

Prevalence of anti-hepatitis C virus antibodies among blood donors and risky groups in Diyala

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Summary:

Objective: To determine the prevalence of hepatitis C virus (HCV) infection among blood donors and risky population in Diyala province.

Materials and methods: In this retrospective study, the records of HCV screening and confirmatory tests were reviewed for the period 1996-2001. Third generation Enzyme-linked immunosorbant assay (ELISA) and Enzyme immunoblot assay were used as screening and confirmatory tests respectively.

Results: The prevalence of HCV infection among blood donors was 0.15%, with the highest in 1997. The highest prevalence rates were found among multiple blood recipient; hemophilia, thalassemia and hemodialysis patients (27.3%, 16.9% & 14.3%) respectively. Whereas, the patients with chronic hepatitis B infection and those with acute icteric hepatitis showed slightly elevated prevalence (2.9% & 2.1%) respectively. The overall prevalence in the province was 9.9/105 population. The mean age of infected patients was 29.7 years and the male: female ratio was 3:1.

Conclusion: The prevalence of HCV infection in Diyala population is relatively low. However, the HCV infection is concentrated in certain risky groups, particularly multiple blood recipients.

Key words: Hepatitis C virus infection, Blood donors, Hemophilia.

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Introduction:

Infection with hepatitis C virus is a significant public health problem that has important clinical consequences¹. It has been estimated that 3% of the world population have been infected with HCV, with more than 170 million chronic carriers at risk of developing liver cirrhosis and/or liver cancer²⁻⁴. HCV infection accounts for the majority of posttransfusional hepatitis (PTH) worldwide^{5, 6}. Globally, 0.5%-1.5% of the blood donors are anti-HCV antibodies positive with great geographical variation^{7,8}. In health care settings, needlestick accident from HCV viremic patient may lead to HCV transmission in 3%-10% of cases^{9, 10}. Furthermore, multiple blood recipients, such as thalassemia, hemophilia, hemodialysis patients and those undergoing organ transplantation are at high risk for HCV infection¹¹⁻¹³. In Iraq, the prevalence of anti-HCV among the general population was 0.5%-0.9%, and among blood donors was 0.07%-0.7%^{14, 15}. However, higher prevalence rates were detected among certain risky groups, such as hemophilia 59%, thalassemia 62% and hemodialysis 60%¹⁶. The aim of the current study is to explore the prevalence of anti-HCV antibodies among blood donors and risky population in Diyala province.

Materials and methods: The records of virology unit in the public health laboratory in Baquba (the center of Diyala province) were reviewed for the period 1996 to 2001. The number of anti-HCV positive cases among blood donors and risky groups were recorded. Additionally, information including age, sex, occupation and the time of diagnosis were also subtracted. All data were statistically analyzed. Third generation Enzyme-linked immuno- sorbant assay (ELISA) was used for detection of specific anti-HCV antibodies. The assay procedure was proceeds following manufacturer's instructions. Repeatedly positive sera were confirmed by immunoblot assay, in the reference laboratory for viral hepatitis at the center of disease control in Baghdad.

Results: Throughout the period of the study, a total of 47169 subjects were screened and 145 were anti-HCV positive. 109 (75.1%) of them were males and 36 (24.9%) were females. The overall M:F ratio was 3:1. The distribution of anti-HCV positive cases by years was shown in table (1).

Table (1): Distribution of HCV positive cases by year.

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The infection rate ranges between 0.1% - 0.5%, while the mean infection rate was 0.3%. The overall prevalence rate of anti-HCV in the province was $9.9/10^5$ population (the total population is 1,181,746). The results also revealed that there was no marked monthly variation in the distribution of Anti-HCV positive cases throughout the study period. The mean infection rate among the blood donors was 0.15%, with slightly variation among the years of the study, table (2).

Table (2): Distribution of HCV positive blood donors by year

Years	No. tested	No. positive	%
1996	7707	17	0.21
1997	3621	18	0.49
1998	4825	4	0.08
1999	8500	7	0.08
2000	9148	3	0.03
2001	8189	13	0.15
Total	42140	62	0.15

Table (3), revealed the infection rates among all study groups, the highest infection rate was found among multiple blood recipient groups; hemophiliacs (27.3%), thalassemics (16.6%) and hemodialysis patients (14.3%). Elevated infection rate was also found among patients with chronic hepatitis B infection and those with acute icterus (2.9% & 2.1%) respectively. Health care workers (HCWs) and household contacts are another risky groups that showed slightly higher rates of infection (0.8% & 1.2%) respectively.

Table (3): number and percentage of HCV positive among study groups.

Groups	No. tested	No. positive	%
Blood donors	42140	62	0.15
Acute icteric cases	1656	35	2.1
HCWs	649	5	0.8
Midwives	384	1	0.3
Prisoners	625	4	0.64
Thalassemia	136	23	16.9
Hemophilia	11	3	27.3
Contacts	486	6	1.23
Hemodialysis	35	5	14.3
CHB cases	34	1	2.94
Gypsies	13	0	0
Total	46169	145	0.31

Discussion:

Hepatitis C is a bloodborne viral infection that being considered as the major causative agent of PTH throughout the world 1, 17. Infection by HCV can cause self-limiting mild viremia, but more frequently chronic liver disease with possible

Year	No. tested	No. positive	%
1996	8974	43	0.47
1997	3908	23	0.58
1998	5229	18	0.34
1999	9281	24	0.26
2000	9787	13	0.13
2001	8990	24	0.26
Total	46169	145	0.31

progression to cirrhosis and hepatocellular carcinoma 4,18. HCV infection is diagnosed primarily by the detection of anti-HCV antibodies in the serum. In Iraq, screening of blood donors and risky groups for anti-HCV antibodies was started since 1995, using ELISA techniques with the confirmation by immunoblot assay. In the present study, the overall infection rate in the blood donors was 0.15%. This slightly lower infection rate compared to other local studies may be attributed, at least in part, to the strict selection of volunteers before blood donation 14, 15, 19. Furthermore, the results also showed that the infection rate by years among blood donors were in a decreasing pattern throughout the study period affirming the effectiveness of the control measures adopted in this respect. Regarding the risk groups, the highest infection rate was found among hemophiliacs (27.3%). Although the total number of hemophilia patients in Diyala province is too small to be accepted statistically, however, hemophilia is a well-recognized risk for acquisition of HCV infection 13, 20. Similarly, thalassemics and hemodialysis patients showed higher infection rates (16.9% & 14.3%) respectively. These multiple blood recipient groups were most probably acquired HCV infection through transfused blood as several previous studies from different localities had reported that multiple blood recipients were highly vulnerable for HCV infection 11, 16, 21. The implementation of HCV screening in blood banks, although has greatly reduced the rate of PTH^{5,7,22}, however, the relatively long period between HCV infection and the development of detectable circulatory antibodies (mean 12 weeks), may limit the sensitivity of the screening assays, particularly among those at low risk of HCV infection such as blood donors 8, 23, 24. The results in the current study also revealed a relatively higher infection rate among HCWs and private midwives (0.8% & 0.3%) respectively. Again these results were consistent with the previous studies reported a high prevalence of HCV infection among HCWs 9, 14. The transmission of HCV infection in the health care settings from patients to health care providers following needlestick and exposure to other body fluids has been documented 17,25. Likewise, transmission to HCV negative patients following exposure to an HCV infected HCW or patient has also been reported.10, 26. Previous studies on the transmission of HCV to household contacts with

index cases yield variable prevalence ranging from 0% to 11% 27,28. In the present study, the infection rate among household contacts was 1.2%. A part from sexual contact, the intrafamilial transmission of HCV infection is largely attributed to percutaneous routes through reusable syringes, sharing of shaving razors, toothbrushes and through other contaminated skin piercing instruments 29, 30. Additionally, in the present study, one patient with chronic hepatitis B was found to be coinfecting with hepatitis C. This finding was not unusual sine coinfection by more than one of hepatitis viruses may occur 31. A slightly higher prevalence of HCV infection was found among prisoners (0.6%) in this study. Actually, prisoners are considered to be at a higher risk for acquiring HCV infection as several previous studies had reported a high prevalence of HCV infection among inmates injecting drug users 32. Regarding the acute icteric cases, only 35 (2.1%) were found to be infected with HCV. This finding may be attributed to the facts that the prevalence of HCV infection among the general population in our community is very low (0.3%-0.9%) and the HCV infection usually characterized by very mild clinical picture that may pass unnoticed 25, 33. In the present retrospective study, which conducted over six years, the majority of anti-HCV positive cases were diagnosed among hemophilia, thalassemia and hemodialysis patients. Thus it can be concluded that generally the overall prevalence of HCV infection among Diyala population is low and that the HCV infections are concentrated in certain risky groups particularly multiple blood recipient.

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