The Prevalence of Hepatitis B and C Virus Infections in the Couples Attending a Premarital Screening Program in Zakho City, Kurdistan Region of Iraq

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Abstract

**Background:** Hepatitis B and C virus (HBV and HCV) infections are major global health issues and the leading causes of liver cirrhosis and hepatocellular carcinoma.  

**Objectives:** The aim of this study was to investigate the prevalence of HBV and HCV infections in couples attending a premarital screening program in Zakho city, Kurdistan region, Iraq.  

**Methods:** This cross-sectional study was carried out in Zakho city, Kurdistan Region of Iraq, between January and October 2019. During this period, 2123 couples were screened for HBV and HCV as a part of premarital screening. The age of couples ranged from 18 to 63 years old. ELISA test was used to detect HBsAg, Hbc IgG, and HCV Ab. Hepatitis C virus Ab positivity was then confirmed by HCV RT-PCR, and all HCV positive patients were then tested for genotyping.  

**Results:** Among the recruited subjects, 38/4246 (0.89%) patients were positive for HBsAg. Of these, 12/2123 (0.57%) were females, and 26/2123 (1.22%) were males. Hepatitis C virus RT-PCR confirmed HCV positivity for one female patient who was further confirmed to be infected with HCV genotype 4.  

**Conclusions:** To conclude, the present study showed a relatively low prevalence of HBV and HCV infections in the couples tested through the premarital screening program in Zakho city. The prevalence of HBV seropositivity was higher in males than females. Therefore special attention should be paid to males during prevention strategies.  

**Keywords:** Premarital Screening, HBV, HCV, ELISA, RT-PCR, Zakho

1. Background

Hepatitis B and C (HBV and HCV) infections are major global health problems and the leading causes of liver cirrhosis, liver failure, and hepatocellular carcinoma (1). Nowadays, it is estimated that more than 300 million patients are chronically infected with HBV, with a prevalence ranging from around 1% in developed countries to more than 8% in some developing countries (2, 3). On the other hand, more than 150 million subjects are currently infected with chronic HCV infection, with a prevalence ranging from 10% in Egypt to less than 1% in industrialized countries (4, 5). In our region, the prevalence of HBV infection ranges from around 1% in Iraq, Iran, and Syria to as high as 7% in Yemen and some Saudi territories (6-8). The majority of the patients who are infected with HBV and HCV are asymptomatic, making the diagnosis and prevention of complications difficult. To combat the infections and their complications, a preventive plan should be implemented to reduce the transmission of the viruses and overcome the challenges of early diagnosis.

2. Objectives

The aim of this study was to investigate the prevalence of HBV and HCV infections among the couples attending a premarital screening program in Zakho city, Kurdistan region, Iraq.

3. Methods

3.1. Study Design

This cross-sectional study was carried out in Zakho city, the Kurdistan region of Iraq, between January and October 2019. During the period of the study, 2123 couples were
screened for HBV and HCV infections as part of premari-
tal screening. The age of the couples ranged from 18 to 63
years old. All the subjects who agreed to participate were
recruited to the project.

3.2. Screening for HBV and HCV

Enzyme-linked immunosorbent assay (ELISA) was con-
ducted to test for hepatitis B surface antigen (HBsAg), hep-
atitis B core IgG (HBc IgG), and hepatitis C virus antibody
(HCV Ab). Commercial ELISA kits were used (DIA.PRO Di-
gnostic Bioprobes ELISA Kit, Italy) following the manufac-
turer’s instructions.

3.3. Quantification of HCV RNA and Genotyping

The patients who tested positive for HCV Ab were sub-
jected to molecular analysis to confirm the infection. Hep-
atitis C viral load was studied by the Xpert HCV quantifi-
cation assay (Cepheid, Sunnyvale, California, the USA). In
this procedure, HCV RNA is amplified in the range of 10 to
10^8 IU/mL. All HCV-positive samples were then sent for HCV
genotyping by reverse hybridization (NLM, Milan, Italy).

3.4. Ethics

The project’s protocol was approved by the scientific
and ethics committee of the College of Medicine, Univer-
sity of Zakho. Informed written consent was obtained from
all the participants before collecting samples.

4. Results

4.1. Participants

Between January and October 2019, 4246 people were
recruited, including 2123 males and 2123 females. All the
subjects were apparently healthy and asymptomatic and
had a negative history of viral hepatitis.

4.2. HBV positivity

Amongst the participants, 38/4246 (0.89%) tested posi-
tive for HBsAg, of whom 12/2123 (0.57%) were females, and
26/2123 (1.22%) were males. All the subjects who tested posi-
tive for HBsAg also showed positivity for HBc IgG.

4.3. HCV positivity

Among the investigated samples, only one female
(1/4246, 0.047%) tested positive for HCV Ab. To confirm the
diagnosis, RT-PCR was performed, rendering a viral load of
232000 IU/mL. Then the sample was sent for HCV genotyping
that revealed HCV genotype 4.

5. Discussion

Hepatitis B and C infections are common public health
issues, particularly in under-developed countries such as
Iraq. The majority of the individuals assessed in the cur-
rent study were asymptomatic. Subsequently, late diagno-
sis in this condition may lead to the development of seri-
ous consequences such as liver cirrhosis and hepatocellu-
lar carcinoma. The prevalence of viral hepatitis, particu-
larly HBV and HCV, has been studied thoroughly in the re-
gion (9-11). In a study conducted in Babylon (12), investigat-
ing the prevalence of HBV, the seroprevalence of the infec-
tion was shown to be less than 1%, which is consistent with
the studies conducted in Kurdistan region, Northern Iraq
(7, 12, 13). In this study, the overall prevalence of HBV was
0.89%. Interestingly, the prevalence of HBV in males was as
twice as its prevalence in females. The same trends were
found in Italy and Iran (14, 15). This phenomenon is some-
how difficult to explain, and more studies are needed to
explore the reasons behind the higher prevalence of HBV
among males.

In a previous study in our region, the prevalence of
HCV positivity was reported 0.2% (11). The prevalence of
HCV infection has been studied in the general population
of different countries; for example, it was found to be 1.1%
in Afghanistan, around 1% in Turkey, and more than 4%
in Pakistan (16, 17). In our study, the prevalence of HCV
was 0.047%. Considering the low prevalence of this infec-
tion and the development of new powerful medications, it
seems feasible to eliminate HCV infection in our society.
In a previous study conducted in the Kurdistan region of Iraq
on the subjects with haemoglobinopathies infected with
HCV, 53% of them typed as HCV genotype 4 followed by 23%
as genotype 1 (18). In another study conducted on patients
with renal failure in our region (In Zakho city, Kurdistan
Region, Iraq), HCV genotype 1 was the most common geno-
type (19). In this study, the only patient infected with HCV
revealed genotype 4.

To conclude, the prevalence of HBV and HCV infections
seems to be low among the couples attending premarital
screening in the Kurdistan region of Iraq. The prevalence
of HBV was higher in males than females, implying that
more attention is needed to be paid to preventive screen-
ing plans among men.

Footnotes

Authors’ Contribution: Concept and idea, SJ and NH;
Data collection and laboratory analysis, SJ, NH, SA, AN, RQ
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