

# Prevalence of HBV, HCV and HIV Infections Among Syrian Refugees in Kurdistan Region, Iraq

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## Abstract

**Background:** Hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are public health problems worldwide. Population mobility such as that occurs in war may play a role in changing the prevalence of infectious diseases.

**Objectives:** This study was conducted to determine the prevalence of HBV, HCV and HIV among Syrian refugees in Iraq and compare it to native Iraqis.

**Methods:** In this cross-sectional study, 880 Syrian refugees and 2975 native Iraqi volunteers were recruited. Subjects were tested for evidence of hepatitis B surface antigen (HBsAg), HCV antibody (Ab) and HIV Ag and Ab.

**Results:** From a total of 880 refugees, 34 cases (3.86%) were positive for HBsAg. None of the recruited samples was positive for HCV. For the indigenous people, 2975 subjects agreed to contribute in the project. Among them, 30 (1.09%) were positive for HBsAg and only one was positive for HCV. All the examined samples were negative for HIV in both populations.

**Conclusions:** While the prevalence rates of HCV and HIV are low and almost the same, the prevalence of HBV among the refugees is nearly fourfold higher than that found in indigenous population. This may put extra burden on health institutions in the host country.

**Keywords:** HBV, HCV, HIV, Syrian Refugees, Iraq

## 1. Background

Hepatitis B and C viruses represent global health problem worldwide. Currently, more than 350 million subjects are chronically infected with HBV and more than 150 million people are infected with HCV (1). Chronic infection with these two viruses may predispose to serious consequences such as liver cirrhosis, liver failure and hepatocellular carcinoma. Annually, around 500,000 deaths occur due to such infections and their consequences (2). The prevalence of HBV varies from less than 1% in developed world to more than 8% in some Asian countries (3). On the other hand, the prevalence of HCV varies from as high as 10% in Egypt to around 1% in most of the European countries (4). In Syria, the prevalence of HBV was studied previously and it was found that around 5% of the population are infected with HBV (5). Also, HCV was studied in that country and the prevalence was ranging from 0.3% - 0.9% (6). The prevalence of HBV and HCV in Iraq were 0.78% and 0.2%, respectively (7-9). Although HIV is uncommon in the region, recent data showed a noticeable increase of HIV infection (10). The prevalence of HIV infection in Iraq and Syria is less than 0.1% (10).

Population mobility is associated with the introduction of new diseases in the host society (11). With mass pop-

ulation immigration such as when occurs in wars, infectious diseases continue to represent major causes of death and morbidity due to respiratory tract infection, diarrheal diseases, tuberculosis, HIV and an acquired immunodeficiency syndrome (12). Other diseases that may pose a threat are vaccine-preventable diseases. Each country has its own program of vaccination according to the resources and national need. Movement of individuals from countries with less comprehensive program of vaccination to areas with good preventive program may represent a threat of developing infectious diseases in the distention countries (11, 12). Additionally, moving from areas with a poor vaccination program such as in post-war Syria to a country with thriving preventive programs such as in Iraq may increase the burden in new habitats.

## 2. Objectives

The aim of this study was to compare the prevalence rates of HBV, HCV and HIV between Syrian refugees in the Kurdistan region and Iraqi volunteers attending health-care facilities in Duhok City, Kurdistan region, Iraq.

### 3. Methods

#### 3.1. Blood Samples

Blood samples were collected from 880 Syrians living in refugees' camp in Duhok city over a period of 6 months. Also, blood samples were collected from 2975 indigenous Iraqis attending healthcare facilities in the city. A 5cc syringe and needle were used to bleed approximately 5 mL of blood from each donor. Then serum was separated by centrifugation at 1500 rpm for 5 minutes. All serum samples were then frozen at -20°C until the tests were performed.

#### 3.2. HBsAg, HBcAb and HIV Detection by the Enzyme-Linked Immunosorbent Assay

The positivity for HBsAg and HBcAb were determined using the commercial DIA.PRO diagnostic Bioprobes ELISA kit (Italy) following the manufacturer's instruction. In short, monoclonal antibodies specific to HBsAg and HBcAb were fixed to the bottom of micro-wells. Then, sera were added to the micro-well and the secondary conjugated monoclonal antibody, conjugated with Horseradish peroxidase (HRP), was added. Unbound serum proteins and the HRP conjugate were then washed off. Then, the enzymatic reaction was blocked and substrate was added. Finally, the optical density of each reaction was measured by an ELISA reader. For HIV, the HIV Ab/Ag fourth generation kit (combo) was used (DIA.PRO, Italy).

#### 3.3. Ethics

The study was approved by the scientific and ethics committee, Shekhan Technical College of Health, Duhok, Kurdistan region, Iraq. Written informed consent was obtained from all subjects before data collection.

#### 3.4. Statistics

All calculations and computations were carried out using SPSS version 21.

### 4. Results

In this study, we recruited 880 Syrian refugees and 2975 indigenous Iraqis from Duhok city. Duhok city is one of the three main cities of Kurdistan region, northern Iraq. The Syrian borders lie to the west of Duhok city. All the Syrian refugees entered to Iraq through this border gate then distributed to refugees camps in other cities of Iraq. Also, Duhok city is next to Islamic state of Iraq and Syria (ISIS) occupied territories. The total population of Duhok city before the last war in the region was 1,423,114 people. The city is hosting now 744, 685 internally displaced people and 109,352 registered Syrian refugees. Additionally, the city is

hosting thousands of unregistered Syrian refugees and the main destination for Syrians. We recruited 880 refugees that included 406 (46.1%) males and 474 (53.9%) females. Totally, 34/880 (3.86%) were positive for HBsAg (Table 1). None of the recruited samples was positive for HCV. On the other hand, we asked people who were visiting health facilities in Duhok to voluntarily contribute in the project. For the indigenous people, 2975 subjects agreed to contribute in the project. All the agreed subjects were males. Among them, 30 cases (1.09%) were positive for HBsAg and only one was positive for HCV. All examined samples were negative for HIV in both indigenous population and refugees.

### 5. Discussion

Infections with HBV and HCV pose serious health-care problem, especially in developing countries. Recently, some of the developing countries started ambitious projects to combat these infections. In Iraq, HBV vaccine was added to the expanded program of vaccination in early 2000 (7). Also, screening programs have been established for the diagnosis of HBV and HCV. Syria, also established preventive programs to stop the spread of such infections. However, after the last war, most of the preventive programs collapsed in a war-torn country. The war in Syria obliged population to move to seek safe shelters. More than 100,000 people moved to Duhok City, Kurdistan region. There is no doubt that migration can change the map of infectious diseases and there is a bilateral effect on the host and moved population. Probably, infectious disease is one of the most challenging risks facing both populations (13). This study aimed to determine the prevalence of HBV and HCV in both host population in Iraq and Syrian refugees. We found that the prevalence of HBV in Iraq was 1% while it was 3.86% in Syrian refugees. Around 100,000 refugees are registered in the city, which means that there are 3860 subjects chronically infected with HBV among refugees. In addition, there were thousands of refugees who did not register with local authorities. This represented a real threat for the local society. Furthermore, this fourfold prevalence of HBV will put an extra burden on thriving preventive programs in Duhok city. This encourages testing all refugees for the infection and additional tests are required to determine patients with active HBV infection and arrange treating them. Recalling that some wave of mass migration arrived to Europe and USA as well, infection with HBV may pose a global hazard and an immediate plan is needed to screen, prevent and treat HBV infection.

A previous study from Syria showed that the prevalence of HCV Ab positivity was around 1% (6). However, in this study, none of the recruited samples was positive

**Table 1.** HBsAg Positivity in Iraqis and Syrian Refugees

HBsAg Positivity	Iraqis					Syrian Refugees				
	Subjects	Mean age	STD of age	HBsAg Positive	%	Subjects	Mean Age	STD of Age	HBsAg Positive	%
<b>Total</b>	2975	34.2	8.72	30	1.09	880	24	6.73	34	3.86
<b>Male</b>	2975	34.2	8.72	30	1.09	406	26	7.99	18	4.43
<b>Female</b>	0	0	0	0	0	474	23.18	6.35	16	3.37

Abbreviation: STD, standard deviation.

for HCV Ab. This might be due to the small sample size involved in this study. The prevalence of HCV is very low in Iraq as shown previously and in this study (8). Therefore, it is concluded that HCV might not pose any threat for both society. The prevalence of HIV was studied before in both populations and it was found that less than 0.1% of both populations were infected with HIV. In this study, none of the examined samples was HIV-positive. However, this does not negate the need for education program about HIV and modes of transmissions.

Our study has some limitations. First of all, the sample size was relatively small for such a study. Probably, screening all the refugees was more desirable. However, limited resources were the main obstacles to perform mass screening. Secondly, the risk factor associated with such infections was not studied. It is important to mention that this study should be considered preliminary and more studies are needed to investigate risk factors associated with the infections and other infectious diseases such as tuberculosis and others.

To conclude, the prevalence of HBV in Syrian refugees was nearly fourfold higher than that of indigenous people of Iraq. The prevalence of HCV and HIV was very low in both refugees and indigenous people. An immediate action plan is needed to screen all refugees for HBV, to determine active HBV infection and treat accordingly and also impose preventive measures to halt the spread of the infection.

## Footnote

**Authors' Contribution:** We confirm that all authors contributed directly to the intellectual content of the paper, planned the project, contributed effectively in data collection and analysis and approved the final version of the paper. We also confirm that the contents of the manuscript have not been published or are not being submitted for publication elsewhere, and all authors have no potential conflicts of interest.

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