

# Prevalence of hepatitis B infections in local and incoming populations of the public health laboratory reviewers in Al-Nasiriyah city, Iraq

Murtada Hafedh Hussein<sup>1</sup>, Intidhaar Naeem Abid<sup>1\*</sup>, Amany Sh. Jabber<sup>1</sup> and Bushra Jabbar Al-Badry<sup>2</sup>

<sup>1</sup>Pathological Analysis Department, College of Science, Thi Qar University, Dhi Qar, Iraq.

<sup>2</sup>Biology Department, College of Science, Thi Qar University, Dhi Qar, Iraq.

Correspondence to Intidhaar Naeem Abid (email: heya12i@yahoo.com).

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**Objective** This study aimed to investigate the number of cases of hepatitis virus infection of the public health laboratory inspectors in Dhi Qar Governorate for the year 2016.

**Methods** The information collected from the viruses department about the numbers of suspicious auditors and the numbers of patients infected with the disease from locals and those coming to the governorate during all months of the year. It was used in enzyme linked immunosorbent assay technique by hepatitis B surface antigen (HBsAg) to the diagnosis of infections.

**Results** Sixty cases from 4696 were given positive result for HBsAg examination within a year of the local and incoming population, the most infections in January with 3.08%. The study was appeared that hepatitis B virus infections were more in male [39 (65%)] than in female [21 (35%)].

**Conclusion** The results of the study illustrated the percentages of local people infected with HBV was more (1.6%) than in an incoming people (0.6%).

**Keywords** hepatitis B virus, HBsAg, infections, populations

## Introduction

Hepatitis B virus (HBV) infection is a serious and common contagious disease in the liver, affecting millions of people across the world. The incubation period for HBV is 45–180 days, the most common 60–90 days.<sup>1</sup> Every year nearly 1 million people die of chronic liver disease associated with HBV, including liver cirrhosis and liver cancer.<sup>2</sup> It is estimated that nearly 2 billion people have serological evidence of past or present HBV infection. More than 350 million chronic carriers of hepatitis B virus.<sup>3</sup> About 75% of chronic carriers live in Asia Western Pacific.<sup>4</sup>

Hepatitis B virus and hepatitis C virus (HCV) infections are the major causes of acute and chronic liver disease. The burden of chronic HBV and HCV remains disproportionately high in low- and middle-income countries, particularly in Asia and Africa.

In addition, even in low-prevalence areas, some populations have high levels with hepatitis C and hepatitis B infection, such as injecting drug users, men who sex with men, people infected with HIV, as well as those belonging to some indigenous communities.<sup>5</sup> Hepatitis B virus is classified in the Hepadnaviridae family.<sup>6</sup> The HBV contains a double stranded DNA of about 3200 base pairs in four partially overlapping open reading frame that encode the envelope, core (precore/core), polymerase and X protein. Envelope proteins are surface glycoproteins, it is collectively assigned as hepatitis B surface antigen (HBsAg). In liver cells infected with HBV, HBsAg is produced in excess and excreted in the blood, as it acts as a sign of active infection and infectivity, currently, recombinant HBsAg is used to vaccinate HBV,<sup>7</sup> HBsAg has been prepared in quantity, and now comprises the immunogen in highly effective vaccines to prevent HBV infection.<sup>8</sup> The core open – read frame encodes polypeptide that is expressed either as an hepatitis B e antigen (HBeAg) or viral capsid protein. The presence of HBeAg in serum or plasma is indicated to high levels of HBV replication, increased

infection and increased risk of hepatic fibrosis. The polymerase protein acts as a reverse transcriptase, a DNA polymerase and a terminal protein.<sup>7</sup> The HBV X protein (HBxAg) with multiple functions, including signal transduction, DNA repair, inhibition of protein degradation and transcriptional activation.<sup>9,10</sup> However, it is established that HBxAg is necessary for the infection of HBV produced *in vivo*, and can contribute to the oncogenic potential of HBV.<sup>11</sup> The HBsAg refers to acute or chronic HBV infection. People with positive HBsAg are infectious and can transmit the virus to others. Diagnosis of acute hepatitis B is reliably found by IgM anti-HBV in the serum, especially in the patient with HBsAg and signs, symptoms, or laboratory features of acute hepatitis. However, in some cases, HBsAg is rapidly cleared from the serum, and IgM anti-hepatitis B core (anti-HBc) is the only marker to detect when the patient is exposed with hepatitis. The anti-HBe (total) and anti-HBs test is not useful in diagnosis, and should be tested for HBeAg and anti-HBe reserved for people who have a positive test for HBsAg. HBsAg results without IgM anti-HBc indicate the presence of chronic hepatitis B (CHB), but this diagnosis generally also depends on finding persistent HBsAg for at least 6 months.<sup>12,13</sup>

Acute hepatitis B is usually a self-limiting disease characterized by acute inflammation and necrosis of the liver, with a mortality rate of 0.5–1%. CHB includes a spectrum of the disease, defined as continuous HBV infection (presence of HBsAg detected in blood or serum for longer than 6 months), with or without associated with active viral replication and evidence of liver injury and inflammation.<sup>14</sup> Age is a key factor in determining risk of chronic infection. Chronicity is common after acute infection in newborns (90% of neonates born to HBeAg positive mothers) and in children younger than 5 years (20–60%), but less common occurrences (<5%) when infection is acquired in adulthood.<sup>15,16</sup> All over the world, in countries with CHB infection more than 8% of the population,

the most of these individuals were infected at birth or in early childhood, when the risk of progression to chronicity was high.<sup>14</sup> Hepatitis B is transmitted through percutaneous or mucosal exposure to the infected blood or other body fluids. Hepatitis B transmission has been observed with many forms of human contact: perinatal/mother-to-child, household (nonsexual), sexual, sharing a needle and occupational/health care. Higher concentrations of infectious HBV were found in the blood and serum. However, the body fluids derived from the serum, such as semen and saliva, are also contagious.<sup>17</sup>

The prevalence of HBV varies widely, ranging from 0.1% to 20% in different parts of the world<sup>14</sup> "high" prevalence (HBsAg positivity rates > 8%) endemic areas include the far east, sub-Saharan Africa parts of the middle east, and the Amazon basin. In these areas, there is serological evidence of previous hepatitis B infection (anti-HBc antigen or anti-HBs positivity) present in the vast majority of individuals.<sup>18</sup> The prevalence is low in several highly endemic countries due to improvements in socio-economic status, global vaccination programs and possibly effective antiviral treatments.<sup>19</sup> However, population movements and migration are change is currently spread and spread in several low areas such as Italy and Germany, because of this and high prevalence rates of HBsAg in immigrants and refugees outside Europe compared with indigenous peoples.<sup>20</sup> Due to the importance and seriousness of infection with hepatitis B and the fact that infection is a source of the spread of the disease to healthy people, we have performed this study to find out the spread of HBV infections in local and incoming people of the reviewers to the public health laboratory in Nasiriyah city, Dhi Qar province, Iraq.

## Materials and Methods

The data of this study were collected from virology unit of public health laboratory in Nasiriyah city, Dhi Qar province, Iraq. The data were taken in period of 1 year from January 2016 to December 2016. The laboratory testing method includes enzyme linked immunosorbent assay (ELISA) to detect HBsAg, anti-HBc and anti-HBs in serum specimens.<sup>21</sup>

The results in Table 1 was appeared, out of 4697 tested persons, 60 (1.27%) persons were seropositivity to HBsAg, the higher percentage of people with HBV was in 2016 emergence in December (3.08%), while in the August was registered the lower percentage (0.20%).

The results revealed that HBV were more in male [39 (65%)] than in female [21 (35%)] (Table 2).

The study shown in Table 3 reveal the numbers and percentages of local and incoming people infected with HBV, it was illustrated the percentage of local people infected with HBV was more (1.6%) than that in incoming people (0.6%).

Table 4 shows the distribution of numbers and percentages of people with HBV according to age groups, it was appeared that the 31–40 years age group was registered with the higher numbers and percentage [16 (26.7%)] of people infected with HBV and the 1–10 years age group was registered with the lower number [1 (1.7%)].

## Discussion

Sixty cases of HBV from 4697 suspected persons were diagnosed at the central public health laboratory in Dhi Qar Governorate in 2016. This laboratory used the HBsAg to detect the

HBV by ELISA. This test was used to diagnose blood screening marker sought. A person who is positive for HBsAg is considered to be infected with HBV and have potential infectious. The most common test of HBsAg used is ELISA, this technique is more suitable for screening the largest number of sample per day as in blood transfusions in industrialized countries.<sup>22</sup> In this study, it was appeared that the males were more infected with HBV than that in females, this result was an agreement with a study of Baig<sup>23</sup> who observed that the overall male to female ratio was 4:1. Clinical studies in the world were viewed that the chronic HBV revealed to progress high rapidly in males than in females and it has been showed that cirrhosis and HCC are prevalence to occur in males and postmenopausal females.<sup>24</sup> HBV remains a major health problem in the world, more than 2 million people have contact with the virus and there are 400 million chronic cases and million deaths each year. It is hyperendemic (i.e. >8%) of the

Table 1. Numbers and percentages of people with HBV in the months of 2016

Month	Total number of persons tested	No. of persons with HBV (%)
January	413	9 (2.17)
February	412	3 (0.72)
March	371	9 (2.4)
April	708	9 (1.27)
May	370	1 (0.27)
June	343	4 (1.16)
July	280	3 (1.07)
August	498	1 (0.20)
September	384	8 (2.08)
October	496	4 (1.01)
November	295	2 (0.67)
December	277	7 (3.08)
Total	4697	60 (1.27)

Table 2. Distribution of numbers of people infect with HBV according to sex

Month	Total number of infected people	No. of male (%)	No. of female (%)
January	9	5 (55.5)	4 (44.4)
February	3	3 (100)	
March	9	4 (44.4)	5 (55.5)
April	9	7 (77.8)	2 (22.2)
May	1	1 (100)	
June	4	3 (75)	1 (25)
July	3	2 (66.7)	1 (33.3)
August	1	1 (100)	
September	8	4 (50)	4 (50)
October	4	3 (75)	1 (25)
November	2		2 (100)
December	7	6 (85.7)	1 (14.28)
Total	60	39 (65)	21 (35)

Table 3. Numbers and percentages of local and incoming people infected with HBV

Month	No. of tested people	No. of tested incoming people	No. of incoming people with HBV (%)	No. of tested local people	No. of local people with HBV (%)
January	413	145	1 (0.7)	268	8 (2.9)
February	412	112	1 (0.9)	300	2 (0.6)
March	371	84	0	287	9 (3.1)
April	708	338	4 (1.2)	370	5 (1.35)
May	370	82	0	288	1 (0.3)
June	343	75	0	268	4 (1.49)
July	280	124	0	156	3 (1.9)
August	498	117	0	381	1 (0.26)
September	384	166	1 (0.6)	218	7 (3.2)
October	496	128	2 (1.6)	268	2 (0.7)
November	295	139	0	156	2 (1.28)
December	277	82	0	145	7 (4.8)
Total	4697	1592	9 (0.6)	3105	51 (1.6)

Table 4. Distribution of numbers and percentage of people with HBV according to age groups

Age group (years)	No. of people with HBV (%)
1–10	1 (1.7)
11–20	4 (6.7)
21–30	15 (25)
31–40	16 (26.7)
41–50	13 (21.7)
<50	11 (18.3)
Total	60

population infected in the sub-Saharan Africa and Asia.<sup>14,25</sup> The prevalence of HBV is <15% in North America, Australia and New Zealand and 2–4% in Japan, 5–18% in China and highest 15–20% in Taiwan as well as some other southeast Asian countries.<sup>26</sup> This study revealed the number and percentages of local people in Dhi Qar province that infected with HBV was more than that in incoming people. Dhi Qar province is located in southern Iraq, and Iraq is from Asian countries, this may be due to sources of infection including through treatment or sex transmission.<sup>26</sup> HBV spread by contact with an infected persons blood, semen, and other body fluids.<sup>27</sup> Nine of incoming people was infected with HBV, all of these people were from Asian countries, divided into two from China, two from Malaysia and five from Bangladesh. WHO estimated that 350 million people worldwide were infected by

HBV, 75% live in Asia pacific region, 90 million people were infected by virus in China alone, or 7% of its population.<sup>28</sup> The disease is endemic in the most Asian countries with chronic disease at a rate of 5–15% in these countries, primary mother-to-child transmission, resulting in high rates of transmission during families,<sup>29</sup> this study revealed that the 31–40 years age group was registered the higher percentage (26.7%) among other age groups, these results were agreement with study of Al-Rubaye et al.<sup>30</sup> who found that the 30–40 years age group had more viral hepatitis when they studied prevalence of hepatitis B seromarkers in blood donors in Basra. In Australia, new cases of hepatitis B infections occur more frequently in young adults during drug injections, skin penetration, or sexual contact,<sup>31</sup> since 2001 the rate of diagnosis of new infections among people of 15–29 years old has declined and remains relatively constant among people over the age of 30.<sup>32,33</sup> These results were agreement with report by WHO<sup>34</sup> as that, the seroprevalence of HBV in young age (0–14) years is 1.2–1.4%, but in adults was higher, at above 5%.

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## Conflicts of Interest

None. ■

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