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RESEARCH ARTICLE

Epidemiology, Mode of Transmission and Risk Factors of Hepatitis C virus (HCV) Infections in Thi-Qar Province / Iraq

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Abstract

Background: Hepatitis C infection is now the most common cause of end-stage liver disease in many countries. World Health Organization (WHO) estimations suggest that up to 3% of the world's population (170 million) have been infected with HCV.

Patients and Methods: The present study was carried out between September 2010 and July 2011 on patients referred to the Center of Thalassemia/AL-Haboby Hospital, Central blood bank, Renal Dialysis Unit/Al-Hussein Teaching Hospital and Public Health Laboratory in Thi-Qar province to detect the seroprevalence, mode of transmission and risk factors of HCV infection among the asymptomatic people. ELISA-III assay was implemented on 12330 individuals : (11608) blood donors, (394) thalassemic patients, (265) polycythemic patients, (32) renal failure patients and (31) medical staff.

Results: Positive results of HCV by ELISA III technique was found in 184(1.49%), the infections were distributed as following: 107(58.15%) blood donors ; 63(34.24%) thalassemic patients ; 9(4.89%) ploycythemic patients ; 3(1.63%) medical staff and 2(1.09%) renal dialysis patients. The statistical analysis was show that the HCV infections were higher in males than females, in patients of blood group O and in urban than rural parts of the province. The highest infection rates at age groups (31-40 ; 41-50 years).

Conclusions: Immigration from endemic areas, especially from Egypt was responsible for HCV spread to Iraq. Blood transfusion, renal dialysis and medical staff were a major roots of HCV infections in Thi-Qar. Thalassemic patients were stilled at a risk of acquiring HCV through administration of HCV infected blood collected during seronegative window period also for polycythemic group.

Recommendations: Further studies should be performed to determine the prevalence of HCV in all Iraqi cities and to estimate the relation between the HCV and blood group.

INTRODUCTION

Hepatitis C infection is now the most common cause of end-stage liver disease in many countries[(1)]. It is a blood-borne infection that was a well-known cause of post-transfusion hepatitis after introduction of hepatitis B screening

in blood banking and before implementation of hepatitis C-sensitive screening laboratory methods. Since the discovery of hepatitis C virus (HCV) and the development of diagnostic tests, almost all of the non-A non-B (NANB) post-transfusion hepatitis cases were shown to be due to HCV infection[2]. World Health Organization (WHO) estimations suggest that up to 3% of the world's population (170 million) have been infected with HCV[3]. The HCV prevalence rate is higher in persons ages 30 to 49 years than in older or younger persons and is higher in males than in females and among certain ethnic group, such as African American and Mexican American, than in whites[4]. Hepatitis C virus is a blood-borne pathogen and the main risk factors predominantly are through exposure to infected blood or blood products, such as: transfusion with unscreened blood and blood products[5], needle-sharing among drug abusers as a major risk factor for infection[6], and needle-stick injuries in health care workers[7], Persons at increased risk of acquiring hepatitis C include β-thalassemic patients[8], hemodialysis patients[9], hemophiliac patients[10], infants of mother with HCV infection[11] and promiscus persons[12]. Percutaneous procedures (e.g. ear and body piercing, circumcision, and tattooing) may be important[13]. It seems that HCV may also spread iatrogenically through the use of nondisposable needles and syringes, and practice of traditional healing techniques involving puncture of skin. For example, in Egypt HCV may have been spread via contaminated needles used to administer antimony as schistosomiasis treatment[14]. The aim of this study was Focus on the epidemiology of HCV infections, mode of transmission and risk factors of HCV in Thi-Qar province.

Patients and Methods

This study was carried out between September 2010 and July 2011 on patients referred to the center of thalassemia /AL-Haboby Hospital, central blood bank, renal dialysis unit/Al-Hussein teaching hospital and public health laboratory at Thi-Qar province. The study was conducted on 12330 individuals : (11608) blood donors, (394) thalassemic patients, (265) polycythemic patients, (32) renal failure patients and medical staff (31). The following data were recorded : Age, sex, Occupation, date, address, risk factor and blood group.

A sample of 5 ml of fresh blood was drawn from each case through make vein puncture and collected in a sterile plastic tube, left to clot at room temperature then centrifuged at 2000 rpm for 10 minutes, then serum was collected in sterile tube and examined by using Third generation ELISA (IgG) Hepatitis kit (BioElisa, Spain) to detected anti HCV antibodies.

Data were analyzed using SPSS version 11 for comparison between groups as appropriate $P< 0.05$ was considered statistically significant.

Results

The present study was carried out on (12330) individual from different groups, all ages and both sexes, Positive result for HCV by ELISA III technique was found in 184(1.49%), the infections were distributed as following: 107(58.15%) blood donors ; 63(34.24%) thalassemic patients ; 9(4.89%) ploycythemic patients, 3(1.63%) medical staff and 2(1.09%) renal dialysis patients (Figure 1).

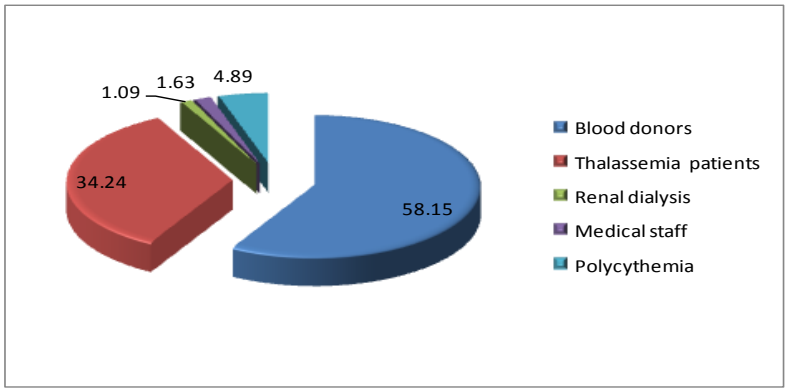

Figure (1) : The distribution of HCV infection in study groups.

The infection with HCV in males were higher than females, males constituted (148)(80.43%), while females were (36)(19.57%)(Table 1).

Table (1) : The relation between gender and seropositivity rates of HCV infection.

Study group / Gender	Blood donors	Thalassemic patients	Renal dialysis	Medical staff	Polycythaemia patients	Total
Male	102(95.33 %)	34(53.97%)	1(50%)	2(66.66%)	9(100%)	148(80.43%)
Female	5(4.67%)	29(46.03%)	1(50%)	1(33.33%)	0	36(19.57%)
Total	107(58.15 %)	63(34.24%)	2(1.09%)	3(1.63%)	9(4.89%)	184(100%)

The present study was confirmed that the HCV infection vary according to geographical distribution, the results of statistical analysis showed a significant difference at level $p<0.05$ between region study, The highest percentage of infection was at Al-Nasiriyah (58.7%) followed by Suq Al-shuyukh (19.02%) and the lowest percentage was at Al-Jebaish (3.26%) (Table 2).

Table (2) : Percentages of seropositivity infections among different groups from five regions in Thi-Qar province.

Region / Infection	Al-Nasiriyah	Suq Al-shuyukh	Al-Shatra	Al-Rifaay	Al-Jebaish
Blood donors	68(63.55%)	16(14.96%)	16(14.96%)	4(3.74%)	3(2.80%)
Thalassem-ic patients	32(50.79%)	16(25.4%)	10(15.87%)	2(3.17%)	3(4.76%)
Renal dialysis	1(50%)	0	0	1(50%)	0
Medical staff	3(100%)	0	0	0	0
Polycytha-emia	4(44.45%)	3(33.33%)	1(11.11%)	1(11.11%)	0
Total	108(58.7%)	35(19.02%)	27(14.67%)	8(4.35%)	6(3.26%)

The statistical analysis was found significant difference among infection at level of $p<0.05$, as shown in (Table 3), the highest infection rates was at age group (31-40 ; 41-50 year) respectively, flowed by age group (1-10 year), whilst the lowest infection rates was at age group (71-80 ; 81-90 year).

Table (3) : The Seropositivity Rates in Different Age of HCV Infected patients .

Study group / Age group (years)	Blood donors	Thalassem-ic patients	Renal patients	Medical staff	Polycythemia Patients	Total
1-10	0	31(100%)	0	0	0	31(16.85%)
11-20	0	23(100%)	0	0	0	23(12.5%)
21-30	10(52.63%)	9(47. 37%)	0	0	0	19(10.33%)
31-40	36(90%)	0	0	2(5%)	2(5%)	40(21.74%)
41-50	33(89.19%)	0	0	1(2.70%)	3(8.11%)	37(20.10%)
51-60	12(85.71%)	0	1(7.14%)	0	1(7.14%)	14(7.61%)
61-70	10(71.43%)	0	1 (7.14%)	0	3(21.43%)	14(7.61%)
71-80	5(100%)	0	0	0	0	5(2.72%)
81-90	1(100%)	0	0	0	0	1(0.54%)

This study showed that seroprevalence of HCV was highest in patients of blood group O (53.26%) and lowest in those of blood group AB (7.07%) at level $p> 0.05$, as be shown in (Table 4).

Table (4) : Percentage of seropositivity rates of HCV infection according to blood groups

Blood Group / Infection	A	B	AB	O
Blood donors	19 (17.76%)	24 (22.43%)	6 (5.60%)	58 (54.20%)
Thalassemic patients	13 (20.63%)	12 (19.05%)	6 (9.52%)	32 (50.79%)
Renal dialysis	0	1 (50%)	0	1 (50.%)
Medical staff	1 (33.33%)	0	0	2 (66.67%)
Polycythaemia patients	2 (22.22%)	1 (11.11%)	1 (11.11%)	5 (55.56%)
Total	35 (19.02%)	38 (20.65%)	13 (7.07%)	98 (53.26%)

Discussion:

Hepatitis C virus infection is worldwide in distribution, the virus has been found in all regions of the world where it has been sought, but the areas of higher prevalence were include of Egypt and other Mediterranean regions followed by sub-Saharan Africa[20]. Serologic tests for detection of HCV antibodies are important first-line tests in screening and diagnosis of HCV infection. The presence of anti-HCV antibody in serum and plasma reflects exposure to the virus and may indicate an acute, chronic, or resolved infection.

The results of present study reveals that the prevalence of HCV valuate by (1.49%), this result is less than previous studies conducted by Hamid *et.al*., (2010)[18] and Abass *et.al*., (2008)[15] which estimate the prevalence in Baghdad (8.3%) and in Thi-Qar province (3.2%) respectively, while this result is more than result obtained from studies by Hussein (2010)[19] in Sulaimani (0.1%), Al-Saaedi *et.al.*, (2001)[17] in AL-Diwania (0.45%) and Abdul-Kareem *et.al*., (2001)[16] in Al-Najaf province (0.34%). By contrast with results of studies in other countries, show agreement with Australia, China, India, Japan, Korea, Saudi Arabia, Syria and in Turkey, and less than in Taiwan, Thailand, Vietnam, Pakistan, Egypt and more than in Iran and USA [21, 22, 23, 24].

Blood transfusion which considered the main reason of HCV transmission and followed by renal dialysis , medical staff , injection drug use, and may be due to the dental surgery, sharing razors, tattoos, as well as a recent study by Abdul-Sada**,** (2011)[25] was pointed to the role of mosquitoes in transmission of HCV infection. Decreasing of infections percentage in the present study in comparison with previous study by Abass *et.al*., (2008) indicate for good controlling on known risk factors in Thi-Qar province.

Blood donors showed significantly high prevalence of HCV as compared with other groups. This may be due to the fact that this group composed of significant younger patients, usually take no health control measurement, and this group of population were more exposure to risk specially due to sexual contact, on other hand because of disease is asymptomatic therefore infection detection occur when their blood submitted to investigation during blood donation. In addition to that contaminated needles and razors play important role. The results showed that the thalassemia patients were stilled at a risk of acquiring HCV through administration of HCV infected blood collected

during seronegative window period. Horizontal nosocomial patient to patient transmission by contaminated equipment and or to contaminated multidose vials[26], splenectomy and injection drug use were responsible of thalassemia infection[27,28]. Frequent blood donation in polycythemic patients as a result of continuous production of bone marrow to red blood cells and increasing blood levels, was the main reason for HCV infections in this group as nosocomial infections. Very low percentage of infections was found in hemodialysis patients group, isolation of seropositive patients can help in prevention of HCV transmission among hemodialysis patients. Hemodialysis systems play an important role in transmission of infection among the patients[29]. The reasons for appeared the infections among medical staff group, due to negligence some of them to rules of protection and ignorance of how to deal with the infected persons, in addition to the percentage of infections related to occupational risks.

The results of ELISA test showed the prevalence of HCV infection among males higher than females, that is in agreement with studies by[4,15,25,30]. Can be ascribed the increase in the numbers infected males relative to females to several reasons, the most important one is the possibility of exposure of males to infection more than females, especially by using of razors or frequent travel and contact with the occupational hazards[31,32], while other studies were attributed the causes of this variation to genetic factors related to the willingness of any of the sexes to infection according to the genotype of the virus [33]. Also the sex hormones have an effects on infection as indicated by Soulsby, (1982)[34] who explained that male hormones cause decreasing cellular immunity, while female hormones cause increasing.

The prevalence of HCV according to the present study appears to be concentrated in geographical areas where high density like the center of the province (Al-Nasiriyah) and Suq Al-Shuyukh, this result was agreement with results in Iraq by Al-Khozai, (2006)[30], Al-Saaedi (2001)[17] and Mahmood *et.al*., (2005)[29] were found that HCV infections in urban areas more than of that in rural areas. The pattern of spread of hepatitis C in the urban over the rural may be due to the fact that the urban's population more evolution and the people with a good level of pension and more deal with razor and tattoos, in addition to the large number of referred to the hospitals and exposure to the risk of infection due to contact with contaminated tools.

The results of this study was showed that HCV prevalence is higher in persons within age group (31-50) years than in older or younger persons, and that is agreement with[4,35]. Exposure of this group to the various medical device for treating and donation of blood is the leading cause of infection. The reason for decrease of infections in age groups older than (30-49) years was the death due to liver failure. In contrast the reasons for decreasing of infections in the age groups below this age group are the improvement conditions of blood transfusion and the use of sterile apparatus also many routes of HCV acquisition are absent at the childhood such as sexual contact and occupational risks[37] .

The result of this study demonstrated a correlation between HCV infections and blood groups. The prevalence of HCV was found to be higher in patients with blood group O, this finding is not unexpected as there is usually a high demand for blood group O which is the most common blood group in the general population, and lower in patients with blood group AB, this results agreement with [38,39].

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