

Prevalence of hepatitis B and hepatitis C in blood donors and high risk groups in Hajjah, Yemen Republic

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ABSTRACT

Objective: To determine the prevalence of hepatitis B antigen and anti-hepatitis C virus (HCV) antibodies in blood donors, hospital employees, patients suspected to have liver disease, and hemodialysis patients.

Methods: This study was conducted from April 1997 through to September 1999 as a hospital based study in Hajjah, Republic of Yemen. All healthy blood donors, hospital employees, suspected hepatitis patients and patients in the hemodialysis unit were included in this study. The hepatitis B antigen (HbsAg) measured in IMX system (Abott) using the monoclonal anti-HBs assays. The Hepatitis C screened by the same system using HCV version 3.0 [Third generation (Recombinant HCr43, c200, c100-3, NS5)].

Results: The screened blood donors for HbsAg and HCV were 7868 and 2434 with a prevalence of 9.8% for hepatitis B antigen and 1.1% for anti-hepatitis C virus.

Two hundred of the hospital employees were screened with a prevalence rate of 1.5% and 0.5% for hepatitis antigen and anti-hepatitis C virus. The patients referred selectively for testing the hepatitis B antigen and anti-hepatitis C virus were 1229 and 749, the prevalence rate of HbsAg was 14.9% and 8.8% for anti-HCV, double infection (both hepatitis B virus and HCV) recorded in 8 patients forming 3.2% of the positives (in 0.4% of the total).

Conclusion: The prevalence was high in Hajjah governorate, Republic of Yemen in both the healthy blood donors and in the risky groups except the hospital employees.

Keywords: Hepatitis B antigen, anti-hepatitis C virus, liver disease, dialysis.

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Hepatitis B virus (HBV) is a major worldwide infection and cancer-promoting agent contains a deoxyribonucleic acid (DNA) genome but hepatitis C virus (HCV) is a single strand RNA.¹ The utilization of reaction time-polymerase chain reaction for detecting ribonucleic acid (RNA) helped in confirming the infection in asymptomatic individuals with positive anti-HCV antibodies.² Hepatitis B and C viruses are present in higher prevalence in certain high-risk groups.³⁻⁷ In patients with liver diseases around 7.1% of each of hepatitis B and hepatitis-C

developed chronic hepatitis.⁸ Many of the positive anti-hepatitis C, have post-transfusion hepatitis.⁹ The prevalence of anti-HCV among patients with chronic hepatitis or liver cirrhosis increase with age while the prevalence of hepatitis B antigen (HbsAg) decreases with age.¹⁰ The prevalence among healthy individuals varies from one country to the other. Studying the prevalence of HBV and HCV is important as of the known serious complications most obviously the liver cirrhosis and hepatocellular carcinoma,¹¹⁻¹⁴ this will be more serious if there was a simultaneous

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infections by both viruses.¹⁵ With various preventive measures the prevalence has dropped dramatically in many countries.^{16,17} It was extremely rare to find a study in this subject in Yemen Republic in the medline search and there was no previous study in Hajjah governorate on blood donors neither for HBV nor HCV as well as the prevalence of these viruses in hospital employees, patients suspected to have liver diseases or patients under hemodialysis this was why this study was conducted. The complication arising from the infection by these viruses deserve more attention for knowing their prevalence in Yemen to know the magnitude of this problem in both the general population and high-risk groups

Our objectives were to study the prevalence of hepatitis B and hepatitis C viruses in 1. Healthy blood donors. 2. High risk groups namely hospital employees, patients suspected to have liver diseases and patients under hemodialysis for identifying the magnitude of this health problem.

Methods. This study was conducted from April 1997 through to September 1999 for HbsAg and since January 1999 through to September 1999 for anti-HCV. This was a hospital based study in Hajjah governorate, the hospital capacity is 60 beds, and most of the time was occupied by the emergency admissions however this shifted the workload to the Emergency and Outpatient Department. Hajjah governorate composed of low lands and high lands regions accordingly, the patients coming to the hospital were having a wide spectrum of illness namely malaria, leishmania and various types of anemia's which, commonly required blood transfusion. The blood bank is receiving healthy donors from different regions of Hajjah and outside Hajjah governorate. The donors weather donated for the first time or recurrent donors were subjected for physical and laboratory tests to ensure that the donor is not going to be negatively affected, then the donated units were subjected for screening starting by screening for HbsAg, if positive no further tests were carried out and discarded but if negative the screening for anti-HCV and others were carried out. Around 2-3rds of the hospital employee agreed to the request for screening. Hepatitis B antigen screened by the IMX system (Abbott) using the monoclonal anti-HBs assays. The Hepatitis C screened by the same system using HCV version 3.0 [Third generation (Recombinant HCr43, c200, c100-3, NS5)].

Results. There were 7868 blood donors tested for HbsAg, 771 of them were positive for HbsAg forming a prevalence rate of 9.8% (**Table 1**). Anti-hepatitis C screened in 2434 blood donors, 26 of them were positive (2%), **Table 1**. Two hundred of the hospital employees from different departments

Table 1 - Hepatitis B antigen and anti Hepatitis C virus antibodies in blood donors.

Test	Total screened	Negative	Positive	Prevalence Rate %
Hepatitis B antigen	7868	7097	771	9.8
Anti Hepatitis C virus	2434	2408	26	2

Table 2 - Hepatitis B antigen and anti Hepatitis C virus antibodies in patients suspected to have liver disease.

Test	Total screened	Negative	Positive	Positivity rate %
Hepatitis B antigen	1229	1046	183	14.9
Anti Hepatitis C virus	749	683	66	8.8

were screened for HbsAg the prevalence rate was 1.5%. Two of the 3 positive HbsAg was nursing assistants and the 3rd one from the few administration employees. Out of the 200 employees screened for Anti-HCV, 2 were positive by using the 2nd generation ELIZA but only one positive by the 3rd generation which arrived soon after using the 2nd generation giving a prevalence rate of 0.5%. Out of 1229 patients selectively subjected for HbsAg test, as of the suspicion of liver disease (acute or chronic), 183 patients were positive (14.9%) and out of 749 patients tested for HCV, 66 of them were positive (8.8%), **Table 2**. Double infection (HBV and HCV) found in 8 patients out of the 249 positives (3.2%). There were 30 patients in the dialysis unit for regular hemodialysis, 12 of them were positive for anti-HCV (40%).

Discussion. The blood donors came to our hospital donating as per requirement of their relatives who came from different regions of the governorate and some from other governorates this in turn reflected to some extent the prevalence of HBV and HCV carriers in this community but is more precisely reflecting the prevalence among apparently healthy adult blood donors. The prevalence of HBV was higher compared to many other countries,¹⁸⁻²³ but in Chinese living in Taiwan and Gabon the prevalence of HBV was higher than that in our study^{24,25} **Table 3**. It was also lower than what has been reported in 3 previous studies in the Republic of Yemen carried

out by surveying healthy individuals and part of them were blood donors²⁶⁻²⁸. The prevalence of HCV in blood donors in the current study located in the middle of many other previous reports, those which showed higher prevalence were ranging from 1.2-14.8%,^{18,22,24,29-33,34} and those showed a lower prevalence³⁵⁻³⁸. **Table 4.** In 2 previous studies in the Republic of Yemen they showed a higher prevalence (6% and 2.1%)^{31,32} which might indicate a regional variation, however in some other countries this prevalence was not markedly different which ranged from 0.9-1.2%,³⁹⁻⁴⁵ but it should be noted that the prevalence of HCV among the blood donors in our study was underestimated as those who were positive for HBV were not further tested for anti-HCV as the purpose for screening was to determine the suitability of the blood for transfusion and once its positive for HbSAg it became unsuitable. The prevalence of HbsAg in our hospital employees was lower than that in Malaysia (2.1%),⁴⁶ and Jamaica (5.3%),⁴⁷ Italy (23.3%),⁴⁸ Libya (3.7%),⁴⁹ Pakistan (5%),⁵⁰ though the majority of our employee were from Philippines, India and Yemen. It was higher than what was reported from Peru (0%),⁵¹ Japan (1.1%).⁵² The prevalence of the HCV in the hospital employee was lower than that reported in other studies^{48,50,52} and much lower than its prevalence in our studied blood donors however the mixed nationality might explain this difference but more importantly is that there was a possibility of underestimation as one-3rd of the employee did not agree for screening with unknown reasons but some of them might have had a previous tests in other laboratories and as of being positive for either viruses they were hesitant for this procedure as it might be a reason for terminating their contracts. The prevalence of both HBV and HCV were higher

Table 3 - Prevalence of Hepatitis B antigen among blood donors in different countries.

Reference n	Country	Prevalence %
Our study	Yemen Republic-Hajjah	9.8
18	Chile	0
19	Austria	0.2
20	United States of America	0.3
22	Brazil	0.8
21	United States of America	0.8
23	Kingdom of Saudi Arabia	3.3
25	Gabon	11.1
24	Chinese in Taiwan	18.6
n - number		

Table 4 - Prevalence of anti Hepatitis C virus among blood donors in different countries.

Reference n	Country	Prevalence %
Our study	Yemen Republic-Hajjah	1.1
38	United Kingdom	0.4
35	Belgium	0.8
36	Vietnam in one study Another study	0.8 20.6
37	Kenya	0.9
23	Kingdom of Saudi Arabia	1.2
29	China	1.3
18	Chile	1.7
24	Chinese in Taiwan	1.8
26	India	1.9
28	Italy	2.8
22	Brazil	14
27	Egypt	21
n - number		

in those patients suspected to have liver disease than the previous 2 groups (blood donors and hospital employee) which was expected being selectively tested but still it was lower than what was reported in one study in Yemen,³² and in other countries^{26,53,54} however, in Kenya liver disease was attributed to HCV in only 2.6%.³⁷ The prevalence of HCV in our hemodialysis unit was lower than that in some other countries^{55,56} but in other hemodialysis center they reported a lower prevalence^{57,58} however, almost all of patients with hepatitis C in our dialysis unit have been dialyzed in other centers prior their presentation to this hospital which might explain this high prevalence of HCV. There was no hepatitis B patients in the dialysis unit as the number of these patients initially was not enough to assign one machine for them in the same time there was a load of patients who had HCV and non-hepatitis and can be benefited by full utilization of the available machines but this indicated a low prevalence of HBV in these patients who came in the beginning of operating the dialysis unit which was similar to other hemodialysis centers reported a lower prevalence of HBV.⁵⁷⁻⁵⁹ The prevalence of hepatitis B and hepatitis C viruses is relatively high in this governorate forming a major health problem; this problem was of larger magnitude in those high-risk groups except among health employee. The blood banks should include the screening for HCV. All the dialysis units in our

country should screen routinely every patient for these viruses. The vaccination card should be one of the essential requirements for any child going to register in the school for the first time and it should include the HB vaccine. Health education program is of vital importance.

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