

## Prevalence of Syphilis and Human Immunodeficiency Virus in expatriates in Sharjah, United Arab Emirates

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**Abstract.** Data on the prevalence of sexually transmitted diseases in the United Arab Emirates (UAE) is lacking and scarce. This study was carried out to determine the prevalence of both *Treponema pallidum* (causative agent of syphilis) and HIV infections among expatriates in Sharjah, UAE. The study group (N = 20,670) included expatriate workers of both sexes undergoing mandatory pre-employment testing between May and June 2014. Detection of specific antibodies to *Treponema pallidum* and HIV antigens and antibodies was conducted using commercially available kits. Of the 20,670 samples screened for syphilis, one hundred and five (0.51%) tested positive. Expatriates from India (30.5%), Pakistan (25.7%), and Bangladesh (15.2%) showed the highest infection rate with *T. pallidum*. Moreover, three age groups were most affected with syphilis and a significant correlation was noted between age and *T. pallidum* infections ( $\chi^2 = 76.23$ ;  $p = 0.001$ ). Furthermore, an association was also observed between gender and infection with *T. pallidum* ( $\chi^2 = 3.37$ ;  $p = 0.04$ ). Of the 20,670 samples screened for HIV, three samples (0.014%) tested positive for HIV antibodies and antigen. The results were consequently confirmed by western blot assay. The prevalence of infection with *T. pallidum* and HIV was determined for the first time among expatriates in Sharjah providing policymakers with data which could be used to develop appropriate prevention and control strategies.

### INTRODUCTION

Sexually transmitted infections (STIs) are one of the most unrevealed health problems globally. One of the most common STIs is syphilis which is caused by the pathogen *Treponema pallidum*. Its main mode of transmission is by sexual contact. Other equally important modes of transmission include vertical transmission (mother to fetus), blood transfusion, and accidental inoculation. Population studies on various age and gender groups have shown the seroprevalence for most developing countries to range from 0.5 to 94% (WHO, 1995; WHO, 2001, 2012; Newman *et al.*,

2015). Venereal syphilis is uncommon in the United Arab Emirates (UAE) and other countries in the region. Moreover, to our knowledge, no data is available on the prevalence of this infection in the UAE.

Since its recognition in the eighties of last century, Acquired Immunodeficiency Syndrome (AIDS) has claimed many lives. Two virus variants, notably Human Immunodeficiency Viruses (HIV1 and HIV2) are known to be involved in AIDS. Forty million individuals are believed to be presently infected with HIV globally (Merson *et al.*, 2008; Shen & Siliciano, 2008), while an estimated 16,000 new infections are presumed to occur daily all over the world

(Gupta *et al.*, 2008; Alzahrani *et al.*, 2009). The incidence of HIV infection among adults in the Middle East is estimated to be 0.3%. However, there was a significant increase of 20% in 2002 (Oelrichs, 2004). In 2000, the cumulative number of HIV- infected individuals in Saudi Arabia was estimated to be 1,100 with an adult rate of 0.01% (Alrajhi, 2004; Madani *et al.*, 2004; Madani, 2006).

Expatriates form the driving workforce in the Gulf countries. In the UAE, pre-employment testing of expatriates for infectious diseases is a mandatory requirement. It applies to all jobs and all age groups. This includes screening for infectious agents such as Hepatitis B, HIV, TB, and syphilis. Currently, the assessment of the HIV infections in expatriate workers in the UAE depend on the simultaneous detection of HIV specific antibodies and antigen and results are confirmed by a Western Blot test. Syphilis diagnosis depends on the detection of specific antibodies to *Treponema pallidum*. Detection of both organisms reduces the risk of spreading the infection within the public. Expatriates identified as positive for syphilis are normally treated and are tested periodically for antibody presence. While information about STIs in Islamic countries is limited, no accurate / limited data is available on the prevalence and epidemiology of syphilis and HIV in UAE. Thus, in the present study, we aim to determine the prevalence and epidemiology of both syphilis and HIV among expatriate workers applying for various jobs in Sharjah, UAE.

## MATERIALS AND METHODS

Approval to use the data to conduct this study was sought from the Sharjah Public Health Clinic's Director. The study group from Sharjah, UAE included expatriate workers from 103 countries who underwent mandatory pre-employment testing for the months of May and June 2014 at Sharjah Municipality Public Health Clinic (SMPHC) (N= 20,670; mean age 33.9 years +/- 10.2). Jobs included domestic workers, farm workers, laborers and various other jobs. The

subjects involved in this study were from 103 countries with the majority originating mainly from India, Bangladesh, Pakistan, Afghanistan, Nepal, Philippines, Sri Lanka, Egypt, Ethiopia, Comoros Islands, Indonesia, Iran, Iraq, Sudan, Jordan, Morocco and Syria. Of the 20,670 study population, 15531 (75%) were males while 5139 (25%) were females. Table 1 shows the age group distribution of the study population. Blood samples were collected from expatriates who attended the SMPHC for overall checkup requirements to obtain license for working in the UAE. The collection of samples was performed in the months of May and June, 2014.

Detection of HIV specific antigens and antibodies was performed using Siemens Enzygnost HIV Integral II kit, according to the manufacturer's recommendations and results were confirmed by Western Blot tests. Detection of specific antibodies to syphilis was performed using Siemens Enzygnost Syphilis kit, according to the manufacturer's recommendations and results were confirmed by TPHA test. Data were analyzed statistically (Chi-square test) using IBM SPSS Statistics for Windows v. 22 (IBM Corp., Armonk, NY).

## RESULTS

Of the 20,670 samples screened for syphilis, one hundred and five (0.51%) tested positive; 87 (82.9%) were males and 18 (17.1%) were females giving a ratio of nearly 5:1. The prevalence distribution of *T. pallidum* infections in the different subpopulations that demonstrated positive results is shown in Table 2. The table also displays the number of negative results obtained for each of the nationalities found to be positive for *T. pallidum* antibodies. Results of the remaining 83 nationalities were all negative, thus the data was not included in Table 2. Positive samples distribution according to country of origin is shown in Figure 1. Individuals from India, Pakistan and Bangladesh showed the highest rate of infection with *T. pallidum* 32/105 (30.5%), 27/105 (25.7%) and 16/105 (15.2%); respectively. The prevalence of infection in these subpopulations according

Table 1. Age group distribution of the study population

Age Group	No.	Percentage
14 – 24	3618	17.5%
25 – 35	9287	44.9%
36 – 46	5127	24.8%
47 – 57	2108	10.2%
58 - 68	470	2.3%
69 - 79	60	0.3%
Total	20,670	100%

to nationality are India 32/8480 (0.38%), Pakistan 27/3086 (0.88%), and Bangladesh 16/2440 (0.66%). Table 3 demonstrates the distribution of the age groups and the result obtained by the whole study population. The age groups most affected were the 25 – 35, 36 – 46 and 47 – 57 years old (28.6%, 25.7% and 28.6% positive cases, respectively). A significant correlation was noted between age and *T. pallidum* infections ( $\chi^2 = 76.23$ ;  $p = 0.001$ ). Moreover, an association was also observed between gender and infection with *T. pallidum* ( $\chi^2 = 3.37$ ;  $p = .04$ ).

On the other hand, of the 20,670 samples that were tested for HIV antibodies and antigen, only three (0.014%) samples gave

Table 2. Distribution of *T. pallidum* results for the study subpopulations that tested positive

Nationality	Results		Total
	Negative	Positive	
Afghanistan	363	2	365
Bangladesh	2440	16	2456
British	88	1	89
Comorians	170	1	171
Ethiopia	120	2	122
Guinean	1	1	2
India	8480	32	8512
Iran	172	3	175
Iraq	126	1	127
Mauritania	1	1	2
Morocco	200	2	202
Nepal	691	4	695
Pakistan	3086	27	3113
Philippines	1499	4	1503
Romania	6	1	7
South Africa	6	1	7
Sri Lanka	348	1	349
Sudan	184	2	186
Thailand	10	1	11
Yemen	63	2	65
Total		105	

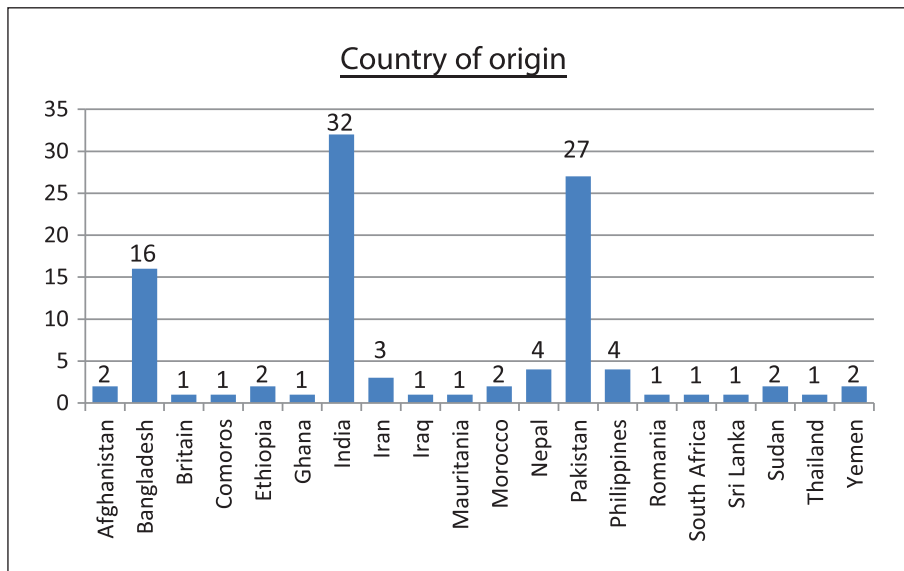


Figure 1. Graphical distribution of the syphilis positive study population (N=105) according to country of origin.

Table 3. Age groups and *T. pallidum* test results

Age Group	Result		Total
	Negative	Positive	
14 – 24	3611 17.6%	7 6.7%	3618 17.5%
25 – 35	9257 45.0%	30 28.6%	9287 44.9%
36 – 46	5100 24.8%	27 25.7%	5127 24.8%
47 – 57	2078 10.1%	30 28.6%	2108 10.2%
58 – 68	461 2.2%	9 8.6%	470 2.3%
69 – 79	58 0.3%	2 1.9%	60 0.3%
Total	20565 100.0%	105 100.0%	20670 100.0%

repeatedly positive results. All three samples were from males (two Indians and one Sudanese). The results were subsequently confirmed by HIV western blot assay.

## DISCUSSION

Many expatriates arriving into the UAE come from countries where *Treponema pallidum* and HIV are highly endemic and therefore may impact on the spread of these infections in the host country. In the present study, we have shown for the first time that the infection rate with *T. pallidum* was 0.51%. The highest rate of infection was observed in individuals from India 32/105 (30.5%), followed by Pakistan 27/105 (25.7%) and Bangladesh 16/105 (15.2%). Interestingly, the total number of Indian nationals in the current study was 8480 individuals, of which 32 cases (0.3%) were identified as infected with *T. pallidum*. This is similar to a study conducted by Makroo *et al.* (2015) in which a 0.23% infection with *T. pallidum* among blood donors in North India was reported. In Iran, Nasirian *et al.* (2015) reported an estimated incidence for syphilis of 0.04% per 1000 women and 0.005% per 1000 men.

An Egyptian study on the prevalence of syphilis antibodies in blood donors reported an overall prevalence of 0.13% (Hussein, 2014).

The vast majority of the study population included in this report come from low socioeconomic parts of their native countries and often are uneducated and illiterate. Thus, lack of information and knowledge may be a factor contributing to their exposure to infectious agents such as *T. pallidum* and HIV. Interestingly though, a significant correlation was noted between age, gender and *T. pallidum* infections  $p = 0.001$  and  $p = 0.04$ ; respectively. Moreover, the age distribution of the syphilis study sample was between 23 – 74 years with a mean of 42.43 years  $\pm$  12.21. The age groups most affected with syphilis in the present study were 25 – 35, 36 – 46 and 47 – 57 years old (28.6%, 25.7% and 28.6% positive cases, respectively) (Table 3). Newman *et al.* (2015) recently reported the estimates of the prevalence and incidence of four curable STIs (chlamydia, gonorrhoea, trichomoniasis, and syphilis) based on systematic review and global reporting between 2005 and 2012 among women and men aged 15–49 years, the estimated global prevalence of syphilis among women was 0.5% whereas among men was 0.48%. In the present study, the prevalence (0.5%) found was similar to the estimated prevalence reported by Newman *et al.* (2015). Unfortunately, the burden associated with the affliction of these particular age groups may result in the tragic weakening and debilitation of parents, productive individuals and their associated family members, health systems and governments alike.

The HIV prevalence among expatriates studied in this report was 0.014%. Only three subjects gave repeatedly positive results. All three samples were from males. The results were subsequently confirmed by HIV western blot assay. Similar to our study population, a study in the Eastern region of Saudi Arabia reported 0.11% HIV prevalence among expatriates (only one subject among 875 samples examined tested and confirmed positive). In Egypt, Hussein (2014) reported a prevalence of 0.07% among blood donors.

In the present study, the low prevalence rate of HIV indicates the accuracy of the adopted screening methods, both in the UAE and possibly in the expatriate's home country.

A significant limitation of the study was the inability to identify expatriates applying for residency for the first time from residents screened again for residency permit renewal to ascertain the possible source of spread and dispersion of the STIs right through the native Emirati local community and other groups of migrants. Furthermore, there is an urgent need for further studies within the native Emirati population before any conclusion can be made about expatriates transmitting STIs to the local community.

Results from this study highlight the necessity of effective interventions for STI prevention, screening, diagnosis, and treatment. Moreover, it also emphasizes the strict follow up on the treatment regimens for people identified as syphilis positive to prevent spread of the disease. Since the potential exists to acquire these infections locally, it is important to educate expatriates about the risk of contracting these diseases and provides health education programs in their gathering places, specially that most of them come from societies with high illiteracy levels.

The present study provides for the first time the epidemiology and rate of infection with *T. pallidum* and HIV among expatriates in the Sharjah emirate, providing policy-makers with data which can be used to develop appropriate prevention and control strategies. It also underscores the accuracy of the testing and screening methods for both pathogens locally.

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