Clinical and demographic trends in a sexually transmitted infection clinic in Mumbai (1994-2006): An epidemiologic analysis

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ABSTRACT

Background: People presenting to sexually transmitted infections (STIs) clinics represent an important risk group for HIV infection; prevention strategies will depend on the clinical attendance. **Aims:** The demographic and clinical changes in clinic attendees in Mumbai, as well as the factors associated with HIV infection in this clinic over a 13-year period, were assessed. **Methods:** STI clinic data in 3417 individuals (1994 to 2006) were analyzed: clinical presentation, types of STIs, and serology over the 13-year period. We used a logistic regression model to assess socio-demographic and clinical associations with HIV infection. **Results:** The clinic evaluated 689 patients in 1994 and the number had dropped to 97 in 2006. In 1994, the majority of STIs seen in the clinic were bacterial (53%, 95% confidence interval [CI] 50% to 57%); however, this proportion had dropped in 2006 (28%, 95% CI: 19% to 38%). There was a proportional increase in viral STIs during the same time period. Although women attending the clinic were younger than men, they were more likely to be married. The overall seropositivity for HIV was 28%. Viral STIs were more likely to be associated with HIV than bacterial infections (odds ratio: 1.5, 95% CI: 1.2 to 1.9). **Conclusions:** Viral infections were the most common STIs in recent years in a tertiary care center in Mumbai. HIV prevalence was high in this population. Thus, these clinical data suggest that STI patients were and continue to be an important group for HIV prevention in the country.

Key words: Epidemiology, human immunodeficiency virus, sexually transmitted infections, trends

INTRODUCTION

The World Health Organization in 2007 estimated that there are about 2.5 million people currently living with HIV in the country.[1] The National AIDS Control Organization (NACO) of India has identified surveillance and prompt treatment of STIs as important thrust areas for HIV prevention in the country.[2] Previous STI studies have shown that the epidemiology has changed from the 1970's to 2000 in various regions of the country.[3-7] In particular, there has been a reduction in the frequency of donovanosis, an STI which was commonly seen in the 1970's and 1980's.[8] Simultaneously, there was an increase in genital herpes and syphilis cases and[5,9] there have

been reports of increased HIV seropositivity in these STI cases.[9]

In general, sexually transmitted infections (STIs) are important causes of disease burden, particularly in young individuals. The World Health Organization (WHO) estimates that there were about 97,420 disability adjusted life years (DALYs) attributed to these infections in 2002 in the world, accounting for 6.6% of the total DALYs.[10] However, about 5.8% of these are attributed to human immunodeficiency virus (HIV) infections and the remaining 0.8% to other STIs. HIV and other STIs interact in causing morbidity: the presence of STIs, particularly ulcerative STIs can increase the transmission of HIV, and the presence

of HIV increases the chances of acquiring other STIs and is often associated with atypical presentations of common STIs.[11,12] Thus, STIs represent an important public health problem internationally, and particularly in developing countries.

Knowledge of both clinical and demographic changes in STI population may help us better cater our prevention programs to the target population in these STI clinics. For example, men and women may have different intervention requirements. This added knowledge may also help identify risk groups in the population at large. Thus, the present study was designed to identify the demographic and clinical changes at an STI clinic in a tertiary care center in Mumbai during the 13-year period from 1994 to 2006. We also aimed to understand the association between socio-demographic variables and HIV in the clinic attendees during this period.

METHODS

The present study is a retrospective analysis of data collected from the clinical records of 3417 patients over a period of 13 years (1994-2006).

Study site
The data were collected from individuals attending an STI clinic at the Dermatology Department of a teaching hospital situated in Central Mumbai. The clinic evaluates dermatological cases as well as patients presenting with STIs, including HIV infection. Although anyone living in Mumbai is eligible to access the clinic, the hospital is mainly used by individuals of the middle to lower socio-economic strata in Mumbai. All individuals above the age of 18 presenting at the STI clinic were eligible for the present analysis.

Data used
Subjects were clinically evaluated by trained physicians for STIs. In addition to the on-site laboratory examination for STI (such as dark ground microscopy, Grams stain and culture, Tzanck smear, hanging drop preparation, potassium hydroxide wet mount preparations, and oil mounts), the serological tests included ELISA and rapid tests for HIV, and VDRL for syphilis. Data were collected on a clinical form; information was collected at the baseline visit. We used the following characteristics for our analysis: 1) Demographic information - age, gender, and marital status; 2) Sexual orientation, history of the last sexual

contact (when and the gender of the partner); 3) Clinical information - complaints at the time of presentation, duration of complaints, any treatment taken for the complaints. The clinical presentation was classified as ulcers, discharge, growths on genitals related to STIs (e.g. warts, molluscum), infestations, and others; 4) Clinical diagnosis and treatment given: we classified the diagnosis as bacterial (e.g. gonorrhoea, non-gonococcal urethritis, syphilis), viral (e.g. herpes simplex infection, viral warts), fungal (candidiasis with an explicit sexual history and absence of any systemic causes), and parasitic (scabies, pubic lice). We also included the serological results for HIV and VDRL.

Data analysis
Data were entered in EpiInfo 2000 and were converted to Stata (version 10) for analysis. Means, standard deviations (SD), medians, and proportions were estimated. We calculated the proportions and confidence intervals for demographics, STIs, and HIV for each year (1994-2006). We used t-tests to examine the difference between the means of the continuous variables. Pearson's chi square tests were used to evaluate the associations between categorical variables (marital status, gender, type of STI, clinical presentation, HIV and VDRL positivity). We performed a Chi square test for trend to assess trends over the 13-year period.

HIV test results were available for 1692 individuals. We calculated the odds ratio and the 95% confidence intervals (CIs) as a measure of association between demographic and clinical characteristics, and HIV seropositivity by using a simple logistic regression. We had missing information on marital status for about 11% of the individuals in the complete sample. We performed 20 imputations of this data set by 'Multiple Imputations with Chained Equations' using the *ice* command with Stata. We compared the odds ratio for association between marital status and HIV in the original dataset and in the imputed dataset; the results were comparable. Thus, we have reported the estimates using the original dataset with missing values.

The study was approved by the Faculty of Medicine, Institutional Review Board at McGill University.

RESULTS

There was a reduction in the total number of patients

evaluated per year at the STI clinic over this 13-year period. The clinic evaluated about 689 patients in 1994 and the attendance had reduced to 97 patients in 2006 [Figure 1a]. The mean age (SD) of men attending the clinic was significantly greater than mean age of women during this period [Men: 27.3 (7.9), Women: 26.4 (7.1), P=0.04].

Demographics

There was a gradual increase in the proportion of individuals belonging to the older age groups ($\geq$ 35 years) attending the clinic from 1994 to 2006 [Figure 1b]; the test for trend was significant ($P <$ 0.01). The clinic was also evaluating more women in the later years than relatively early on, and this trend was statistically significant ($P <$ 0.001). There was a total of eight male-to-female transgenders evaluated in this period. About 45% of clinic attendees in 1994 were married, this proportion had increased to 67% in 2006 ($P <$ 0.001). Women attending the clinic were more likely to be married than the men (OR: 10.1, 95% CI: 6.9 to 14.7).

Clinical findings

In 1994, the majority of STIs seen in the clinic were bacterial (53%, 95% confidence interval [CI] 50% to 57%); however, this proportion had dropped to 28% in 2006 (95% CI 19% to 38%). There was a proportional increase in viral STIs during the same time period. In 1994, the viral STIs constituted about 25% (95% CI 22% to 28%) of the cases, and this proportion had increased to 57% (95% CI 46% to 67%). The preponderance of viral infections was first seen in the years 2000-2001 [Figure 2a]. The trends for the changes

in bacterial and viral STIs were statistically significant (P<0.001). The most common clinical presentation in all these years was an ulcer (range 34% to 59%). The most common STIs were chancroid (25%), herpes genitalis (20%), viral warts (11%), syphilis (11%), and gonorrhoea (9%). Figure 2b shows trends in these STIs over the study years. Among the viral infections, in our data we found HIV infection to be higher in those presenting with genital warts (38% *vs* 30%, P=0.05); however, there was no significant difference in the HIV proportion in those with herpes (30% *vs* 36%, P=0.14) or molluscum contagiosum (32% *vs* 33%, P=0.85).

Serology

The overall HIV seropositivity over the 13-year period was 28% (range 19% to 55%), and the overall VDRL reactivity was 13% (range 7% to 28%). Individuals presenting with a genital ulcer and growths were more likely to be HIV positive than those presenting with urethritis [Table 1]. People presenting with viral STIs were more likely to be HIV positive than those presenting with bacterial STIs. The associations between HIV and individual characteristics are presented in Table 1. The odds ratio for the association between marital status and HIV obtained from the imputed dataset was 1.1 (95% CI: 0.9 to 1.4); it was similar to the one obtained from the original dataset with missing data (odds ratio: 1.1, 95% CI: 0.8 to 1.4).

We also compared the demographic characteristics of individuals for those who had an HIV test with those who did not. They were comparable with respect to age (Chi square P = 0.59) and gender (Chi square P = 0.13).
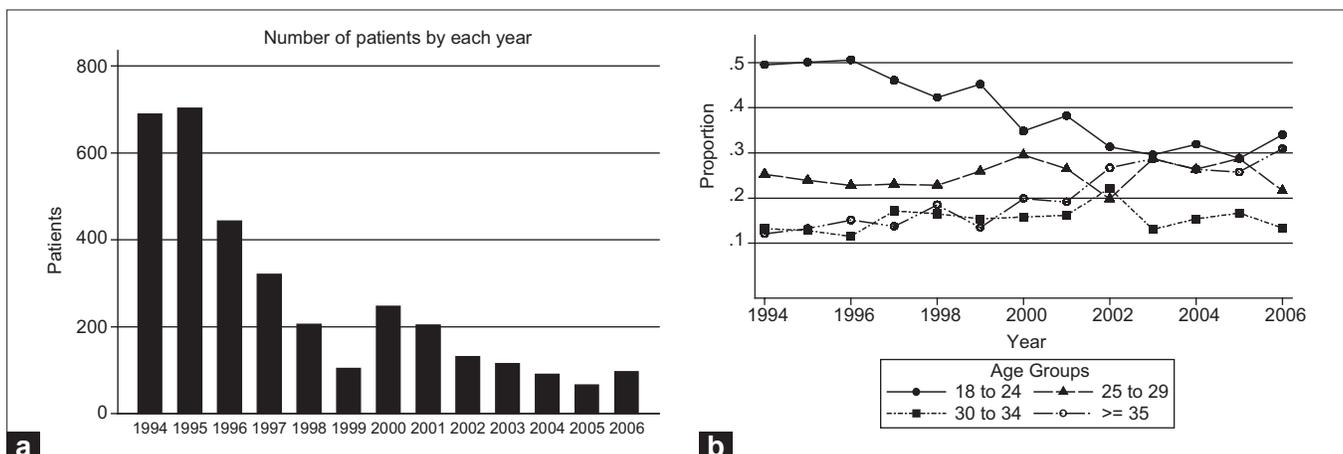
Figure 1: Demographic changes in 3417 individuals attending an STI Clinic in a tertiary care center in Mumbai, India (1994 - 2006). a) Total number of patients in the clinic. b) Age groups of people attending the STI clinic*

*Test for trend: 18-24 years *P* < 0.001; 25-29 years *P*=0.48; 30-34 years *P*=0.04; > 35 years *P* < 0.001
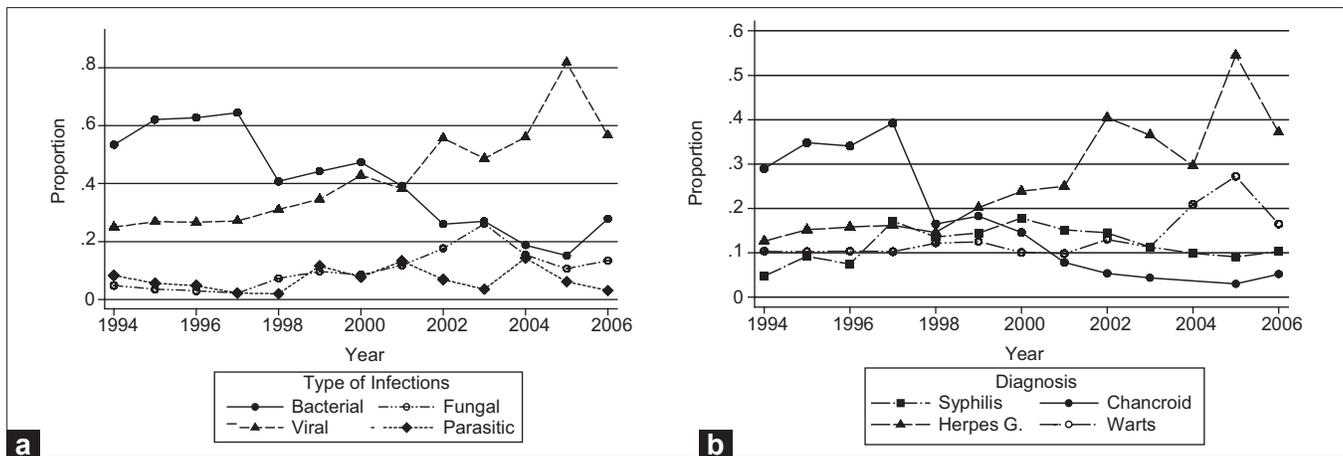
Figure 2: Clinical changes in 3417 individuals attending an STI Clinic in a tertiary care center in Mumbai, India (1994 - 2006). a) Types of infections in individuals attending the STI clinic**. b) Changes in syphilis, chancroid, herpes, and warts cases individuals attending the STI clinic***

** Test for trend: Bacterial *P* < 0.001; Viral *P* < 0.001; Fungal *P* < 0.001; Parasitic *P* =0.34, *** Test for trend: Syphilis *P* < 0.001; Chancroid *P* < 0.001; Herpes *P* < 0.001; Viral Warts *P* = 0.002

DISCUSSION

The attendance to the STI clinic in a tertiary care center in Mumbai decreased between 1994 and 2006. There were more older and married individuals in 2006 than in 1994. The proportion of women attending the STI clinic increased during this 13-year period. Bacterial STIs represented the single largest group of infections in 1994 while viral infections formed the largest group in 2006. The overall HIV seropositivity and VDRL reactivity over the 13-year period were 28% and 13%, respectively. HIV was associated with a clinical diagnosis of viral infection.

A decrease in the number of patients attending STI clinics has been reported by authors in different parts of the country.[4,9,13] This may be due to an actual reduction in the number of STI patients in catchment areas of the hospital clinics. The Mumbai Districts AIDS Control Society, set up in 1998, has identified treating STIs as an important priority area for HIV prevention.[14] This has resulted in many more static and mobile STI clinics affiliated to private and/or non-governmental based health care settings in Mumbai. Thus, STI patients had many more options for care than in the mid-to-late 1990's. The attendance of cases in these clinics may represent another potential explanation for the reduced number of patients seen in the public clinics. Finally, many STI patients opt for over the counter medications and they may not access formal health services at all.[15] Though, oft-repeated, a good assessment of STI trends in Mumbai should not

only include public hospitals and dispensaries, but also private hospitals and clinics. Estimates should also take into account people receiving self-medication from drug stores and pharmacies without consulting clinics.

The demographic transition is an important issue for sexual health care. The typical clinic attendee in the initial years of the study was the young, single, unmarried male. However, in the later years more older and married individuals attended the clinic. Overall, more women attending the clinic were married than men. These observations have been reported by other authors as well.[16-20] STIs in women may be asymptomatic or without any typical features. Even if they have symptoms, they may be reluctant for STI check up at an STI clinic; they are more likely to attend the obstetrics and gynecological clinic for sexual health problems [8,20] and this may be responsible for fewer women being examined at the STI clinic. In recent years, married men have been encouraged to motivate their regular sexual partners (often the spouse) to receive STI testing and care. Thus, the increase in number of married people attending the clinic may be potentially responsible for increased numbers of women in the clinic. The presence of married individuals poses the following issues in STI care: confidentiality issues within marriage, partner notification and treatment, couple counselling. Frameworks to deal with these issues should take into account the existing social, cultural, and legal norms in the country; these issues should be an integral part

Table 1: Association between demographic and clinical characteristics, and HIV in 3417 individuals attending an STI clinic in a tertiary care center in Mumbai, India (1994-2006)

Characteristics	All individuals	HIV test reported			
	N	N1	HIV positive n (%)	Odds ratio (95% confidence intervals)	Age-adjusted odds ratio (95% confidence intervals)
All	3417	1692	473 (28)		
Demographics					
Age groups					
18-24	1519	722	161 (22)	reference	
25-29	841	409	125 (31)	1.5 (1.2 - 2.0)	
30-34	491	249	85 (34)	1.8 (1.3 - 2.5)	
≥ 35	566	282	88 (31)	1.6 (1.2 - 2.1)	
Gender					
Males	2985	1435	393 (27)	reference	reference
Females	406	217	64 (29)	1.1 (0.8 - 1.5)	1.1 (0.8 - 1.6)
Marital status					
Single	1439	680	173 (25)	reference	reference
Married	1592	822	225 (27)	1.1 (0.9 - 1.4)	0.9 (0.8 - 1.3)
Sexuality					
Heterosexual	3061	1489	404 (27)	reference	reference
Homosexual	61	37	11 (30)	1.1 (0.6 - 2.3)	1.2 (0.6 - 2.5)
Bisexual	38	27	8 (30)	1.1 (0.5 - 2.6)	1.2 (0.5 - 2.7)
Clinical features					
Clinical presentation					
Urethritis	429	201	28 (14)	reference	reference
Ulcer	1507	693	192 (28)	2.4 (1.5 - 3.6)	2.4 (1.5 - 3.7)
Growths	469	254	90 (35)	3.6 (2.1 - 5.5)	3.6 (2.2 - 5.8)
Others	907	458	126 (28)	2.3 (1.5 - 3.7)	2.3 (1.5 - 3.6)
Clinical diagnosis					
Bacterial	1542	723	175 (24)	reference	reference
Viral	1099	569	187 (33)	1.5 (1.2 - 2.0)	1.5 (1.2 - 1.9)
Fungal	233	104	16 (15)	0.6 (0.3 - 1.0)	0.5 (0.3 - 0.9)
Parasitic	219	108	19 (18)	0.7 (0.4 - 1.1)	0.7 (0.4 - 1.1)
Serology					
VDRL negative	1380	1247	289 (23)	reference	reference
VDRL reactive	209	172	61 (35)	1.8 (1.3 - 2.5)	1.8 (1.3 - 2.5)

Note: N1 is the number of STI cases tested & for HIV

of STI care training in health centers. Although these are obvious recommendations, many clinics may not have institutionalized these in practice. With the changing demographic profile of the STI attendee, it is imperative to include these dimensions in STI care.

There was shift in the type of STIs evaluated at the clinic; the initial years (1994-2000) saw predominance of bacterial STIs whereas viral STIs were more common in the later years (2001-2006). Particularly, the proportion of herpes genitalis cases had increased in the later years with a significant reduction in chancroid cases. Reduction in bacterial STIs and increased proportion of herpes cases have been reported from other clinics in India.[9,21,22] These increases in viral STIs may be due to the following reasons: 1) increased self-medication or antibiotic use, which can treat some of the bacterial STIs; 2) treatment of bacterial STIs at the primary care level with hard to treat viral STIs presenting at tertiary centers; and/or 3) an actual change in the pattern of STIs. Regardless of the cause of change, viral STIs formed the single most important group in the recent years; they were more likely to be associated with HIV in our sample. This finding is comparable to observations from other regions of the world - herpes has been the most common cause for genital ulcers and was most likely to be associated with HIV.[23]

As with other studies, this study had its limitations. The data were clinic based; they may not be representative of the population at large. We did not have detailed information about the sexual behaviors (including condom use) in these patients; hence we were not able to assess these characteristics. We had missing information for many of these variables, and data were incomplete in 1998 (July to December) and 1999 (January to May) when there was a change in data recording systems. We did not have information about HIV tests on all patients, although the two groups (with and without HIV test were comparable in age and gender). Further, the laboratory tests were not the most sensitive or specific for STIs, including serological tests in syphilis which might have resulted in few false positives. However, these are usually the tests commonly available in resource constrained settings and have remained the diagnostic standards in this clinic for the past two decades.

Despite the above limitations, the study provides useful information on the STI (including HIV) patterns in a tertiary care center in Mumbai. First, it demonstrates that more older and married individuals are likely to attend the clinic. Second it shows that viral STIs, the bulk of which are composed of herpes genitalis, have become the single largest groups of STIs in Mumbai. These infections are difficult to treat and have higher chances of recurrence; hence health resources should be adjusted to account for these changes in STI clinics. Finally, HIV prevalence was high in this population, a finding observed in the sentinel surveillance by NACO.[24] Thus, STI patients were and continue to be an important risk group for HIV prevention in Mumbai, India.

ACKNOWLEDGEMENTS

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