Original Article

Screening Expatriate Work Force for HIV, HBV, and HCV Infections in Kuwait

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Kuwait Medical Journal 2002, 34 (1): 24-27

ABSTRACT

Background: The Ministry of Health (MOH) in Kuwait has introduced a policy to prevent the immigration of expatriates who are infected with Human Immunodeficiency Virus (HIV), Hepatitis B or Hepatitis C to the country. This study was aimed at investigating the impact of the policy on the prevalence of these three important viral infections among the expatriate workforce seeking work permits in Kuwait.

Methods: The prevalence of infection in different nationals was determined by detecting viral specific antibodies to HIV and Hepatitis C virus, or the viral specific surface antigen of Hepatitis B virus.

Results: During the screening of 243,258 individuals, it was found that 0.025%, 0.635%, and 0.336% were infected with HIV, HBV, and HCV, respectively. The prevalence rate of infection varied by nationalities with the highest prevalence of HIV found among Indians (0.057%), while the highest prevalence of HCV and HBV was among Egyptians (1.259%) and Bangladeshi (1.731%), respectively.

Conclusion: Screening the workforce for these important viral infections has a definite impact on the prevalence of infected individuals. The preventive policy of MOH has proven to be a successful measure to substantially reduce the number of infected expatriate workers seeking work permits in Kuwait.

KEYWORDS : antibody, Kuwait, prevalence, preventive policy

INTRODUCTION

Soon after the discovery of HIV, it became evident that HIV/AIDS was a worldwide health problem posing challenges for both governmental and non-governmental organizations. By the 1990's, about 33.6 million people worldwide were infected with HIV and the disease was spreading rapidly[1,2]. In Asian countries, the prevalence of HIV infection is on the rise. HIV is spreading rapidly in India. In Bangladesh, the HIV prevalence has reached 36% in STD patients, and 25% in pregnant women[3]. By serological tests, individuals infected with the virus can be identified and the impact of HIV/AIDS on the community can be assessed[4,5,6].

Together with HIV/AIDS, infections like hepatitis B and C may also be a main concern. This is explained by the fact that 5 - 10% of the adults in Asia are infected with Hepatitis B virus[7]. In order to combat these infections in countries like Kuwait, where 75% of the population are expatriates and coming from areas with a high prevalence of HIV, hepatitis B and C, preventive measures should be implemented. Therefore, in 1998 Kuwait adopted a new policy to screen expatriates coming to work to the country for HIV, as well as hepatitis B and C infections.

MATERIALS AND METHODS

Prevention policy of the Ministry of Health:

In 1998, Kuwait asked the major work-force donating countries to set up laboratories to screen their citizens intending to work in Kuwait for HIV, HBV and HCV infections. Only those applicants who proved to be negative in their country of origin were offered a job. Despite this measure the government of Kuwait requests these tests to be done again once the worker arrives in Kuwait.

Study population:

During 1998 and 1999, blood samples collected from 243,258 expatriates were tested in the Virology Department, Public Health Laboratories, Ministry of Health, Kuwait. All of the samples were tested for HIV. A total of 129,973 samples were tested for HBV and HCV. Table 1 shows the tests done according to nationality.

Collection of blood samples:

Blood samples were collected in the centers nominated by the Ministry of Health. Coded samples were sent to the laboratory. In the event of a positive sample, the corresponding individual was invited to the laboratory where another sample was collected for confirmation.

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Table 1
Expatriates tested for HIV, HBV and HCV infection

Nationality	No. of samples tested for HIV, HBV and HCV
Indian	75325
Sri-Lankan	34555
Indonesian	20991
Bangladeshi	33777
Pakistani	11027
Egyptian	29457
Philippinos	12844
Nepalease	1317
Others	23965
Total	243258

Table 2
Prevalence of HIV, HBV , and HCV in expatriates

Nationality	No. tested	HIV		HBV		HCV	
		POS.	%	POS.	%	POS.	%
Indian	75325	43	0.057	403	0.534	110	0.146
Sri-Lankan	34555	1	0.002	34	0.098	19	0.054
Indonesian	20991	3	0.0142	51	0.242	18	0.085
Bangladeshi	33777	5	0.0148	585	1.731	46	0.136
Pakistani	11027	1	0.009	92	0.834	162	1.469
Egyptian	29457	0	0	105	0.356	371	1.259
Philippinos	12844	2	0.0155	105	0.817	11	0.085
Nepalease	1417	2	0.141	20	1.141	0	0
Total	219393	57	0.0259	1395	0.6358	737	0.3359

LABORATORY METHODS

1. Detection of HIV antibody

For screening serum samples for the presence of HIV-1/2 antibodies, an ABBOTT PRISM system was used. It is a chemiluminescent-based (ChLIA) immunoassay, which uses three recombinant antigens corresponding to the envelope and core regions (HIV-1 env, HIV-1 core, and HIV-2 env) and two synthetic peptides corresponding to HIV-1 envelope and HIV-2 envelope regions[8,9].

Every PRISM system positive sample was retested by another ELISA-based test. We used the Wellcozyme immunoassay which utilizes recombinant proteins containing HIV-1 core and envelope antigens from CBL-1 isolate of HIV-1 captured by a mouse monoclonal antibody specific for HIV-1, which had previously been immobilized in microwells[10].

As a confirmatory test, a Western Blot type assay (Bio-Rad Novapath) was used. The test operates with nitrocellulose strips containing nine HIV-1 related antigens (3 from the env, 3 from the gag, and 3 from the pol regions).

Criteria of HIV antibody positivity

A sample was considered as real positive when it showed reactivity in the PRISM system and in the Wellcozyme immunoassay and reacted with at least three antigens in the immunoblot test[11,12].

Detection of Hepatitis B surface antigen (HBsAG)

ABBOTT PRISM assay was used for the detection of HBsAG. The test is a chemiluminescent immunoassay (ChLIA) for qualitative detection of Hepatitis B Surface Antigen (HBsAg) in human serum or plasma. Positive samples were re-tested by a confirmatory test (Specific antibody neutralization test, ABBOTT).

Detection of hepatitis C antibody(HCV-IgG):

Antibodies to hepatitis C virus was also detected by the ABBOTT PRISM assay. The system is designed to detect antibodies to recombinant antigens covering core, and non structural (NS3, NS4, and NS5) regions of hepatitis C virus[13]. All positive samples were tested by a confirmatory assay (LIA - TEK HCV 111) which is a line immunoassay test with antigens representing different regions of HCV (E2/NS1, NS3, NS4, NS5, and core proteins). Antigens are electroblotted on nitrocellulose strips. The assay includes one anti-streptavidin control line and three positive control lines (anti-human IgG and human igG). The assay was performed strictly as recommended by the manufacturer.

RESULTS

Prevalence of antibodies to HIV-1/2 ,HBV and HCV according to nationalities

The results are shown in Table 2.

A. HIV Antibodies:

If the prevalence rate of HIV-specific antibodies obtained for Indians (0.057%) were applied for the rest of the nationalities, the expected number of

Table 3
Detail of HIV antibody positive individuals

No. of	Nationality Distribution							Age	Sex	
HIV Pos.	Indian	SriLankan	Indonesian	Bangladeshi	Pakistani	Philippinos	Nepalease	Range	F	M
57	43	1	3	5	1	2	2	20 - 45	28	29

HIV positive individuals would be 65. However, there were only 14 positive cases for the rest of the nationalities tested. From India alone, three times more HIV positive individuals (n = 43) could be identified than from the eight other countries combined (n = 14). This occurred despite the fact that the number of persons tested (n = 130,952) from these countries were higher than that from India (n = 75325). It is worth mentioning that none of the 29,457 Egyptians had HIV antibodies.

B. HBsAg:

It has been established that in Egypt the prevalence of HBsAG is about 5%[16]. Taking this into account, the number of HBsAG positive cases among Egyptians would be 1472 compared to the actual number of 105. Accepting this rate for the rest of the workforce donating countries would give us an estimated 10,969 HBsAg positive individuals against the actual number of 1395.

C. HCV antibodies:

In Egypt, the prevalence of HCV antibodies is about 15%, which is the highest in the world[16]. However, among those Egyptians screened here in Kuwait, only 1.2% proved positive for the antibody. Despite this, Egyptians were still on the top of the list with 371 positive cases. The rest of the nationals together had only 366 positive individuals though their number were about six times higher (188,553 versus 29,457) than that of the Egyptians.

It is interesting to note that among the Pakistanis, the prevalence of antibodies was 1.4%, which is in accordance with the figure estimated for the Pakistani population.

DISCUSSION

The policy of MOH to prevent HIV infection from being imported to the country has proven to be successful. In line with this policy, we have obtained a very good picture for nationalities where the prevalence of HIV infection is known eg. India[3]. Yet despite testing the workforce in India intending to come to Kuwait for HIV infection, the prevalence rate detected here in Kuwait was at a relatively high level (0.057%) resulting in 43 positive individuals. Among the other nationalities, the total number of HIV antibody positive cases was only 14 (prevalence rate 14/144068, 0.0097%). Therefore, the HIV antibody prevalence for Indians was six times higher than it was for others. In Bangladesh the prevalence of HBV and HCV infection is 19 and 13%, respectively[14]. Among the Bangladeshis tested in Kuwait, the respective positivity rates were 1.75 and 0.13%, which is ten times less than the average prevalence rate. This points to the importance of operating local laboratories for testing the future workforce for Kuwait for such important infections.

The carrier state of HBV may pose a problem in transmitting the infection from one group to the other. This is due to the fact that testing individuals at the time of entry to the country is not enough to determine whether they are carriers or not. However according to the prevalence rate, an estimation can be done as it is known that about 5-10% of persons infected with hepatitis B virus may be carriers. Taking this fact into account, we estimate the number of HBV carriers to be between 70 and 140. Since the carrier rate in Kuwait is about 5%[15], the incoming expatriates do not increase the carrier rate significantly.

Therefore, due to this preventive screening policy, the number of carriers who pose a high risk of transmitting the infection to Kuwait has been considerably reduced. Without this policy the treatment and management, eg. blood donation, would create an extra cost for the health services.

It is known that the major route of transmitting HCV infection is transfusion of blood and blood products. Because of the high prevalence, which may be as high as 38% in some parts of Egypt[16], the screening of this infection is an important component of the policy. Therefore, entering a high number of people to Kuwait who are infected with HCV would add an extra burden on the country's health service. According to our data, for nationalities such as Egyptians, the HCV antibody prevalence rate was 1.259%, while for the Indians it was 0.146% and for the Pakistanis 1.469%.

Screening the workforce for these important viral infections before coming to Kuwait has reduced the number of HIV positive individuals dramatically in major donor countries except in India. It remains to be seen whether the screening policy in India can reduce the number of HIV antibody positive individuals.

Finally it is proven that the policy implemented by the Ministry of Health to screen expatriates for HIV, HBsAg, and HCV is a successful measure in preventing the importation of such important infectious diseases to the country.

ACKNOWLEDGMENT

We thank all the technical staff in the virology unit, Ports & Borders Health Division (MOH), and all who helped in this work.

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