

Emerging trends in sexually transmitted diseases in a tertiary care center in Davangere, Karnataka: A five year study

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Abstract

Background: Sexually transmitted diseases (STDs) are a public health challenge, and the epidemiological profile is variable by geographical region and distinct from that of other diseases. Accurate knowledge of emerging disease trends is crucial for formulating effective control strategies. **Aims and Objectives:** The aim and objective of this study were to identify the changing scenario and emerging trends of STDs in Davangere, Karnataka, by evaluating patients attending a tertiary care center. **Materials and Methods:** A tertiary care-based retrospective study was conducted by analyzing the clinical records of the attendees presenting to the STD clinic at Chigateri General Hospital affiliated to JJM Medical College in Davangere, Karnataka, for a period of 5 years from January 2015 to December 2019. The collected data were analyzed and statistically compared with other studies. **Results:** Out of the 614 patients studied, the male-to-female ratio was 2:1, with 30–39 age groups being most affected. Eighty-eight percent of patients were married, with 36.64% giving a history of extramarital contact. Homosexual and bisexual contacts were observed to be 5.21% and 0.65%, respectively. Viral STDs affected nearly half of the patients (49.51%), followed by fungal (28.88%), bacterial (22.63%), and others (3.1%). The most common STD observed was herpes genitalis as seen in 101 (24.48%) patients, followed by candidal balanoposthitis (17.1%). Thirty-three (5.7%) patients were diagnosed with more than one STD. Of these patients, 13 were seropositive for HIV, resulting in a prevalence of 2.12%. **Conclusion:** The epidemiological profile of STDs is ever changing, and this study found an increase in viral and fungal STDs and downward trend of bacterial STDs comparable to that of studies from other regions.

Key words: Balanoposthitis, fungal sexually transmitted diseases, herpes genitalis, sexually transmitted disease, viral sexually transmitted diseases

Introduction

Sexually transmitted diseases (STDs) are diseases transmitted by sexual intercourse and conventionally include infections, resulting in clinical diseases that may involve the genitalia and other parts of the body participating in sexual interaction.^[1] The epidemiology of an STD is the consequence of the interplay between the causative organisms, attributes, and tendencies of the patient and the control measures being enforced in a given region. As STDs are more widespread among the sexually active than other infections, the resultant epidemiological profile takes on a more specific yet variable form due to the various social, cultural, and economic factors at play as well as the sex education and sexual practices prevalent among the sexually active population in the area.^[2-4] Therefore, a structured, regular, large-scale analysis of the prevalence of STDs among STD clinic attendees would

not only help to observe trends of STDs and formulate appropriate control measures but also to evaluate the effectiveness of existing control programs in a given region.^[5]

Materials and Methods

This was a retrospective study wherein the case records of the patients attending the STD clinic of the Department of Dermatology, Venereology and Leprosy at Chigateri General Hospital and Bapuji Hospital affiliated to JJM Medical College in Davangere, Karnataka, for 5 years from January 2015 to December 2019 were collected. Detailed history and demographic data of the patients, which included age, gender, occupation, origin, marital status,

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and sexual history, were noted, and a diagnosis was made following clinical examination and conducting relevant laboratory investigations.

Tissue smears and discharge were subject to wet mount, Gram and Giemsa staining, KOH examination, dark-ground microscopy and culture wherever applicable, and serum samples of all patients were subject to ELISA for HIV and Venereal Disease Research Laboratory (VDRL) after taking informed consent and for treponema pallidum hemagglutination (TPHA) in suspected cases. Chest radiograph, histopathology, and fine-needle aspiration cytology were done wherever additionally required. Diagnosis of each condition is as follows: chancroid – GRAM stain of ulcer smear for Gram-negative coccobacillus and culture for *Haemophilus ducreyi*; donovanosis – Giemsa stain of ulcer smear for Donovan bodies; syphilis – VDRL and TPHA of sera, and dark-ground microscopy to visualize *Treponema pallidum*; gonococcal urethritis (GU) – urethral discharge for Gram-negative diplococci and polymorphonuclear cells; lymphogranuloma venereum (LGV) – Giemsa staining of tissue smear for elementary and inclusion bodies; chlamydial urethritis – culture of urethral discharge for *Chlamydia trachomatis*; bacterial vaginosis – Amsel's criteria; herpes genitalis (HG) – Tzanck smear (Giemsa stain) of vesicle base for multinucleated giant cells; genital warts – on a clinical basis, molluscum contagiosum (MC) – on clinical diagnosis, HIV-ELISA, candidal balanoposthitis (BP), and vaginal candidiasis (VC) – KOH mount and culture of discharge specimens for *Candida albicans* after obtaining a positive history of similar lesions in sexual partner to rule out nonvenereal candidal infection, trichomoniasis – wet mount of discharge to visualize *Trichomonas vaginalis*, genital scabies – wet mount of scrapings to visualize mite after obtaining a positive history of similar lesions in partner to rule out nonvenereal scabies. The collected data were compiled and analyzed.

Results

Of the 614 STD clinic attendees, males were 415 (67.59%) and females 199 (32.41%), with male-to-female ratio being 2.08:1. The most common age group to be affected was 30–39 years, constituting 38.76% of cases closely, followed by the 20–29 age groups (32.25%), as shown in Table 1.

Majority of the patients hailed from rural areas (62.21%). The unemployed constituted 29.48%, whereas the employed were small business owners (22.64%), professionals (17.26%), unskilled and laborers (16.29%), and semiskilled and farmers (14.33%). The bulk of the patients were married (88.27%). Premarital sexual activity was recorded in 58 (9.45%) patients, out of which 89.65% were men and 10.34% were women. Similarly, of the 225 (36.64%) patients engaged in extramarital sexual activity, 80.4% were men and 19.55% were women. At the time of presentation, 37.30% of patients gave a history of partners having similar complaints. Homosexuals constituted 5.21% of patients and bisexuals 0.65%, and all the nonheterosexuals were male. Barrier contraception was the most popular contraception method employed by both males and females during intercourse, and tobacco chewing was the most common addiction [Table 1].

While a considerable number had asymptomatic lesions (180, 29.32%), a majority of patients presented with the chief complaint of itching in the genital area (210, 34.2%), followed by pain (106, 17.26%), burning sensation

Table 1: Social and sexual behavior among males and females

Age range (years)	Male (n=415), n(%)	Female (n=199), n(%)	Total (n=614), n(%)
10-19	4 (0.96)	5 (2.51)	9 (1.47)
20-29	130 (31.32)	68 (34.17)	198 (32.25)
30-39	152 (36.62)	86 (43.21)	238 (38.76)
40-49	67 (16.14)	31 (15.57)	98 (15.96)
50-59	41 (9.87)	5 (2.51)	46 (7.49)
60-69	17 (4.09)	4 (2.01)	21 (3.42)
70-79	4 (0.96)	0	4 (0.65)
Marital status			
Single	55 (13.2)	7 (3.51)	62 (10.10)
Married	360 (86.74)	182 (91.45)	542 (88.27)
Divorced	0	3 (1.5)	3 (0.49)
Widowed	0	7 (3.51)	7 (1.14)
Premarital contact			
Extramarital contact	52 (12.53)	6 (3.01)	58 (9.45)
Similar complaints in partner	181 (43.61)	44 (22.11)	225 (36.64)
Sexual orientation			
Heterosexual	116 (40)	113 (56.78)	229 (37.30)
Homosexual	379 (91.32)	199 (100)	578 (94.14)
Bisexual	32 (7.71)	0	32 (5.21)
Contraception method			
None	4 (0.96)	0	4 (0.65)
Barrier	189 (45.54)	143 (71.85)	332 (54.07)
OCP	221 (53.25)	45 (22.61)	266 (43.32)
IUD	4 (0.96)	10 (5)	14 (2.28)
Addictions			
None	1 (0.24)	1 (0.5)	2 (0.33)
Tobacco chewing	83 (20)	181 (90.95)	264 (43.00)
Smoking	179 (42.16)	14 (7.03)	193 (31.43)
Alcohol	70 (16.8)	2 (1)	72 (11.73)
Drugs	63 (15.1)	2 (1)	65 (10.59)
	20 (4.8)	0	20 (3.26)

OCP=Oral contraceptive pills, IUD=intrauterine device

(64, 10.42%), genital discharge (40, 6.51%), and genital swelling (14, 2.28%) as the primary complaint. Lymphadenopathy was observed in 26.55% (163) of patients.

Viral STDs affected nearly half of the patients (49.51%), followed by fungal (28.88%) and then bacterial (22.63%). The most common STD observed was HG as seen in 151 (24.58%) patients. Among the bacterial STDs, syphilis was the most prevalent seen in 56 (9.12%) patients, followed by chancroid (21, 3.42%). GU was more frequent as compared to chlamydial urethritis. Among women, VC was the most common form of vaginal discharge observed in 69 (11.89%) patients [Table 2].

Twenty-two (3.58%) patients were diagnosed with more than one sexually transmitted infection. Of these patients, 13 were seropositive for HIV, resulting in a prevalence of 2.12% in this study. Among retropositive patients, four had concurrent infection with HG and two with MC and one each with *candida* BP, VC, genital warts, LGV, and chancroid. One patient had both HG and VC and another with both genital warts and VC. Among HIV patients, concurrent viral STDs were most prevalent (61.5%), after which was fungal (38.46%) and then bacterial (15.38%).

While the total number of cases has been steady from 2015 to 2018, a rise of up to 142 cases was observed in 2019. Viral STDs have been consistently more in number than bacterial STDs over the past 5 years, with a sudden spike

of 36.9% in 2019 owing to the abrupt escalation in the number of patients who attended the STD clinic. In 2017 and 2018, fungal STDs were observed to be the greatest in number among the other STDs. Other STDs consisting of protozoal and parasitic infections were scarce over the 5 years [Figure 1].

Discussion

In the current study, males outnumbered females in a ratio of 2:1. The current demographic ratio was found to be similar to findings in other studies.^[6-9] In a study conducted by Murugesh *et al.*^[10] in the same region in 2004, male-to-female ratio was almost 3:1. The improved sex ratio could possibly be due to better social attitude toward female health, health-care-seeking behavior among women, contact tracing, and spousal screening through better health awareness as well as in addition to increased referrals from the gynecology department.^[6]

Table 2: Sexually transmitted diseases among males and females

STD	Male	Female	Total (percentage of n=614), n (%)
Bacterial			139 (22.63%)
Chancroid	16	5	21 (3.42)
Donovanosis	9	0	9 (1.47)
Syphilis			
Primary	16	4	56 (9.12)
Secondary	23	12	
Tertiary	1	0	
Gonococcal urethritis	15	5	20 (3.36)
LGV	13	2	15 (2.44)
Chlamydial urethritis	12	1	13 (2.12)
Bacterial vaginosis	0	5	5 (0.81)
Viral			304 (49.51%)
Herpes genitalis	110	41	151 (24.58)
Genital warts	53	30	83 (13.52)
Molluscum contagiosum	35	22	57 (9.28)
HIV	7	6	13 (2.12)
Fungal			174 (28.88%)
Candidal balanoposthitis	105	0	105 (17.1)
Vaginal candidiasis	0	69	69 (11.89)
Protozoal			
Trichomoniasis	0	3	3 (0.49)
Parasitic			
Scabies	11	5	16 (2.61)

STD=Sexually transmitted disease, LGV=Lymphogranuloma venereum

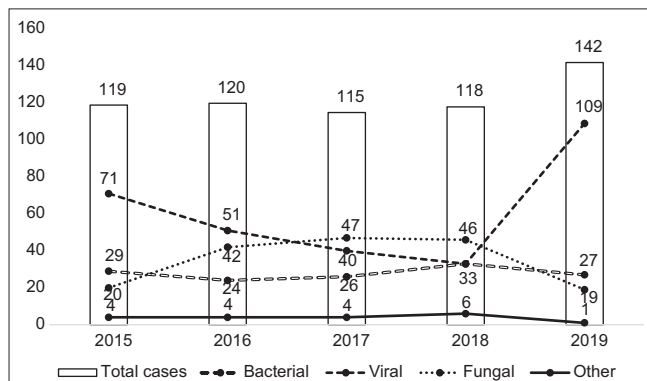


Figure 1: Total number of STD cases and trends of bacterial, viral, and fungal STDs from 2015 to 2019. STD: Sexually transmitted diseases

The most common age group affected was the 30–39 years range, as noted by other workers as well.^[6,7,11,12] It has been well established that members of this age group experience greater sexual activity and promiscuity; in addition to social and monetary independence, better health care awareness could be the reason why their numbers were more prominent.

Two-thirds of the patients hailed from rural areas. Unemployed members were nearly one-third which was similar to the observations by Nair *et al.*^[8] and Murugesh *et al.*,^[10] indicating that lack of employment is still a major risk factor for contracting STDs.

A majority (88.27%) of the patients were married, comparable to the findings of other studies^[9,11,13] and a greater percentage of women were married as compared to the men (91.45% and 86.74%, respectively). High-risk sexual behavior such as pre and extramarital intercourse was noted considerably more among males, and similar complaints in the partner as to what the patient was experiencing were noted by 40% of men and 56.78% of women. The number of married women denying external contact but being affected, and noticing similar complaints in the partner, points towards a conjugal spread to female partners. The higher rate of extramarital contact among the men suggests a tendency of males to be more involved in high-risk sexual behavior and acting as a source contributing to the transmission of infection.^[6,8,9]

Homosexuals constituted 5.21% of cases and bisexuals 0.65%. Across various studies, homosexuality and bisexuality were observed in 0.4%–2.8% and 0.8%–4.6%, respectively.^[6,8,13]

HG was the most common STD in this study at 24.58%. The prevalence of HG varied between 3.7% and 43.33% in other studies conducted across India.^[6,7,9,11,12,14,15] Anogenital warts were the next common viral STD at 13.52% compared to the previous reports, with the prevalence ranging from 0.98% to 17.5%.^[6,7,9,11,12,14,15] The prevalence of genital MC was on the higher side at 9.28%, with earlier studies reporting a much lesser prevalence.^[6,7,12,14,15]

Fungal STDs were the second major cause of infection in this study, constituting 28.88% of cases, with other workers noting similar prevalence.^[7,11,14] Candidal BP was overall the second-highest STD in this study (17.10%), with Arakkal *et al.*^[7] and Tada *et al.*^[12] noting lesser values (8.79 and 4%, respectively) and Zamzachin *et al.*^[14] and Sharma *et al.*^[15] noting greater (20% and 33.33%, respectively). VC was seen in 11.89% of patients which was greater than that reported in other studies.^[6,7,14]

Among the ulcerative bacterial STDs, syphilis was most common, constituting 9.12%, with similar higher incidences observed by other reports.^[6,11,14] The prevalence of chancroid (3.42%) too was comparable to that of other findings ranging between 0.27% and 10.8%.^[6,7,9,11,12,14,15] LGV (2.44%) and donovanosis (1.47%) were the next common ulcerative bacterial STDs occurrence of which ranged from 0.1% to 4.8% for LGV^[6,7,9,11,14] and two studies reporting 0.6% for donovanosis.^[9,14] GU was the most frequent cause of urethral discharge (3.36%) in contrast to numerous studies^[6,7,11] but comparable to the findings of Narayanan *et al.*^[9] Scabies in our study was found to be 2.61% which is less compared to that other reports.^[7,11,14,15]

The prevalence of HIV in this study (2.12%) had been found to be significantly less as compared to earlier reports.^[6,12,14] The most common STD observed in

retropositive patients was HG, followed by genital warts, as with other studies.^[7,12]

In comparison to an older study from the same region conducted 15 years ago [Table 3], there has been a drastic increase in STDs of viral origin as well as fungal STDs. Ulcerative bacterial STDs such as syphilis, chancroid, donovanosis, and LGV have shown a downward trend as well as urethritis. Genital scabies though has remained unchanged. The upward trend of the viral and downward trend of bacterial STD have been evident in other studies, the reason most likely due to persistence and recurrence of viral STDs and increased use and easy accessibility to antibiotics and syndromic approach to the management of bacterial STDs by general practitioners.^[12,13,16] Fungal STDs could be more on the rise, possibly due to unwarranted use of antibiotics, poor hygiene, use of occlusive clothing, and the rise of diabetes mellitus among the general population.^[7]

Limitations of this study include small sample size and missing out of patients in the incubation period as only those with signs and symptoms suggestive of STD at the time of presentation to the STD clinic were subject to testing. Also, some patients were treated other department OPDs such as obstetrics and gynecology and hence were not recorded at the STD clinic. Diagnosing true venereal genital scabies as a result of sexual contact as opposed to the acquisition of infestation through close contact with partner proved to be difficult in some cases. Several diagnosed patients refused to reveal or inform their sexual partners or spouses for testing as a result of stigma.

Conclusion

The epidemiological profile of STDs is ever changing, and this study found an increase in viral and fungal STDs and downward trend of bacterial STDs from the previous studies from the same region but in concordance to that of studies from other areas of the country. Conducting

research at timely intervals helps to detect subtle trends and formulate prevention and treatment strategies to optimize the control of STDs.

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Conflicts of interest

There are no conflicts of interest.

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Table 3: Comparison of prevalence of sexually transmitted diseases in an earlier study and the present study

STD	Muruges <i>et al.</i> ^[10] (%)	Present study (%)
Herpes genitalis	13.04	24.58
Genital warts	5.92	13.52
Genital molluscum contagiosum	2.07	9.28
Candidiasis (candida balanoposthitis and vulvovaginal candidiasis)	19.85	28.88
Syphilis	15.95	9.12
Chancroid	10.45	3.42
Donovanosis	5.82	1.47
LGV	5.76	2.44
Gonorrhoea	10.14	3.36
Nongonococcal urethritis	8.14	2.12
Scabies	2.85	2.61

LGV=Lymphogranuloma venereum