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The changing pattern of hepatitis A in Lebanese adults

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SUMMARY

Objective: A shift in the age of hepatitis A virus (HAV) infection from early childhood to adulthood has been observed in many developing countries. This epidemiological shift has been attributed to improved socioeconomic status and sanitary conditions resulting in growing cohorts of susceptible young people and hence an increased risk of HAV outbreaks. The aim of this study was to investigate the evolutionary trend of anti-HAV seroprevalence in Lebanon in a cohort of Lebanese adults.
Methods: This was a cross-sectional study employing a convenience sample (voluntary blood donors) along with secondary data analysis. Sera from 283 healthy blood donors were tested for anti-HAV IgG antibodies. Moreover, we analyzed the national reports of HAV cases published by the Lebanese Ministry of Public Health since 2001.
Results: Anti-HAV seropositivity increased steadily from 60% in the younger age group (19–29 years) to 91% in the older age group (50–59 years), leaving the younger group at higher risk of acquiring HAV. The national data show that the number of acute hepatitis A infections is higher in the age groups 5–9 and 10–19 years.
Conclusion: Our seroprevalence data reveal that young adults are becoming more at risk of acquiring HAV infection. Thus the introduction of hepatitis A vaccine is highly recommended.

1. Introduction

The hepatitis A virus (HAV) is a non-enveloped single-stranded positive-sense RNA virion belonging to the family *Picornaviridae*, genus *Hepatovirus*.[1] Worldwide, tens of millions of hepatitis A cases occur annually.[2] HAV is transmitted mainly through the fecal–oral route, either by direct contact with an infected person or by the consumption of contaminated food, raw seafood, or contaminated drinking water.[3] Hepatitis A infection is mainly asymptomatic among children aged <6 years and symptomatic among older children and adults. Symptoms include fever, nausea, anorexia, abdominal discomfort, and jaundice.[4] It is well established that an improvement in economic conditions and the associated increased access to clean water and better sanitation leads to a reduction in the endemicity of HAV infection in developing countries, including countries of the Middle East and North Africa (MENA) region.[2]

During the past three decades, two major observations have been made. The first is that there has been a gradual shift in the age of infection from early childhood to adulthood in many of the developing countries.[5] This shift, referred to as epidemiological shift, has been attributed mainly to improved socioeconomic status and sanitary conditions[3] resulting in growing cohorts of susceptible young people and hence an increased risk of hepatitis A outbreaks. Second, the clinical picture of hepatitis A disease appears to be changing from asymptomatic or mild infection, which is the case in early childhood infection, to symptomatic infection with jaundice in adults.[4]

Studies on anti-HAV seroprevalence estimates clearly show that middle-income countries in Asia, Latin America, Eastern Europe, and the Middle East have an intermediate or low level of HAV endemicity and consequently may suffer from an increasing burden of hepatitis A infection.[2] Recently, we reviewed the data available for the past 10 years on anti-HAV seroprevalence in countries of the MENA region. Twelve out of 25 MENA countries have shown a clear shift in HAV incidence with a decline among the younger age groups and an increase among adults and older individuals.[6] These results are in accordance with those for other areas of the world.

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The recent population movement of Syrian refugees into neighboring countries (Lebanon, Turkey, Jordan, and Iraq) and their settlement in densely populated camps has increased the risk of disease; the poor sanitation, unclean water supplies, and low-quality housing in these camps are all likely to contribute to the rapid spread of diseases, including hepatitis A.[7] These changes have increasingly compelled the reluctant public health authorities in developing countries to introduce hepatitis A vaccination in order to prevent and/or minimize the risk of HAV infection. However, there is a general lack of updated data on the burden of hepatitis A disease and its incidence and age-specific seroprevalence, and these data are required prior to the introduction of any vaccination program in most developing countries.

To better understand the current evolutionary trend of HAV seroprevalence in Lebanon as compared to countries of the MENA region, we estimated the seroprevalence of anti-HAV antibodies in a cohort of Lebanese adults and reviewed the cases of acute HAV infection reported during the past decade by the Epidemiological Surveillance Unit (ESU) of the Ministry of Public Health (MOPH).

2. Methods

This is a cross-sectional study employing a convenience sample (voluntary blood donors) along with secondary data analysis. This study was approved by the Institutional Review Board of the American University of Beirut. The study was performed in compliance with the relevant laws and institutional guidelines and in accordance with the ethical standards laid down in the Declaration of Helsinki.

Whole blood was collected from 283 healthy Lebanese blood donors (aged 19–59 years) presenting at Hammoud Hospital, Saida (South Lebanon) and the American University of Beirut Medical Center (AUBMC) between October 2012 and March 2013. The study participants were from the Beirut area and the southern part of Lebanon. Serum samples were obtained and stored at −20 °C until tested. Anti-HAV IgG antibodies were detected using a commercially available ELISA kit (Architect HAVAb-IgG) as per the manufacturer's instructions. The Architect i 100 SR machine (Abbott Laboratories, Germany) was used to analyze anti-HAV levels. Moreover, we evaluated the reports of the ESU on HAV infections by age at the national level in an attempt to assess the changing epidemiology of HAV over time.

3. Results

Table 1 summarizes the demographic characteristics of the healthy blood donors enrolled ($n = 283$). The majority of study participants were male. Forty-eight percent of these participants were aged 19–29 years and 36% were holders of a university degree. Moreover, the majority of study participants lived in non-crowded settings. Our study did not include children and young adults aged less than 19 years. Data on the participants' vaccination status were not collected.

Table 1
Demographic characteristics of the study participants

	Number ($N = 283$)	Percentage
Gender		
Male	221	78.0
Female	62	21.9
Age, years		
19–29	137	48.4
30–39	75	26.5
40–49	48	16.9
50–59	23	8
Education		
Illiterate	9	3.2
Primary school	30	10.5
Secondary school	80	28.1
High school	63	22.2
University level	101	35.7

The overall prevalence of anti-HAV among our study participants was 72%. The anti-HAV seropositivity rate within age groups 19–29, 30–39, 40–49, and 50–59 years increased gradually or steadily from the lower age group (60%, age 19–29 years or young adults) to the older age group (91%, age 50–59 years). Accordingly, 40% of our tested young adults aged 19–29 years were anti-HAV-negative as compared to 23%, 6%, and 9% for age groups 30–39, 40–49, and 50–59 years, respectively (Figure 1).

The ESU at the MOPH collects data on HAV cases from different regions of Lebanon. Table 2 shows the number of HAV infections per year for the following age groups: 0–4, 5–9, 10–19, 20–39, 40–59 and ≥60 years. The total number of acute cases reported by the ESU during the years 2001–2014 was 7501 cases.[8] These reports were used to assess the epidemiology of hepatitis A by age at the national level. The largest number of reported hepatitis A cases was found to be clustered among children and adolescents aged 5–9 and 10–19 years during 2001–2014 (Table 2). The national data presented does not show a specific trend in which HAV infections are clustered in one specific area. The highest number of HAV cases reported during 2007–2014 originated from the Bequaa area, whereas the southern part of Lebanon as well as Beirut were characterized by lower numbers of HAV cases (data not shown).

4. Discussion

The detection of anti-HAV antibodies by age is an important measure of age-specific incidence rates of HAV infection.[9] This is critical to assess the evolutionary shift of the risk of HAV acquisition. Overall, our data show that anti-HAV seropositivity is increasing with age, with 94% and 91% of our study participants in the 40–49 and 50–59 years age groups, respectively, being positive for anti-HAV antibodies. Previous data from Lebanon have indicated a gradual increase in anti-HAV seroprevalence with age, with 11%, 28%, 57%, and 70% of subjects aged 1–5, 6–10, 11–15, and 16–20 years, respectively, being positive for anti-HAV.[10] While we did not test for anti-HAV antibody levels among children and young adolescents, this is the first report on anti-HAV seroprevalence rates among adults of different age groups in Lebanon, albeit with a small sample size. Our seroprevalence data reveal that younger Lebanese adults are more at risk of acquiring HAV

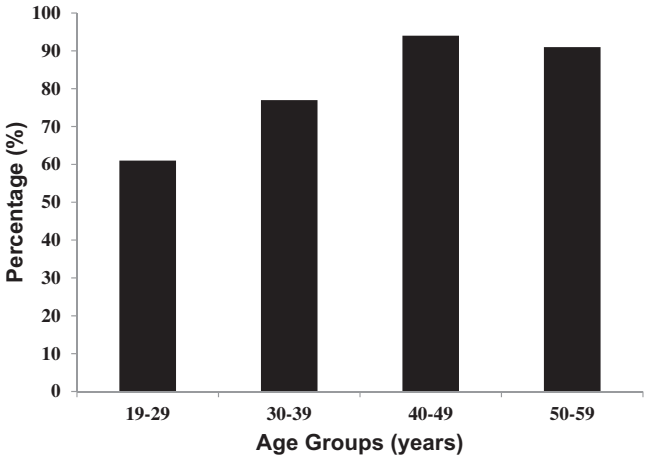

Figure 1. The percentage of anti-HAV antibodies in sera of the study participants. Sera from 283 healthy Lebanese blood donors were tested for anti-HAV antibodies using ELISA. The percentage of anti-HAV positive sera (*y*-axis) was plotted against the following age groups (*x*-axis): 19–29, 30–39, 40–49, and 50–59 years.