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Research Article

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Investigation the Prevalence and Risk Factors Associated with Viral Hepatitis B and C among Workers Employed in State Hospitals in Ahvaz, Iran

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ABSTRACT

Around the world, health care centers' workers due to occupational exposures are at greater risk of blood-borne pathogens such as hepatitis B, C and HIV compared to other jobs. This study was a cross - sectional (cross-sectional). 188 workers of were enrolled from 5 state hospitals in Ahwaz. About 5 cc bloods in the form clots were taken from who participated in the study and simultaneously a questionnaire was completed including demographic characteristics, work experience, a history of needle stick, and the history of HBV vaccination and etc. Laboratory examinations and inventory information were statistically analyzed by SPSS16 software and statistical X 2 test and T - Test and descriptive statistics. This study was carried out on 188 service workers employed in state hospitals in Ahvaz. The average age of the workers was 37.3 years old. 45.7% reported that they experienced needle stick and 15.2% experienced splattering blood and serous secretions to mucosa. The amount of vaccination against hepatitis B in service personnel was 81.4%. HBV and HCV infection rate was 2.1% (4 cases) and 0.5% (1 case), respectively. There was a significant relationship between HBV infection and needle stick experience. Also a significant relationship between gender and HCV and HBV infection was found but there was no significant relationship between splashing of blood and secretions, age, type of service, work experience and HCV and HBV infection .Education, screening and vaccination against hepatitis B and examination of antibody titers after vaccination of hospital workers should be paid special attention in educational planning and control nosocomial infection.

Keywords: Hepatitis, HBV, HCV, Vaccination

INTRODUCTION

Viral hepatitis is one of the five causes of premature death of man in the world (1). It is estimated that about a third of the world's population are infected with this virus and about 5 percent of them carries its chronic ; of this number 25 percent are progressed toward chronic liver disease, cirrhosis and hepatocellular carcinoma (2). Groups at high risk for this infection are gay men, drug users by injection, prisoners, staff and patients of rehabilitation institutions and kidney dialysis centers and all workers who employed in health care centers that have frequent contact with

blood and serous secretion (3). In the past, recipients of blood and blood products were also at high risk for this infection, but currently this risk have reduced considerably due to effective vaccines and blood donations control.

Viral hepatitis is of the type of Non A - Non B hepatitis that more than 90% have infections without symptoms or slight symptoms, but in a large percent of the cases the infections (about 50-80%) turns to chronic status that eventually almost half of these chronic cases are infected by cirrhosis or liver cancer (4).

Health care centers' workers around the world are at greater risk of being infected by blood-borne pathogens such as hepatitis B, C and HIV compared to other jobs (5). This group is located at high risk of being infected by blood-borne pathogens due to needle stick and injuries caused by cutter objects which is common among healthcare workers (6).

Among the personnel of specialized staff of health care centers with regard to special academic education and emphasis on the observance of protective cases and recommendation of the Ministry of Health to vaccinate against hepatitis B (3) , appropriate acts should take place in order to prevent viral hepatitis B and C but unfortunately service personnel are deprived of vaccination against hepatitis B due to lack of proper training and being divided in Health Care Worker Without Blood Cantact group in most hospitals, and protective tools are not provided for them adequately and properly. However this group is exposed at high-risk as well as other groups working in hospitals.

Few studies have been conducted on this group of workers in the Iranian hospitals. Therefore this study was designed to estimate the prevalence of HBV and HCV infection in workers employed in the state hospitals in Ahvaz and the factors influencing the risk of this infection in service personnel working in hospitals.

MATERIALS AND METHODS

This study type was cross - sectional (cross-sectional). After obtaining license from the Ethics Committee of Ahvaz Jondi Shapour Medical Sciences University, registration was performed from all service personnel working in the departments of laboratory, laundry, pathology, operating room, surgery, urology, pediatrics and...., of 5 state hospitals in Ahwaz (Golestan, Shafa, Sina, Imam, and Razi) who were responsible for jobs such as patient–carrier, cleaning supplier and pipe-cleaning supplier. And people with a history of jaundice or chronic liver disease, a history of positive hepatitis B or C, or users of anti-tuberculosis drugs or immunosuppressant and pregnant women were excluded from the study. At the beginning, the study method and its purpose were explained to them and then they were filled the consent consciously and ultimately 188 patients were enrolled in the study.

About 5 cc bloods in the form clots were taken from who participated in the study and simultaneously a questionnaire was completed including demographic characteristics, work experience, a history of needle stick, and the history of HBV vaccination and etc. Samples were sent to Tropical and Infectious Research Center in Ahvaz Jondi Shapour Medical Sciences University in order to be examined by ELISA and Western blot, and were evaluated by MEGA Diagnostics, INe kit (sensitivity of 0.98 and specificity of 0.99) in order to explore HBSAg. The kit was based on sandwich method.

Positive cases of HBSAg by ELISA test were considered as individuals infected with HBV. Screening infection with viral hepatitis C was performed with HCVAb in ELISA method by Dia plus kit (sensitivity of 98% and specificity of 97%). The kit was also based on sandwich method. Regarding to the low value of ELISA method in the communities where the prevalence of hepatitis C infection are less than 10%, positive cases by this method were re-evaluated for approval by Western Blot method and 3.0 BlotHCV Kit. The results achieved by laboratory studies and questionnaire's information were statistically analyzed by SPSS16 software and X 2 test and T - Test and descriptive statistics.

RESULTS

This study was done on 188 service workers employed in state hospitals. The average age of the workers was 37.3 years old (21 to 66 years), and 88.3% of them were male. Of them, 81.7% of workers were employed in state hospitals and the service of 75% of them were cleaning supplier. The most frequency of education level of the participants was diploma (68.08%).

Protective appliances used by hospital workers were based on the type job including gan, gloves, mask and boots was. 183 persons (97.3%) used these appliances, and five workers (2.7%) stated that they do not use any protective appliance while working. The study results showed that holding training sessions for workers are considered in state hospitals. Of the 180 respondents, 131 persons (69.19 %) on average participated in two training sessions.

Table 1. Characteristics of participating in the study

Variable type	(%) Number
Gender	
Male	166(88.3)
Female	22(11.7)
Type of hospital	
Private	35(18.3)
Public	149 (81.7)
Job Type	
Cleaning supplier Supplies	141(75)
Patient-carrier	40(21.28)
pipe-cleaning supplier	7(3.7)
Education	
illiterate	0(0)
Elementary	10(5.3)
Middle and high schools	50(26.59)
Diploma	128(68.08)
Collegiate	0(0)
The use of Protective tools	
Yes	183(97.34)
No	5(2.7)
Training in the workplace	
Yes	131(69.68)
No	49(26.06)
Experience of needle stick	
Yes	85(45.7)
No	101(53.4)
Experience of splattering blood and serous secretions to mucus	
Yes	26(15.2)
No	145(84.8)
receiving the vaccine of Hepatitis B	
Yes	153(81.4)
No	35(18.6)

45.7% of participants had reported experience of needle stick 15.2% and experience of splattering blood and serous secretions to mucosa. The amount of vaccination against hepatitis B in service personnel was 81.4%, and full vaccination (3 times) was inoculated in 52% of them.

HBV and HCV infection rate was reported 2.1% (4 cases) and 0.5% (1 case), respectively. All cases were positive HBV, and a case with positive HCV was observed in males; a statistically significant relationship between gender and HCV and HBV infection was discovered.

The mean age of positive HBV was 44.2 years old, and a case with positive HCV was also 29 years old but no significant relationship was obtained between age and the infected by HCV and HBV. 46.28% of participants had reported experience of needle stick associated with experience of needle stick in negative HCV group but positive HCV group had not reported experience of needle stick. 44.5% in negative HBV group had a history of needle stick but experience of needle stick was observed in every 4 cases in positive HBV group. There was a statistically significant relationship between experience of needle stick and infected by HBV. Among 188 persons of the study

population, 171 persons responded to the experience of splattering blood and secretions into mucus and eye of which 26 persons (15.3%) in negative HCV group reported this history, history of secretions and blood splattering was also observed in person with positive HCV. 43 persons (22.88%) in negative HBV group expressed its history but no one in positive HBV group reported history of splattering blood and secretions. Results showed that there is no significant relationship between infected by HCV and HBV and a history of splattering blood and secretions. The relationship between the number of needle stick as well as the number of splattering blood and secretions and infected by HBV and HCV did not usable the investigation of the results because of the limitations of remind in the respondents. The results of this study showed that 19% of negative HCV had been working in private hospitals, and 80.85% in public hospitals, and a case with positive HCV had worked in public hospital. 81.20% and 18.08% in negative HBV had been working in public and private hospitals, respectively, and in positive HBV, one person from four cases had been working in private hospitals, and the other 3 cases in public hospitals. The results showed that 3 out of 4 cases of positive HBV were working on a rotating basis in different parts of hospital, and the service location of a person was in Landeri, and a case with positive HCV had been also a rotating worker. About type of service, 137 persons (72.87%) were cleaning supplier and 40 persons (21.28%) were patient-carrier, and 7 persons (3.7%) were pip-cleaning supplier in negative HBV group, and in positive HBV group, every 4 people are cleaning supplier.

Table 2. Relationship between affecting factors with hepatitis B in workers employed in public hospitals in Ahvaz

Variable type	HIV infection status		
	HBsAg + Number of persons	HBsAg- Number of persons	pvalue
Gender			
man	4(2.27)	162(86.17)	<0.05
woman	0(0)	22(11.70)	
Type of hospital			
Specialized	1(0.53)	34(18.08)	Is not significant
Public	3(1.59)	150(81.2)	
splattering the patient's blood and secretions to mucosa			
Yes	0(0)	43(22.88)	Is not significant
No	4(2.12)	141(75)	
Experience of needle stick			
Yes	4(2.27)	83(44.5)	<0.05
No	0(0)	101(53.72)	
Type of Service			
Cleaning supplier Supplies	4(2.27)	137(72.87)	Is not significant
Patient-carrier	0(0)	40 (21.28)	
pipe-cleaning supplier	0(0)	7(3.72)	

Table 3. Relationship between affecting with hepatitis in workers employed in public hospitals in Ahvaz

Variable type	HCV infection status		pvalue
	(%) HCV Ab + Number of persons	(%) HCV Ab - Number of persons	
Gender			
man	1(0.53)	165(87.76)	<0.05
woman	0(0)	22(11.70)	
Type of hospital			
Specialized	0(0)	35(18.62)	Is not significant
Public	1(0.53)	152(80.85)	
splattering the patient's blood and secretions to mucosa			
Yes	0(0)	26(15.3)	Is not significant
No	1(0.53)	144(76.59)	
Experience of needle stick			
Yes	0(0)	87(46.28)	<0.05
No	1(0.53)	100(53.19)	
Type of Service			
Cleaning supplier Supplies	1(0.53)	140(74.47)	Is not significant
Patient-carrier	0(0)	40(21.28)	
pipe-cleaning supplier	0(0)	7(3.7)	

One hundred forty persons (47/74%) in negative HCV group were cleaning supplier and 40 persons were (28/21%) patient-carrier and 7 persons (7/3%) were pipe-cleaning supplier, and patient with HCV infection had been cleaning supplier. But significant relationship was not achieved between the prevalence of HCV and HBV and the type of service.
The average age of entering to work of studied workers has been reported 27 years old but no relationship was obtained between the ages of entering to work and infected by HBV and HCV.

The average work experience of workers who had been enrolled to the study was 10 years old, and in positive HBV group 13 years and 7 months, and work experience in a case with positive HCV had been reported one year and three months but there was not any statistical significant relationship between work experience and infected by HBV and HCV.

DISCUSSION AND CONCLUSION

Four persons (2.1%) of the 188 workers employed in state hospitals in Ahwaz who were enrolled in the study were positive HBsAg. This amount in the study of Babamahmoudi had been reported 0.66% (7), but prevalence in the study of Ziraba and Braka had been reported 8.1% and 9 % (8, 9).

In this study, the amount of vaccine inoculation against hepatitis B has been reported 81% which was similar to the study of Ali NS (80.1%) (10) And has a higher coverage than the study of Ziraba (2.6%) (8). But unfortunately, three cases of the positive hepatitis B had a complete vaccination history (3 times) that regarding to the efficiency of 95% of hepatitis B vaccine, detailed examination of finding evidence of infection before vaccination or lack of immunity after vaccination should be considered.

Three occupational groups of cleaning supplier and pipe-cleaning supplier and patient-carrier perform their tasks in hospital workers of which 4 cases of positive HBsAg and a case of positive HCVAb were located in cleaning supplier group and waste carrier to sanitary disposal site. It seems that this group with regard to direct contact with sick people and their infectious substances and secretions are at greater risk compared to other groups of service workers, that paying attention to training them and their protective tools has a particular importance.

It seems that working in state hospitals regarding to the wide variety of different diseases in hospitalized people is considered as a risk factor for being infected by the hospital's infectious diseases this issue was also confirmed in this study, and three cases of positive hepatitis B, a case of positive HCV were employed in public hospitals.

In this study, 4/53% of workers had reported the experience of needle stick. In the study of Javadi, Ziraba and Muralidhar (8, 11, 12), this indicator had been reported 61.4%, 67.8% and 80.1%, respectively, and in the Askarian (49.6%%), Al Awaidy (17.9%) and Hashemi (24.1%) (13-15).

Experience of needle stick had been seen in every 4 cases of positive HBV, the use of prophylaxis after needle stick and implementation of appropriate educational programs seems necessary, while only in 51.8% of these cases in this study had received prophylaxis services after needle stick.

In this study, 4 cases of positive HCV was discovered by ELISA test that regarding to existence of the high pseudo-positive, this test was conducted in countries where the prevalence of hepatitis C have been less than 10% (16).

The positive cases were re-evaluated with additional test that only one of four cases was positive HCVAb with Western blot test (0.5%), of course this amount was zero in the study of Babamahmoudi (7).

Study limitations

Determining the genotypes of hepatitis C in cases with positive HCV is important in terms of clinical and epidemiological that was not evaluated in this study. In this study, in some relation-assessing, the correlations are not statistically significant, probably due to the small sample size.

Suggestions

Health training programs to be prioritized as the most important component of preventive programs in health care centers. Screening of workers in terms of nosocomial, especially HBsAg and HCVAb is considered.

Considering that vaccination against hepatitis B was done in 3 of 4 cases with positive HBV (2 cases completely and one case incompletely), it is essential that full vaccination for high risk groups according to health ministry instruction be considered and the antibody in this group be checked after 6 months, and re-vaccination be done in case of low antibody titer (with dose double than the normal) (1).

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