75.2

Table 10: Distribution women based on anemia		
Anemia (Hb-<10)	Number(n=250)	Percentage (%)
Present	100	40.0
Absent	150	60.0

Table 11: Distribution of subjects based on HIV, HBsAg and VDRL status			
Laboratory tests	number	Percentage (%)	P value
HIV, positive	13	5.2	<0.001 HS
HBsAg positive	3	1.2	>.99
VDRL positive	3	1.2	>.99

Table 12: Distribution of study subjects depending on the type of vaginal discharge		
Type of discharge	Number=250	Percentage (%)
White	116	46.4
Yellow	36	14.4
Greenish	16	6.4
Mucoid	63	25.2
Yellowish white	33	13.2

Table 13: Distribution of study subjects depending on the type of causative organism		
Different type of organisms	number=250	Percentage (%)
Candida albicans	86	46.9
Candida kruzi	9	4.9
Candida glabrata	14	7.6
Candida tropicalis	10	5.5
Staphylococcus aureus	14	7.6
Acinetobacter species	7	3.8
Citrabacter	2	1.1
Enterococcus fecalis	22	12
Trichomoniasis	4	2.2
Gardnerella vaginalis	13	6.6
Klebsiella	3	1.6

Table 14: Distribution of subjects with respect to mode of delivery		
Mode of delivery	number	Percentage (%)
Normal delivery	110	44.0
LSCS	118	47.2
ABORTION	22	8.8
TOTAL	250	100

Table 15: Distribution of subjects with respect to maternal complications		
Maternal complications	**Number=250**	**Percentage (%)**
Abortion	22	8.8
Threatened preterm labour	62	36.6
Preterm delivery	59	34.9
Chorioamnionitis	18	10.6
endometritis	8	4.7

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Table 16: Distribution of subjects according to fetal outcomes			
Neonatal outcomes	**Number=250**	**Percentage (%)**	**P value compared with 0**
Very low birth weights <1.5 kg	42	18.4	.000<0.001 HS
Low birth weight<2.5 kg	14	6.14	.000<0.001 HS
Neonatal sepsis	26	11.4	.000<0.001 HS
RDS	18	7.89	.000<0.001 HS
Neonatal jaundice	19	8.3	.000<0.001 HS

Table 17: NICU admissions		
Study	NICU admission	Percentage
Rathod s et al 2016	76	8.9%
Our study	105	46.04%

Discussion:

In our study 37.6 of women were in age group 21-25 years, 36.4 in age group 26-30 yrs ,12.8 in age group 31-35 yrs and 10.4 in age group<20 yr s. vaginal infections were most prevalent in age group 21-25 yrs and least in >35 yrs age group

This is comparable to previous studies done by Kapova et al and Raviraj et al where the incidence was 47 and 51.9 respectively in the age group< 30 yrs and 26 -35 years respectively. The difference with the current study is probably due to lower age at marriage and poverty in this study.

In our study the incidence of vaginal infections among pregnant women is 73.2 and this is comparable to previous study done by Wathne B, Holst E[11] et al and Zeinal B[12] et al where the incidence was 75 and 46,9 respectively

Most common symptom was itching followed by vaginal discharge which was comparable with previous study done by Ravi raj et al[13] most common organism was found to be Candida albicans 47 which was comparable with previous study done by Kapova et al, where Candida glabrata was most common Raviraj et al gardenella vaginalis minkoff h et al[14] bacterial vaginosis was most common organisms respectively

Complications: In our study Candida albicans was the commonest cause for threatened pre term delivery where as in Leitich et al[15] study bacterial vaginosis was the commonest cause for preterm delivery and abdelaziz et al[16] chlamdia trachomatis was the commonest cause for spontaneous abortion. In the present study history of UTI was present in 109 patients ie 55 is comparable with the previous studies done by Tania maria et al[17], 54 had vaginal infection associated with UTI. In our study depression rates were only 5 that is comparable with v patel et al[18] study that showed 55 of women had vaginal discharge associated with depression.

Among culture positives 53 were primigravida compared to multigravida and this is in contrast to the previous study done by Koley A Kr et al[19]. In this the history of diabetes were 94(52.8%) history of UTI were 137 (54.8%) and is comparable with the study done by Paul S,Kannan I et al[20] and with anemia were 100(40%)

However, the association of socio demographic variables like age, education socio economic status with occurrence of vaginal infection were highly significant (P<0.001). The distribution shows that vaginal infections were significantly distributed in gravid status, type of vaginal discharge, past diabetic history (P<0.001). The association of urinary tract infections and anemia with occurrence of vaginal infections were found to be statistically significant (P<0.05).

Conclusion:

Most of the infected women were in the younger age groups lower economic status. In our study we observed that vaginal infections were more common in primigravida and with previous history of vaginal infections and with past history of diabetes. In our study the commonest isolated organism was C.albicans and associated maternal complications like threatened pre term labour pre term delivery, Chorioamnionitis, endometritis. Fetal complications like low birth weight, neonatal sepsis, neonatal jaundice, respiratory distress syndrome.

Regular antenatal checkup and examination of abnormal vaginal discharge, routine vaginal swab sample cultures should be performed on all pregnant women during antenatal visits especially during second and third trimesters, isolation of yeast in culture for better identification and routine laboratory investigations for predisposing conditions like urinary tract infections, anemia, diabetes should be carried out to prevent adverse maternal and fetal outcomes.

Predisposing factors should be eradicated wherever possible for best therapeutic approaches. The results stress the need for proper management and treatment of vaginal discharge and pregnant women should be educated on personal hygiene and preventive measures. Education regarding the risk factors associated with vaginal infections can reduce the maternal and fetal complications.

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