

A retrospective analysis of sexually transmitted infections among males presenting to a tertiary care hospital of India

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Abstract

Context: Sexually transmitted infections (STIs) are one of the most neglected diseases, leading to a high percentage of morbidity and mortality in India. The World Health Organization estimated that 20% of persons living with human immunodeficiency virus/acquired immunodeficiency syndrome are in their 20s and one out of twenty adolescents contract an STI each year. **Aims:** The present study was conducted to study the characteristics of the pattern of STI in adult males and study the prevalence of various STIs among them. **Settings and Design:** This retrospective study was conducted by retrieving records of males presenting to STI laboratory of our tertiary care hospital between (April 2018 and December 2019). **Subjects and Methods:** The patients comprised high-risk group males, approached through nongovernmental organizations (NGOs) and slum population visiting the dispensary attached to our institute. The age group of the patient included was between 0 and 85 years. **Results:** A total of 1023 males presented to our STI laboratory out of which 124 (12.12%) were symptomatic. The most common complaint was urethral irritation seen in 22.5%, followed by discharge in 9.6%. The most common sexually transmitted disease among symptomatic (34/124) as well as asymptomatic (172/899) men was syphilis showing a combined prevalence of 20% (206/1023). Out of 124 symptomatic patients, 29 (23.38%) complained of urethritis due to gonococcal infection. The association between the two was found to be significant (i.e., $P < 0.05$). **Conclusion:** STIs are a serious health problem in our country. Approximately 6% of the adult population have one or the other STI amounting to 30–35 million cases per year. An intensive study is the need of the hour which could help clinicians as well as microbiologists to control the spread of these infections.

Key words: Chlamydia, gonorrhoea, male, sexually transmitted infections, syphilis

Introduction

Sexually transmitted infections (STIs) are one of the most neglected and serious diseases with a higher rate in young adults and adolescents between the age group of 15 and 25 years. According to the World Health Organization estimates, 20% of the human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS)-infected patients are in their 20s with one out of twenty adolescents getting infected with STI each year.^[1] The highest burden is seen in resource-limited nations and various countries show a varied prevalence among states, regions, gender, and age group. In our country, 6% of the adult population have one or the other STI, thus, amounting to 30–35 million cases per year.^[2] The data on the prevalence of various STIs in India are scarce and more studies need to be done in this regard.

The diagnostic and therapeutic algorithms can generally be tailored to the leading clinical manifestations (if the patient is symptomatic). STIs can be classified according to presenting features, such as genital, perianal ulcers, anal, oral ulcers, urethral discharge, vaginal discharge, genital warts, HIV, and Hepatitis C virus infection.^[3] Around 90% of STIs are asymptomatic.^[3] The probability of asymptomatic infection depends on the site of infection as well as on the pathogen causing it. For example, the probability of asymptomatic rectal infection with *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG) is 85% in men who have sex with men.^[4] Asymptomatic infection can be diagnosed by identifying the people who come

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under high-risk groups such as males having sex with males (MSM), sex workers, etc.^[4]

The most common symptom of STI in males is a urethral discharge which may or may not be associated with other urethral symptoms. Urethritis can be either infectious or of noninfectious origin. Most of the time, it is asymptomatic, but symptomatic cases can present with purulent or mucopurulent discharge and dysuria with or without itching. The common pathogens associated are NG, CT, and *Mycoplasma genitalium* (MG). Rare causes include *Trichomonas vaginalis* (TV), *Gardnerella vaginalis* (GV), *Ureaplasma urealyticum*, herpes simplex virus (HSV), and adenoviruses.^[4] The present study was conducted to study the characteristics of the pattern of various STIs in adult males.

Subjects and Methods

Study design

A retrospective study done by retrieving and analyzing data of male patients presenting to STI reference center of the Department of Medical Microbiology at Postgraduate Institute of Medical Education and Research, Chandigarh, was carried out over 21 months (April 2018–December 2019).

Inclusion criteria

Urine, urethral swab, chancroid fluid, and whole blood from male patients who presented to STI laboratory of our tertiary care hospital were accepted. The patients comprised high-risk group males, those high-risk groups were approached through nongovernmental organizations (NGOs) and slum population visiting the dispensary attached to our institute. The age group of the patient included was between 0 and 85 years.

Exclusion criteria

Those patients in whom only serum samples were processed. Follow-up patients were also excluded.

Sample collection and processing

According to our laboratory policy, the samples were collected as per the sample collection manual.

The patient was explained not to urinate 2 h before sample collection. A normal saline dipped Dacron swab (HiMedia Laboratories, Mumbai, India) was used for sample collection. The penile area was inspected for the presence of any bleeding or discharge. The prepuce was retracted and the tip of the penis was pressed between thumb and forefinger. If the discharge was visible, it was collected directly on a swab. Two swabs were collected, one for wet mount and culture and one for polymerase chain reaction (PCR). The discharge was directly taken on a glass slide which was used for staining purposes. If the discharge was not obvious on pressing the penis, then the swab was inserted 1–2 cm inside the meatus and then turned clockwise and counterclockwise direction. For urine sample collection, the first void urine was collected and the patient was given a universal container for the same. In case of skin lesions, swabs were collected by pressing the swab against the lesion and two swabs were collected.

The first swab was inoculated onto blood and chocolate agar, followed by dipping in screw-capped falcon tubes (HiMedia Laboratories, Mumbai, India) containing 0.5 mL of 0.9% saline for carrying out wet mount. Usually, material for gram staining and wet mount was collected onto a glass slide but if the discharge was not present then the swab used for culture was used for wet

mount examination for the detection of any parasite such as *T. vaginalis*. The swab was firmly pressed against the walls of the tube containing it and then wet mount was prepared and seen under low power and high power. The second swab was used for PCR and repeated staining/wet mount if needed after performing PCR and repeat staining/wet mount if needed after performing PCR.

The Gram-stained smear was prepared after heat fixing the smear and was reported the same day for the presence of White Blood Cells, Gram-negative diplococci, yeasts, and TV.

The second swab was used to put up NG and CT PCR using three conventional PCRs, as described earlier.^[5,6] The swab was thoroughly squeezed in molecular grade water for DNA extraction. DNA was extracted using Chelex® (Sigma Aldrich, MO, USA) and amplified.

The chocolate agar and blood agar plates were incubated in candle jars at 37°C for at least 72 h. The plates were examined daily for the presence of any growth. Colony identification was done by MALDI TOF- MS (Bruker Daltonics, GmbH, Germany).

Data collection and analysis

Clinical history was collected from all patients with regard to symptoms of STI. The confidentiality of all patients was maintained. High-risk behavior (as informed by the NGOs) was kept anonymous and not included in the analysis. The age, specific symptoms, and results of the swabs were maintained and analyzed in Excel (Microsoft Inc., USA). The institutional ethical clearance was duly obtained vide letter no INT/IEC/2019/002222 dated 15/10/2019.

Statistical Analysis

The analysis was performed using GraphPad (GraphPad Software Inc., USA). Discrete variables were presented as percentages and Chi-square with Fisher's exact test was applied for the analysis of categorical variables. A $P < 0.05$ was considered to be statistically significant.

Results

A total of 1023 males presented to our STI laboratory out of which 124 (12.12%) were symptomatic (included in the study). The majority of patients belonging to the symptomatic group were in between the age group of 26 and 35 years (41%) [Table 1]. The mean age of symptomatic males was 34.06 years. A decreasing trend in the number of patients was observed with increasing age.

Analysis of the symptomatic profile showed that urethral irritation was the most common complaint in 28 out of 124 patients (22.5%), followed by discharge in 12 (9.6%) and burning micturition (BM) (3.22%). The other less common cause of presentation was chancre, genital ulcer, herpes, and skin lesions [Table 2].

In symptomatic patients, MSM accounted for 6.4% of patients. One patient was found to be HIV positive during the investigation and 28% had syphilis apart from other complaints which were diagnosed with a routine STI checkup.

Out of 899 asymptomatic males, 51 were MSM and 2/51 (3.92%) had syphilis. Out of these 899 patients, 172 (19.13%) had syphilis only and no symptom on presentation. The overall prevalence of syphilis in our study was 20.52% (210/1023).

Microbiological diagnosis – as per the culture growth, the STI in men was categorized as gonococcal and

Table 1: Age-wise distribution of males

Age group (years)	Number (total=124), n (%)
<1	2 (1.6)
15-25	27 (21.7)
>25-35	51 (41)
>35-45	25 (20)
>45-55	11 (8.9)
>55-65	7 (6)
>65-75	0 (
>75-85	1 (0.8)

Average age=34.06 years

Table 2: Symptomatic profile of males presenting to the sexually transmitted infection laboratory

Reason for presentation	Number of patients (n=1023)	
	Symptomatic (n=124), n (%)	Asymptomatic (n=899), n (%)
Discharge	12 (9.6)	-
Burning micturition	10 (8.06)	-
Burning micturition and discharge	5 (4)	-
Chancere	1 (0.8)	-
Genital ulcer	1 (0.8)	-
Herpes	1 (0.8)	-
MSM	3 (2.4)	51 (5.6)
MSM + syphilis	2 (1.6)	2 (0.22)
MSM + gonococcal urethritis	2 (1.6)	-
MSM + skin lesions	1 (0.8)	-
Syphilis	34 (28)	172 (19)
HIV positive	1 (0.8)	-
Sexual partner having STI	1 (0.8)	-

MSM=Males having sex with male, STI=Sexually transmitted infection, HIV=Human immunodeficiency virus

nongonococcal infection. Out of 124, 9 (7.25%) symptomatic STIs were due to gonococcal infection, whereas asymptomatic gonococcal infection accounted for just 0.11% (1/899). The overall rate of gonococcal infection was 0.97% (10/1023). Only 1/899 (0.11%) asymptomatic patients' samples grew NG on culture. The PCR was positive for 6/8 (75%) symptomatic patients. One patient had hepatitis B virus (HBV) and gonococcal coinfection [Table 3].

Majority of cultures of patients due to nongonococcal causes showed no significant growth (8/124), followed by MG (1/124), CT (1/124), and *Staphylococcus haemolyticus* (1/124).

The most common sexually transmitted disease among symptomatic (34/124) as well as asymptomatic (172/899) men was syphilis showing a combined prevalence of 20% (206/1023).

The association of gonococcal urethritis (GU), nongonococcal urethritis (NGU)/nonchlamydial nongonococcal urethritis (NCNGU), chlamydial nongonococcal urethritis (CNGU) was found out with urinary symptoms and was found out to be significant. The association was strongest in GU patients [Table 4]

Discussion

Urethritis is defined as inflammation of the urethra which can have a bacterial or viral etiology. It is one of the important sexually acquired conditions by males attending the STI clinic. Symptoms include discharge from the urethra, dysuria, burning or frequent urination, and urethral

Table 3: Microbiological profile of sexually transmitted infection infecting males

Type of sexually transmitted infection	Number of patients (n=1023)		Percentage (%)	PCR result
	Symptomatic (n=124)	Asymptomatic (n=899)		
Gonococcal	8	1	6/9 (66.7)	
HBV + gonococcal infection	1	-		-
Nongonococcal				
<i>Chlamydia trachomatis</i>	1	1		1/1 (100)
<i>Mycoplasma genitalium</i>	1	-		-
<i>Staphylococcus haemolyticus</i>	1	-		-
Growth of no significance	8	4		-
Serum testing for syphilis	34	172		-

PCR=Polymerase chain reaction

Table 4: Categorization of urethritis in symptomatic males presenting with urinary and urethral symptoms

Type of urethritis (n=29)	n (%)	P	OR
GU	8 (27.5)	<0.00001	397.6 (95% CI, 47.46-3330.72)
NGU/NCNGU	20 (68.9)	0.0274	-
CNGU	1 (3.44)	0.0001	-

OR=Odds ratio, GU=Gonococcal urethritis, NGU=Non-GU, CNGU=Chlamydial NGU, NCNGU=Non-CNGU

or penile discomfort, few patients can be asymptomatic also. It is caused due to NG and nongonococcal causes include *C. trachomatis*, *U. urealyticum*, *M. genitalium*, *T. vaginalis*, yeasts, herpes simplex, and *Haemophilus* species.^[7] Mixed infections are also known to cause various STIs in males. In our study, only one patient whose swab culture yielded gonococcus was found to be HBV positive.

The most common age group infected with STI lies between 25 and 35 years as this is the sexually active population. A similar observation was seen by us with 41% of patients in the age group of >25–35 years. The high-risk group people also belonged to this age group in our study. Vora *et al.* found that 59.7% of people in between the age group of 25 and 45 years which is almost similar in our study (61%).^[8] Nayak *et al.* also calculated maximum cases in the age group of 25–35 years with a mean age of 33 years which is similar to our findings (mean age of 34.06 years).^[9] This emphasizes the need to educate the young people group about the sexual behaviors, cons of unprotected sex, and the severity of sexually transmitted diseases to decrease prevalence among this target group.

The most common symptom at presentation was discharge seen in 10% of patients, followed by BM in 8% and the least common was the combination of both BM and discharge (3.22%). In a study done by Nayak *et al.*, the most common presenting symptom was urethral discharge with dysuria (68%), followed by dysuria in 27% of patients which is higher than our study. They also observed that 68% had discharge per urethra which is much higher as compared to our study.^[9] This might be explained by the higher rate of asymptomatic people in our study.

The culture reports revealed that the most common organism isolated in our study was NG in 10/1023 patients, thus the overall prevalence of gonococcal infection in

our study is 0.98%. Only one out of 124 patients had coinfection with HBV. A similar conclusion was made by Nayak *et al.* who isolated gonococcus from most of the cultures amounting to 37% positivity and 8% coinfection with *C. trachomatis*.^[9] However, a different observation was done by Janier *et al.* who reported *M. genitalium* as the most common STI-causing pathogen in the study.^[10] This shows that there is a varied prevalence of infection-causing agents among various countries, states, and districts, thus emphasizing the need for more research and reporting from every state and district. Not a single case should be missed and reported to the authorities.

Out of nine culture-positive NG cases, the PCR was positive in only six patients (67%). Nayak *et al.* found a higher percentage concordance (71%) with PCR and culture results. Alary *et al.* found PCR positive in just 27% of samples.^[11]

Among the other causes of STI among males, the majority were suffering from syphilis (28%), followed by CT (1/124) and *M. genitalium* (1/124). Nayak *et al.* had 13% of patients positive for CT and none for *M. genitalium*.^[9]

The patients complaining of dysuria, discharge, penile discomfort, or a combination of any symptom was regarded as a case of urethritis and microbiological correlates were matched with patient records. It was found that 29/124 (23.38%) patients had urethritis and were a significant association with gonococcal infection ($P < 0.05$).

The incidence of GU 8/29 (27.5%) in our study was higher than that calculated (10.94%) by Vora *et al.*^[8] NGU and NCNGU comprised 69% of patients and CNGU comprised just 3.44% of patients. Vora *et al.* calculated NGU incidence as lower than our study, i.e., 4.97%.^[8] Ito *et al.* in their study calculated that out of 424 patients having urethritis, 1/3 were suffering from gonococcal infection and the remainder 1/3 had CNGU and 1/3 had NCNGU.^[12]

In our study, 2/29 MSM were suffering from GU. MSM are recognized as one of the high-risk groups and are responsible for transmitting extragenital carriage of various organisms responsible for causing STIs.^[13] Extragenital sites are believed to serve as hidden reservoirs and play a critical role in their transmission.^[13] Therefore, an intensive study is required to study different STIs in MSM who also contribute to a very high proportion of people transmitting STIs in India.

The other organisms that may also be commensals found in urethral flora such as *Mycoplasma hominis*, GV, and *Candida* can also be regarded as a cause of NGU and should not be ignored. However, none of our patients were found to harbor these organisms. Various viral causes such as HSV and adenovirus also contribute to NGU and hence should be incorporated in the routine evaluation of acute urethritis.

Conclusion

Male STIs are avoidable yet serious which has huge implications on a person socially, psychologically as well as economically. The young age group which is the most sexually active age group is the priority population to be screened for the same. The other population group is MSM, in whom screening for various STIs is needed and

health professionals must create awareness among them. Even varied prevalence has been observed in different geographical regions; therefore, a thorough study is required by various researchers. More national programs need to be implemented in our country. Due to the stigma attached to STIs, there can be a house-to-house active search of cases and their contacts. More studies need to be done in this regard to widen the horizon and find out various causes responsible for causing STIs.

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Conflicts of interest

There are no conflicts of interest.

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