

**Syphilis and Human Immunodeficiency Virus in Expatriates in
Sharjah, United Arab Emirates**

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DECLARATION

I, **Eihab Abdin Abdelaziz**, the undersigned, declare that this thesis submitted to the **University of Gezira** for the degree of MSc in Medical Laboratory Sciences to the Faculty of Medical Laboratory Sciences, and the work contained herein is my original work with exception to citations and that this work has not been submitted to any other university in part or in its entirety for the award of any degree.

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Date 30/ 1 /2016

Dedication

To all of you ...

Those who give my life meaning.

To My Parents ..

To My Supportive Wife ..

To Dr. Ali El Bakri ..

Eihab

Acknowledgements

My praise and thanks be to Almighty Allah the most gracious and most merciful who granted me the mind, health, strength and patience to conduct this study.

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Abstract

Sexually transmitted disease is frequently an unrevealed health issue. In the United Arab Emirates (UAE) data on the prevalence of these infections appear to be lacking and scarce. Therefore, this study was carried out to determine the prevalence of *Treponema pallidum* and HIV infections in expatriates in Sharjah, UAE. The study group (N = 20,548) included expatriate workers of both sexes who were undergoing mandatory pre-employment testing between the months of May and June 2014. Detection of specific antibodies to *T. pallidum* and HIV antigens and antibodies was performed using commercially available kits. Of the 20,548 samples that were screened for syphilis, one hundred and five (0.51%) tested positive for syphilis. The age groups 30-40 and 40-50 years old are most affected. Individuals from India (30.5%), Pakistan (25.7%), Bangladesh (15.2%); respectively showed the highest infection rate. No correlation between age (P=0.43), gender (P=0.46) and country of origin (P=0.72), and infection with *T. pallidum* was noted. Of the 20,548 samples that were screened for HIV, three samples only (0.014%) tested positive for HIV antibodies and antigen, repeatedly yielding positive results. The results were subsequently confirmed by western blot assay. The present study provides for the first time the prevalence of infection with *T. pallidum* and HIV among expatriates in Sharjah emirate. Similar studies in the other emirates will be of great value to provide an unambiguous picture of the frequency of infection with both organisms among the expatriate population in the UAE.

معدل انتشار مرض الزهري وفيرس نقص المناعة المكتسبة في أوساط المغتربين في الشارقة - الإمارات العربية المتحدة

إيهاب عابدين عبد العزيز جاد المولي

ملخص الدراسة

غالباً ما تعتبر الأمراض المنقولة جنسياً مشكلة صحية عالمية غير محددة المعالم. إن البيانات عن مدى انتشار هذه الأمراض في دولة الإمارات العربية المتحدة نادرة و تبدو وكأنها غير موجودة. لذلك أجريت هذه الدراسة لتلقى الضوء على مدى انتشار الإصابة بعدوى فيروس نقص المناعة المكتسبة (الإيدز) و مرض الزهري في أوساط المغتربين في الشارقة بالإمارات العربية المتحدة. أجريت هذه الدراسة على عدد (20,548) فرداً و شملت العمال المغتربين من كلا الجنسين الذين أجروا اختبار ما قبل التوظيف الإلزامي بين شهري مايو و يونيو 2014. بينت نتائج الدراسة أن (105) فرداً مصاباً بمرض الزهري من كامل عينة الدراسة البالغ (20,548)، و أن الفئات العمرية 30-40 و 40-50 عاماً هي الأكثر عرضة للإصابة. الأفراد من الهند (30.5%)، وباكستان (25.7%)، وبنغلاديش (15.2%)؛ على التوالي أظهرت أعلى معدلات للإصابة. كذلك بينت النتائج إصابة ثلاثة أشخاص بفيروس نقص المناعة المكتسبة (الإيدز) من مجموع (20,548) فرداً هم مجموع عينة الدراسة. توفر هذه الدراسة لأول مرة صورة عن مدى انتشار عدوى الإصابة بمرض الزهري وفيروس نقص المناعة المكتسبة (الإيدز) بين المغتربين في إمارة الشارقة. إن إجراء دراسات مماثلة في الإمارات الأخرى سيكون ذا قيمة كبيرة لتقديم صورة لا لبس فيها عن مدى انتشار عدوى الإصابة بتلك الأمراض بين السكان المغتربين في الإمارات العربية المتحدة.

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List of Abbreviations

▪ AIDS	Acquired Immunodeficiency Syndrome
▪ HIV	Human Immunodeficiency Virus
▪ IDUs	Injecting Drug Users
▪ SMPHC	Sharjah Municipality Public Health Clinic
▪ STDs	Sexual Transmitted Diseases
▪ STIs	Sexual Transmitted Infections
▪ <i>T. pallidum</i>	Treponema pallidum
▪ TPHA	Treponema Pallidum Hemagglutinin Antigen
▪ UAE	United Arab Emirates
▪ VDRL	Venereal Disease Research Laboratory
▪ WHO	World Health Organization

Introduction

1.1 Introduction:

Sexually transmitted infections (STIs) are one of the most unrevealed health problems worldwide. While extremely common, STIs are difficult to track; many people with these infections do not have symptoms and remain undiagnosed. Furthermore, cases that are diagnosed are frequently not reported and counted. Most of the published data on the prevalence and incidence of STIs come from developed countries. Despite the tracking difficulties, the estimated global annual incidence of curable STIs (excluding HIV and viral hepatitis) is 333 million cases; of which infections with syphilis are 12 million cases (Madani 2006).

Syphilis is one of the most common STIs, caused by the pathogen *Treponema pallidum*. Its main mode of transmission is by sexual contact, another significantly

important mode of transmission is through the placenta from mother to fetus. Kissing, blood transfusion, and accidental inoculation have also been reported as routes of transmission. 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 the disease, they transmitted in the same manner as *T. pallidum*.

Expatriates form the driving workforce in UAE and other Gulf countries. Like many other countries, pre-employment testing for infectious diseases is mandatory, and this requirement applies to all jobs and all age groups. This includes screening for infectious agents such as Hepatitis B, HIV, TB, Syphilis and intestinal parasites (for a certain group of professions only). 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 Western Blot test. Syphilis diagnoses depends on the detection of specific antibodies to *Treponema pallidum* and the results of the positive cases are confirmed by the TPHA test.

1.2 Rationale:

Sharjah, an emirate within the United Arab Emirates, is a cosmopolitan city that is expanding rapidly with many development projects. It has a large number of expatriate workers with over 150 nationalities from all regions of the globe. Testing for various infectious agents including *T. pallidum* and HIV is a mandatory requirement for employment and settlement. While information about STIs in Islamic countries is limited, no accurate data is available on the prevalence and epidemiology of syphilis and HIV in UAE.

Accurate statistical data on the prevalence of HIV and syphilis among different nationalities and age groups including Sudanese expatriates generated from this study will contribute to the overall control of syphilis and HIV. This will therefore, reduce the risk of spreading within the community and develop effective control strategies in the country and other countries alike.

1.3 Study Objective:

1.3.1 General Objective:

To determine the prevalence and epidemiology of syphilis and HIV in expatriates in Sharjah, UAE.

1.3.2 Specific Objectives:

- i. To determine the prevalence of Syphilis according to age, sex and nationality.
- ii. To determine the prevalence of HIV according to age, sex and nationality.
- iii. Determine the correlation between age, sex and nationality, and the infection with syphilis and HIV.

CHAPTER TWO

Literature Review

2.1 Literature Review:

Although accurate figures on the incidence of syphilis are not available for most developing countries, population-based studies have shown the seroprevalence to vary widely, from 0.9 to 94% depending on the group tested (Arya et al., 1988; WHO 1995). In 1995, the WHO estimated that approximately 12 million new cases of syphilis have been documented globally (WHO 1995). Southeast Asian and sub-Saharan African countries had the greatest number of cases with 5.8 million and 3.5 million cases, respectively (WHO, 1995). Factors associated with a high prevalence of syphilis include occupations such as commercial sex work, presence of other sexually transmitted diseases (STDs), lack of male circumcision, and literacy level (WHO 1995). African long distance drivers have been reported to have rates of syphilis as

high as 15%, while commercial sex workers have rates varying from 23 to 47% in North Africa and the Middle East (WHO 1995).

Human Immunodeficiency Viruses (HIV1 and HIV2) are known to be the causative agents of the Acquired Immunodeficiency Syndrome (AIDS). Forty million individuals are believed to be presently infected with HIV globally (Merson et al., 2008; Shen and Siliciano 2008), while an estimated 16,000 new infections are believed to occur daily all over the world (Gupta et al., 2008). 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 2004).

HIV and *Treponema pallidum* can co-infect the same host, since both are transmitted in the same manner (Mutua et al., 2012). By the end of 2007, 33 million people were infected by HIV. Meanwhile, syphilis is still one of the major causes of death in some developing countries where HIV infection is rampant (Badie et al., 2013; Mutua et al., 2012; Hosseini et al., 2010). Syphilis ulcers can facilitate the transmission of HIV, decrease CD4 levels and increase viral load among HIV infected patients.

On the other hand, HIV infection may alter syphilis's clinical features and its treatment outcomes and it might be related with syphilis treatment failure, especially if neurosyphilis had a delayed diagnosis (Wang et al., 2012; Blank et al., 2011).

Despite of the extended use of penicillin and the subsequent decline of syphilis prevalence, *Treponema pallidum* infections reappeared among patients who were infected with HIV in 1980s (CDC, 2007). In a recent Iranian report, Badie et al. (2013) studied the frequency of syphilis infections among Iranian HIV positive patients, of the 450 HIV positive patients, 24 (5.3%) had a positive VDRL test and only two men had a FTA-Abs positive test indicating that 0.45% of them had a co-infection of syphilis. In another Iranian study, Khedmat et al. (2007) determined the frequency of hepatitis B, hepatitis C, HIV and syphilis infections in blood donors. The prevalence of serological markers of HIV and syphilis infections was evaluated. It was found that the prevalence of positive HIV western blot and FTA-Abs in the study sample (318,029 participants) was 11 (0.003%) and 19 (0.005%), respectively. In an integrated bio-behavioral HIV surveillance survey among female sex workers in Sudan (2011-2012), Elhadi et al. (2013) assessed the HIV, syphilis prevalence, and of the country

CHAPTER THREE

Materials and Methods

3.1 Study Area and Demographic Characteristics of the Study

Population:

In the UAE, it is required by the Emirates Health authorities that the expatriate workers should be infection free and physically fit to avoid disease transmission. The study group from Sharjah, UAE include expatriate workers of both sexes who underwent mandatory pre-employment testing for the months of May and June 2014 at Sharjah Municipality Public Health Clinic (SMPHC) (N= 20,548). Jobs included domestic workers, farm workers, laborers and various other jobs. The expatriate workers included in this study were mainly from India, Bangladesh, Pakistan, Afghanistan, Nepal, Philippines, Sri Lanka, Egypt, Ethiopia, Indonesia, Iran, Sudan, Jordan, Kenya and Tanzania with a mean age 42.4 years +/- 12.2.

3.2 Specimen Collection:

Blood samples were collected from expatriates who attended the SMPHC for overall checkup required to obtain license for working in the UAE. The collection of samples was performed in the months (May and June, 2014).

3.3 Detection of HIV Antigen and Antibodies:

Detection of HIV specific antigens and antibodies were performed using Siemens Enzygnost HIV Integral II kit, according to the manufacturer's recommendations and results confirmed by Western Blot tests.

3.4 Detection of Antibodies to *Treponema pallidum*:

Detection of specific antibodies to syphilis was performed using Siemens Enzygnost Syphilis kit, according to the manufacturer's recommendations and results confirmed by TPHA test.

3.5 Statistical Analysis:

The data were statistically analyzed using SPSS software statistic program version 17.0 (Chi-square test).

Clinic's Director.

CHAPTER FOUR

Results and Discussion

4.1 Prevalence of Syphilis:

Of the 20,548 samples that were screened for syphilis, one hundred and five (0.51%) tested positive. Of the 105 positive samples, 87 (82.9%) were males and 18 (17.1%) were females giving a ratio of nearly 5:1 (Table 1).

Table 4.1: Distribution of syphilis study sample according to gender

Gender	Number	Percentage
Male	87	82.9%
Female	18	17.1%
Total	105	100%

The age distribution of the syphilis study sample was between 23 – 74 years with a mean of 42.43 years +/- 12.21. The age groups most affected by this infection are the 30 – 40 and 40 – 50 years old (28 and 30 positive cases, respectively), (Table 2). Unfortunately, the burden associated with the affliction of this particular age group may result in the tragic weakening and debilitation of parents and productive individuals and their associated family members. Furthermore, socio-economic stability is compromised which may affect the health systems and governments alike.

Table 4.2: Distribution of the syphilis study population according to the different age groups

Age Group	Number	Percentage
20 – 30	20	19.0%
30 – 40	28	26.7%
40 – 50	30	28.6%
50 – 60	19	18.1%
60 – 70	5	4.8%
70 - 80	3	2.9%
Total	105	100%

The distribution of the positive samples for syphilis according to country of origin was: India 32/105 (30.5%), Pakistan 27/105 (25.7%), Bangladesh 16/105 (15.2%), Nepal and Philippines 4/105 (3.8%), Iran 3/105 (2.9%), Afghanistan, Ethiopia, Morocco, Sudan and Yemen each 2/105 (1.9%). The remaining nine positive samples were from: Romania, South Africa, Sri Lanka, Thailand, Mauritania, Iraq, Ghana, Comoros, and UK; one from each country 1/105 (0.9%) (Figure 1).

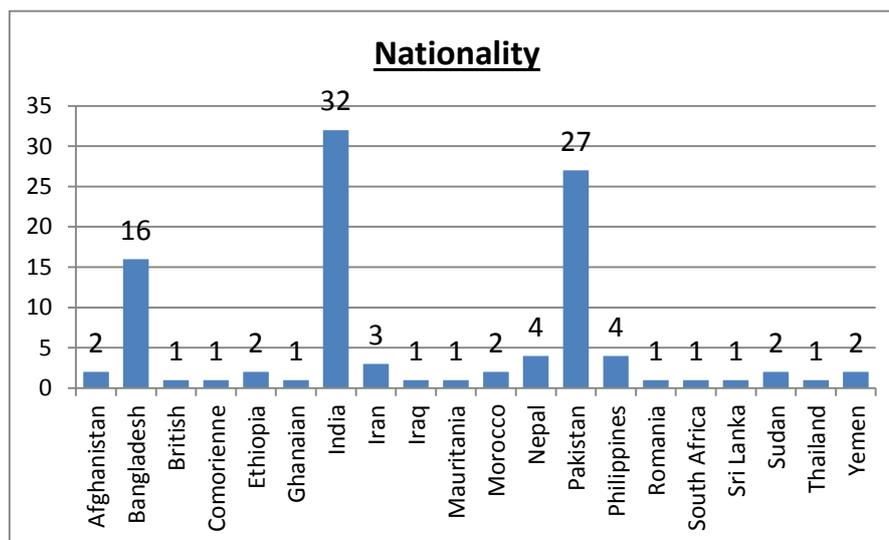


Figure 4.1: Graphical distribution of the syphilis study population according to country of origin

Individuals from India, Pakistan and Bangladesh showed the highest rate of infection with *T. pallidum*; 30.5%, 25.7% and 15.2%; respectively (Table 3). Table 4 depicts the countries of origin for those with the lowest infection rate.

Table 4.3: Countries of origin for individuals with the highest rate infection

Nationality	Number	Percentage
India	32	30.5%
Pakistan	27	25.7%
Bangladesh	16	15.2%

Table 4.4: Countries of origin with individuals with the lowest rate infection

Nationality	Number	Percentage
British	1	1.0%
Comorienne	1	1.0%
Ghanaian	1	1.0%
Iraq	1	1.0%
Mauritania	1	1.0%
Romania	1	1.0%
South Africa	1	1.0%
Sri Lanka	1	1.0%
Thailand	1	1.0%

Approximately 16% of the positive females were from Bangladesh and Pakistan followed by 11.1% from both Ethiopia and the Philippines. Roughly 6% were females from the UK, India, Iraq, Morocco, Nepal, South Africa, Sri Lanka and Thailand.

No correlation between age ($P=0.43$), gender ($P=0.46$) and country of origin ($P=0.72$), and infection with *T. pallidum* was noted.

4.2 Prevalence of HIV

On the other hand, of the 20,548 samples that were tested for HIV antibodies and antigen, only three (0.014%) samples gave repeatedly positive results. All three samples were from males (two Indians and one Sudanese). The results were subsequently confirmed by HIV western blot assay.

4.3 Discussion

Expatriates generally encompass an important yet seldom studied group of foreign travelers. Many expatriates arriving into the region come from countries where *Treponema pallidum* and HIV are highly endemic and therefore may spread these infections in the host countries (Alzahrani et al., 2009). In the present study, we have shown for the first time that the infection rate with *T. pallidum* was 0.51% among expatriates in Sharjah, UAE. 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%). The total number of Indian nationals in the present study was 8480 individuals, of which 32 cases (0.3%) were identified as infected with *T. pallidum*.

This result is somehow similar to a North Indian study which reported a 0.23% infection with *T. pallidum* among blood donors (Makroo et al., 2015).

Maan et al. (2011) studied the STDS in Faisalabad, Pakistan in a prospective, cross-sectional study in patients attending STI clinics from July 2006 to September 2009 with a mean age 38.9 (+/- 9.4) years. Syphilis was present in 29.5% of the patients attending the clinic. In Bangladesh, Azim et al. (2008) in a ten year annual serological surveillance for HIV and syphilis among individuals mostly at risk (such as injecting drug users (IDUs), sex workers and homosexuals), reported high active syphilis rates in female IDUs (9.9%) followed by female street-based sex workers (8.6%). Furthermore, in Pakistan, Hussain et al. (2014) showed the prevalence and associated risk factors for syphilis in women with recurrent miscarriages to be 1.9%.

In Iran, Nasirian et al. (2015) reported an estimated incidence for syphilis per 1000 women was 0.04 (95% CI: 0.02, 0.05) and per 1000 men were 0.005 (95% CI: 0.003, 0.008). In Egypt, Hussein et al. (2014) reported a prevalence of HIV and syphilis antibodies in 308,762 blood donors. The overall prevalence of HIV and syphilis were 0.07% and 0.13%, respectively.

The study population included here come from low socioeconomic parts of their native countries and often is uneducated and illiterate. Thus, lack of information and knowledge may be a factor contributing to their exposure to such infectious agents. Furthermore, it was not possible to note any correlation between infection with *T. pallidum* and age, gender and the expatriate nationality.

In 2013, 35 million people were estimated to be living with HIV-1. Acquired immunodeficiency syndrome (AIDS) related deaths peaked in 2005 and have fallen by the end of 2013 whereby 1.5 million people died from AIDS related causes worldwide compared to 2.4 million in 2005 (UNAIDS Fact Sheet 2014). The use of combined antiretroviral therapy (cART) has significantly reduced the mortality and morbidity caused by HIV-1. In the Middle East and North Africa countries, the picture of the HIV-1 epidemic is different. 230,000 people living with HIV were reported in 2013, 15000 deaths and treatment coverage estimated to be 11% (range of 8% - 16%) (UNAIDS Fact Sheet 2014). 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 (two Indians and one Sudanese). The results were subsequently confirmed by HIV western blot assay.

It is important to note here that the Sudanese national has contracted the HIV in the UAE. This highlights possibility of contracting the virus from visitors who are not required to undergo mandatory testing or from residents who may have got the infection while abroad. In Egypt, Hussein (2014) reported a prevalence of 0.07% among blood donors. In a Saudi Arabian study among expatriate workers, Hamdi & Ibrahim (2008) analyzed the prevalence of STDs in domestic workers in Jeddah. They reported a 19% HIV seroprevalence. Thus, it was concluded that screening of expatriates prior to employment is a worthwhile and practical way of identifying major STDs and other infectious pathogens. 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.

Consequently, based on the results provided in the current study and others in the region (Alzahrawi et al., 2009; Hamdi and Ibrahim 2008; Sickinger et al., 2008), the addition of antigen detection test to screening for Syphilis, HIV and other similar pathogens may lower the transmission of these serious and often fatal infectious agents and contribute to the overall control of STDs in the UAE.

CHAPTER FIVE

Conclusion and Recommendations

5.1 Conclusion

Sexually transmitted infections represent a major international health problem leading to morbidity, mortality and an associated stigma. The present study provides for the first time the epidemiology and rate of infection with *T. pallidum* and HIV among expatriates in Sharjah emirate, providing policymakers with data which they can use to develop appropriate prevention and control strategies. It also highlights the accuracy of the testing and screening methods for both pathogens locally.

5.2 Recommendations

1. Take stringent measures to perform blood screening for expatriates in their home countries prior to arrival in the UAE as a resident to avoid unnecessary financial expenses to them as well as to the local health authorities.
2. Strictly follow up on the treatment regimens for people identified as syphilis positive to prevent spread of the disease.
3. Since the potential exists to acquire these infections locally, it is important to educate the expatriates about the risk of contracting these diseases, providing health education program in their gathering places (camps, companies), especially that most of them come from societies with high illiteracy levels.
4. Educate the UAE residents and natives about the risk of acquiring these infections while abroad and locally.
5. Premarital screening for STIs should become mandatory in Sudan before legalization of the marriage to restrain the spread of these diseases.

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