Epidemiological characteristics of acute symptomatic hepatitis A in Al Alwyia pediatric teaching hospital during 2013

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ABSTRACT

Background: Concerns about hepatitis A infections is increasing worldwide specially after improving economic and sanitary conditions in many countries making older age groups who escape infection on early life vulnerable to infection.

Objectives: The objectives were to estimate the frequency of hepatitis A among children consulting Al Alwyia pediatric Teaching Hospital during the year 2013 and to study some demographic characteristics of the disease.

Methods: This cross - sectional hospital -based study was conducted during 2013-2014 and include pediatric patients (43525 patients) who consult Al Alwyia pediatric hospital during that time. The outcome is total IgM antibodies to hepatitis A virus detected using Enzyme Linked Fluorescent Assay (ELFA) the test is performed on 380 clinically suspected cases. The age distribution of the susceptible population is estimated using a simple catalytic model.

Results: The age groups (1-4 and 5--9) constitute 43.6% and 42 % of sero-positive cases respectively with a P value of 0.001. The incidence is more among males (56%). Incidence is more during June and July 40 %and 15.6% respectively with a p value of 0.001. 1.2% needed causality or ward admissions.

Conclusions: High incidence in school age group might indicate the transition to older age groups and vaccinations should be considered at near future.

Key words: Hepatitis A infection, Hepatitis A virus, hepatitis A vaccine

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In developing countries with high endemicity, the incidence of acute hepatitis A in adolescents and adults is relatively low because of prior exposure to Hepatitis A virus (HAV) in childhood and thus immune [1]. HAV is highly endemic in some areas, particularly Central and South America, Africa, the Middle East, Asia, and the Western Pacific [2]. High prevalence is associated with poor socioeconomic conditions and diverse epidemiological patterns [2, 3]. In developing countries most children (90%) have been infected with the hepatitis A virus before the age of 10 [3]. The reported cases of acute hepatitis A considerably underestimate the true incidence of HAV infections due to underreporting and the high frequency of subclinical infections in children [4]. Epidemics are uncommon because older children and adults are generally immune. Because young children frequently have unrecognized or asymptomatic infection, a relatively smaller proportion of infections among children than adults are detected by routine disease surveillance [5].

The severity of this HAV infection increases with age and older age groups are more likely to increase the disease morbidity and mortality [6].

Developed countries have low circulating levels of hepatitis A virus while developing (endemic) countries have high circulating levels of hepatitis A virus [1]. In developed countries with good sanitary and hygienic conditions (Northern and Western Europe, Japan, Australia, New Zealand, USA, Canada) there are low circulating levels of hepatitis A virus infection, rates are generally low and the proportion of susceptible individuals, especially young adults, is high [7].

In developing countries, countries with transitional economies and some regions of industrialized countries where sanitary conditions are variable (Southern and Eastern Europe, some regions in the Middle East), children escape infection in early childhood. Paradoxically, these improved economic and sanitary conditions may lead to a higher disease incidence, as infections occur in older age groups, and reported rates of clinically evident hepatitis A are higher [7]. In developing countries, common-source outbreaks from contaminated food or water may occur [8] and hepatitis A infections occur in cyclical epidemics approximately every 10 years [9].

Hepatitis A vaccine, licensed in 1995, is now used in hepatitis A childhood immunization programs in certain parts of the world. The wider use of vaccine is probably contributing to marked decrease in hepatitis A rates in the United States since 1998. There were 30,000 cases of hepatitis A reported to the CDC in the US in 1997, but the number has since dropped to less than 2,000 cases reported per year [10].

Globally, symptomatic HAV infections are believed to occur in around 1.4 million people a year [11].There are, however, likely tens of millions of infections in all [12]. In 2010, acute hepatitis A resulted in 102,000 deaths which is slightly up from 99,000 in 1990 [13]. In general, surveillance data on HAV incidence are limited because of underreporting and lack of laboratory confirmation and case investigation [14].

In low endemic countries and in specific outbreaks, the World Health Organization (WHO) recommends vaccination

according to the epidemiology of hepatitis A in the respective region. In highly endemic areas, HAV vaccination is not recommended [2] and in areas with intermediate endemicity, improving socioeconomic conditions that have moved from high to intermediate hepatitis A endemicity [15]. Several countries, including Argentina, China, Turkey, and the United States of America have introduced the vaccine in routine childhood immunizations.

The main goal of this research is to estimate HAV incidence using a hospital -based study. The study also identifies predictive factors for hepatitis A infection among children and adolescents.

Method. A cross-sectionalstudy was done in Al Alwyia pediatric teaching hospital during whole 2013 (from 1st January 2013 till 31 December 2013) involving all clinically suspected cases of hepatitis among 43525 patients (under 18 years of age) who consult the hospital during the period of study . Suspected cases who have symptom of hepatitis A which include acute onset of any of the following: fatigue, anorexia, nausea with or without vomiting, abdominal pain, dark urine (or positive bile pigment in urine), fever, headache, diarrhea, or jaundice are enrolled in the study .

The diagnosis of hepatitis is based on the total IgM antibodies to hepatitis A virus detected using the Mini Vidas Automated Immunoassay Analyzer through Enzyme Linked Fluorescent Assay (ELFA) technique offered by bioMérieux. Statistical analysis was performed by the use of SPSS software. Statistically significant value is considered as P ≤ 0.05 and statistically highly significant (HS) as P ≤ 0.001.

Results. It is found that 65% of suspected cases have HAV infection. Only 1.2 % required hospital or emergency ward for management. P value 0.001.

Table 1: Number and percentage of hepatitis A (outpatient and inpatients) among suspected patients.

	No. of cases	Percentage among suspected (among confirmed)	P value
Anti Hepatitis A positive (IgM)	250	65.8(100)	0.001 HS
Number need causality & word admission	3	0.79(1.2)	
Number need outpatient management	247	65(98.8)	
Total Suspected cases for hepatitis	380	100	

Table 2: Gender distribution of HAV infection.

Gender	No.	%	P value
Male	140	56	0.179
Female	110	44	
Total	250	100	

It is found that males constitute 56% of cases and females 44% of cases with a non significant p value.

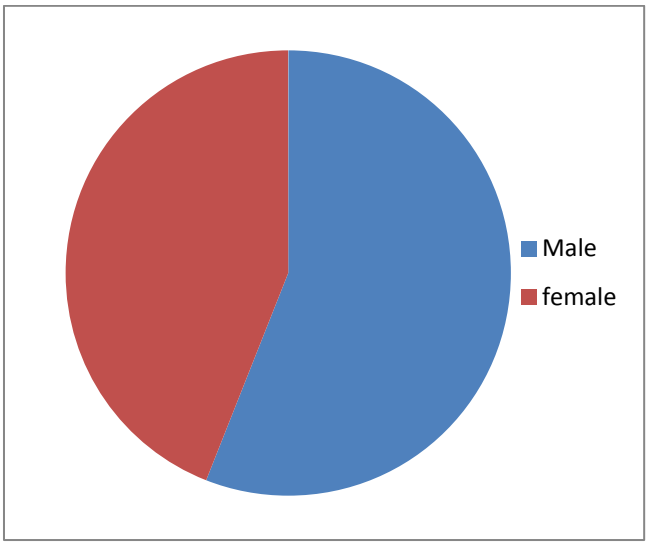

Figure 1: Gender distribution of HAV infection.

It is found that reported cases in infancy are low (2%), in 1-4 years 43.6%, 5-9 years 42%, 10-14% years 11.6% and 15-17 years 0.8%. This finding has a highly significant p value.

Table 3: Age distribution of HAV infection.

Category (year)	No.	%	P value
<1	6	2	0.001 HS
1-4	108	43.6	
5-9	105	42	
10-14	29	11.6	
15-17	2	0.8	
Total	250	100	

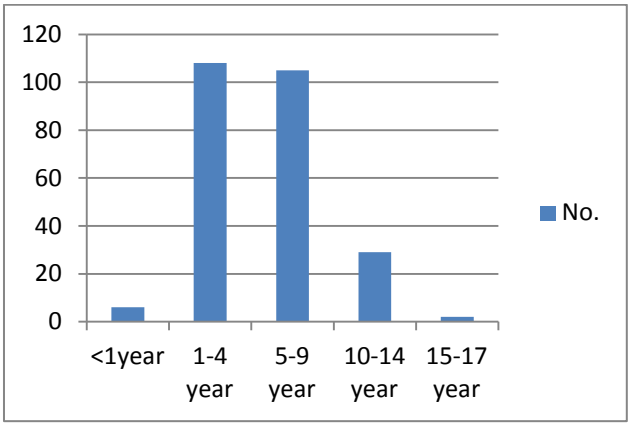

Figure 2: Age distribution of HAB infection.

The reported cases were highest in June (16%) followed by July (15.6%) and lowest in January (1.6%). This finding has a highly significant p value.

Table 4: Month Distribution of HAV infection.

Month	No. of cases	% of cases	P value
January	4	1.6	0.001 (HS)
February	18	7.2	
March	17	6.8	
April	16	6.4	
May	17	6.8	
June	40	16	
July	39	15.6	
August	21	8.4	
September	35	14	
October	10	4	
November	27	10.8	
December	6	2.4	
Total	250	100	

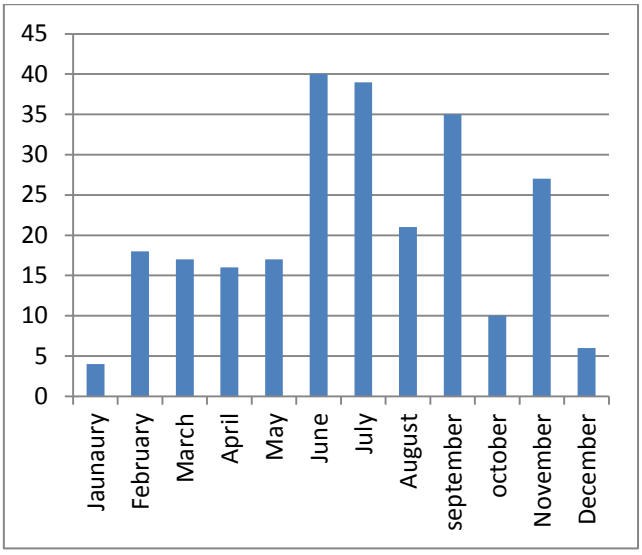

Figure 3: Month distribution of HAV infection.

Discussion. HAV infection is one of health problems in Iraq encountering 41% of suspected cases acute viral hepatitis in general population during 2005 [16].

The finding in this study of 250 cases (65.8% of suspected cases) who were positive for IgM HAV testing indicates that the disease constitute a proportional percentage of patients consulting the hospital.

Male predilection in this study is (56%) and this finding is in agreement with many studies and reports from developing and developed countries. In multicenter study conducted in five different centers in India; males show predominance [17]. 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 [18]. In Canada, the rates are higher for males than for females according to study on reported cases of hepatitis A from 1990 to 1999[19]. In a previous study in Iraq and in Saudia Arabia the prevalence was almost the same in male and female [16, 20]. According to this study and other studies and reports [18]; incidence of acute, symptomatic hepatitis A varies by age.

When socio-economic and hygienic conditions improve, the decrease of HAV circulation progressively leads to a decline of herd immunity; Infections usually no longer occur in infancy and early childhood, and susceptibility progressively expands to cohorts of older children, adolescent and adults, when the probability of acute disease (sometimes severe or even fulminant form of disease) increases [21]. In this study the reported cases in 5-9 years old age group is 42% and 10-14 years old group 11.4% indicate susceptibility(with highly significant p value) of school age and late child age groups and adolescents to HAV infection in a certain number of people due to escape of early life infection in certain number of patients . (WHO) recommends large-scale hepatitis A vaccination in countries with improving socioeconomic conditions that have moved from high to intermediate hepatitis A endemicity [15]. 15 - 17 years age group might consult hospitals caring for adults leading to low incidence of hepatitis A among 15-17 years age group in this study.

According to multicenter study in India overall, 348 (37.5%) children were seropositive for anti-HAV IgG antibodies. Seroprevalence of HAV in the 6- to 10-year age group (50.3%) was higher than in the 18-month to 6-year age group (30.3%) (17).

In USA During the pre-vaccine era, the reported incidence of hepatitis involving children aged <15 years was approximately one-third of total incidence of hepatitis A [5] while in our study more than 90% of cases were bellow 15 years age this might be to high level of sanitation status in USA.

Declining levels of hepatitis A infection, related to socioeconomic development, have been reported in many countries worldwide [22].

In contrast to our study a study conducted in Pakistan, prevalence was 94% for children < 5 years increasing to 100% at 14 years and above [23]. 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 incidence of acute hepatitis A, change in the endemicity from high to intermediate, and consideration of cost effectiveness [24]. In

other EMRO countries Prevalence of anti-HAV seropositivity in early childhood (below 5-8 years) varies through different countries according to different studies : in Egypt was 26.3% [25] , Saudia Arabia was 7% (20) ,Lebanon was 11% [26], Morocco 42% [27], while in UAE and Iran were 20% and 22%respectivly (for those below 12 - 14.9 years) [28,29].

According to study conducted in Rio De Janiero, Brazil, seasonal variation was recognized with the highest incidence in spring and summer [30] which is in agree with this study which shows rise incidence in June and July with highly significant association . However, Fathalla et *al* [31] and Papaevangelou *et al* [32] did not observe the seasonal variation in the prevalence of hepatitis A in Saudi Arabia and Greece, respectively. In this study, 1.2 % required hospital or emergency ward for management and the vast majority treated as outpatients .This indicates mild form of disease.

In conclusion, the study shows high incidence of HAV among school-age children with a highly significant association, this finding indicates the need for periodic screenings of prevalence of HA virus IgG antibody seroposetivity among all age groups to detect transition to older age groups. The need for implementing preventive programs including HAV vaccine is highly indicated if transition occurs.

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