RESEARCH ARTICLE

Genital Tract Infections and Their Correlation with Sociodemographic Features among Infertile Women at a Tertiary Care Center

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Abstract

In developing nations like India, genital tract infections (GTI) among women remain an underdiagnosed condition until they progress into complications. This study was planned to study GTI among infertile women attending infertility clinics. Samples from 105 married women for diagnosis of gonorrhea, *Chlamydia trachomatis*, candidiasis, trichomoniasis, bacterial vaginosis, syphilis, human immunodeficiency viruses (HIV), and hepatitis B were processed. The overall prevalence of reproductive tract infection (RTI) in the study population was 17.1% and the prevalence of chlamydial infection was 8.6%. Rural locality and illiteracy were found to be significantly correlated with infertility. The prevalence of different RTIs was candidiasis (10.5%), genital chlamydiosis (8.6%), bacterial vaginosis (5.7%), syphilis (2.9%), and gonorrhea (1%). Sociodemographic factors significantly correlated with *Chlamydia trachomatis* were positive history of RTI/sexually transmitted infection (STI) in the husband (72.2%), lower age-group, (44.4%), rural locality (100%), illiteracy (77.8%), and duration of marriage <5 years (44.4%). The genital discharge was the most common presentation.

Keywords: Assisted reproductive technology, *Chlamydia trachomatis*, Ectopic pregnancy, Genital tract infections, Infertility, *In vitro* fertilization.

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Introduction

In developing nations like India, genital tract infections (GTI) among women remain an underdiagnosed condition until it progresses into some complication. Some further consequences of female GTI are infertility, fetal wasting, low birth weight, infant blindness, and neonatal mental impairment.[1]

According to the World Health Organization 2019, approximately 1 million sexually transmitted infections are acquired each day worldwide, and an estimated 374 million newly acquired reproductive tract infections (RTIs) with one out of four being caused by *Chlamydia trachomatis*—129 million, *Neisseria gonorrhea*—82 million, syphilis—7.1 million, and trichomonas vaginalis—156 million.[2]

Approximately 15% of couples are affected by infertility worldwide. India contributes to 15.2 million cases of infertility. Among different etiologies of infertility, tubal factor infertility is one of the most common causes. The causative factor behind tubal factor infertility can be previous or persistent genital infections that lead to pelvic peritoneal adhesions.[3] The GTI that are reported to have been associated with the pathogenesis of female infertility are *Mycobacterium tuberculosis*, *Candida*, *Mycoplasma hominis*, *Ureaplasma* infections, bacterial vaginosis, *Chlamydia trachomatis*, *Neisseria gonorrhea*, and human papillomavirus.[4,5]

Preventable causes of tubal infertility will require more research into vaginal flora and other possible infections. Research on the significance of GTI and the morbidity caused by them is significantly lacking. This study was planned with the aim of studying GTI among infertile women attending infertility clinics at a tertiary care center and the correlation of various demographic and clinical features with these.

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Materials and Methods

This was a hospital-based prospective observational study. All 105 married women of age-group of 18–45 years in the study, visited infertility clinics, Queen Mary Hospital, and King George's Medical University, Lucknow, Uttar Pradesh, India. Patients who refused to participate in the study and patients with well-established diagnoses of infertility other than infectious causes were excluded from the study. Samples from each patient consisted of two high vaginal swabs, two cervical swabs, secretions in case of genital ulcers, and 5 mL of venous blood. Samples were processed in the postgraduate Department of Microbiology, King George's Medical University, Lucknow, for

gonorrhea, *Chlamydia trachomatis*, candidiasis, trichomoniasis, bacterial vaginosis, syphilis, human immunodeficiency viruses (HIV), hepatitis B as follows.

Around 5 mL venous blood was collected from an antecubital vein in a plain vial and transported immediately to microbiology, serum was separated and tested for hepatitis B surface antigen (HBsAg) by enzyme-linked immunosorbent assay (ELISA), HIV, venereal disease research laboratory (VDRL), and treponema pallidum hemagglutination assay (TPHA) in VDRL-positive cases (Table 1).

Culture for gonococci was done bedside on both chocolate agar and selective media Thayer–Martin agar with VCNT. Multiplex real-time polymerase chain reaction (PCR) for *Chlamydia trachomatis* was carried out on an ABI Quant Studio 5 (96 × 0.2 mL) instrument, for amplification of nucleic acid TaqMan Probe assay was used. Primers and probe sequences used as Jaton et al. Sequences for the primer-probe were as follows.[6]

Chlamydia trachomatis

Fp-5′-CATGAAAACTCGTTCCGAAATAGAA-3′
Rp-5′-TCAGAGCTTTAC CTAACAACGCATA-3′
Probe-5′-FAM-5′-TCGCATGCAAGATATCGA-3′
Internal control:
Fp-5′-AGA TTT GGA CCT GCG AGC G
RP-5′-GAG CGG CTG TCT CCA CAA GT
Probe-5′-VIC-TTC TGA CCT GAA GGC TCT GCG CG-MGBNFQ

Samples with a Ct value <35 were considered positive and those with a Ct value >35 were considered negative for *Chlamydia trachomatis*.

Results

Infertile women were classified into four groups to correlate the overall GTI/RTI with different associated risk factors, *Chlamydia trachomatis* infection, and its risk factors with other GTI. Initially, subjects were divided into two groups on the basis of the presence or absence of GTI. Out of 105 infertile women, only 18 (17.1%) were found to have GTI, these women were classified as group I, rest of the infertile women as group II. The prevalence of GTI among infertile women in the present study was 17.1% (Table 2).

The mean age of overall women enrolled in the study was 30.21 ± 4.71 years. Among genital tract infection-positive women, the maximum belonged to the age-group of 26–35 years (55.6%), followed by the age-group <25 years (27.8%), and >35 years (16.7%), respectively. Among genital tract infection-negative women also the maximum number of patients belonged to the age-group of 26–35 years (75.9%), followed by >35 years (14.9%), and <25 years (9.2%), respectively. The difference in the mean age of women in group I (29.06 ± 5.90 years) and group II (30.45 ± 4.43 years) was not statistically significant ($p = 0.081$). Also, there was no statistically significant difference in the distribution of religion between the two groups ($p = 0.809$).

The proportion of group I (GTI-positive) women was higher as compared to group II living in rural areas (77.8 vs 31.0%) and slums (11.1 vs 9.2%) while the proportion of group II women was higher belonging to urban areas (59.8 vs 11.1%), this difference was statistically significant ($p = 0.001$).

Literacy profile of group I included illiterate (61.1%), followed by those who were educated up to primary level (22.2%), followed by those educated up to secondary level (5.6%), and then lowest were those who were educated above secondary level (11.1%). Among group II the majority of women were educated above the secondary level (28.7%), followed by secondary level (26.4%), primary level (23%), and illiterate (21.8%), respectively. This difference was statistically significant ($p = 0.005$).

The majority of overall women ($n = 88$; 83.8%) as well as of group I (83.3%) and group II (83.9%) were nulliparous. Among women with G1P1, genital infection was higher (11.1 vs 2.3%) and this difference was statistically significant.

The majority of overall women (88 out of 105; 83.8%) as well as of group I (83.3%) and group II (83.9%) women had primary infertility, rest had secondary infertility.

In group I patients with primary infertility contributed 83.3% and those with secondary infertility contributed 16.7%. Among group II, women with primary infertility constituted 83.9% and those with secondary infertility constituted 16.1%. The difference in type of infertility of the above two groups was not statistically significant ($p = 0.952$). Differences in contraceptive practices of both groups were comparable but were not statistically significant ($p = 0.073$). Past history of any RTI among women of group I was present in 61.1%, while in group II past history of RTI was present in 71.3% and absent in 28.7% of subjects with a similar proportion of past history of antibiotic uptake among them.

Table 1: Samples, disease suspected, and tests performed

Samples	*Disease suspected*	*Tests performed*
Cervical swab	Gonococcal cervicitis	Gram's stain, culture on chocolate agar, culture on Thayer–Martin agar, identification of isolates by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF)
	Chlamydial cervicitis	RT-PCR for *Chlamydia*
High vaginal swab	Candidiasis	KOH Mount, Gram's stain, culture on Sabouraud's dextrose agar slopes, identification of *Candida* species on culture by: Saline wet mount Germ tube formation test Morphological characteristics of corn meal agar Color production on CHROM agar Identification by MALDI-TOF antifungal susceptibility for *Candida* species
	Trichomoniasis	Direct wet mount
	Bacterial vaginosis	Saline wet mount Gram's stain pH test Whiff's test
Discharge from ulcer	Syphilis	Darkfield microscopy
Blood	Syphilis	VDRL TPHA ELISA for HBsAg HIV

Table 2: Prevalence of GTI in women attending infertility clinic

Serial number	*Group*	*Status of GTI*	*No. of women*	*Percentage*
1	Group I	GTI	18	17.1
2	Group II	Genital tract noninfected	87	82.9
		Total	105	100.0

A higher proportion of group I women as compared to group II reported past history of STI/RTI and antibiotic uptake (38.9 vs 28.7%) but this difference was not statistically significant.

The history of RTI/STI in the husband of group I was present in 72.2% and absent in 27.8% while in group II, 100% of them had no history of RTI in their husband. History of RTI/STI in the husbands of women of group I was significantly higher as compared to group II ($p \leq 0.001$). Table 3 depicts the overall clinical presentation among patients visiting infertility clinics, its distribution among two groups, and its significance. Only 32 women presented with complaints of abnormal discharge. The most common type of discharge was thick, curdy white (37.5%) followed by thick mucopurulent (21.9%). The clinical findings that were found to be significantly correlated with GTI were presence of history of RTI/STI in husband (72.2%), genital discharge (77.8%), lower abdominal pain (<0.001), burning micturition (50%), dysmenorrhea (38.9%), dyspareunia (55.6%), itching of genitalia (66.7%), and erythema of genitalia (44.4%). All these findings showed statistical significance (<0.05) when compared with the group with no genital tract infection.

Prevalence of different RTIs among infertile women were vaginal candidiasis (10.5%) genital chlamydiosis (8.6%), bacterial vaginosis (5.7%) syphilis (2.9%), and gonorrhea (1.0%). None of the women tested positive for trichomoniasis, HIV, and hepatitis B infection. Clinical features associated with different GTI are listed in Table 4.

Infertile women enrolled in the study were further classified into two groups, nine (8.6%) with PCR positivity for *Chlamydia trachomatis* were classified as group III, and nine (8.6%) women with PCR negative findings but evidence of other genital infection were classified as group IV (Table 5).

Table 3: Comparison of different clinical features between groups I and II

Serial number	*Variables*	*Number of women*	*Overall prevalence (%)*	*Group I (n = 18)*	*Group II (n = 86)*	*p-value*
1	Discharge	32	30.5	9	9	<0.001
2	Genital ulcer	0	0.0	0.0	0.0	0.0
3	Lower abdominal pain	18	17.1	9	78	<0.001
4	Itching of genitalia	31	29.5	12	19	<0.001
5	Burning micturition	27	25.7	9	18	0.010
6	Erythema of genitalia	19	18.1	8	11	0.001
7	Backache	12	11.4	4	8	0.114
8	Dyspareunia	20	19.0	10	10	<0.001
9	Postcoital bleed	11	10.5	2	9	0.923
10	Dysmenorrhea	16	15.2	7	9	0.004
11	Vaginal pH					<0.001
	<3.6	18	17.1	12	6	
	3.6–4.5	76	72.4	1	75	
	>4.5	11	10.5	5	6	

Table 4: Prevalence of clinical features in different types of GTI

Clinical features		*Vaginal candidiasis (n = 9)*	*Chlamydia trachomatis (n = 9)*	*Bacterial vaginosis (n = 6)*	*Syphilis (n = 3)*
Infertility	Primary	81.8% (9/11)	88.8% (8/9)	83.3% (5/6)	66.7% (2/3)
	Secondary	18.2% (2/11)	12.5% (1/9)	16.7% (1/6)	33.3% (1/3)
Genital discharge		72.2% (8/11)	66.6% (6/9)	83.3% (5/6)	66.7% (2/3)
Cervical hypertrophy		0.0	22.2% (2/9)	16.7% (1/6)	0.0
Cervix bleeds on touch		0.0	44.4% (4/9)	33.3% (2/6)	0.0
Lower abdominal pain		54.4% (6/11)	66.6% (6/9)	33.3% (2/6)	0.0
Lower backache		27.2% (3/11)	33.3% (3/9)	16.7% (1/6)	0.0
Genitalia itching		81.8% (9/11)	44.4% (4/9)	50% (3/6)	66.7% (2/3)
Erythema of genitalia		36.3% (4/11)	33.3% (3/9)	16.7% (1/6)	0.0
Dyspareunia		54.4% (6/11)	55.6% (5/9)	66.7% (4/6)	33.3% (1/3)
Postcoital bleed		9.1% (1/11)	22.2% (2/9)	16.7% (1/6)	0.0
Dysmenorrhea		27.3% (3/11)	44.4% (4/9)	50% (3/6)	33.3% (1/3)

Table 5: Comparison of groups III and IV on the basis of pus cells on Gram stain

Total number of women	*Total (N = 18)*	*Group III (n = 9)*		*Group IV (n = 9)*		*Statistical significance*	
		No.	*%*	*No.*	*%*	*χ^2*	*"p"*
Absent	8	0	0.0	8	88.9	14.400	<0.001
Present	10	9	100	1	11.1		

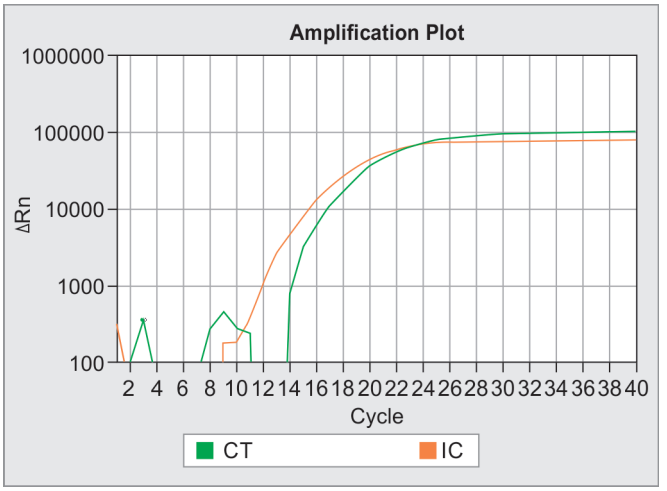

Fig. 1: Real-time PCR graph for *Chlamydia trachomatis*

A total of 10 out of 18 GTI-diagnosed patients showed the presence of pus cells on the Gram stain. The distribution was significantly higher in group III (100%) than in group IV (11.1%). This difference was statistically significant ($p < 0.001$) (Fig. 1).

Discussion

In the present study, the prevalence of genital tract infection in women attending infertility clinics was 17. 1% which is higher than the prevalence found in the study of Chaudhary et al., i.e., 9.7%.[7] In a similar context in the study of Diadhiou et al., the prevalence of any genital infection was 69.6% which is slightly higher than the prevalence found in the present study.[8]

In the present study, GTI was not significantly associated with age ($p = 0.081$) and religion ($p = 0.809$), GTI was significantly associated with locality ($p \leq 0.001$), and was found to be higher in patients from rural areas which could be due to poor hygiene practiced in rural areas which was similar to the findings in the study done by Nandan et al. where they found the overall prevalence of RTI 35.2% and the prevalence was found to be higher in married women of reproductive age-group of rural population (49%) than urban (27%).[9] Although another study done in Surat by Kosambiya et al. found a higher prevalence of sexually transmitted infections among the urban population (69%) than among the rural population (53%).[10]

Genital tract infections (GTI) among infertile women were significantly associated with their education ($p = 0.005$) and were significantly higher among illiterate women (61%) than among women with primary education (26%), secondary education (25%) and above secondary education (27%), respectively which was similar to the findings of the study, Patel et al., where they found RTIs to be significantly higher among women who were illiterate (8.1%) than literate women of reproductive age-group (3.5%).[11] The correlation of increased prevalence of GTI among women who were illiterate reflects that the health-seeking behavior is more among those who are more aware of the symptoms of genital tract infection with the seriousness of the issue. In the present study, GTI was not significantly associated with occupation ($p = 0.461$) which was similar to another study done by Sharma et al.[12]

In this study, GTI was found to be significantly higher (77.8%) among women living in rural areas than among those living in urban areas (31%) which is similar to the finding of a study done by Sawant et al. in which they observed that the prevalence of RTI among women of reproductive age-group was significantly higher among women from rural area (80%) than urban areas (20%).[13] Another study done in Lucknow by Gupta et al. correlates sociodemographic factors with RTI among women and shows a significantly higher prevalence of RTI among rural (95.5%) than among urbanites (84.6%).[14]

In the present study, the GTI positive (group I) and negative women (group II) were not significantly associated with parity ($p = 0.266$), which was different than the study done by Kafle and Bhattarai in which they found a significant correlation of increased parity with RTIs ($p = 0.025$) among married women.[15] It was found in the study that there was no significant correlation between the presence of genital tract infection with the type of infertility ($p = 0.952$) which was similar to the finding of a study done by Hassan.[16]

In the present study, there was no significant correlation between the type of contraceptive method ($p = 0.073$) and history of abortion ($p = 0.286$) with GTI which is similar to the finding of the study done by Chaudhary et al. in which they found no significant association of RTI with contraceptive method ($p \geq 0.05$), and history of abortion ($p \geq 0.05$).[7]

On the basis of past history, the GTI positive and negative women were found to be not significantly associated with past history of STI/RTI in women ($p = 0.394$) and a history of antibiotic uptake ($p = 0.505$). However, GTI positive was found to be significantly associated with the history of RTI/STI in the husband (<0.001) which is a similar finding to the study of Chaudhary et al., it was found that the prevalence of RTIs is not associated with a past history of RTI in women ($p > 0.05$) but the prevalence of RTIs was associated with a past history of RTI in a partner ($p \leq 0.05$).[7]

In the present study, 79 (75.23%) women had at least one genital tract infection-related symptom with discharge being the most common symptom with a prevalence of 30.5% overall among infertile women and 77.8% among group I, that is, infertile women with RTI. This finding was similar to the study done by Chaudhary et al. in which vaginal discharge remained the most common symptom among females of the reproductive age-group (52.8%) and was significantly correlated with RTIs. However, genital discharge was also found in 20.7% of GTI-negative study population which was found to be in concordance with a study done by Usharani and Swetha, where she established in her study population that 16.9% were found to have clinical symptoms but no microbiological findings and it was found that only 41.5% of patients with positive clinical findings had confirmed microbiological finding.[17]

In present study, the clinical correlation of GTI among infertile women was significantly correlated with lower abdominal pain ($p < 0.001$), lower backache ($p = 0.114$), burning micturition ($p = 0.010$), dysmenorrhea ($p = 0.004$), dyspareunia ($p < 0.001$), itching of genitalia ($p < 0.001$), erythema of genitalia ($p = 0.001$), abnormal vaginal pH ($p < 0.001$). In another similar study done by Balakrishnan et al., they found a significant correlation between vulvar itching, lower backache, and genital discharge ($p < 0.05$).[18] Findings were similar to the study done by Bhilwar et al. and it was found that over half of the female participants (53.8%) reported, previously had RTI symptoms, and a significant correlation was found between RTI and abdominal discomfort (68.2%), back pain (69.6%), and vaginal discharge (59.3%) with $p < 0.05$.[19] In a similar context, according to a study done by Kafle and Bhattarai overall 39.9% women of reproductive age-group had one or more symptoms related to RTI with the distribution of symptoms to be

32.6% with lower back pain; 26.7% with vaginal discharge; 19.4% with low abdominal pain; 15.9% with itching around the genitalia; 10.5% reported painful or burning urination; and 2.3% reported experiencing genital ulceration but none of the single clinical findings was found to be significantly correlated with RTI. This discordance might be due to a large number of study population, that is, 258 in the abovementioned study.[15]

In the present study, the correlation of burning micturition with GTI was statistically significant ($p = 0.010$) which was similar to the study of Rani et al. in which, it was found that among married women, painful or burning micturition was present among 4.05%.[20]

Dysmenorrhea was found to have a statistical significance of ($p = 0.004$) in our study and it was found to be similar to the study done by Hassan in which they found dysmenorrhea as the dominating complaint among infertile women (54.4%) and was significantly correlated with infertility ($p < 0.05$). 16 Dyspareunia was found to have a statistical significance ($p = 0.001$) with GTI-positive group in our study which was different than the finding in a study done by Thekdi Komal et al. in which dyspareunia among patients with RTI only contributed to 1.8% of the study population.[21] The difference in the finding result can be either due to difference in the type of study population which in our study includes infertile women and in their study includes women of reproductive age-group or due to difference in the awareness of the symptoms as has been mentioned in the study by Rani et al.[20] The prevalence of vaginal candidiasis being 10.5% followed by *Chlamydia trachomatis* with the prevalence of 8.6, followed by bacterial vaginosis with the prevalence of 5.7%, then syphilis with the prevalence of 2.9% then gonorrhea with the prevalence of 1.0% and no any case of trichomoniasis. In another study, done by Diadhiou et al. it was found that the prevalence was maximum of bacterial vaginosis (39.5%) followed by vaginal candidiasis (29%), *Chlamydia trachomatis* (4.7%), trichomoniasis (2.5%) and least was the prevalence of *Neisseria gonorrhea* (1.1%).[8] The slight difference between the distribution can be due to differences in geographical variation and hygiene practices prevalent in different regions as the finding in our study parallels the finding of a study done in a population of a similar geographic region by Chaudhary et al. in which they found the prevalence of candidiasis was maximum (11.5%) followed by *Chlamydia trachomatis* infection (4.1%), syphilis (4.1%), bacterial vaginosis (1.73%), and least was trichomoniasis (0.57%).[7] However, the order of prevalence of vaginal candidiasis and *Chlamydia* infection is similar; the prevalence of *Chlamydia trachomatis*, bacterial vaginosis, and gonorrhea was found to be higher in our study which might be due to difference in the target population.

In an epidemiological study, done by Wang et al. in China, they found a fall in the cases of trichomoniasis and *Chlamydia* over the passing years from 2011 to 2015 with a fall in trichomoniasis cases by 47.3% than that in 2011, indicating an improved management but there has been increase in the percentage of bacteria and *Candida* infection causing vaginitis which parallels the finding in study done by Chaudhary et al. in the geographical area similar as our study in 2019 prevalence of trichomoniasis was 0.57% while in our study we didn't find any case of trichomoniasis.[7,22]

In a similar study, done by Liu et al. it was found that the prevalence of RTI positivity among the sample of 439,372 reproductive-aged women trying to conceive was 5. 03% with the highest prevalence of candidiasis (2.47%) than bacterial vaginosis (1.28%), syphilis (0.73%), trichomonas vaginalis (0.49%), *Chlamydia trachomatis* (0.20%), and *Neisseria gonorrhea* (0.07%). The order of prevalence of different types of genital infections was similar yet the prevalence was low as the study population in their study doesn't strictly include only infertile females and also due to a larger sample size.[23]

Another study, done by Le et al., to establish genital tract infection as the cause of infertility in Vietnam, found the overall prevalence of GTI to be 43.4% among infertile women which is higher than the prevalence in the general population of Vietnam which as per a study done by Lan et al. which was 37%. In the study by Lan et al., the prevalence of bacterial vaginosis was found to be maximum (19.6%), then vulvovaginal candidiasis (17.4%), then chlamydial disease, detected by real-time-PCR (RT-PCR) (3.7%) and then trichomoniasis (0.3%).[24,25] The higher prevalence seen in their study can be explained by the strict exclusion of patients who had a history of antibiotic uptake in the past 4 weeks by researchers and the overall prevalence even in their general population remains high. Another study, performed by Dhont et al., established that the prevalence of bacterial vaginosis was significantly higher among infertile women (28%) as compared to fertile women (15%). Also, the prevalence of genital *Chlamydia trachomatis* infection among infertile women was higher (18%) than the fertile control population (15%).[26]

In the present study, the prevalence of vaginal candidiasis was found to be 10.5% which was slightly less than the finding by Chaudhary et al.[7] However, the order of prevalence of different species of *Candida* in both the study is similar, that is, in our study prevalence of *Candida tropicalis* was highest (36.4%) followed by *Candida glabrata* and *Candida albicans* (27.3% each), rest 1 (9.1%) was *Candida parapsilosis*. The order of prevalence *Candida* species causing vulvovaginal candidiasis in our study has also been found similar to the study done by Wójkowska-Mach et al.[27]

In the present study, genital itching was shown to be the most prevalent clinical sign of vaginal candidiasis, present in 81.8% of females with laboratory-confirmed vaginal candidiasis, followed by genital discharge (72.2%), lower abdomen pain, and dyspareunia in 54.4% of cases. In addition to dysmenorrhea and lower back pain, erythema of the genitalia was seen in 36.3% of patients with vaginal candidiasis. The least frequent symptom in these patients was postcoital bleeding (9.1%). No individuals with vaginal candidiasis had symptoms of cervical hypertrophy and touch-sensitive bleeding from the cervix. These findings parallel the findings of a study done by Peters et al.[28] In the present study, genital discharge, which was seen in 83.3% of women with bacterial vaginosis and dyspareunia (66.7%), the most frequent clinical characteristic linked to the condition. Genital itching (50%) and dysmenorrhea (50%) were the third prevalent clinical characteristics. Patients with bacterial vaginosis (33.3%) had lower abdominal pain, lower backache (16.7%), erythema of the genitalia (16.7%), and postcoital hemorrhage (16.7%) were the least frequent clinical features linked to bacterial vaginosis which parallels the findings of a study done by Ranjit et al.[29] In present study, prevalence of genital *Chlamydia trachomatis* infection as detected by RT-PCR was 8.6% higher than direct fluorescent antibody confirmed *Chlamydia trachomatis* (4.1%).[7] This difference in prevalence could be attributed to differences in the type of study population and different methods of diagnosis for the same organism. These findings parallel the findings in a study done by Parpillewar and Singh.[30] Only a single patient with *Neisseria gonorrhea* was found in the present study. The lower prevalence of *Neisseria* found in the present study could be due to lower sample size, the inclusion of even those patients who have received antibiotics previously for genital infection, and

also the prevalence of *Neisseria gonorrhea* as has been found in previous study by Chaudhary et al.[7]

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