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PREVALENCE OF STIs AMONG ATTENDEES OF TERTIARY HEALTH FACILITIES IN NORTH INDIA: A HOSPITAL BASED STUDY

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Abstract

Introduction: STI constitute a major public health problem in both developed and developing countries. There is a proven role of these diseases in facilitating transmission of HIV, which in turn increases susceptibility to other infections including STIs .HIV and STI are linked in their similar mode of transmission and also the presence of STIs facilitate the acquisition and transmission of HIV infections.

Objectives: The present study was conducted to identify the burden and any change in the trend of STI among attendees of a STI clinic of a tertiary care hospital in North India.

Material and methods: This cross- sectional, retrospective study analysed data from consecutive STI patients over the age of 18 years with a present /past history of STI and exhibiting high risk behaviour during the last 4 years (Jan2011-Dec 2014).

Result: A year wise increase in the number of STI patients was explicit during the last four years. Viral STIs are seen in increasing proportion of patients against a discernible back drop of decreasing bacterial STIs. Among the viral STIs herpes genitalis (65.25%) was the commonest followed by genital warts (61.95%) and genital molluscum contagiosum (60.75%); parasitic STIs were the least (2.3%). Coinfection with two pathogen was seen in 28.5%, while co-infection with three pathogen was seen in 16.48%. A bacterial pathogen with a fungus was seen in 16.8% and a fungal pathogen with a parasite in 0.83%.

Conclusion: In conclusion, a definite change in trend in the profile of STI was observed with viral STIs constituting the major burden in STI clinic attendees, thereby increasing the susceptibility of an individual to acquire and transmit HIV through sexual contact.

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INTRODUCTION

Sexually transmitted infections (STI) constitute a major public health problem for both developing and developed countries. STIs are ranked among the top five diseases impelling the afflicted to seek health care services.[1] The disease profile of various STIs is variable and depends on the socio-economic, cultural, geographic and environmental factors prevalent in different geographic regions.[2] The epidemiological profile too varies from country to country and from one region to another within a country, impinging on ethnographic, demographic, socioeconomic and health factors. The emergence of human immunodeficiency virus (HIV) infection has increased the importance of measures aimed at control of STI. Both ulcerative and non-ulcerative STI are prevalent in India and constitute a major public health problem. [3] The linkage between HIV and STI stems from transmission of the pathogens through unprotected sex and the felicity of acquisition of a sexually transmitted pathogen in the presence of a STD. Some STIs pathogens may be more virulent in the presence of HIV related immunodeficiency.[4,5] Anunderstanding of the patterns of STIs prevailing in different geographic regions of a country is necessary for proper planning and implementation of STI control strategies. Lackof optimal laboratory infrastructure in the country, restricts optimal laboratory investigation and data available from different regions are usually based on syndromic diagnosis. [3, 4] The present study was conducted to identify the burden and pattern of STIs among attendees of

a STIs clinic tertiary care hospital, in North India. Changes in the trend of STIs over time and the epidemiological factors and behaviour of individual diseases were also documented.

MATERIALS AND METHODS

Setting - A cross-sectional study was carried out among patients attending the STIs clinics of our tertiary care hospital in North India during the period of January 2011 to December 2014.

Study population - All new consecutive STIs cases over the age of 18 years with a present/past history of STIs and /or exhibiting high risk behaviour, without antibiotic intake during the previous 4 weeks, and in whom a speculum examination was possible, were enrolled in this study.

Specimen collection and transport - Patients were diagnosed based on history and clinical presentation .Urine, urethral swab, vaginal and endocervical swab, tissue biopsy and swab from ulcer, if any were collected from male and females patients. Blood sample of all thepatients were collected for serology. Specimens collected at STI clinic were transported immediately at room temperature to the laboratory for processing.

Laboratory methods - Normal saline wet mount examination was done to detect clue cells of*bacterial vaginosis,* motile trophozoites *of Trichomonas vaginalis* and yeast cells for candida infection. Tzanck smear was made and stained by giemsa stain for multinucleated giant cells (MNGC of *Herpes simplex virus* (HSV). Smear wasmade for examination by gram's and giemsa staining for the presence of gram negative intracellular diplococci forgonorrhoea, budding yeast cells for vulvo-vaginal candidiasis (VVC), gram negative coccobacilli in school of fish appearance for *Hemophilus ducreyi* and Donovan bodies for *Klebsiellagranulomatis*;pH of vaginal sample was checked and Amine test performed for the diagnosis *bacterial vaginosis* using Amsel's criteria. Histopathology of suspected biopsy sample was done for diagnosing of genital warts, donovanosis, and genital molluscum contagiosum.

10 millilitres venous blood (without anticoagulant) was collected aseptically from all patients and stored at -20°c after separation of the serum. HSV-1 IgM antibody (Maddens Diagnostics HSV-1 Netherlands) and HSV-2 IgM antibody (Ridascreen HSV-2 IgM Germany) was detected by μ capture ELISA, as per manufacturer's instruction. Sera were

also tested for reaginic antibodies by Venereal Diseases Research Laboratory (VDRL) test (antigen from Serologist Kolkata, Government of India)and in those reactive with VDRL, *Treponema pallidum*haemagglutination (TPHA) was done for confirmation (Omega Diagnostics, UK). Chlamydia Antigen in the genital swab of all the patients was performed by ELISA (Bio –Rad Chlamydia Microplate EIA, United states). All patients were tested for HIV by three approved rapid tests, following NACO guidelines after pre-test counselling and written informed consent, followed by post-test counselling.[5]

RESULTS

There was a year wise increase in the total number of patients reporting to the STI clinic during the last four years. In the year 2011 and 2012 the total number of STIs remained nearly same after which there was a fall in 2013 which again increased in 2014. Table- 1 shows the spectrum of STIs from Jan 2011 to Dec 2014. A total of 1635 patients attended STI clinic during the study period. Of these, 60% (988) of the patients were male (M: F=1.5:1). Commonest age group affected was 18-25 years (53.6%). Viral STIs were the most common (44.3%) with genital Herpes leading at 65.25% followed by genital Molluscum Contagiosum (60.75%). Majority of patients (64%) were literate, only 20.6% had primary level school education. Table-2 shows Demographic profile of study participants at enrolment.

Around 48.1% of the patients had first sexual exposure between the ages of 19-25 years. Highest (62.5%) risk was in premarital individuals with less than two sexual partners. Table-3 shows risk factors for STIs among our study patients. STIs were seen most commonly in home makers (41.4%) followed by labourers (16.1%). Fig-1 shows occupational status of STI patients. Majority of the male patients presentedwith genital ulcer (20%) followed by anogenital growth (13%). In females genital discharge (38%), followed by genital itching (32.4%) and dysuria (29.3%) was common. Fig-2 Shows presenting complaints of patients attending STIs clinics.

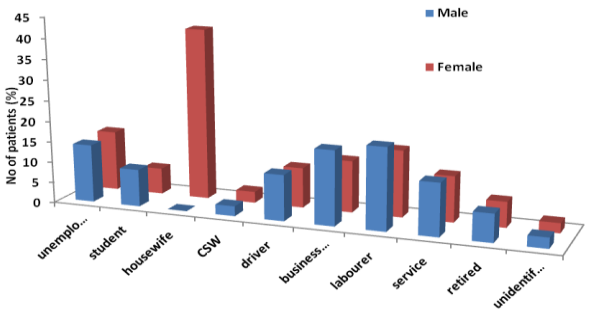

Fig-1: Occupational profile of STIs patients

Co-infection with two pathogens was seen in 28.5%; a bacterial pathogen with a fungus in 16.8% and a fungal pathogen with a parasite in 0.83%. Co-infection with three pathogens was seen in 16.48% with bacterial, viral and fungal pathogen, combination accounting for 9.6%of affected subjects.

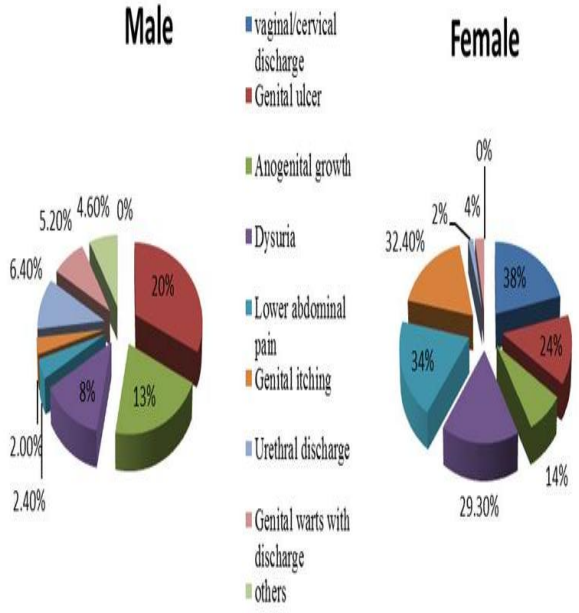

Fig-2: Presenting complaints of patients attending STIs clinic

The HIV seropositivity was three times higher in patients with non-ulcerative STI than those with ulcerative STIs in a ratio of 2.6:1. HIV sero-propondrance was higher in male patients with STI than females (1.02% versus 0.85percent). Fig-3 shows ulcerative and non-ulcerative STI with HIV seropositivity (%) during the study period.

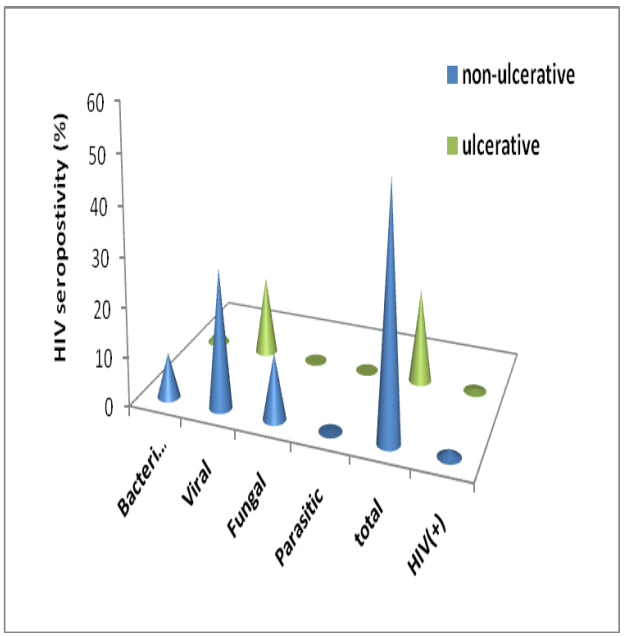

Fig-3: Ulcerative and Non-ulcerative STIs with HIV seropositivity(%) during study period

Table 1: % Prevalence of STIs from Jan 2011 to Dec 2014

	Disease	2011 n=280	2012 n=410	2013 n=473	2014 n=472	Total n=1635
Viral STIs	*Genital M.C **	12	16.25	16	16.25	15.8
	Herpes genitalis	17	18.75	14.7	14.8	16.2
	Genital warts	12.1	13.25	11.8	12.5	12.3
Total viral STIs		41.1	48.25	42.5	43.8	44.3
Bacterial STIs	*NGC #*	25	25.6	24.5	23.3	24.5
	BV $	8.9	13.5	7	1.6	7.4
	*NGU ***	5.7	2	2	1.78	2.5
	Syphillis	1.4	4.2	2.3	3	2.8
	Gonorrhoea	2.5	1.4	1.6	1.2	1.6
Total Bacterial STIs		43.5	46.7	37.4	30.88	38.8
Fungal STIs	*VVC ##*	11	1.2	3.8	12.5	13.3
Parasitic STIs	*TV @*	1	0.5	0.4	0	0.4
Total STIs		96.6	96.7	84.1	87.2	97.2

M.C* - Molluscum contagiosum; NGC # - Non gonococcal cervicitis; BV $ - Bacterial Vaginosis; NGU** - Non gonococcal urethritis; VVC ## - Vulvo vaginal candidiasis; TV@ - Trichomonas vaginalis

Table-2: Demographic profile (%) of study participants at enrollment

DEMOGRAPHIC FACTORS	Male (60.5%) n=988	Female (39.5%) n=647	Total (n=1635)
Religion			
Hindu	662(57)	200(33)	862(50.7)
Muslim	380(38.4)	288(44.5)	668(41)
Sikh	60(6.07)	21(3.2)	81(5.9)
Christian	22(2.1)	2(0.4)	24(2.4)
Economic status			
Rural	240(24)	176(27.2)	416(25.4)
Urban	685(69.5)	225(34.7)	910(55.6)
Semi urban	201(20.3)	108(16.6)	309(18.8)
Education status			
No schooling	370(37)	216(33.2)	586(35.8)
Primary(0-5th class)	227(22.9)	110(17)	337(20.6)
Middle(6-8thclass)	186(18.8)	74(11.4)	260(15.6)
Secondary(9-12thclass)	205(20.7)	60(9.2)	265(16.3)
Graduate and above	122(12.3)	65(10.4)	187(11.4)
Marital status			
Single	310(31)	185(28.5)	495(30)
married	475(48.2)	285(44.04)	760(46.4)
Divorced	155(15.6)	100(15.4)	255(15.5)
Widow	88(8.9)	45(6.9)	133(8.1)
Employment status			
unemployed	320(32)	112(17.3	432(26.4)
Full time	465(47)	189(29.2)	654(40)
Part time	175(17.7)	115(17.6)	290(17.7)
others	169(17)	90(13.9)	259(15.8)

Table-3: Risk factors for STIs among patients

	Male (%) n=988	Female (%) n=647	Total (%) n=1635
Premarital status (Exposed)	770(61.8)	320(49.5)	1030(62.5)
Extramarital status (Exposed)	684(69.2)	297(45.9)	981(60)
Sexual partners			
1-2	200	92(30.9)	768(46.9)
>2	320(32.3)	207(31.9)	527(32.2)
unidentified	178(18.0)	162(25.9)	34020.7)
Un circumcised	680(68.8)	……..	680(68.8)
Commercial Sex Workers			
Homosexual	280(28.3)	152(23.4)	432(26.4)
Heterosexual	530(53.6)	320(49.4)	850(51.9)
Bisexual	98(9.9)	48(7.7)	146(8.9)
Other	162(16.3)	45(6.9)	207(12.6)
Age at first sexual exposure			
<18	210(21.2)	140(21.6)	350(21.8)
19-25	568(57.4)	220(34)	788(48.1)
26-35	198(20.2)	98(15.1)	296(18.1)
>35	156(15.7)	45(6.9)	201(12.
Past STD history yes	434(43.9)	234(36.1)	668(40.9)

DISCUSSION

There is dearth of information on the epidemiology of STIs in India, perhaps due to reasons of stigma and prejudice associated with STI, lack of academic interdepartmental coordination in medical institutions for detailed study, poor attendance of STI patients at public clinics and academic institutions, and restricted diagnostic facilities. Our analysis offers insight into the burden and pattern of various STIs.

A gradual increase in the occurrence of new STIs cases was observed similar to other government health facilities.[5] This is perhaps due to free of cost of health care delivery at such centres coupled with increased referrals

from other departments of the hospital. Over a period of 4 years (2011 to 2014) there was an 11 % increase in the patient turnover.

In this study, 46.75 % of the patients were 18-25 years of age, comparable to other studies. [3, 4, 5] Clustering of patients in this above age group is due to the fact that, this group is sexually active and behaviourally at high risk of STI acquisition due to frequent and more numbers of sexual partners coupled with concurrent marital and extra-marital partnership. The next major age group affected was the teenagers. Our data support earlier consensus that teenagers and young adults should be the priority target group in STI control programmes.

Male STIs patients were in higher numbers than females (M: F=1.5:1) as in previous studies from Northern and Southern parts of India.[1, 2, 7] High promiscuity in males may be a reason for increased male attendance, but low female turn-out in the STIs clinic may be due to social and cultural restrictions including lack of motivation by their regular sexual partner (often their spouse), and the asymptomatic nature of the disease in this sex resulting in poor attention of their STI problem.[1,3] STI prevalence was almost equal in married male (48.02%) and females (44%), which contrasts with the other studies, where married males were almost double the number of their counterparts.[4,5, 6] Most of our patients were home makers (41.4%) followed by labourers (16.1%) and 14.8% of our patients were unemployed. Similar data is reported in studies from Rohtak, Surat and Davangere.[4,8,10] A study from Ahmedabad found truck drivers with maximum STIs.[5] An earlier study seven years ago from our institute[3] found maximum (63.9%) number of afflictions in commercial sex workers (CSW), sharply contrasting with the present study where this group constituted a meagre 2.5% only. This drastic decrease probably denotes awareness regarding STI and health seeking behaviour among the CSW.

Demographic change is a crucial concern for sexual health and constitutes a risk factor. Fifty percent of our patients were from the Hindu community similar to STI patients from Madhya Pradesh.[10] Nearly half (46.4%) of all our STI patients were married at the time of presentation, comparable to other studies from North India.[3,4] In our study 64% were literate (Table-2), similar to the findings reported by Murugesh et al, Marfatia et al. [10,16] Formal education had little restraining influence in containing of STIs. Literate and illiterates alike need proper sex education to modify their behaviour.

The risk factors in our patients showed that disease was more in exposed males (62.5%) having premarital sex with more than two sexual partners, consistent with other studies.[2,4,7,8] More than half (51.9%) of our patients were heterosexual, contrasting with the report of Jain et al,[4] who found disease more common in homosexual males. Nearly half (48.1%) of our patients had their first sexual exposure between the age of 19-25 years. This trait is also documented in studies from both Northern and Southern India.[3,4,7] Sensible use of media for proper sex education, preferably starting at school level and awareness regarding STIs may lead to a decrease in STI.

The most common clinical presentation in male (19.8%) was genital ulcers,) while cervical/vaginal discharge (38.2%) followed by dysuria (29.3%) and a genital ulcer (24.4%) was observed in females was common. Ray K et al and Nair et al. [2, 7] have reported similar findings.

Contrary to the higher prevalence of bacterial STI, a decade ago, [12, 13] the present study documents a higher prevalence of viral STIs. Viral predominance has also been reported by others from different parts of the country. [2, 4, 5, 8] Present study found Herpes as the predominant (16.2%) viral STI followed by genital Molluscum Contangiousum (15.8%), which is comparable to other studies.[3, 4, 8] However, Kumar et al from Chandigarh[14] reported genital warts and Chopra et al from Patiala [15] documented Trichomoniasis as the most common infection. In contrast to our study, Neeta et al from Ahmedabad found the prevalence of Herpes genitals almost double, [5] but a study from Bangalore (13.04%) [10] and another from Kerala (17.5%) [6] reported a prevalence of genital Herpes similar to ours. There was however a decrease (from 28.7% to the present 16.2%) in the prevalence of herpes genitals compared with a previous study from our institution 6 years ago. [3]

Co-infection with two pathogens was seen in 28.5% of our subjects. Maximum co-infection was seen with a bacterial and a fungal organism. Co-infection with three pathogens was seen in 16.48%, where the combination of bacterial, viral and fungal pathogens was maximum. Testing for more than one etiological agent in STI is warranted especially if one pathogen is diagnosed or strongly suspected; Often multiple infections are overlooked or underdiagnosed since the finding of a single pathogen is presumed to have completed the etiological diagnosis.

Concurring with a study by Jain et al,[4] the seropositivity rate of HIV in our study was

1.68% which is much lower than that seen 6 years ago from the same study setting (10.3%). [3]

Present study found HIV seropositivity more in non-ulcerative STIs in comparison to other studies who found the proclivity of HIV infection to genital ulcerative disease (GUD).[2,7] Needless to say that the breach in the mucus membrane caused by the ulcerative STIs promote effective transmission of HIV indicating the close association of the two and hence, the importance of early diagnosis of the curable component of STI. Review of multiple studies [1,2,3] indicated that both ulcerative and non-ulcerative STIs promote HIV transmission via a variety of biological mechanisms, and the treatment of these conditions reduces an individual's ability to transmit HIV by decreasing the amount and frequency of HIV shedding.

A definite change in the trend and in the profile of STI with viral STIs constituting the major burden in our STI clinic is obvious. Such infection increases the susceptibility of an individual to acquire and transmit HIV through sexual contact. The decline in bacterial infections may be attributed to the liberal and prophylactic use of over-the-counter broad spectrum antibiotics and probable up gradation of health facilities at primary health-care facilities. Our study emphasizes the need for periodic need based surveillance of sexually transmitted infections for clinical intervention. The rise in numbers and the shift in the type of STIs, necessitate periodic review of these infections for effective management through W.H.O syndromic approach. Necessary modification may be adapted as per the epidemiological pattern of STIs in a given setting. A comprehensive knowledge of the various epidemiological factors is essential to design preventive and control strategies to curb sexually transmitted infections.

CONCLUSION

A definite change in the trend and in the profile of STI with viral STIs constituting the major burden in our STI clinic is obvious. Such infection increases the susceptibility of an individual to acquire and transmit HIV through sexual contact. The decline in bacterial infections may be attributed to the liberal and prophylactic use of over-the-counter broad spectrum antibiotics and probable up gradation of health facilities at primary health-care facilities. Present study emphasizes the necessity for periodic need based surveillance of STIs for clinical intervention. The rise in numbers and the shift in the type of STIs, call for periodic review of

these infections for effective management through W.H.O syndromic approach. Required modification may be adapted as per the epidemiological pattern of STIs in a given setting. A comprehensive knowledge of the various epidemiological factors is essential to design preventive and control strategies to curb sexually transmitted infections.

Conflict of Interest Statement-

There is no conflict of interest.

Informed consent was taken from the patient.

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