

Sexually transmitted infections in Pakistan

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BACKGROUND AND OBJECTIVES: Sexually transmitted infections (STIs) represent a major global health problem leading to morbidity, mortality and stigma. Prior to this study there was no information on the prevalence and knowledge of STIs in Faisalabad, Pakistan.

DESIGN AND SETTING: Prospective, cross-sectional study in patients attending STI clinics from July 2006 to September 2009.

PATIENTS AND METHODS: After obtaining consent, patients completed structured questionnaires used for behavioral surveys. Blood and urethral swabs were collected and tested for syphilis, gonococcus, genital herpes, chlamydia and chancroid.

RESULTS: Mean (standard deviation) age of the 1532 participants was 38.9 (9.4) years, including 37.8 (10.2) years for males and 35.5 (6.3) years females. Male gender (n=1276, 83.3%), low socioeconomic class (n=1026, 67.0%) and residence in rural suburbs (n=970, 63.3%) were more common. Most (n=913, 59.6%) were aware of the modes of transmission of STIs and the associated complications, 20% (n=306) were condom users, and 21.2% (n=324) had knowledge of safe sex. Opposite-sex partners were preferred by 972 (63.4%) patients, while 29.9% (n=458) had both homosexual and heterosexual sex partners. Syphilis was present in 29.5% of patients (n=452); gonorrhoea, in 13% (n=200), HSV-2, in 3.2% (n=49), chlamydia, in 4.7% (n=72) and chancroid, in 1.3% (n=20).

CONCLUSION: This report establishes baseline local prevalence rates for STIs. Syphilis emerged as the most prevalent STI in Faisalabad. Population-based studies are required to study the epidemiology of STIs, along with initiation of national health-education campaign.

Not all sexually transmitted infections (STIs) are reproductive tract infections, nor are all reproductive tract infections sexually transmitted. The 'ST' in 'STI' denotes the manner of transmission of infection, while reproductive tract infection refers to the site of infection. In 1999, 340 million new cases of four curable STIs (gonorrhoea, chlamydia, syphilis and trichomoniasis) occurred. These infections represent a major global health problem leading to morbidity, mortality and stigma. Control of STIs has been given priority since the advent of the HIV/AIDS epidemic, in recognition of their role in facilitating the sexual transmission of HIV. Although the course of many of these STIs is benign even without treatment, some infections may lead to long-term sequelae, including pelvic inflammatory disease, infertility and cervical cancer. Their epidemiological profile varies with geography and depends upon ethnic, de-

mographic, social and economic factors.¹⁻³

Pakistan is the second most populous Muslim-majority country, with an estimated population of 169 639 500 in 2010. Faisalabad, located in the north-east region, was founded in 1892 as an agricultural market and has grown into a large metropolitan city. Also known as "the Manchester of Asia," Faisalabad is renowned for textiles, engineering, chemicals, food processing, hosiery, printing, publishing, pharmaceuticals and household power loom units.

Religious and social ethics are highly admired and deeply ingrained in the Pakistani society. Many people in Pakistan are severely disadvantaged in terms of income, education, power structure, or gender. Addressing these basic issues of human rights lies at the core of achieving better health outcomes. Certain key features have a direct bearing on Pakistan's health-delivery system: the population size and distribution,

the country's geography, the gender ratio and the socio-economic development of people. The majority of the population, 69%, is rural. Poverty is widespread—31% of Pakistanis subsist on US\$1 per day, and 85% earn less than US\$2 per day. With only 22% of the population economically active, the proportion of people officially unemployed is currently 20%. All these factors are compounded by cultural practices. Pakistan is a male-dominated society, and prejudice against women is reflected in the higher female mortality rate and low literacy rate. This combination of factors gives rise to strong negative repercussions on health.³⁻⁷ Dynamic changes in clinical patterns of STIs must be acknowledged and tracked in populous cities like Faisalabad. The present study assesses the prevalence and knowledge of some common STIs in Faisalabad, Pakistan.

PATIENTS AND METHODS

There was no information on the prevalence of STIs among Faisalabad residents prior to this study. In the general population, sampling was not possible due to social, ethical and religious issues. For this reason, convenience sampling was used. In this cross-sectional observational study, respondents were selected from the Outpatient Departments of the District Head Quarter Hospital and Allied Hospital, Faisalabad, using a multistage systematic sampling method. Multistage sampling involved sample selection over at least three stages. At the first stage, large groups with various infections were selected. At the second stage, a sample with selected STIs was determined; and at the third stage, those who gave consent were included in the study.

Data were collected through behavioral questionnaires (appendix) and biological tests. A pre-coded questionnaire was the survey instrument. Trained investigators pre-tested the validity and reliability of the questionnaire before use. Privacy and confidentiality were maintained for all aspects of the study—history taking, examination and sampling. The Ethical Committee of Punjab Medical College, Faisalabad, reviewed the protocols, gave ethical approval for the study, and its recommendations were included in the study. Before data and sample collection, a workshop was organized to familiarize the study team with standard procedures. Consenting participants were interviewed by a physician trained to make in-person assessment in the following areas: socio-demographic characteristics (age, religion, civil status, education, occupation) and risk factors for STI (current signs of STI, number of marriages and extramarital relationships, symptoms of STI in the past, current symptoms of vaginal/urethral discharge, and medical history).

Clinical screening was performed, including a speculum and bimanual examination for signs of STI not noticed by patients.

Five common STIs were screened through laboratory assessments: syphilis (Venereal Disease Research Laboratory test [VDRL], *Treponema pallidum* hemagglutination [TPHA], and rapid plasma reagin [RPR]), gonococcus (positive oxidase reaction, gram-stain, culture in modified Thayer-Martin (MTM) medium, and carbohydrate utilization patterns), genital herpes (immunofluorescent assay, Tzanck test), chlamydia (direct immunofluorescence test), and chancroid (direct immunofluorescence test, culture, coagglutination). Both internal and external quality control mechanisms were ensured. Kits and reagents were purchased from reputable companies, and manufacturers' guidelines were followed for collection, storage and analysis.

RESULTS

Of the 1532 patients who consented to participation, most infections were among people aged 30 to 45 years (Table 1). The mean age of the participants was 38.9 (9.4) years (males, 37.8 [10.18] years; females, 35.5 [6.3] years). Approximately 63.3% of patients (n=970) were from rural suburbs. Male gender (n=1276, 83.3%) and low socioeconomic class (n=1026, 67.0%) were dominant. Most patients (n=1370; 89.4%) were married. About 79% of patients (n=1210) never attended school, while 21% (n=322) had attained primary/high school or higher education. Fifty-five (3.59%) patients were unemployed, 491 (32.0%) were self-employed and 986 (64.4%) were employees.

Nine hundred seventy-two (63.4%) patients were heterosexual, while 458 (29.9%) had both same-sex and opposite-sex partners. The majority of patients (57.0%) refused to disclose the number of past or present partners; 28.5% (n=437) reported having two or more partners. Approximately 20% (n=306) were condom users, 45.4% (n=691) had heard of or seen condoms but never used them, and 34.7% (n=531) did not respond to the query. Nearly 60% of patients (n=913) were aware of the modes of transmission of STIs, complications, and HIV/ AIDS; and 324 (21.2%) patients knew about precautionary methods for safe sex.

Four bacterial species—*Chlamydia trachomatis*, *Treponema pallidum*, *Neisseria gonorrhoeae* and *Hemophilus ducreyi*—and one viral herpes simplex virus, HSV-2, were identified (Table 2). Genital ulcer was the most common presenting complaint (n=452, 29.5%). Painful, tender ulcers (duration of 7 days to 3 weeks) were recurrent and grouped.

Table 1. Sociodemographic and behavioral characteristics of study participants (n= 1532).

Mean (standard deviation) age in years	38.9 (9.4)
Sex	
Males	1276 (83.3)
Females	256 (16.7)
Marital status	
Single	22 (1.43)
Married	1370 (89.4)
Divorced	25 (1.6)
Widowed	33 (2.2)
No response	82 (5.5)
Living area	
Urban	562 (36.7)
Rural	970 (63.3)
Education	
Illiterate	1210 (79.0)
Literate	322 (21.0)
Economic status	
Low	1026 (67.0)
Middle	410 (26.8)
High	96 (6.3)
Occupation	
Self-employed	491 (32.4)
Employee	986 (64.36)
Unemployed	55 (3.6)
Sexual preferences	
Homosexual	102 (6.7)
Heterosexual	972 (63.4)
Homosexual+Heterosexual	458 (29.9)
Number of partners	
1	222 (14.5)
>1	437 (28.5)
No response to either	873 (57.0)
Do you know about condoms?	
Yes	691 (45.1)
No	819 (53.5)
No response	22 (1.4)

Table 1 (Contd...)

Table 1 (cont.). Sociodemographic and behavioral characteristics of study participants (n= 1532).

Do you use condoms?	
No	695 (45.4)
Yes	306 (20.0)
No response	531 (34.7)
Aware of modes of transmission of STIs, complications, HIV/AIDS	
Yes	913 (59.6)
No	619 (40.4)
Aware of safe sex/precautionary methods	
Yes	324 (21.2)
No	874 (57.0)
No response	334 (21.8)

Values are number (percent) unless otherwise indicated.

Table 2. Prevalence and clinical presentation of STIs in 1532 participants.

STI	Pathogen	Cases n (%)	Common clinical manifestations
Active syphilis	<i>Treponema pallidum</i>	452 (29.5)	Genital ulcer
Gonococcus	<i>Neisseria gonorrhoeae</i>	200 (13)	Urethritis, epididymitis, cervical inflammation
Genital herpes	Herpes simplex virus type 2	49 (3.2)	Watery blisters in the skin of the mouth or genitals
Chlamydia	<i>Chlamydia trachomatis</i>	72 (4.7)	Purulent exudate, unusual vaginal discharge
Chancroid	<i>Hemophilus ducreyi</i>	20 (1.3)	Ulcers in fourchette and labia minora

DISCUSSION

STIs have a great impact on the health of populations worldwide. STIs may be contracted by people of any age, race or social standing, and their early diagnosis and treatment are necessary to avoid propagation. Sexual education is fundamental to STI prevention.⁸ Wide disparities and racial gaps in STI rates are evident. Prevalence data are important for the surveillance of STIs. However, no data on STI rate (cases over time) or prevalence assessment was previously available in the study region.

Syphilis emerged as a major STI in Faisalabad. Syphilis, caused by *Treponema pallidum*, facilitates the transmission of HIV.^{1,2} We observed a 29.5% prevalence of syphilis, which supports the studies by Basal et al⁹ and Rehan,¹⁰ reporting 32.4% and 31.6% syphilis infection rate, respectively, in the region. In the United States, the rate of syphilis infection was 2.1 cases per 100 000 persons in 1999.¹¹ Syphilis infection has reached alarming rates (13.8%-19.5%) in China.¹² In the Peruvian Amazon, it was 6.3%.¹³ Different studies have reported the prevalence of active syphilis as follows, 9% in Northwestern Tanzania, 1.8% in China, 4% in South Africa and 0.2% in South Korea.¹⁴⁻¹⁷ In the rural population of Punjab, India, syphilis was altogether absent.¹⁸

The World Health Organization estimates that 92 million *Chlamydia trachomatis* (CT) infections occurred worldwide in 1999.¹⁹ Our estimates of chlamydia prevalence were broadly comparable with those reported in other population-based studies showing prevalence rates ranging from 4.1% to 5.2%.^{15,20-24} In a population-based study from the Netherlands, CT prevalence was 2.0%.²⁵ Most of the 11.3% of the Barbados population infected with CT urogenital infection were asymptomatic.²⁶ The CT infection rates in Northern Canada, Alaska and Greenland were reported to be 1.69%, 0.72% and 5.54%, respectively.²⁷ Jindal et al¹⁸ reported a CT-infection rate of 1% in the rural population of Punjab, India.

Neisseria gonorrhoeae infection is a common bacterial STI.²⁸ The 13% prevalence observed in our study was not comparable to that (27.5%) reported by Rehan.¹⁰ A 31.5% prevalence of gonorrhoea was observed among STI patients attending hospital in Farwaniya, Kuwait.²⁰ Gonorrhoea accounted for 85% and 71% of male urethral discharge presentations in Cape Town and Johannesburg, South Africa, respectively.²⁹ Among men with the complaint of urethral discharge, *Neisseria gonorrhoeae* was identified in 35% in Karnataka state, South India.³⁰ In contrast, miners in Yunnan, China, had a 0.8% prevalence of *Neisseria gonorrhoeae*.¹⁵ Gesink et al²⁷ summarized published and unpublished rates of gonorrhoea infections reported from 2003 through 2006 in Arctic communities. Greenland consistently reported the highest rates of gonorrhoea (1.74%); Northern Canada reported a 0.25% rate of gonorrhoea infection. The overall prevalence of gonorrhoea in the United States was reported to be 0.43%, with substantial racial/ ethnic disparities in the prevalence of gonococcal infections also observed.²⁴

Genital herpes simplex virus type 2 (HSV-2) is an

increasingly important cause of genital ulcer disease (GUD).^{31,32} Our observed 3.2% prevalence of genital herpes was in accordance with the results of the studies by Mir et al³³ and García-Corbeira et al.³⁴ The overall HSV-2 seroprevalence in the United States was 21.0% in 1988-1994, 17.0% in 1999-2004,³⁵ and 16.2% in 2005-2008.³⁶ HSV-2 was identified in 85.2% of STI clinic attendees in Delhi, India.³⁷ A cross-sectional study reported an HSV-2 prevalence of 4.8% in Turkey.³⁸ In the 1997-1998 German National Health Survey, the seroprevalence of HSV-2 was 13.3% in Germany, 16.5% in the former East Germany and 12.6% in the former West Germany.³⁹ The prevalence of HSV-2 was 9.6% among miners in China¹⁵ and was estimated at 15% in Chennai, India.⁴⁰ A population-based study demonstrated a 12% prevalence of HSV-2 in Australian adults.⁴¹ Among the Korean population attending public health centers, HSV-2 seroprevalence rates for those aged <20, 20-40 and >40 years were 22.6%, 32.7% and 32.3%, respectively.⁴²

During infection, *Hemophilus ducreyi* thrives in the extracellular environment comprised of antibacterial components, such as phagocytes, of the innate and adaptive immune responses.⁴³ Our observed prevalence of *H ducreyi* infections (1.4%) was in accordance with that reported in Durban, South Africa (1.2%).⁴⁴ Five-year (1995-1999) surveillance for STIs in Saudi Arabia indicated a 0.2% prevalence of chancroid.⁴⁵ Contrary to our findings, *H ducreyi* occurrence rates of 3% in Paris, 13% in Kuwait and 17.2% in rural Pakistan have been reported.^{20,46,47}

Lack of knowledge and misconceptions in beliefs and attitudes were prominent in our cohort, as reported earlier.⁴⁷⁻⁴⁹ Although relatively fewer numbers of sexual partners per subject were reported in this study, consistent condom use was low. There is an acute need to enhance condom usage and STI-related counseling. In addition, health services need to be modified to ensure early diagnosis and treatment. Pakistan is a Muslim country where lay knowledge regarding STIs is poor. Surveillance arrangements are limited and frequently ignored, with the result that the true incidence of STIs is unknown. Modern diagnostic techniques are not widely deployed, and there is little standardization of medical arrangements.

A major barrier we observed was the difficulty in obtaining STI prevalence data from women. Female participants were shy about pertinent queries. The lower number of female patients in our study can be justified by the fact that the majority of Pakistani women consult gynecologists, family elders, local ha-

keems, or daies (untrained local women who help in delivering children at home). Family and spousal pressures limit their approach to male physicians. Most female participants were employed in domestic chores and were dependent on men and may have had limited decisive power in their sexual relationships. Another constraint was that sampling was limited to interviewees, who can under-report risk behavior. People also sometimes contact pharmacies or traditional healers instead of health care facilities, and self-medication or alternative therapies may worsen or improve STIs. Many people generally consult local *hakeems* (homeopathic doctors) and seek medical advice only when pain is intolerable. Therefore, the differences in STI prevalence between this study and other studies may be attributed to the difference in setting, social beliefs and level of awareness about complications between the study populations.

The factors that determine health behaviors in Pakistan may be seen in various physical, socioeconomic, cultural and political contexts. Religious and social ethics discourage open discussion of sexual matters. The low social status of women limits their economic options, and women may exchange sex for money or other forms of support. Poor health services offer little for the prevention and treatment of STIs. Various factors, including proximity, affordability, availability, family pressure and strong community opinion, lead to self-care and consultation with traditional healers, *hakeems* or even quacks.⁵⁰ Long-held misconceptions continue to contribute to the national neglect of STI treatment and prevention. Prompt STI detection, prevention and STI-related counseling in STI clinics for vulnerable groups, as well as educational interventions, should be the requisites of public and private health sectors in Pakistan.

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Appendix 1. Behavioral Questionnaire.**PRO FORMA**

DEPARTMENT OF DERMATOLOGY

DHQ/ALLIED HOSPITALS, PUNJAB MEDICAL COLLEGE, FAISALABAD

(STI CLINIC)

Patient # (for STI Project only): _____ Date: _____

Demographics			
Name: _____	Age: _____ years	Sex: Male/ Female	
Religion: _____	Education: _____	Income: _____	
Occupation: _____			
Economic status:	Low	Middle	High
Marital status:	Single	Married	Divorced
	Widowed		
Number of marriages:		Extramarital relationships: Yes	No
Living area:	Urban	Rural	
Travel abroad:	Yes	No	Country (if yes):
Address:			
Symptoms: Urethral discharge ----- Genital discharge -----			
Dysuria ----- dyspareunia ----- Pruritus ----- Pain -----			
Signs: Genital ulcer -----			
Discharge ----- Tenderness -----			
Lymphadenopathy ----- Cutaneous rash -----			
Previous Treatment Investigations: Blood C/E ----- Urine C/E ----- Urine C/S ----- Semen C/S ----- Urethral smear ----- VDRL ----- TPHA ----- TPI -----			
Provisional Diagnosis:			
Fresh Laboratory Investigations:			
Final Diagnosis:			
Suspected case for HIV/AIDS: (Yes / No)			
Sexual Preferences			
Homosexual	Heterosexual	Homosexual +	
Heterosexual			
[A] Average number of previous partners:			
≤ 2	3-5	6-10	11-25
[B] Average number of present partners:			
≤ 2	3-5	6-10	11-25
No response to [A], [B]			
Personal Risk Perceptions			
Do you know about condom?			
Yes	No	No response	
Use of condom			
Yes	No	No response	
Aware of modes of transmission of STIs, complications, HIV/AIDS			
Yes	No	No response	
Aware about safe sex/precautionary methods			
Yes	No	No response	

Sample #

Physician Comments:

Signature

Date