

Prevalence and Awareness of Sexually Transmitted Infections among Inmates of a Drug Rehabilitation Center in Saudi Arabia: A Cross-Sectional Study

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Abstract

Background: Drug addicts constitute a high-risk group for the transmission of HIV and other Sexually Transmitted Infections (STIs). The aim of the study was to screen inmates at a drug rehabilitation center for the presence of commonly occurring STIs. We also aimed to correlate the prevalence of STIs with injecting and non-injecting drug use and awareness about the prevention of STIs.

Methods: This cross-sectional study was conducted on a convenience sample of 115 inpatients at Al Amal Hospital for the Treatment of Addiction and Rehabilitation between September 1, 2011 and November 1, 2012. Demographic data, use of intravenous and other addictive drugs, and awareness about condom use for protection against STIs were documented. Blood samples were collected, and serum and DNA were extracted to test for HIV and Hepatitis B Virus (HBV) using enzyme-linked immunosorbent assay and for syphilis using polymerase chain reaction. The data were analyzed using the Statistical Package for the Social Sciences.

Results: Of the total participants, 18 had one or more STIs, including syphilis (n=11), HIV (n=5), HBV (n=5) and combined HBV and syphilis (n=3). The prevalence of STIs was higher among injecting drug users than among non-injecting drug users. Compared to the group that did not have STIs, very few participants who were positive for STIs were aware that condoms provided protection against STIs.

Conclusions: The prevalence of HIV, HBV and syphilis among male drug addicts in Saudi Arabia is very high. Healthcare providers should focus on raising awareness and providing treatment and counselling to this high-risk population.

Keywords: Drug addicts; Hepatitis B; HIV; Injecting drug use; Sexually transmitted infections; Syphilis

Introduction

Alcohol and substance abuse is associated with considerable health risks. Psychological and physical harm is noticed before an individual becomes addicted, sometimes even after one instance of substance abuse [1]. Substance abuse can cause potentially permanent damage to almost all organs, and there are additional risks associated with the lifestyle of substance abusers. There is a higher tendency for risky behavior, which is associated with the spread of Sexually Transmitted Infections (STIs). According to a World Health Organization report [2], cocaine use is largely restricted to the Americas, the European Union, and the developed countries of the Oceania, while opioid abuse is apparently restricted to Asian, eastern and central European countries, as well as developed countries of Oceania, North America and countries of the European Union. In Saudi Arabia, substance abuse has emerged as an important public health issue, especially among the younger generation [3]. However, the Saudi Arabian society is bound by considerable cultural and social restrictions, which may prevent addicts from admitting to drug abuse. This also makes it difficult to target this group to spread awareness about STIs and their diagnosis and treatment.

Most countries have realized the importance of screening for STIs, but preventing the spread of STIs, such as HIV, hepatitis B, Chlamydia trachomatis, and Neisseria gonorrhoeae infections remains a public health challenge [4]. In the United States, multiple agencies have drawn up guidelines or recommendations for the prevention and control of HIV infection and other STIs, viral hepatitis, and tuberculosis among illicit drug users. The aim of these regulatory agencies is to establish integrated services for the prevention of transmissible diseases, to provide illicit drug users with better access to services, to ensure timely service delivery, and to increase the effectiveness of efforts directed at preventing infectious diseases that share common risk factors, behaviors and social determinants. Both treatment of infectious diseases and treatment of substance use and mental disorders contribute to the prevention of transmission of infectious diseases [5].

Injecting Drug Users (IDUs) are at a high risk of infection with blood-borne viruses including HIV, hepatitis B, and hepatitis C, and they are increasingly being targeted by policies that aim at preventing the spread of HIV [6]. Approximately 10% of HIV infections worldwide are transmitted via injecting drug use [7]. Many countries in Asia, including Thailand, Myanmar, Indonesia, Bangladesh, Nepal and India, have reported serious HIV epidemics among IDUs [8]. Injecting drug use is an efficient and prevalent mode of HIV transmission, and it is the principal mode of transmission in some parts of the world. In the United States, approximately 10,000 IDUs

are believed to acquire HIV each year, and they account for 8% of new HIV infections and 16% of people currently living with HIV (CDC Report, 2012) [9]. Increasing the number of HIV-infected IDUs who undergo diagnosis, increasing their access to care and prevention services, and increasing their adherence to a therapeutic regimen are the current challenges in tackling the HIV epidemic in this population. To overcome these obstacles, clinicians must have both the technical knowledge and skill required for assisting patients [10]. The timeliness of HIV diagnosis and the initiation of antiretroviral treatment are major determinants of survival for HIV-infected people. IDUs are less likely than non-users in other transmission categories to seek early HIV counselling, testing and treatment. To improve the survival of IDUs, HIV prevention efforts must ensure early access to HIV testing and care, as well as encourage adherence to antiretroviral treatment to slow disease progression [11].

Syphilis data from the CDC in the United States showed a 12.4% increase in the number of cases of early latent-phase syphilis (up to 9,186 cases) and a 11.8% increase in the number of cases of primary and secondary syphilis in the year 2006 compared with 2005 [12]. In addition, a relatively higher rate of HIV co-infection is reported in individuals infected with syphilis. According to a study conducted in a hospital in Ethiopia, there is a high risk of syphilis infections in blood donors and also in people who share needles for drug injection [13]. Hepatitis B can be transmitted by percutaneous or mucous membrane exposure to infectious blood or fluid, and therefore screening for Hepatitis B Virus (HBV) is mandatory for STI-positive patients, especially IDUs. Awareness about the modes for acquiring and transmitting STIs is a very important prelude to preventing them. Hence, large-scale screening programs are required for early screening and detection of these diseases in order to facilitate appropriate treatment.

The STIs that receive the major focus in Saudi Arabia are HIV, hepatitis B, chlamydia and syphilis. Information about STIs in Islamic countries, where non-marital sex and homosexuality are prohibited by religion, is notably limited. An assumed low prevalence of STIs and religious and cultural intolerance of non-marital sex and homosexuality in Islamic countries are the reasons for the limited data [14]. Detailed information on HIV in Saudi Arabia was recently published for the first time; however, data on other STIs from this Islamic country have not been published [15]. Therefore, there is definitely a need for more data on the prevalence of STIs in the Saudi Arabian population, especially among high-risk groups such as drug users. There is also a need for large-scale screening programs at hospitals and rehabilitation centers, and we believe that this study lays the groundwork for such a screening system.

Our study aims to screen for three major STIs, namely, HIV, HBV and syphilis, using Enzyme-Linked Immunosorbent Assay (ELISA) tests for the first two and a Polymerase Chain Reaction (PCR) test for syphilis. The use of PCR will facilitate rapid screening of a large number of samples within a short period of time, and this technique can therefore be used in routine screening programs at various hospitals in order to increase awareness. Our aim is to first screen high-risk groups, and with this in mind, we have conducted this preliminary study on drug addicts. Once a disease is confirmed, we propose that the patients be given STI treatment as well as counsel on the risk of transmission.

Materials and Methods

Patients and procedure

We performed a cross-sectional study between September 1, 2011 and November 1, 2012 at Al Amal Hospital for the Treatment of Addiction and Rehabilitation. The target population consisted of a convenience sample of inmates at the rehabilitation hospital.

The laboratory technician explained the nature of the study and distributed pamphlets that described the most common STIs to all patients who agreed to participate in the study. Written informed consent was obtained from the patients prior to screening. All patients were assured of the confidentiality of the data.

We collected data regarding the patients' age, marital status, level of education, the type of drug they were using and their awareness about condom use for protection against STIs. Injection drug users were defined as patients who had injected heroin, cocaine, amphetamine, or morphine and were receiving treatment for their addiction.

Blood samples were collected and screened for HIV, HBV, and syphilis using the ELISA and PCR techniques. ELISA was used to detect HIV and HBV since it is the most widely accepted method for rapid testing. We used a PCR-based technique for syphilis because we wanted to explore the possibility of accurately testing for syphilis using the Nucleic Acid Amplification Test (NAAT), which is now rapidly replacing traditional methods of STI testing. Whole blood samples (5 ml) were collected in ethylenediaminetetraacetic acid tubes from the volunteers by trained phlebotomists, transported to the labs in cold storage containers, and stored at 4°C for further processing to extract DNA. DNA was extracted from whole blood using the Qiagen blood DNA extraction kit. DNA samples were then stored at -20°C. HIV 1/2 antibodies and hepatitis B antibodies obtained from Ranbaxy were used for ELISA, which was conducted with the ELISA kit using standard protocols. Bangalore Genei Primers and PCR reagents were used for PCR-based detection of syphilis, and the primers used were 5'-TGC GCG TGT GCG AAT GGT GTG GTC-3' (forward primer) and 5'-CAC AGT GCT CAA AAA CGC CTG CAC G-3' (reverse primer). The PCR protocol used was as follows: 35 cycles of initial denaturation at 95°C for 5 min, annealing at 60°C for 1 min, extension at 72°C for 5 min, and final extension at 72°C for 5 min. The expected size of the amplified product was 185 bp.

The results of the STI tests were provided to the medical healthcare provider at the rehabilitation center, so that appropriate treatment could be given to the infected inmates.

Statistical analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, US), version 20. Frequency distribution and descriptive statistics were computed for demographic data, and the chi-square test was used to compare the relationship between categorical variables. Results were expressed as frequency (percent) and as mean \pm Standard Deviation (SD). The significant level was set as $\alpha=0.05$.

Approval to conduct the study was granted by the Institutional Review Board of the Ministry of Health (Western Province, Saudi Arabia).

Results

The mean (SD) age of the participants was 29.9 ± 9.0 years. Among the 115 participants, 75 (65.2%) were single, 29 (25.2%), married, and nine (7.8%) were divorced. Two participants did not state their marital status. With respect to education, 41 (35.7%) were illiterate, 10 (8.7%) had completed primary school, nine (7.8%) had completed high school, 35 (29.6%) were educated at college level and 20 (17.4%) were in the medical field. With regard to employment status, 49 (42.6%) were jobless, 48 (41.7%) were still studying and 14 (12.2%) were employed. Four patients (3.5%) did not respond to this question. When the participants were asked about the protective effect of condom use during sex, 82 (71.3%) thought that condoms provide 100% protection from HIV/STIs, 23 (20.4%) thought that condoms do not provide 100% protection against HIV/STIs, eight (7%) were

uncertain, and two did not respond to the question. With regards to addictive drug use, 57 participants (49.5%) used more than one addictive drug, 70 were addicted to hashish (60.9%), 61 used Captagon (fenethylamine) (53%), 33 used heroin (28.7%), 22 used alcohol (19.1%); five used amphetamines (4.3%), four used cocaine, two sniffed glue, and one participant chewed tobacco (noshog) or morphine.

Of the 115 participants, 18 were positive for one or two STIs, including HIV (n = 5), HBV (n = 5), and syphilis (n = 11). Three of the eleven patients with syphilis also had HBV. More than half of the patients (55.5%) in the group with STIs were addicted to hashish (Tables 1 and 2). Up to 55.5% of the patients in the STI-positive group were IDUs as compared with the 32.9% who were IDUs in the STI-negative group.

Serial number	HIV	HBV	Syphilis	Drug type
8			Positive	Captagon
15			Positive	Heroin
19			Positive	Heroin
2		Positive	Positive	Captagon, heroin
9	Positive			Refused to disclose the type of addiction
20			Positive	Captagon, heroin, hashish, cocaine
16	Positive			Captagon
18	Positive			Hashish, alcohol
21			Positive	Amphetamines
3		Positive	Positive	Refused to disclose the type of addiction
6		Positive	Positive	Hashish, Captagon
22			Positive	Hashish, <i>noshog</i>
25			Positive	Hashish
29			Positive	Hashish
53		Positive		Hashish, Captagon
65		Positive		Hashish, Captagon
41	Positive			Hashish, Captagon
42	Positive			Hashish, Captagon, heroin

Table 1: Results of screening for sexually transmitted infections and type of drug used, Abbreviations: HBV, hepatitis B virus; HIV, human immunodeficiency virus.

Addictive substance	STI-positive (n = 18)	STI-negative (n = 97)
Hashish	10 (55.5)	60 (61.8)
Captagon	9 (50.0)	52 (53.6)
Heroin	5 (27.7)	28 (28.8)

Alcohol	1 (5.5)	21 (21.6)
Amphetamine	1 (5.5)	4 (4.1)
<i>Noshog</i> (chewing tobacco)	0 (0.0)	1 (1.0)
Cocaine	4 (22.2)	0 (0.0)
Morphine	0 (0.0)	1 (1.0)
Gheraa	0 (0.0)	2 (2.1)

Table 2: Comparison of addictive substance use in positive and negative cases of sexually transmitted infection^a, Abbreviation: STI, sexually transmitted infection. ^aData are presented as frequency (percent).

The mean age of the infected patients was 29.6 ± 13.7 years. Patients who were STI-positive were, in most cases, illiterate and jobless. They were also more likely to be married and middle-class citizens (Table 3).

Patients who were STI-negative were more likely to believe that condoms could protect them against STIs and to know how to protect themselves against these infections (Table 4).

Variables	STI-negative (n=97)	STI-positive (n=18)	Total	P-value
Marital Status				
No Answer	0 (0.0)	2 (100.0)	2 (100.0)	0.001
Single	68 (90.7)	7 (9.3)	75 (100.0)	
Married	21 (72.4)	8 (27.6)	29 (100.0)	
Divorced	8 (88.9)	1 (11.1)	9 (100.0)	
Mode of living				
No answer	0 (0.0)	2 (100.0)	2 (100.0)	0.006
Apartment	35 (81.4)	8 (18.6)	43 (100.0)	
Apartment Owner	47 (87.0)	7 (13.0)	54 (100.0)	
Rented Villa	2 (66.7)	1 (33.3)	3 (100.0)	
Villa Owner	13 (81.4)	0 (0.0)	13 (100.0)	
Education				
Illiterate	31 (75.6)	10 (24.4)	41 (100.0)	0.200
Primary	9 (90.0)	1 (10.0)	10 (100.0)	
Secondary	9 (100.0)	0 (0.0)	9 (100.0)	
College	48 (87.3)	7 (12.7)	55 (100.0)	
Work				
No Answer	2 (50.0)	2 (100.0)	4 (100.0)	0.09
Yes	14 (100.0)	0 (0.0)	14 (100.0)	
No	40 (81.6)	9 (18.4)	49 (100.0)	
Student	41 (85.4)	7 (14.6)	48 (100.0)	

Table 3: Association between infection rate and various parameters^a. ^aData are presented as frequency (percent) unless otherwise specified. Abbreviation: STI, sexually transmitted infection.

Variables	STI-negative (n=97)	STI-positive (n=18)	Total	P-value
Do you know how to protect yourself from STIs?				
No answer	1 (33.3)	2 (66.7)	3 (100.0)	0.048
Yes	78 (85.7)	13 (14.3)	91 (100.0)	
No	18 (85.7)	3 (14.3)	21 (100.0)	
Do you think condoms will completely protect you against STIs?				
No answer	0 (0.0)	2 (100.0)	2 (100.0)	<0.001
Yes	75 (91.5)	7 (8.5)	82 (100.0)	
No	22 (71.0)	9 (29.0)	31 (100.0)	

Table 4: Comparison of awareness between patients who tested positive and those who tested negative for sexually transmitted infections^a, ^aData are presented as frequency (percent) unless otherwise specified. Abbreviation: STI, sexually transmitted infection.

Discussion

In this study, we found that the prevalence of STIs was high among drug users at Al Amal Hospital. Moreover, substance users with STIs generally had lower education levels, came from a middle class background, and were generally unemployed and single. These factors therefore could increase the chances of acquiring an STI.

In this study, participants were screened for infections that can spread via needles and through an intravenous route, including HIV, HBV, and syphilis. Of the total participants, 15.7% were positive for one or more STIs. This rate is higher than that reported by a study conducted in Texas [16], which showed that among 407 drug abusers, 62% had markers for at least one STI. Moreover, in our study, the use of injectable drugs was more common in the group with positive results for STIs: 55.5% of the members of this group were IDUs, while 32.9% of the participants in the non-STI group were IDUs. This has also been reported by another study, which showed that IDUs have a high risk of acquiring STIs [17]. However, non-IDUs also carry a significant risk [18]. All these findings indicate that STIs and drug abuse are inter-related and that the treatment of one should be accompanied by screening for and, if required, treatment of the other.

We found that participants who tested positive for STIs had much lower awareness about the use of condoms for protection against STIs. Given the lack of awareness and the high percentage of IDUs, care providers at Al Amal Hospital should redouble their efforts toward providing the necessary awareness to help drug users protect themselves. Drug users should be educated about the necessity of adopting protective measures (condom use and avoidance of syringe sharing) for the prevention of STIs [19]. In Saudi Arabia, medical means are used in concert to prevent the spread of STIs: HIV-negative partners of HIV-positive patients are instructed to use condoms during sexual intercourse and non-immune hepatitis B-negative partners of hepatitis B-positive patients are routinely vaccinated [20]. Based on the findings of our study, special attention should be paid to addicts, especially those with lower education, as compliance may pose a major obstacle. Voluntary testing and counseling for HIV or STIs, accompanied by referral to drug treatment programs may reduce the incidence of unprotected sex and the incidence of sexual intercourse while under the influence of drugs [21].

On analyzing various parameters that correlate with infection, we observed that marital status and mode of living were two statistically significant parameters that affected STI occurrence. Infection rate is higher among married people; this was probably because participants were less likely to use condom, as has been shown previously [22]. Additionally, they tended to be of a lower socio-economic class. Furthermore, we found a significant association between the absence of STIs and awareness about STIs and modes of protection. This suggests that people who are aware of the modes of transmission and protection methods against STIs have a lower risk of acquiring diseases compared to individuals who lack this awareness.

The five addicts in this study who tested positive for HIV were not aware that they were infected, as we were unable to contact them for a confirmatory PCR test. We have handed over this responsibility to the rehabilitation center administration, so that they can take the necessary steps through official channels. From our experience, it is apparent that patients prefer to not confirm their diagnosis for fear of discrimination or rejection. Ignorance plays a major role as well, as lack of education and awareness about the seriousness of these diseases prevents patients from getting the necessary treatment and preventing their partners from contracting it [23]. Currently, mandatory screening for STIs is not part of the policy at addiction rehabilitation centers, and this contributes to the lack of accurate information about the prevalence of STIs among addicts. Even though the incidence of STIs is limited in Saudi Arabia, appropriate preventive strategies that conform to Islamic rules and values are essential and should be of the highest priority for policymakers, because of the potential for such infections to spread, particularly among the youth [15]. There is also a need to employ more primary health care workers to collect accurate and valid data about STIs [24].

Our study is a preliminary step towards establishing a regular screening program in high-risk populations. From the findings, we can conclude that the prevalence of STIs is considerable among drug users and that early diagnosis can pave the way for proper treatment as well as prevent transmission. Treatment and counseling about the risk of transmission were organized through the rehabilitation center administration for syphilis- and hepatitis-positive patients, but unfortunately neither us nor the hospital administration could communicate with the HIV-positive patients for further confirmatory testing and provide them appropriate counseling and treatment.

Encouraged by these preliminary findings, we plan to extend the study to other high-risk groups and ultimately formulate a comprehensive screening program that could provide insights into the spread of these STIs in Saudi Arabia.

Some limitations of this study warrant consideration. First, the number of participants is limited, and there is a need to validate these findings in a bigger population of drug users. Second, because our sample was a convenience sample, the results cannot be extrapolated to the population of illicit drug users in Jeddah, Saudi Arabia. Third, as mentioned before, we could not communicate with the HIV-positive patients for further testing to confirm the diagnosis and provide appropriate counseling and treatment. Nonetheless, this study adds considerable new information, as it is the first to report the prevalence of HIV, syphilis, and HBV among addicts in Saudi Arabia.

Conclusion

Male drug users in Saudi Arabia have lower education and come from a lower socio-economic class. The prevalence of STIs is high in this group, and it is especially high among IDUs than non-IDUs. Furthermore, their awareness about condom use for protection against STIs is low, so it is important for health care providers to implement measures to enhance awareness and improve the use of preventive measures in this high-risk population.

Competing Interests

The authors declare that they have no competing interests.

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