

## Epidemiological shift of hepatitis A in central Adana, Turkey

Emre Alhan<sup>2</sup>, Banu Kozanoğlu<sup>3</sup>, Gökhan Tümgor<sup>1</sup>, Ümit Çelik<sup>2</sup>, Akgün Yaman<sup>4</sup>, Nafiz Bozdemir<sup>5</sup>

<sup>1</sup>Department of Pediatric Gastroenterology, Çukurova University Faculty of Medicine, Adana, Turkey

<sup>2</sup>Department of Pediatric Infectious Disease, Çukurova University Faculty of Medicine, Adana, Turkey

<sup>3</sup>Department of Pediatrics, Çukurova University Faculty of Medicine, Adana, Turkey

<sup>4</sup>Department of Microbiology, Çukurova University Faculty of Medicine, Adana, Turkey

<sup>5</sup>Department of Family Medicine, Çukurova University Faculty of Medicine, Adana, Turkey

### ABSTRACT

**Background/Aims:** The aim of the study was to determine the epidemiological shift that may have occurred in the last 11 years of Hepatitis A virus (HAV) seroprevalence.

**Materials and Methods:** In 1998, we reported the anti-HAV seroprevalence in 711 children aged between 2 and 16 years children in Adana city center. Eleven years later we repeated the same study at the same locations in a similar population with the same method.

**Results:** From 1998 to 2009 anti-HAV seroprevalence declined from 33.9 % to 22.2 %, 29.5 % to 25.3 % ( $p>0.05$ ), 52.2 % to 30.8 %, 69.7 % to 35.2 %, 66.9 % to 37.7 % and 71.4 % to 47.3 % ( $p<0.0001$ ) in the age groups of 48-71, 72-95, 96-119, 120-143, 144-167 and 168-198 months respectively.

**Conclusion:** Our study showed that anti-HAV seroprevalence has decreased statistically significantly during the last 11 years in school-aged children. Results showed that anti-HAV seroprevalence has shifted to further ages. Since adolescents and young adults are at risk of symptomatic HAV infection, routine hepatitis A vaccination of children will be initiated in 2012 in Turkey.

**Keywords:** Hepatitis A, seroprevalence, childhood, epidemiological shift

### INTRODUCTION

Viral hepatitis is a major health problem in Turkey as in most developing countries. The prevalence of antibodies to hepatitis A virus (HAV) in general population shows striking geographic differences. Its occurrence and age dependence is determined to a large extent by environmental and socioeconomic conditions (1-6). With economic development and consequent improvements in the levels of sanitation and quality of water supply, there is a shift in the peak age of infection from childhood to adulthood (7-18). In this study, we aimed to determine the anti-HAV seroprevalence and the factors affecting it in children and adolescents of different age groups in Adana, a city in southern Turkey.

### MATERIALS AND METHODS

Adana is an industrialized city in southern Turkey with a population about one million and five hundred thou-

sands. We have previously studied the anti-HAV seroprevalence in 711 children aged between 2 and 16 years children with various socioeconomic levels in Adana city center in 1998 (19). 11 years later we repeated the same study at the same locations in a similar population with the same method.

#### Sample size

As the population of children and adolescents was not exactly known, sample size representing children and adolescents in Adana was calculated by the formula ( $n = (t1-a) (pxq) / S^2$ ) using an  $a$  of 0.05 and a  $b$  of 80%,  $P$  of 50%,  $q$  of 50%,  $S$  of 0.05 and  $t1-a$  of 95%(3). According to the formula, it was estimated that blood samples had to be taken from at least 600 subjects.

Blood samples were obtained between April 1<sup>st</sup> and November 30<sup>th</sup> 2009. On the first street of the three

**Address for Correspondence:** Gökhan Tümgor, Department of Pediatric Gastroenterology, Çukurova University Faculty of Medicine, Adana, Turkey  
E-mail: gtumgor74@yahoo.com

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selected districts, houses were visited randomly and 5 mL of blood was obtained from each child and/or adolescent in the household upon permission of the parents. If the number was not sufficient on the first street, blood was obtained from the subjects on the second and third streets. Serum samples were stored at -20°C and subsequently tested for anti-HAV. As negative results indicate a lack of immunity to hepatitis A, total anti-HAV, (MEIA (Microparticle Enzyme Immunoassay, Abbott Laboratories, Illinois, USA) is analyzed. Informed constant from the parents and permission from the Çukurova University Faculty of Medicine Ethical Commity had been taken.

### Statistical analysis

Data was analyzed using the SPSS-X 6.0 for Windows. Chi-square and and student's *t* tests were performed for comparison of independent samples.

### RESULTS

711 healthy children aged between 24 to 198 months (mean age: 107.1±45 months) have been included to the study. 355 of them were boys (% 49.9) and 356 of them (% 50.1) were girls. The children were grouped according to their ages. Any patients were having acute HAV at the time of the study and none of them were vaccinated against HAV.

In 1998 and 2009 studies anti-HAV seroprevalance was 10.6% vs 10.0%; 33.9% vs 22.2% and 29.5% vs 25.3% in 24-47, 48-71 and 72-95 months age groups respectively ( $p>0.05$ ), (Table 1, Figure 1).

**Table 1.** Anti-HAV seropositiveness in studies at the years of 1998 and 2009 depending on age groups in the city center of Adana.

Age Group (months)	Study year	Anti-HAV seropositiveness n	(%)	p value
24-47	1998	15	(10.6)	$p>0.05$
	2009	18	(10.0)	
48-71	1998	37	(33.9)	$p>0.05$
	2009	20	(22.2)	
72-95	1998	28	(29.5)	$p>0.05$
	2009	24	(25.3)	
96-119	1998	48	(52.2)	$p<0.0001$
	2009	40	(30.8)	
120-143	1998	53	(69.7)	$p<0.0001$
	2009	38	(35.2)	
144-167	1998	95	(66.9)	$p<0.0001$
	2009	43	(37.7)	
168-198	1998	40	(71.4)	$p<0.0001$
	2009	35	(47.3)	

HAV: hepatitis A virus

On the other hand in 1998 and 2009 studies anti-HAV seroprevalance declined from 52.2% to 30.8%, 69.7% to 35.2%, 66.9% to 37.7% and 71.4% to 47.3% in the 96-119, 120-143, 144-167 and 168-198 months age groups, respectively ( $p<0.0001$ ), (Table 1, Figure 1).

### DISCUSSION

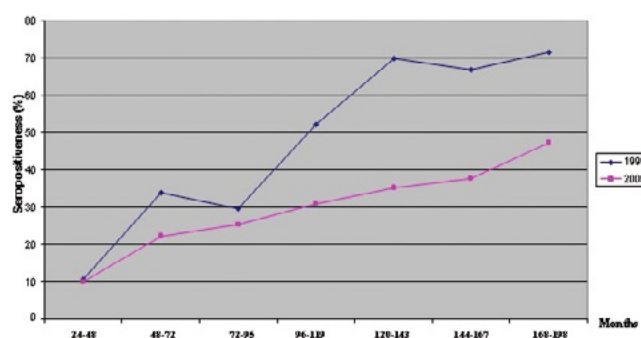
Many reports have been published indicating a global change in the seroepidemiology of hepatitis A infection in the world. Data from the most recent during the last ten years show that most children and adolescents were susceptible to the disease. Thus exposure to HAV infection was shifted from children to young adults (2-5).

Epidemiologic shift in the prevalence of Hepatitis A virus from the younger to the higher age groups has shown in developing countries (7-18). Park et al. (7) suggested that the majority of adolescents and young adults are at risk of symptomatic hepatitis A virus infection and morbidity. They detected to the anti HAV seropositive rates for the period 1988-1997 declined from 52.9% to 31.2%. Last the 20 years studies show major change in HAV prevalence from high to low endemicity in Southeast Asia and China (8-10).

Recently, a marked decrease in the prevalence of anti-HAV seropositivity in adolescent age group from 1998 to 2008 in İzmir have been published by Kurugol et al (11).

Poovorawan et al has shown that HAV infection in Thailand has increasingly started to be seen in adolescents rather than in children (9). In Hong Kong, study by Lee et al showed that anti-HAV seropositivity in 11-20 years old patients has declined to 44.8% in 1978, and to 7% in 1999 (10). The same study also found that regions of high endemic have been transformed into mildly endemic, and mildly endemic regions have been transformed into low endemic regions (8).

The overall prevalence of anti-HAV was 44.4% (316/711) in our study in 1998. The prevalence increased with advancing age i.e. 28.8% (2.1-6 yr), 49.8% (6.1-12 yr), and 68% (12.1-16.5 yr)



**Figure 1.** Anti-HAV seropositiveness and epidemiological shift in studies at the years of 1999 and 2009 depending on age groups in the city center of Adana.

( $p < 0.0001$ ) (19). In our study we have not found any statistically significant difference in anti-HAV seroprevalence levels of pre-school children whereas we did detect a significant difference in children attending to school.

In conclusion, our study showed that anti-HAV seroprevalence has decreased statistically significantly during the last 11 years in school-aged children. Results showed that anti-HAV seroprevalence has shifted to further ages. Since adolescents and young adults are at risk of symptomatic HAV infection, routine hepatitis A vaccination of children will be initiated in 2012 in Turkey.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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