Frequency of Hepatitis A Virus among Children in Diyala Governorate during 2023

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Abstract

Background: Hepatitis A infections are severe public health problems around the world. Children play essential roles and are considered crucial reservoirs for acute hepatitis A. The hepatitis virus comprises five primary strains, known as types A, B, C, D, and E. While they all cause liver disease, they differ in significant ways, including mechanisms of transmission, severity of the sickness, geographical distribution, and preventative techniques.

Objective: To ascertain the incidence of the hepatitis A virus in kids in the Diyala Governorate in 2023.

Patients and Methods: Cross sectional study was conducted in the Batool Teaching Hospital for Children during the period between January to December 2023 in Diyala Governorate. A seroepidemiologic survey about hepatitis A virus infection was carried out in a group comprising ١٠٢٣ patients, ranging in age from 1 month to 18 years.

Results: The infection rate of hepatitis A virus during 2023 was 29.71% (304 out of 1023) positive for IgM anti-HAV antibodies in Diyala City. The frequency of infection was more common in males 171 (56.25%) than females 133 (43.75%). The infection rate was the highest 45.18% in the age group from (1 month -5 years) and distributed of disease according to residence found it infection more common in Baqubah city than around it.

Conclusion: Proportion of Anti HAV IgM positive tests among all cases was 29.71% so the infection rate was still high in Diyala governorate, most infection under 5 years old, further studies are recommended.

Keywords: Hepatitis A virus, ELISA, epidemiology, prevalence

Introduction

The liver is the biggest organ in the body and is responsible for food digestion and toxin elimination. Hepatitis is a condition that causes inflammation of the liver. Hepatitis is a serious global health issue that includes a variety of inflammatory liver illnesses caused mostly by viral infections, but also by other etiologies. Understanding hepatitis is vital because of its multiple forms of transmission and the potential for major health problems [1].

The elements that caused this illness were divided into two categories. The first group includes pathogenic factors (causes, transporters, hosts, and storage facilities), also known as pathogens, which have a direct impact on disease development. The other category is associated with geographical variables (both natural and anthropogenic), which are commonly referred to as geogens. They are the factors that contribute to the disease's progression, both directly and indirectly. To avoid contracting this sickness, ensure that your water and food are clean [2].

Every year, approximately 1.5 million individuals show symptoms worldwide, with tens of millions likely to become infected. It is more prevalent in places around the world with poor sanitation and insufficient drinking water. In general, there was a threefold increase in hepatitis A (HAV) diagnoses among Iraqis between 2009 and 2014. Iraq is considered a low-endemic country for hepatitis B and C when compared to its neighbors [3]. Acute viral hepatitis is an ongoing infection that affects the liver primarily. Almost all instances of acute viral hepatitis are caused by one of five viral agents: the hepatitis A virus HAV, HBV, HCV, the HBV-associated delta agent HDV and HEV [4].

Hepatitis A is the most frequent kind of acute viral hepatitis in underdeveloped countries. Most infections in children under the age of six are asymptomatic, and when disease does arise, it is usually anicteric [5]. It has been reported that approximately 1.5 million cases receive diagnoses per year globally. HAV infection is particularly common in impoverished nations with poor sanitation and hygiene, household overcrowding, and limited water availability [6]. Mature individuals may experience evident signs, including yellowing of the skin and eyes. The main cause of this condition is the hepatitis (A) virus, a bicorn virus with a diameter of 27 Nm. Hepatitis A virus is a positive-strand RNA virus that belongs to the family Picornaviridae. Four of the seven HAV genotypes impact humans, however there is only one serotype. Infection with either of the genotypes usually confers permanent immunity [7]. Infection is typically spread from person to person or through oral consumption following fecal contamination of the skin or mucous membranes. Hepatitis A virus can be spread in a variety of ways, including eating food handled by an infected person who does not thoroughly wash his or her hands after using the toilet, drinking contaminated water, consuming raw shellfish from polluted water, having a sex partner who has the virus, and coming into close contact with an infected person [8]. The incubation time for hepatitis A is typically 14-28 days. Hepatitis A symptoms can range from moderate to severe [9].

Several studies from Iraq and overseas have found variable frequencies. The study aims to ascertain the incidence of the hepatitis A virus in kids in the Diyala Governorate in 2023.

Patients and methods

Study design: A cross-sectional study has been done at the Batool Teaching Hospital for Children in Diyala Governorate from January to December 2023. A seroepidemiologic survey comprising hepatitis A virus (HAV) infection was conducted on a group of **1023** patients aged ١ month to 18 years from inside and outside of the Diyala city governorate.

Sample Processing

Blood samples were taken from all patients for Anti HAV (IgM) via used ELISA Special Kit (Camp Medica Distribution, Lot, HAV2212-6). People cross sectional study is done in Diyala Governorate during the year of 2023.

Statistical Analysis

All date are summarized as number and percentages in results section.

Results

According to the current study's findings, 29.7% of Diyala City residents tested positive for IgM anti-HAV antibodies between January 2023 till December 2023. The distributed between age group from (1 month – 18 years). The infection rate was the highest in the age group from (1 month - 5 years).

Table 1: Distribution of HAV among study population during 202٣.

Months	Examine No.	Infected No.	Percentage
January	84	35	41.7%
February	75	30	40%
March	122	41	33.6%
April	173	34	19.65%
May	233	46	19.74%
June	101	33	32.7%
July	3	1	33.3%
August	0	0	0%
September	0	0	0%
October	105	40	38.1%
November	56	19	34%
December	71	25	35.2%
Total	**1023**	**304**	**29.7%**

Gender-specific distribution of HAV infection in children shows that males have a higher percentage (56.25%) than females (43.75%) as shown in (Table 2).

Table 2: Gender distribution among study population during 2023.

Gender	Infected No.	Percentage
Males	171	56.25%
Females	133	43.75%
Total	**304**	**100%**

Their age range for positive HAV cases varied from one month to eighteen years, based on age distribution. The rate among age groups (1 month - 5 years) revealed a high frequency 136 cases as shown in (Table 3).

Table 3: Distribution of HAV among study population according to age during 2023.

Age	Infected No.	Percentage
1 month -5 years	136	45.18%
6-10 years	122	40.53%
11-18 years	43	14.29%
Total	**301**	**100%**

The frequency of HAV infection in children by residence shows that there are 160 (52.46%) in the Baqubah area compared to 145 (47.54%) in Baqubah as shown in (Table 4).

Table 4: Distribution of HAV in study population according to residence during 2023.

Residence	Infected No.	Percentage
Baqubah	145	47.54%
Around Baqubah	160	52.46%
Total	**305**	**100%**

Discussion

The present study indicated that 29.7% of HAV infections between January 2023 and December 2023 tested positive for IgM anti-HAV antibodies. This finding was consistent with many Iraqi studies such as study done in Mosul City indicated that the frequency of HAV IgM was 21.7% in 2020 [10]. On the other hand, A vivid shifting in the prevalence of HAV in Karbala Governorate showed a decreasing pattern, that is, from 632 cases in 2007 to 314 cases (PR=33) in 2008. In 2012, its prevalence was twice greater 695 cases [11].

The percentage of infection in present study was lower than reported in numerous Iraqi studies that showed varying percentages, including 44.8% among patients admitted primary health care centers in Baghdad [12], 45.7% among 59 patients were admitted to Children Welfare Teaching Hospital diagnosed as hepatitis A infection [13]. 65% in Al-Alwyia Pediatric Teaching Hospital in

2015 [14] and 83.3% in Wasit Province/Iraq in 2015 [15]. The recent development of inactivated and live attenuated hepatitis A vaccinations has increased hopes for lowering hepatitis A incidence. With hepatitis A vaccination already available in some countries, including the United States, great thought is being given to which groups to vaccinate [16].

High percentage of infection was noticed in April and May followed by March. So the results of April month study indicate that the total infected people of type-A virus in Diyala City was (19.65%) from total number of people (173) and was distributed between infected males and females (61.8%) (38.2%), respectively. The infection rate was the highest in the age from (6-11 years).while in May the results of May month study indicate that the total infected people of type-A virus in Diyala City was (19.74%) from total number of people (233) and was distributed between infected males and females (50%) (50%), respectively. The infection rate was the highest in the age from (1 month -5 years). Followed by March Month so the results of March month study indicate that the total infected people of type-A virus in Diyala City was (33.6%) from total number of people (122) and was distributed between infected males and females (51.3%) (48.7%), respectively. The infection rate was the highest in the age from (1 month -5 years). Therefore, this related with fact the virus more common in summer season than winter and agreed with study reported the highest incidence in spring and summer [17].

This study found a male predominance, which is in accordance with previous studies conducted in Iraq and other countries [14][15][18][19]. Other studies found that HAV seropositivity was more prevalent in women than in men [20]. Another study conducted in Canada found that males have a larger proportion of HAV infection than females [21]. Other studies reported no sex prediction [22][23].

According to residence the HAV infection in children was more common 160 (52.46%) in patient lived around Baqubah than in 145 (47.54%) Baqubah. This could be related with health awareness, general cleanness and hand washing regularly, HAV has been found to survive on hands longer than several other human pathogenic viruses and bacteria [24]. As well as HAV is relatively resistant to inactivation by chemical germicides and other chemical and physical agents [25, 26]. Other study found that the center of Baquba and the center of Baladruse Provence are the most frequent places for the patients during the previous four years. This means that these cities have a number of natural and human factors that lead to the appearance of the disease [27].

In conclusion, proportion of Anti HAV IgM positive tests among all cases was 29.71% so the infection rate was still high in Diyala governorate, most infection under 5 years old, further studies are recommended