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Comparative study between icteric and non-icteric hepatitis A among pediatric patients admitted to Babylon Maternity Hospital, Iraq

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Objective Acute infections of viral hepatitis are considered as serious health threats of the populations around the world. There are diverse forms of the infections that exhibit wide range of epidemiology and natural histories. Viral hepatitis A is the most public and common viral hepatitis throughout the childhood period, particularly in the developing countries.
Methods A cross-sectional sampling of (145) child who admitted into out-patients treatment center in Babylon Maternity Hospital. For each person, different demographic parameters, were obtained. Immunoglobulin G (IgG) and immunoglobulin M (IgM) antibodies specific for hepatitis A virus (anti-HAV) were obtained in patients' sera by enzyme-linked immunosorbent assay.
Results Seroprevalence of HAV was 100% among the tested children, with a wide range of presentation mainly as fever, hepatomegaly, choluria and jaundice, while non-jaundiced are 31%. Chi-square analysis of demographic parameters showed a high significant difference with age, residence, family history and personal hygiene among jaundiced and non-jaundiced pediatric patients (P value = 0.0001) and a significant difference with nutritional status (P = 0.03), while no difference with socioeconomic status and chronic drugs usage (P = 0.054 and 0.559) respectively and with no gender differences.
Conclusion Hepatitis A viral infection continues to be a major health problem in developing countries and it is a hyper-endemic in Iraq.
Keywords hepatitis A, icteric, non-icteric, pediatrics and jaundice

Introduction

Hepatitis virus class A (HAV), is categorized as a member of Picornaviridae family, a non-enveloped ribonucleic acid (RNA) virus. Its route of transmission is feco-orally and associated with poor sanitation and hygiene, and primarily spreading through close contact with sick individuals leading to infection plus inflammation of the liver.[1,2] HAV shows a high endemic rate in the underdeveloped countries, those with deprived hygiene and sanitation, especially through drinking contaminated water and food.[3]

It is the most common distributed type of viral hepatitis around the world, as it is responsible for around 1.4 million new infections worldwide each year. The asymptomatic childhood infections with higher incidence are generally allied with inadequate water treatment, poor sanitation, overcrowding, and lower socioeconomic factors.[4]

Infections of hepatitis A is usually self-limiting, acute liver illness, while the progress of the disease is not always benign; starting with a flu-like symptoms, jaundice and/or elevated liver enzymes (serum aminotransferases). Initially, clinical symptoms may be like those of a viral prodrome, and with nonspecific presentations.[5,6] Complication of hepatitis A occurs dramatically as an acute liver failure. The elder patients especially immunosuppressed or those with underlying liver disease are at risk for this complication. In children, the course of hepatitis A usually has an asymptomatic mode while the clinical presentations are more common in adults, thus in developed populations, the symptomatic cases proportion is higher as the infection is more expected in elder patients due to routine vaccination coverage in childhood.[7,8]

This study aimed to compare different demographic parameters among children with hepatitis A.

Materials and Methods

This study included 145 pediatric children who were admitted to the out-patients clinic in Babylon Maternity Hospital over a period of 1 year. They were presented with variable range of clinical signs and symptoms; 87 male and 58 female and with age range from 1 to 10 years. Hepatitis is suspected, thus blood sample (2 mL) was taken from each one for preparation of serum, then immunoglobulin G (IgG) and immunoglobulin M (IgM) antibodies, anti-HAV; specific against hepatitis A virus were identified in sera by the use of enzyme-linked immunosorbent assay. Antibody levels when they are more than the determined cut-off point were considered as positive, to establish the diagnosis of HAV hepatitis. In addition to that, different parameters such as age, sex, residence, family history, personal hygiene, socioeconomic status, nutritional status and history of chronic drugs usage were collected from all patients. Later on the 145 patients were divided into two groups (100/45) according to their presentation with jaundice or not respectively.

Statistical Analysis

All these taken parameters were compared between these two groups by the use of Chi-square through SPSS version 18.0. The 95% confidence interval of a proportion was used to calculate the population parameters. P-value that is obtained as less than the 0.05 the level of significance was considered statistically significant.

Ethical considerations

This study was conducted on patients who signed written informed consent forms. The study was approved in the ethics committee of Babylon University.

Results

The whole (145) pediatric patients who were encompassed in this study, were subjected to ELISA to determine the titer of IgG and IgM antibodies against hepatitis A virus (anti-HAV); and all of them (100%) were within the positive titer level, which indicate positivity for this viral infection.

These patients were presented with variable ranges of clinical signs and symptoms, with more number presented with jaundice (100) as compared to non-jaundiced (45) individuals (Fig. 1); and then children were divided into two groups according to jaundice (icteric/non-icteric) presentation as tabulated in Table 1.

The results of Table 2 showed the distribution of hepatitis A pediatric patients in relation with different demographic parameters; as it revealed that between icteric and non-icteric viral hepatitis, there was a highly significant difference with age, residence, family history and personal hygiene (P-value = 0.0001) for each, and a significant difference with nutritional status (P-value = 0.03), while no difference with socioeconomic status and chronic drugs usage (P = 0.054 and 0.559) respectively and with no gender differences (P-value = 1).

Regarding managements that applied for patients with HAV, according to Table 3.

Discussion

The HAV viral infection that is enterically transmitted, is endemic in many of the developing countries, as its prevalence can approach 100% in children under 5 years of age.[9] In the developing countries, acquirement of HAV occurs very early in life and the adults 100% nearly have detectable levels of anti-HAV and therefore are immunized to infection. In the more developed countries, where sanitation and hygiene is good, most individuals reaching adulthood without undergoing infection, as with a low prevalence (10%) among children, and adults are largely susceptible of being negative for anti-HAV (63%).[10]

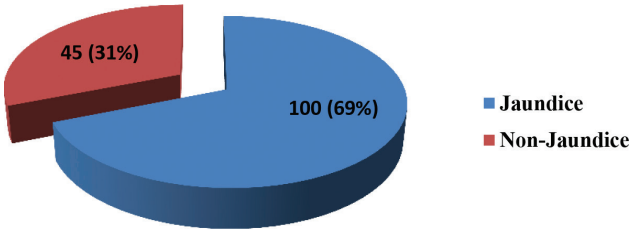

Fig. 1 **Ratio of jaundice to non-jaundice [No. (%)] presentation in children with Hepatitis A viral hepatitis.**

Certain Iraqi study showed that 96.4% of the population sample had positive anti-HAV IgG antibodies. The frequency distribution of positive anti-HAV antibodies was lowermost in Dahuk, Al-Ta'mim, Diyala and Al-Basrah with a range of 85.2–95%.[11] Similar study performed in Egypt with prevalence of anti-HAV antibodies was 86.2%;[12] in addition to other numbers of studies, as the prevalence ranged between 89.4% and 100% (in Alexandria and rural areas).[13–15] Analogous of this high prevalence had been reported from Syria (89%) and Palestine (93.3%).[16,17] Comparable work from Shiraz in Iran, antibody of hepatitis A IgG gave positivity in 88.2% of individuals.[18]

People of all ages are liable to hepatitis A virus infections, its incubation period A is approximately 28 days (range 15–50 days). It affects the liver as an acute inflammatory disease. The disease severity ranges from a mild illness for a few weeks to a severe illness that last several months.[19]

Regarding demographic characteristics, Rafeey and Shoaran[20] showed no differences in respect to age and sex. Also, the same result was found in two studies in Zanjan and Isfahan (Iran) on pediatric patients, as no association between sex, age and seropositivity in the first study and between sex and positive antibody in the second survey.[21,22]

Other two studies done in Iraq and Egypt showed no gender differences.[11,12]

In developed European countries, there is a decrement in the prevalence of HAV infection, specifically amongst the young age group, this is attributed to marked enhancements in hygiene and socioeconomic situation and vaccination in a widespread coverage.[23]

In a Korean study, the female/male ratio for total seropositivity of anti-HAV was not significant statistically (49.44% vs. 52.86%, P = 0.560).[24,25]

Table 1. **Presentations [No. (%)] of pediatric patients with hepatitis A virus hepatitis**

Signs and symptoms	Non-jaundiced (45) No. (%)	Jaundiced (100) No. (%)	Total [No. (%)]
Jaundice	0	100 (100)	100 (69)
Fever	45 (100)	95 (95)	140 (97)
Abdominal pain	39 (87)	95 (95)	134 (92.4)
Choluria	45 (100)	100 (100)	145 (100)
Acolia	6 (13)	15 (15)	21 (14.5)
Malaise	24 (53)	45 (45)	69 (47.6)
Vomiting	30 (66.7)	60 (60)	90 (62.1)
Headache	6 (13)	20 (20)	26 (17.9)
Diarrhea	3 (6.7)	15 (15)	18 (12.4)
Epistaxis	0	5 (5)	5 (3.5)
Hepatomegaly	45 (100)	100 (100)	145 (100)
Splenomegaly	3 (6.7)	10 (10)	13 (9)
Ascites	6 (13)	5 (5)	11 (7.6)

Table 2. **Distribution of hepatitis A pediatric patients in relation with different demographic parameters**

Variables		Non-jaundice (45) (No.)	Jaundice (100) (No.)	No. (%)	*P*-value
Age (years)	1–5	30	35	44.8 (65)	0.0001
	5–10	15	65	55.2 (80)	
Sex	Male	27	60	60 (87)	1
	Female	18	40	40 (58)	
Residence	Rural	30	35	44.8 (65)	0.0001
	Urban	15	65	55.2 (80)	
Family history	Yes	3	45	33.1 (48)	0.0001
	No	42	55	66.9 (97)	
Socioeconomic status	Low	21	30	35.2 (51)	0.054
	Mod-high	24	70	64.8 (94)	
Personal hygiene	Bad	27	20	32.4 (47)	0.0001
	Good	18	80	67.6 (98)	
Nutritional status	Bad	3	20	15.9 (23)	0.030
	Good	42	80	84.1 (122)	
Chronic drugs usage	Yes	1	1	1.38 (2)	0.559
	No	44	99	98.6 (143)	

Table 3. **Types of management needed by pediatric patients with HAV**

Managements		Non-jaundice (45) No. (%)	Jaundice (100) No. (%)	Total [No. (%)]
Pre-hospital management	None	12 (26.7)	30 (30)	42 (29)
	Antibiotics	18 (40)	50 (50)	68 (47)
	Symptomatic	36 (80)	65 (65)	101 (70)
Hospital management	Symptomatic	36 (80)	75 (75)	111 (77)
	Antibiotics	39 (86.7)	95 (95)	134 (92.4)
	Vitamin K	15 (33.3)	50 (50)	65 (45)

The likelihood of symptomatic illness from HAV infection is directly related to age. Young children who have hepatitis A is often asymptomatic or simply manifest signs and symptoms of viral gastroenteritis without icterus. In contrast, older children and adolescents have a sudden onset of headache, fever, and general malaise followed by the onset of jaundice, abdominal pain, nausea, vomiting and anorexia. In children under 6 years of age, most (70%) infections are asymptomatic. In adults and older children, infection is generally symptomatic, with jaundice occurring in more than 70% of patients. It occasionally yields fulminant hepatitis A.[2,3,26,27]

Spontaneous recovery within a few weeks occurs in a majority of individuals with acute viral hepatitis, and without any remaining consequences. However, severe form of the disease may occur in some people, as a complication of illness.[28] Significantly, 80% of symptomatic patients get hepatomegaly, while, to a less common outcomes include cervical lymphadenopathy, splenomegaly, arthritis, a leukocytoelastic vasculitis and, rarely, evanescent rash.

People those with chronic liver disease are not at increased vulnerability to infection but are at increased risk of acquiring fulminant hepatitis A.[29]

HAV seroprevalence varies from one state to the other, this occur according to the standard of living and socioeconomic factors.

This infection is distributed worldwide and is inversely proportional to the levels of personal hygiene and environmental sanitation. In the developing nations where hygiene and sanitation are unsatisfactory, especially those belonging to lower socioeconomic group, approximately 100% of the population is infected, this can be indicated by the presence of antibodies in early life and obvious infection in adults is rare.[30] Egypt, considered as an area of high endemicity for HAV infection, with noticeable economic, sanitary and hygiene improvements have occurred in recent years, chiefly in urban regions.[31] Enhancements of the living parameters may lead to changes in the HAV epidemiology, with a reduction in the antibody prevalence among children; accordingly a significant proportion of the adult and adolescent population will be at risk of infection.[32]

The disease is usually self-limited, and the treatment is supportive. There is no certain food type with a major effect on the outcomes of patients with acute hepatitis A. Symptomatic treatment is targeted and needed at particular situation and symptoms. In addition to increased intake of fluid which is necessary to prevent dehydration in the case of diarrhea and emesis, also need bed rest.[7] Sometimes intravenous fluids may be essential, according to the severity of illness. In practice, medications that are toxic to the liver it is prudently to be limited, and usage of acetaminophen

should be thoughtfully monitored in children to limit serious potential complications; no available official guidelines at this time.[33]

Hospitalization is rarely required except when acute hepatic failure develop. Evidence of hepatic injury [INR > 1.5 and/or PT > 15 with encephalopathy, or INR > 2.0 and/or PT > 20 with or without encephalopathy]. These measures should be achieved within 8 weeks from the onset of illness, and the above described coagulopathy (prolonged prothrombin time and/or INR) should be unresponsive to therapy with vitamin K. At this time, aggressive supportive therapy is required, and should be transferred to a center for performing liver transplantation.[34,35]

Conclusion

Hepatitis A viral infection still to be a major health problem in developing countries and it is a hyper-endemic in Iraq.

Conflict of Interest

None.

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