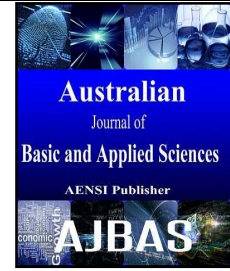




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Immunological Study for Hepatitis A virus infected patients in Babylon province / Iraq.

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ABSTRACT

Background: Hepatitis A is an acute infectious disease caused by hepatitis A virus (HAV), which belongs to genus *Hepatovirus* of *Picornaviridae*. There is only one serotype known; Hepatitis A is the most common viral hepatitis during childhood, especially in developing countries. The main route of infection is oral ingestion of contaminated food or water. The average incubation period is 4 weeks. Patients start to shed the virus via stools 3-4 weeks before the onset of clinical symptoms. Virus shedding continues for several months. It is, usually, self-limiting, but may be associated with severe complications in some patients particularly those associated with diseases. In rare occasions, fulminant type hepatitis is observed. Among young children, most cases are asymptomatic or, even if symptomatic, illness is very mild. No specific therapies are available and patients are treated symptomatically. **Objectives:** This study was aimed to determine the seroprevalence of hepatitis A in 1-25 years old patients in Babylon, Iraq. **Methods:** This study was conducted to determine the seroprevalence of hepatitis A virus antibodies among (285) infected person aged (1-25) years, during the period from January 2014 to December 2014, who were recorded in Al-Asatetha typical Health Center and public health laboratory in Babylon government. In this study formula were used, including age, sex, seasonal variation. Immunoglobulin M (IgM) antibodies against hepatitis A virus were measured in sera by enzyme-linked immunosorbent assay. The association between seropositivity and demographic characteristics was studied. **The results:** The age groups (1-5 and 6-15) years constitute 68.38% and 30.3 % of seropositive cases, respectively, more incidences were detected during march and September 17.42 % and 14.2%, respectively, whereas lowest incidence recorded in January, May and April was 2.58 % and 3.23% respectively. **Conclusions:** We can cloud the High incidence of Hepatitis A Virus recorded in school age group. According to this study, hepatitis A is prevalent in the pediatric population, and it must be considered in the approach to all susceptible cases of acute hepatitis. Considering the difficulties for the control of environmental sources, we need to have a protocol for routine vaccination of children in our country.

INTRODUCTION

Hepatitis A virus (HAV) is a member of the Hepatovirus genus of the family Picornaviridae, and is a nonenveloped single-stranded RNA virus.

It was first isolated in 1979. Humans are the only natural host, although several nonhuman primates have been infected in laboratory conditions (Franco, E. *et al.*, 2012; Centers for Disease Control and Prevention, 2015). HAV is transmitted via the fecal-oral route either by direct contact with an infected person or by

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ingestion of contaminated food or water. The incidence of infection has a strong relation with sanitary and environmental conditions and the level of socioeconomic development (Rafeey, M, and M. Shoaran, 2014). It is estimated that 1.5 million new HAV infections occur each year (Traore, K.A. *et al.*, 2012; Nastaran M and M.A. Seyed, 2014). Hepatitis A virus has emerged as an important public health problem in many countries of the Middle East region including Iraq is no exception. Hepatitis A (formerly known as infectious hepatitis) is an acute infectious disease of the liver caused by the hepatitis A virus. Hepatitis A infection has four clinical phases, although these do not occur in all patients. The first stage is an incubation period of 15 to 50 days (mean 28 to 30 days). This stage is asymptomatic, but the infected person may be actively shedding the virus in the stool. The second stage is a pre-icteric period of several days to weeks that may precede the onset of jaundice. This prodromal period is characterized by nonspecific symptoms followed by gastrointestinal symptoms such as anorexia, nausea, vomiting, abdominal pain, fatigue, malaise, and fever. Other symptoms at this stage may include myalgia, arthralgia, cough, pharyngitis, constipation, and diarrhea. Dark urine caused by elevated bilirubin levels usually occurs prior the onset of jaundice. In the third stage, the characteristic yellowing of the skin and eyes of jaundice appear and most symptoms subside, although clinical signs such as hepatomegaly and hepatic tenderness are found in about half of patients.

There is no treatment for HAV infection. Jaundice usually resolves within a few weeks. The final stage is a convalescent period during which the patient recovers (Wasley, A., A. Fiore, B.P. Bell, 2006; CDC., 2013).

In developing countries, these infections are associated with poor hygiene and, in particular, the lack of clean drinking water and, in some areas, inadequate sanitation (Rezig, D. *et al.*, 2008). Estimation of hepatitis A seroprevalence in a population is very important to determine strategies for infection control (Tapia-Conyer, R. *et al.*, 1999; Pinho, J.R. *et al.*, 1990). However, this study was conducted to estimate the rate of infection in the Babylon province as a guide for vaccination program strategy.

MATERIALS AND METHODS

Study design:

A total number of (285) serum samples were collected from patients exhibiting symptoms of gastrointestinal symptoms such as anorexia, nausea, vomiting, abdominal pain, fatigue, malaise, fever and dark urine recorded in (the Al-Asatetha typical Health Center and public health laboratory). For every subject, the questionnaires, which included age, sex, and type of water supply were taken by interviewing the parents.

Approximately 5 ml blood sample by vein puncture was collected from each patient included; serum was separated and stored at -20°C until tested. To measure total anti-HAV, we used HAV IgM E LISA Test Kit, CTK Biotech, Inc. USA. Quality control of the kits was performed at a specialized laboratory in Hilla city. Specific antibodies present in serum, compete with specific antibodies linked to HRP (Horse Radish Peroxidase) enzyme to attach to antigens, by adding the enzyme substrate, the strength of the product color will be reversely proportionate to the quantity of specific anti-HAV antibodies in the serum sample. Statistical analysis was performed by the use of SPSS software. The statistically significant value is considered as $P \leq 0.05$.

Results:

This study was carried out on (1-25) years old admitted in Al-Asatetha Typical Health Center and public health laboratory in Babylon province. Of a total (285) individuals tested, (155) subjects were infected. Eighty two patients (52.9 %) were male and 73 patients (47.09 %) were female (Figure– 1 and Table 1). This study reflected that high incidence of infection recorded in 1-5 years age group. Furthermore the inactivity with this virus increased in March (17.42%) followed by September (14.2%), whereas the lowest percent of the infectivity recorded in January, May, and November (Table 2).

On the other hand, the immunity assessment were studied, 155 subjects (54.38 %) From the 285 subjects tested have antibody against HAV, while 130 (45.6%) were antibody negative.

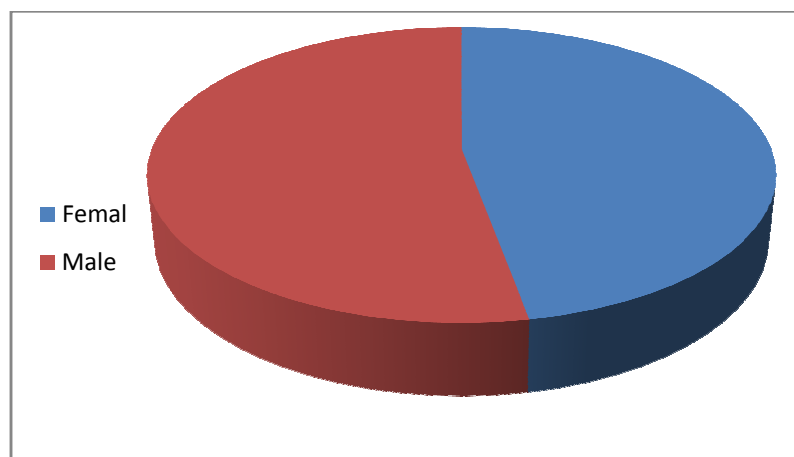


Fig. 1: Gender distribution of HAV infection.

Table 1: Gender distribution of HAV infection

Gender distribution		No.	%	F. value	Significant
Positive patient with HAV infection	Male	82	52.9	38.22	0.147
	Female	73	47.1		
	Total	155	100		
Negative patient with HAV infection	Male	74	56.7	14.89	0.096
	Female	56	43.3		
	Total	130	100		

Table 2: Month distribution of HAV infection

Positive Patients		No.	%	F. value	significant
Positive Patients /Month	January	5	2.58	73.330	.049
	February	20	12.9		.044
	March	27	17.42		.119
	April	5	3.23		.142
	May	4	2.58		.062
	June	13	8.38		.084
	July	8	5.2		.048
	August	21	13.54		.000
	September	22	14.2		.000
	October	11	7.09		.000
	November	3	2.58		.000
	December	16	10.3		
	Total	155	100		

Furthermore, the mean of age group was studied, the mean of age group of participants was 10 (range: 1–15) years. Participants were categorized into three age groups: 1–5, 6–15, and 16–25 years. Age-specific seroprevalence of anti-HAV antibody (Table 3).

Table 3: Seroprevalence of Anti-HAV among different age groups

age groups		No.	Percentage	F. Value	Significant
+ve with age groups	1 - 5 years	106	68.38	82.088.	0.000
	6 -15 years	47	30.3		
	16- 25	2	1.29		
	Total	155	100		
-ve Negative With age groups	1 5 years	52	40	93.44	0.091
	6 -15 years	40	30.7		
	16- 25	38	29.23		
	Total	130	100		

Discussion:

This study was revealed investigated the seroprevalence of HAV among different age groups from two place of Babylon province.

The infection is transmitted by fecal-oral and percutaneous routes. The incubation period is approximately twenty eight days. Fecal shedding rate of the virus is maximally during the late incubation period, several days before or shortly after the onset of symptoms (Lemon, S.M., 1985). Individual with hepatitis (25%), contact with

a day-care center attendee. The risk factors that have been associated with transmission of HAV infection within the United States include sexual or household contact with another (15%), international travel (5%) and food or waterborne outbreak (5%). However, in fifty percent of cases, no risk factor can be identified (Kemmer, N.M., and E.P. Miskovsky, 2000). HAV infection is one of health problems in Iraq encountering a 41% of suspected cases, acute viral hepatitis in the general population during 2005 (Turky, A.M. *et al.*, 2011). The study revealed 155 cases (54.38% of suspected cases) who were positive for IgM HAV testing indicates that the disease constitute a proportional percentage of patients attended the public health laboratory.

In this study Male represented (52.9%) and this finding is in agreement with many studies and reports from developing and developed countries. In a multicenter study conducted in five different centers in India; males show a predominance (Arankalle, V. *et al.*, 2014). In USA From 1996 through 2002, rates of acute, symptomatic hepatitis A have been higher among males than females, however, since 2006, overall rates have declined more among males than among females. In 2008, incidence among males was 0.9 cases per 100,000 populations, compared with 0.8 cases per 100,000 populations among females (CDC, 2014). In Canada, the rates are higher for males than for females according to study on reported cases of hepatitis A from 1990 to 1999 (Wu, J., S. Zou and A. Giulivi, 2001). In a previous study in Iraq and in Saudia Arabia the prevalence was almost the same in male and female (Almuneef, M.A. *et al.*, 2006). In view of these Iraq is still in high endemic status, but moving to intermediate status is anticipated in view of low incidence during infancy and increased incidence in school ages and early adolescents. WHO recommends that vaccination against HAV be integrated into the national immunization schedule for children aged ≥ 1 year if indicated on the basis of the incidence of acute hepatitis A, change in the endemicity from high to intermediate, and consideration of cost effectiveness (World Health Organization., 2011).

Most of HAV patients in this study were located within the age groups (1-5 and 6-15) years with a percentage of 69.38% and 30.3% respectively, whereas 1.29% of all patients were within the age group (16-25 years) These results agreed with WHO report, 2014 which found that in the developing world about 90% of children have been infected by age of 10 years and thus are immune by adulthood (World Health Organization, 2014). According to a study conducted in Rio De Janiero, Brazil, seasonal variation was recognized with the highest incidence in the spring and summer (Vilar, L.M. *et al.*, 2002) which is in agreeing with this study which shows the rising incidence were increased in march (17.42%) followed by September (14.2%) with significant association, this may be due to geographic differences and habits of different population feeding.

Conclusions:

we can cloud the High incidence of Hepatitis A Virus recorded in school age group.

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