Sero-Prevalence of Acute Hepatitis A Virus among School Children in Khartoum State, Sudan

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Abstract

Background: Hepatitis A is the most common type of hepatitis in children and very common in developing countries due to problem of both personal and environmental unhygienic sanitary practices. The aim of this study was to detect HAV among school children in different hospital in Khartoum state.

Methods: Enzyme-linked immunosorbent assay (ELISA) was done to determine the presence of anti-HAV IgM among 90 School children (50 males and 40 females) during the period from September to December 2018.

The results: This study was relived a positive sero-prevalence of Hepatitis A virus in (44%) and the rest examined patients were representing negative results of (56%). ALT and AST test in all group was high with mean (620.2, 580 ±) and the ALP showed slightly increase with mean (334.5 ±).

Conclusion: The Lack of control for school children and eating from unknown sources of the family may be a major cause of infection with hepatitis A virus as well as sellers in cafeterias of schools and water resources can also be other source.

Keywords: Anti-HAV IgM; ELISA; Hepatitis A virus; School Children; Sudan

Introduction

Hepatitis A is the most common type of hepatitis in children, it can present as symptomatic or asymptomatic infection, and clinical features usually appear after an average incubation period of 28 days, with a range from 15 to 50 days [1]. Hepatitis A is characterized by a relatively quick onset of symptoms that may include jaundice, weakness, fatigue, anorexia, nausea, abdominal pain, fever, and/or dark brown urine. In children under 6 years of age, 70% of infections are asymptomatic, and symptoms rarely include jaundice [2]. Older children and adults usually present with symptoms, and generally more than 75% of infected adults are symptomatic, with

40% to 70% exhibiting jaundice [3]. The likelihood of symptoms generally increases with increasing age. It is important in the etiology of fulminate hepatitis, particularly among older adults and individuals with chronic liver disease [4]. Hepatitis A is primarily spread when an uninfected (and unvaccinated) person ingests food or water that is contaminated with the feces of an infected person. The disease is closely associated with unsafe water or food, inadequate sanitation and poor personal hygiene. Unlike hepatitis B and C, hepatitis A infection does not cause chronic liver disease and is rarely fatal, but it can cause debilitating symptoms and fulminant hepatitis (acute liver failure), which is often fatal [5]. Hepatitis A is a highly contagious liver infection caused by the hepatitis A virus (HAV). It is one of several various causes of hepatitis, a condition characterized by inflammation and enlargement of the liver. This test detects antibodies in the blood that are produced by the immune system in response to a hepatitis A infection. There are two different classes of hepatitis A antibody that may be tested, IgM and IgG. When a person is exposed to hepatitis A, the body first produces hepatitis A IgM antibodies [6]. these antibodies typically develop 2 to 3 weeks after first being infected (and are detectable before the onset of symptoms) and persist for about 3 to 6 months. Hepatitis A IgG antibodies are produced within 1 to 2 weeks of the IgM antibodies and usually persist for life [7]. A vaccine that prevents hepatitis A has been available since 1995. Historically, infection rates varied cyclically, with nationwide increases every 10-15 years. However, according to the Centers for Disease Control and Prevention (CDC), hepatitis A rates have declined by more than 95% since the vaccine first became available. In 2015, the number of acute hepatitis A cases reported nationwide was an estimated 2,800 [8]. Tens of millions of individuals worldwide have been reported to be infected with HAV each year [9]. In Sudan during the floods of 1988 in Khartoum patients with acute hepatitis reported low incidence of HAV infection at (5.45%). Also other prevalence rates 33.3% [10]. Victor J, et al. was reported among pediatric population with acute hepatitis in Khartoum state, in related studies reported prevalence rates 5.3% and 2.3% in Burkina Faso and Mexico respectively who reported the level of HAV IgM [11].

Materials and Methods

Study Design and Duration

A Cross-sectional study was carried out in different health hospitals in Khartoum State at Alrhma Medical Lab in Khartoum State, to determine the presence of anti-HAV IgM among School children, during the period from September to December 2018.

Sample Collection

A total of 90 blood samples were collected from School children with signs and symptoms of jaundice and high elevated in liver enzyme including 50 males and 40 females with age from 5-15 years old. A volume of 2.5 ml of blood was collected in lithium heparin for liver function test and 3 ml of blood was collected in plain container then centrifuge at 3000rpm for 5 minutes to obtain serum which was then stored at -20°C until further analysis.

Data Collection

A structured questionnaire were be used; demographic data and other Data (previous infected with HAV, symptoms of Hemolytic anemia and other infectious hepatitis) were collected from each patient and patient parents after obtaining full consent.

Ethical Consideration

This study was approved by the ethical committee of Sudan International University, Faculty of Medical Laboratory Sciences and verbal consent was obtained from each patient and patient parents enrolled in this study.

Laboratory testing

Liver Function Test: AST, ALT, ALP and other liver function test was done by (Maindary BS 200) according to the manufacturers' instructions.

Indirect Immunoassay for Hepatitis A Virus IgM Antibody Detection

Commercial Enzyme-Linked Immunosorbent Assay (ELISA) kits (diagnostic Automation Cortez Diagnostic Inc .USA) was been used for HAV IgM detection according to the manufacturers' instructions.

Data Analysis

Collected data were analyzed by using statistical package for social science (SPSS) program 20.

Results

The results of the current study showed sero-prevalence of Hepatitis A IgM antibodies among 90 school children (50 male and 40 female), out of 90 patients 36 (44%) (P < 0.005) individuals are positive and 54 (56%)

individuals are negative results (Table 1). The results was also clarified according to the gender and age group criteria as the following, according to the gender the Hepatitis A IgM antibodies among male show positive in 22 (44%) individuals and negative in 28 (56%) individuals, the female show positive in 14 (35%) individuals and negative in 26 (65%) individuals, according to the age group the study individuals was classified into three groups the first group < 6 years old show positive in 2 individuals, the second group 6-10 years old show positive results in 15 individuals, the last group 11-15 years old show positive results in 19 individuals which clarified in (Table 2). ALT and AST test were showed highest in all group with mean (620.2, 580) but ALP showed slightly increase with mean (334.5) in (Table 3).

Gender	Hepatitis A IgM antibodies		Total (%)
	Positive (%)	Negative (%)	
Male	22 (44%)	28(56%)	50(55.6%)
Female	14 (35%)	26(65%)	40(44.4%)

Table 1: The total study results.

Age group	Hepatitis A IgM antibodies	
	Positive (%)	
	Male	Female
< 6	2(4%)	0(0%)
6 – 10	9(18%)	6(15%)
11 – 15	11(22%)	8(20%)

Table 2: The study results according to the gender and age group.

Test	Mean
Aspartate Aminotransferase (AST)	580
Alanine Aminotransferase (ALT)	620.2
Alkaline phosphatase (ALP)	334.5

Table 3: The study mean results of liver enzymes.

Discussion

Hepatitis A virus (HAV) is an important pathogen which has been responsible for many food borne outbreaks especially in socioeconomic and school children. There is No data or previous studies in Sudan so the results of the present study were compared with previous HAV seroprevalence studies done in Egypt, Syria and Saudi Arabia. Direct comparison between these studies is difficult because different age category and geographical distribution were studied. However, the seroprevalence of HAV was Low with that in Egypt (86.2%), Syria (89%) and Saudi Arabia that recorded (52.4%) [12-14]. Higher prevalence of HAV in relation to age was observed in this study. A much higher prevalence was reported among school children in age group (11 – 15) years may be due to more available source of eat and drink for this group of ages. The liver enzymes were showed high parameter in both AST, ALT and slightly increase in ALP enzyme which induces for hepatocellular jaundice. No differences were observed between male and female children, supporting previous studies [12-14]. A higher prevalence of hepatitis A was detected in children from the lower social level and environment, although the hepatitis a did not reach statistical significance. Clearly, this is due to a slower improvement in living conditions and hygiene in the lower social level and possibly also in rural communities.

Conclusion

The Lack of control for school children and eating from unknown sources of the family may be a major cause of infection with hepatitis A virus As well as sellers in cafeterias of schools and water resources can also be other source.

Finally, addressing the public health problems associated with the enteric transmission of viral hepatitis in developing countries will require implementing stronger measures to prevent fecal contamination of food and water.

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