

Prevalence of Hepatitis B and C Viruses among Medical Staff in Ramadi General Hospital

Thaa'er Al-Saad , Bassam M. Al-Alousi**, Nisreen M. Khalaf*** ,Bsc , Wahbi Abdul Razak*****

Abstract:

Background: Hepatitis B virus (HBV) infection and Hepatitis C virus (HCV) infections have been recognized as an emerging problem in high risk groups including hospital health care workers (HHCW) and their prevalence varies considerably among different areas of the world. This study has been undertaken to shed light on the prevalence of these viruses among hospital staff in addition to prevention of further transmission of these viruses in such setting.

Methods: The prevalence of hepatitis B and C infection in 422 healthcare workers was estimated on pools of sera collected during immunization against hepatitis B by enzyme linked immunosorbent assay (ELISA). Healthcare workers were arranged according to the age, sex and nationality.

Results: The prevalence of HBV among HHCW was 3 out of 422 (0.94%) which was significantly higher than in control (0.2%), also prevalence of HCV among HHCW was 3 out of 422 (0.71%) which was significantly higher than in control, in both estimations no female were positive. All HCV positive cases were of Egyptian nationality.

Conclusions: A relatively high positivity rate was found among HHCW as compared to control. These results were in agreement with previous reports affirming that HHCW are at risk for infection with both HBV and HCV via exposure to infected blood or body fluids.

Key words:- Prevalence, hepatitis B and C viruses, medical staff, ELISA

Introduction:

Throughout the world, millions of hospital healthcare workers and personnels (HHCW) work in health institutions and it is estimated that 600,000 to 800,000 cut and puncture injuries occur among them per year, of which approximately 50% are not registered. In hospitals it is estimated that approximately 30 injuries occur per 100 beds per year ¹. Hepatitis B virus (HBV) is the greatest threat of infection for healthcare workers. The risk of contracting hepatitis B by healthcare personnel is four times greater than that of the general adult population, among those who do not work in healthcare institutions ².

The discovery of HBV vaccines and the results obtained from their introduction constitute a landmark of great importance for medical practice. Besides providing immunity against HBV infection, these vaccines indirectly protect against hepatocarcinoma ³.

Hepatitis B is an infection of the liver caused by the hepatitis B virus (HBV). Many new infections with hepatitis B are sub-clinical or may have a flu-like illness. Jaundice only occurs in about 10% of younger children and in 30 to 50% of adults. The virus is transmitted by parenteral exposure to infected blood or body fluids. Transmission mostly occurs: through vaginal or anal intercourse, as a result of blood-to-blood contact (e.g. sharing of needles and other equipment by injecting drug users (IDUs)), 'needlestick' injuries, and through parental transmission from mother to child ⁴.

* F.I.M.C. general surgery, Ramadi general hospital -Iraq

**Msc. Clinical Immunology, Al-Anbar College of Medicine

*** B.Sc. Biology. Assistant researcher, Al-Anbar Medical College

****Lab. Staff, Ramadi general hospital -Iraq

According to Department of Health – UK Hepatitis B vaccination is recommended for the following groups who are considered at increased risk: **healthcare workers is** : all healthcare workers who may have direct contact with patient's blood, blood-stained body fluids or tissues, require Vaccination. This includes any staff that is at risk of injury from blood contaminated sharp instruments, or of being deliberately injured or bitten by patients. Advice should be obtained from the appropriate occupational health department. **Laboratory staff:** Any laboratory staff who handle material that may contain the virus which require vaccination. Any individual potentially exposed to hepatitis B-infected blood or body Fluids should be offered protection against hepatitis B, depending on their prior vaccination status and the status of the source ⁴.

The hepatitis C virus (HCV) was first identified in 1989 but has been prevalent for many decades. In western countries, HCV is most commonly transmitted among injecting drug users who share injecting equipment. Once infected, most patients develop chronic HCV infection, a disease with considerable morbidity and mortality⁵. The incidence of HCV seroconversion after accidental needlestick exposure is uncertain, with reports ranging from 0 to 10% ^{6,7, 8, 9}. Whether healthcare workers have a higher prevalence of hepatitis C virus infection than the general population through percutaneous occupational exposure is unclear. ^{10, 11, 12, 13, 14, 15,16}

Hepatitis C virus (HCV) is an RNA virus with a genomic size of 9.6 kb. More than 50% of individuals exposed to HCV develop chronic infection. Of those individuals chronically infected, approximately 20% to 30% will develop liver cirrhosis and/or hepatocellular carcinoma when followed for twenty to thirty years. Methods to identify HCV include a highly sensitive third generation immunoassay that detects antibodies to structural and nonstructural proteins in serum.

Viremia may be detected by reverse transcriptase–polymerase chain reaction (RT–PCR) technology. However, the introduction of routine HCV antibody screening of blood products has led to a sharp decrease in the transmission rate of HCV. For example, the risk of acquiring antibodies to HCV by blood transfusions using current screening procedures was calculated as 1/100,000 units transfused ¹⁷.

The aim of this study was to assess the prevalence of HBsAg and HCV antibodies in Ramadi general hospital medical and non-medical staff in Ramadi city , a city where shared injecting drug use is uncommon, and to evaluate the risk factors for HHCW with viral markers, and determine their epidemiological significance.

Methods :

Study population: The study was conducted in Ramadi General Hospital, Ramadi city, Iraq during the period from April to August-2008 to determine the prevalence of seropositive cases for both HBV and HCV. The study included a total of 422 subjects comprising of health care workers and other services (resident doctors, nurses, technicians and those working in haemodialysis units, haematological laboratories, blood bank, dental units, etc.) employed in the hospital of which 34 females and 388 males were included , 419 Iraqi and 3 only Egyptian nationalities ,These rates (prevalence) were then compared with existing prevalence data in other local populations (100 persons 74 males and 26 females all of them were Iraqi) to determine if certain hospital staff may be at increased risk of occupationally acquired HBV and HCV.

Samples for testing: Sera were initially stored by sequential laboratory number at either 4°C or –20°C on the day of collection in the hospital laboratory.

The study sera were then identified, aliquotted into 2.5 ml plain tubes, labelled with the unique code, and stored at -20°C for testing.

Hepatitis C test: Antibodies to hepatitis C were detected in serum using bioelisa[®] HCV 4.0 which is an ELISA test (BIOKIT, S.A. Spain)

Hepatitis B test: Hepatitis B virus surface antigen (HBsAg) was determined by enzyme-linked immunoassay using the **Hepanostika[®] HBsAg** which is an ELISA based on sandwich principle (Biomereieux bv France)

Statistical analysis :

As the concluded results were controversial and contain zero value in more than one occasion , the calculation of P value became

inapplicable in most of the statistical tests ,and this represented great challenge for the research ,for that we used Binomial test for this purpose

Results:

Out of the 422 health care workers and hospital personnel who participated in the study, 4 turned out to be HBsAg positive (0.94%) and this result is statistically significant when compared to control group which showed no case positive at all .HBsAg positivity in relation to age group, nationality and sex compared to control group is shown Table 1,2.

Table 1. The prevalence of HBV and HCV among the study population and control according to sex and nationality .

	Cases (422)					Control (100)	
	Total (422)	Males (388)	Females (34)	Iraqi (419)	Egyptian (3)	Males (74)	Females (26)
HBV	4(0.94%)	4(1%)	0	4(0.95)	0	0	0
HCV	3(0.71%)	3(0.77%)	0	0	3(100%)	0	0
	$P \leq 0.05$	$P \leq 0.05$		$P \leq 0.05$			

Table 2. The prevalence of HBV and HCV among the study population and control according to age group .

			HBV	HCV	Control
Age groups	20-40	334	3(0.9%)	3(0.9%)	73
	>41	88	1(1.13%)	0	27
P value	≥ 0.05				

Majority of participants were of 20-40 years age. Most of the positive cases also related to this age group (3out of 4) . The result is statistically non significance. The difference in positivity between males 4(1%) and

females (0%) was statistically significant [figure 1]. In addition the difference between Iraqi 4(0.95) and non Iraqi (Egyptian 0%) persons was statistically significant. See [figure 2].

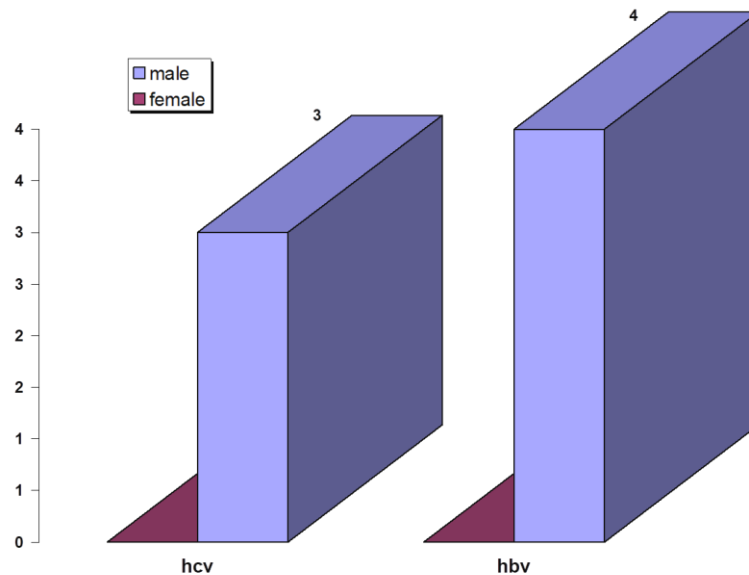


Figure1. Sex -specific prevalence of anti-HCV and HBsAg in the study population

Out of the 422 health care workers and hospital personnel who participated in the study, 3 turned out to be HCV positive (0.71%) . This result is statistically significant when compared to control group which showed no case positive at all. HCV positivity in relation to age group, nationality and sex compared to control group is shown in table 1 and 2.

Similarly the majority of participants were of 20-40 years age. But all of the positive cases belonged to this age group (3out of 3) and this made the result statistically significant. The difference in positivity between males 3(0.77%) and females (0%) was statistically significant [figure 1].Furthermore the difference between Iraqi (0%) and non Iraqi (Egyptian 3(100%)) persons was statistically significant [figure2].

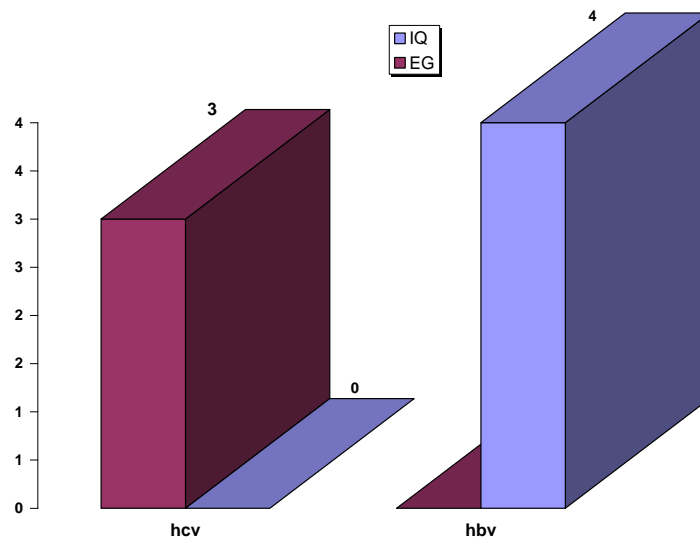


Figure 2. prevalence according to the nationality of anti-HCV and HBsAg in the study population

Discussion:

Chronic viral hepatitis frequently goes undetected until cirrhosis develops. Although the effect of interferon on the natural history of hepatitis B virus (HBV) or hepatitis C virus (HCV) infection in asymptomatic persons is unknown, treatment may modify the course of the infection, producing cures in some. Risk factors for HBV and HCV infection were similar in: blood transfusions, hemodialysis, IV drug use, and sex with an IV drug user. For HBV infection, sex with multiple partners, increasing age, and birth in South East Asia or Africa were additional risk factors.

The cost to find a case of HCV infection is less than the costs for finding many other treatable diseases. Screening for HBV, though more costly, is reasonably efficient, and simultaneous screening for HBV and HCV provides greater efficiency.

In our study, HBsAg prevalence rate of (0.94%) was observed among healthcare workers. These subjects were at high risk of occupational exposure to blood and other secretions of HBV infected subjects. The prevalence rate of HBsAg positive among Ramadi general hospital healthcare workers and personnels (0.94%) is lower than Palestine 9.6%¹⁸, Pakistan (2.4%)¹⁹, and even a western country like Portugal (16.8%)²⁰.

This value is higher than Brazil (0.8%)²¹ and Germany (0.62%)²² and than control (0%). Indicated that HBsAg is significantly more frequent in HHCW when compared to blood donor and general local population candidates. This relatively lower value may be attributed to number of causes of which low endemicity of the local population, inclusion of all hospital staff in the study even those whom never had been in contact with the infected materials like cooks and

gardeners, and frequent sequential vaccination for all hospital staff. In the hospital administration staff, which has no contact with patients, the prevalence of HBV infection was the same as for the blood donor candidates²³.

Most of the infected persons were from young age group, males and Iraqis, this may be because that study population consist mainly of these groups and came in agreement with most of similar studies^{24 22}, but different from other studies²⁵.

The prevalence of anti-HCV antibodies was evaluated in HHCW and found to be considerably low. The prevalence of HCV was (0.71%). This is in disagreement with other studies carried in KSA²⁶, Syria²⁷ and Egypt²⁸. When it was less than all mentioned studies, it was found to be more than that of UK, France and Canada²⁹. Where the prevalence is comparably low which might reflect the awareness of the HHCW and meticulous precautions augmented in the hospitals particularly when the patients are known to be positive for HBV or HCV, in addition to the same factors that were contributed to low prevalence of HBV, especially when we knew that there were no reported cases for injecting drug users in this city of Ramadi and strict limitation of sexual relationships between married partners. This enforced by the got result of this study that found that all the HCV positive persons were Egyptian. In time the prevalence reported in Egypt reached up to 30% being the highest in the world²⁹.

Of note, HCV positivity rate in HHCW is less than that found in a previous study in the same hospital by other researchers³⁰, where they found that HCV positivity rate of (3.3%).

Conclusion:

A relatively high positivity rate was found among HHCW as compared to control. These results were in agreement with previous reports affirming that HHCW is at risk for infection with both HBV and HCV via exposure to infected blood or body fluids.

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