

Research Article

Epidemiological Study of Hepatitis B Virus from 2009 to 2019 in Koya CityAzhi Aram Kareem^{1*} , Dawan Jamal Hawezy^{2,3} , Rukhosh Eshaq Mikha⁴ ¹*Department of Medical Microbiology, Faculty of Science and Health, Koya University, Koya KOY45, Kurdistan Region – F.R. Iraq.*^{2,3}*School of Medicine, Koya University & ²Department of Surgery, Shahid Dr. Khalid Teaching Hospital, Koya KOY45, Kurdistan Region – F.R. Iraq.*⁴*Nursing Department, Koya Technical Institution, Erbil Polytechnical University, Koya KOY45, Kurdistan Region – F.R. Iraq.*

Abstract: Hepatitis B virus (HBV) infection is a serious and common infectious disease of the liver, affecting millions of people worldwide. Infection with the hepatitis B virus (HBV) can lead to cirrhosis and liver cancer. The present study aims to assess the incidence rate of hepatitis B infection in Koya city between 2009 and 2019, among individuals undergoing surgery, marriage, blood transfusion, employed in hospitals or other health care centers, and foreigners. This descriptive-analytical study has been conducted on the individuals with hepatitis B virus visiting health centers in Koya city, demographic characteristics (age, gender and ethnicity) and epidemiologic information of the patients recorded at Koya health centers were analyzed. The total incidence rate reported was 230 cases between 2009 and 2019, in which 160 (69.6%) were males, and 70 (30.4%) were females. The highest number of cases recorded in 2014 in which the incidence rate has increased due to Syrian refugee settlements in Koya city. Surprisingly, the incidence rate show decline from 2014 to 2018. As the study results revealed, the disease incidence rate has shown a decline from 2014. This shows the improvement of education, health and hygiene as well as a good vaccination program. In our region, males are more at risk than females for getting the hepatitis B virus due to male's activity and daily jobs compared with females, which remain mostly at home.

Keywords: Epidemiology, Hepatitis B Virus, HBV, Viral Hepatitis, Koya city.

1. Introduction

Hepatitis B virus (HBV) is a circular, partially double-stranded DNA virus of the family Hepadnaviridae, contains DNA genome of 3.2 kilobase (kb) pairs. HBV is blood-borne and about 75-200 times more infectious than HIV [1].

Hepatitis B infection is one of the serious problems in public health globally. HBV causes chronic hepatitis and may develop into cirrhosis and hepatocellular carcinoma (HCC) [2]. According to serological evidence, about 2 billion people have past or present HBV infection, of which around 350 million are chronic carriers. It was estimated that 75% of chronic carriers live in Asia and the Western Pacific. The reports indicate that about 500,000 to 1.2 million people die yearly of HBV infection, and 15-40% of patients with HBV develop cirrhosis, liver failure, or HCC [3].

Hepatitis B virus can survive for up to 7 days outside of the human body. During this time, the virus can still

cause infection if it enters the body of a person who is not protected by the vaccine. HBV is transmitted parenterally and is found in all bodily fluids. Sexual intercourse in countries with low and intermediate endemicity and vertical transmission (from mother to infant) in endemic areas are important routes of transmission. Exposure to infected blood and various body fluids, as well as through saliva, menstrual, vaginal, and seminal fluids are other routes of transmission [4].

Typically, when transmission occurs in children, the infection usually becomes chronic. However, when transmission occurs in adolescents/adults usually via sexual contact, contaminated needles, and less often from transfusion of blood products, infection normally resolves unless the individual is immune-compromised [5].

The majority of people with HBV infection do not experience any symptoms. In contrast, some people may experience acute illness with symptoms that last several weeks, including yellowing of the skin and eyes (jaundice), dark urine, extreme fatigue, nausea, vomiting,

and abdominal pain. A few persons with acute hepatitis can develop acute liver failure in rare conditions, which can lead to death [6]. HBV infection is considered chronic when it persists longer than six months. The risk of chronic HBV infection is inversely related to age, with chronic infection developing in about 90% of infected infants, 30% of children younger than five years, and less than 5% in all other persons. Individuals with chronic Hepatitis B may develop cirrhosis and liver cancer [7].

There are many ways to diagnose HBV infection, but the most common one is evaluating the patient's blood for HBsAg, hepatitis B surface antibody (HBsAb), and hepatitis B core antibody (HBcAb). Although the presence of HBsAg indicates that the person is infected, the presence of HBsAb indicates recovery and immunity from HBV infection or successful immunization against HBV. HBcAb appears at the onset of acute HBV infection but may also indicate chronic HBV infection [8]. There is no effective treatment for acute hepatitis B. Therefore the adequate nutritional balance and care are recommended. However, chronic hepatitis B can be treated with oral antiviral agents, which slows down the development of cirrhosis and liver cancer. Education about how to avoid risky behavior plays an essential role in HBV prevention [9]. Development of HBV vaccine has been a major success in preventing the incidence of HBV infection and subsequent development of HCC. However, on the other hand, the vaccine is not effective against an already developed infection or escape mutants. Age, alcohol, tobacco, obesity or people with immune system failure are other factors that limit the vaccine response. Moreover, despite the high coverage of universal HBV vaccination, HBV continues to be transmitted among unvaccinated children, adults and war refugees or countries where hepatitis B vaccination programs remain unimplemented or where coverage is low [10].

There has been an increase in the number of cases of hepatitis B in Iraq. However, in the Kurdistan region, the incidence rate of disease and chronic cases is unclear. However, in Koya, the incidence rate varied, war has affected the disease's occurrence, and the number of positive cases has been increased during the war.

The present study's main aim was to assess the Hepatitis B virus in Koya City between 2009 and 2019 among individuals undergoing surgery, marriage, blood transfusion, employed in hospitals or other health care centers, and foreigners. To determine the probable benefits of vaccination benefits of the vaccination program. To understand the disease infectious rate and strategic prevention plan.

2. Methods

2.1 Study area

This descriptive-analytical study was conducted in Koya city, Kurdistan Region, F.R. Iraq. The study focused on hepatitis B virus, individuals who had visited

health centers and lab clinics between 2009 and 2019, including those undergoing surgery, marriage, blood transfusion, employed in hospitals or other health care centers, and foreigners. After carrying out the required tests and confirming the disease in the visiting people, their information was recorded in specific patient forms and then required treatments were applied. The information needed was collected from the Information Record System of the Department of Health Prevention in the General Directorate of Health in Koya City, such as the patient's age, gender, place of residence, and ethnicity.

2.2 Sample and diagnostic procedures

In Koya city, every individual undergoing surgery, marriage, blood transfusion, employed in hospitals or other health care centers, and foreigners had been screened for HBV, HCV, and HIV by ELISA. Individuals with positive screening were asked for repeat sampling and confirmation test by ELISA and PCR in the central laboratory for positive carriers and to determine the ratio of viral load. If the viral load was greater than 2,000 IU/mL indicates that the virus is active and has the potential to cause damage to the liver and treatment is required [11].

3. Result and Discussion

The main objective of the current study was to assess the hepatitis B virus in Koya City concerning demographic characteristics such as sex, age and ethnicity. The present study was conducted on 230 positive hepatitis B cases between 2009 and 2019, summarized in chart (1). During the 11-year study period, it was observed that there were 10 cases in 2009, 15 cases in 2010 and 18 cases in 2011, 29 cases in 2012, 33 cases in 2013, 34 cases in 2014, 25 cases in 2015, 17 cases in 2016, 15 cases in 2017, 14 cases in 2018 and 20 cases in 2019. The highest number of cases was recorded in 2014 and the lowest number in 2009.

It has been indicated that the incidence rate was higher in 2013 and 2014 compared to other years. This may be due to the war in Syria and Sinjar when more than 16,000 refugees came to Koya city. We notice that the number of cases decreased slightly from 2014 to 2018 due to improved health education, people's commitment to health care recommendations, and the vaccination program. Although 230 cases have been reported in 11 years, it is low compared with the WHO estimates in the Eastern Mediterranean region, which is 3.3% of HBV infection in the general population.

The mean of positive HBV cases is 20.9 cases per year. If we exclude 2013 to 2015 the wartime in the region, the mean would decrease 3.65 and become 17.25. The wartime from 2013 to 2015 has increased the mean of positive HBV cases. Most of the positive HBV cases during that time relate to the 16,000 refugees mentioned above.

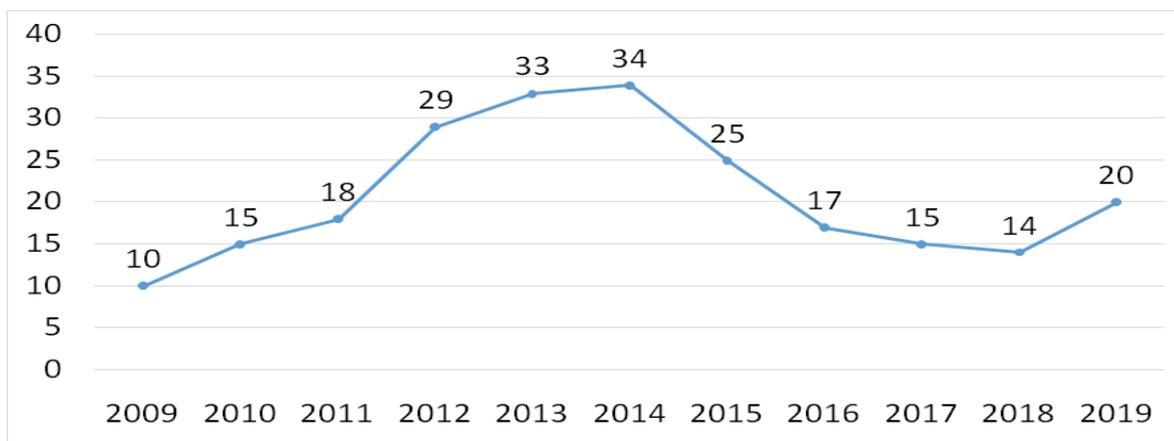


Chart 1: The number of cases of hepatitis B victims. The chart shows a steady increase in cases from 2009 to 2014, however, the cases declined from 2014 to 2018.

A study by Sharara and Kanj showed the impact of the Syrian civil war on infectious diseases. They found that from 2011 to 2014, the number of infectious diseases increased considerably. They also proved the importance of vaccination. In the war zone, the vaccination program cannot be successfully followed, therefore, the number of positive cases in the war zone is significantly higher compared to the peace areas [12].

The overall incidence rate was higher among males with a total of 160 (69.6%) as compared to 70 (30.4%) among females, as represented in table 1. A study by Baig in 2009 also showed a higher incidence rate of 79.5% in males compared with 20.5% females [13]. Generally, female HBV carriers have a lower viral load than male carriers and the risk of HBV-associated HCC is lower in females than in males and postmenopausal females compared to other females [14]. Men infected with HBV are 6 times more likely to develop a chronic form of the disease than women. Chronic hepatitis B tends to develop and cause faster liver damage in men and main victims of the most severe complications of the virus including hepatic cirrhosis and hepatocellular carcinoma [15]. Sex hormones have a differential effect on immune responses to viruses. Androgen interacts directly with HBV genome in the cell nucleus and activates transcription of HBV oncoproteins and estradiol and estrogen receptors protect liver cells from inflammatory damage, apoptosis and oxidative stress, which lead to fibrosis and malignant transformation preceding HCC [16]. Additionally, higher frequency of HBV carriers in males may be due to behavioral differences between males and females. The life activities of males bring them into contact with hepatitis virus, as a result, they are more likely to get infected and become

carriers [17]. This gender difference is possibly due to the natural protective role of estrogen on the inflammation of the liver in women and higher exposure to carcinogens, such as tobacco and alcohol in men, except in Greece, where HBV infection is more prevalent in women than in men [18].

The highest overall incidence rate of disease was found between 20-29 years of age in 69 cases (30%) and the lowest in the birth to nine-year in one case (0.5%) only. The incidence rate for other age groups was 18 cases between 10-19 years of age, 50 cases between 30-39 years of age, 42 cases between 40-49 years of age, and 50 cases above 50 years of age (Table 2).

The age distribution showed that the age group of 20-29 years had the highest incidence rate in this study. This was possibly due to the activities of this age group, which is considered to be one of the most active age group. This correlates with the study in Lome that showed the highest prevalence in the 20-29 age group and the lowest prevalence in people over 50 years of age [19]. It also correlates with a study in Pakistan that the highest rate of infection was found to be 34.93% between the ages of 21-30 [20].

As far as ethnicity is concerned, the highest incidence rate of disease was recorded among Kurdish-Iraqi of 173 (75%) cases and the lowest incidence rate was recorded among Iranian people of only 5 (2%) cases. However, this is due to the high population of Kurdish people in Koya city compared to Arabic, Syrian, and Iranian people. Syrian refugees also have an incidence rate of 36 (16%) cases and incidence rate among Arabic-Iraqi people was 16 (7%) cases (Chart 2). Positive cases among the Syrian and Iranian people are due to the settlement of refugees in Koya city.

Table 1: The number of hepatitis B cases for each year from 2009 to 2019, as well as the number of male and female victims.

Gender	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Male	7	13	15	23	26	21	18	13	8	6	10	160
Female	3	2	3	6	7	13	7	4	7	8	10	70
Total	10	15	18	29	33	34	25	17	15	14	20	230

Table 2: The incidence rate of HBV based on age groups.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Birth-9	0	0	1	0	0	0	0	0	0	0	0	1
10-19	0	2	0	4	2	3	5	2	0	0	0	18
20-29	4	5	8	7	12	8	3	4	6	6	6	69
30-39	2	2	3	6	10	11	3	8	1	1	3	50
40-49	1	3	2	8	5	4	9	1	3	1	4	42
Above 50	3	3	4	4	4	8	5	2	5	6	6	50
Total	10	15	18	29	33	34	25	17	15	14	19	230

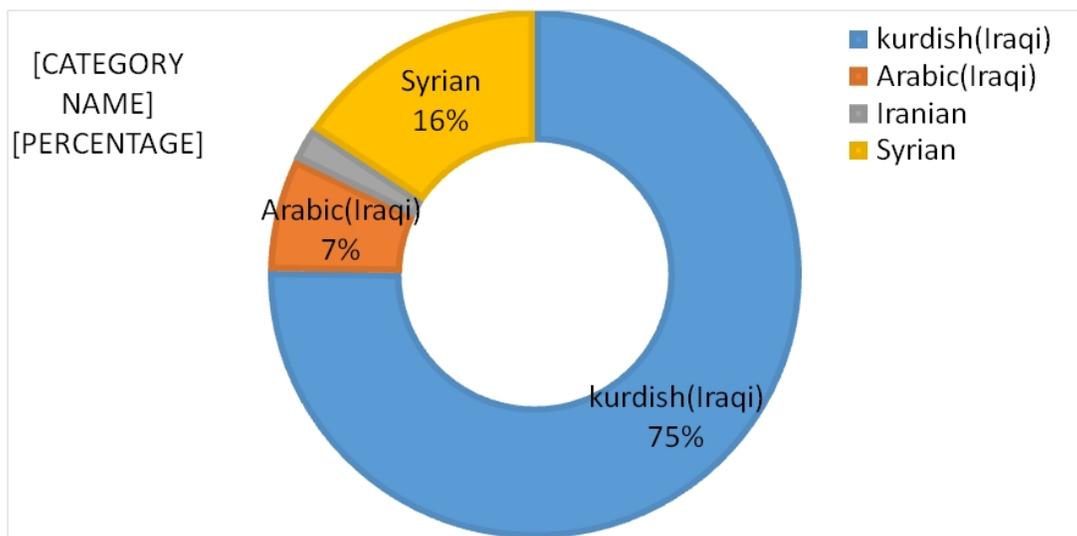


Chart 2: The number of cases based on ethnicity.

4. Conclusion

We conclude that hepatitis B is a significant health problem among communities with high incidence rates. The data show that health education, media, and vaccination programs have a significant role in eliminating the hepatitis B virus. However, a total of 230 positive cases of hepatitis B has been recorded from 2009 to 2019. The positive cases were higher in the 20-29 age group. In our region, the incidence rate was higher among males. This may be because of behavioral differences and life activities of males bring them into contact with virus compared with females who stay at home much of the time and natural protective effects of estrogen on the inflammation of the liver.

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Conflict of interest

The authors have no actual conflicts of interest.

Ethical clearance

Nil (Permission granted to send for publication by the General Directory of Health in Koya)

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