

Seroprevalence of Hepatitis A among Students Enrolled in Tehran University of Medical Sciences during 2011

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ABSTRACT

BACKGROUND

Hepatitis A is often asymptomatic in children, however it can become a serious disease in adults. For countries that do not have a universal vaccination strategy targeted vaccination for high risk groups is recommended. Health workers could be at a higher risk of infection with hepatitis A virus (HAV) compared to the general population. The aim of this study is to investigate the seroprevalence of hepatitis A among enrolled students in Tehran University of Medical Sciences in 2011.

METHODS

This study included all students enrolled in Tehran University of Medical Sciences during 2011. We checked serum samples for anti-HAV antibody and participants completed a simple questionnaire.

RESULTS

From 1864 health sciences students enrolled in Tehran University of Medical Sciences, 1813 samples were analyzed for anti-HAV IgG antibody. The results showed that 970 (53.5%) were seronegative, 722 (39.8%) were seropositive, and 121 (6.7%) were equivocal. There were significantly higher seropositive results for males (54%) compared to females (37%; RR = 1.46; 95% CI: 1.31-1.62).

CONCLUSION

The seroprevalence of HAV among enrolled medical science students is considerably lower than previous reports from Iran. Targeted vaccination for health sciences students prior to exposure should be seriously considered.

KEYWORDS

Hepatitis A; Vaccination; Seroepidemiologic Studies

Please cite this paper as:

Rabiee A, Nikayin S, Hashemi R, Mohaghegh M, Amini M, Rabiee R, Merat S. Seroprevalence of Hepatitis A among Students Enrolled in Tehran University of Medical Sciences during 2011. *Middle East J Dig Dis* 2013;5:137-40.

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Received: 12 Apr. 2013
Accepted: 18 Jun. 2013

INTRODUCTION

Globally speaking, Hepatitis A is a great concern for health care systems. The reported incidence of Hepatitis A is approximately 1.4 million cases worldwide, but the true incidence is believed to be much higher.¹ While hepatitis A is often asymptomatic in children, it can become a serious, even deadly disease in adolescents and adults.²⁻⁴

Improvements in hygiene and socioeconomic conditions worldwide have resulted in lower disease incidence.⁵ A decrease in incidence during childhood leads to more susceptible adolescents and adults. In countries with lower incidence rates, the chance of an outbreak is minimal, hence universal vaccination is not cost effective. Thus universal vaccination is recommended only in countries that experience an epidemic shift from high to low incidence; vaccination in other countries is recommended only for targeted high risk groups.⁶

HAV is primarily transmitted through water, food and direct contact with an infected person. Health workers have a higher chance of direct contact with patients infected with hepatitis A and are at a higher risk compared to the general population.⁷⁻¹⁰ Although some studies imply that using personal protective measures would lower the chance of infection to the level of the general population,¹¹ ideal protective measures are not practical in many situations. Several outbreaks among hospital health care workers have been reported.^{9,10}

Hepatitis A has an intermediate endemicity in the Middle East.^{12,13} One of the largest recent studies of HAV seroprevalence in Iran gathered samples from three provinces including the capital. This study has reported an HAV prevalence of 86% among the general population.¹⁴ Universal vaccination against HAV is not currently a part of the Iranian vaccination program. A prevalence rate this high is indicative of a high risk of infection for people who are not immune to the disease.¹⁵

Our study aims to investigate the HAV seroprevalence of students enrolled in health sciences programs who intend to become health workers.

MATERIALS AND METHODS

Study population

During the year 2011, 1864 students enrolled in Tehran University of Medical Sciences. These students were from various parts of Iran enrolled in health science fields such as medicine, nursing, midwifery, and dentistry. Blood samples are regularly collected from all new students for screening and health insurance purposes. We used the se-

rum of the previously collected samples from all students who consented to the test. A total of 1864 serum samples were collected and transferred to laboratories for analysis.

Assays

For analysis, one ml of serum was used. Each sample was kept in a dry tube and maintained at -20°C until analysis. Anti-HAV IgG status was determined by ELISA. The cutoffs were established according to the manufacturer.

Statistical analysis

For data analysis, we used SPSS Statistics version 21 (IBM Corporation, NY, US) The HAV antibody prevalence was calculated for the entire population and separately for each gender. We calculated the strength of the association between gender, measured seroprevalence and calculated its relative risk.

RESULTS

During the year 2011, 1864 students enrolled in Tehran University of Medical Sciences. From the 1864 samples that were collected, 51 were unsuitable for analysis. The characteristics of the study population are detailed in Table 1.

From the 1813 samples analyzed, a total of 970 (53.5%) were negative for anti-HAV antibodies, 722 (39.8%) were positive and 121 (6.7%) were equivocal. We observed significantly higher seropositive results in males (54%) compared to females (37%; RR = 1.46; 95% CI: 1.31-1.62).

Table 1: Characteristics of the study population.

	Number of subjects	Mean age (years)	Standard deviation
Female	1262	20.8	3.91
Male	602	20.56	3.58
Total	1864	20.73	3.8

DISCUSSION

Numerous studies have been carried out on the seroprevalence of HAV in different regions of Iran (Table 2).^{14,16-20} Our results compared with those

Table 2: Recent studies on hepatitis A virus (HAV) seroprevalence in Iran.

Region(s)	Citation	Study year	Seroprevalence data	Sample size	Population/comments
Tehran, Hormozgan, Golestan	Merat, 2010	2006	73% (age 18-29), 94% (age 30-45), 98% (age 46-65)	1869	Rural and urban populations
Sari	Alian, 2011	2007	8.9% (age 1-5), 15.8% (age 5-15), 64.3% (age 15-25)	1034	Rural and urban populations
Tehran	Elikaei, 2008	2005-2006	86%	407	Healthy blood donors
Fars	Taghavi, 2011	2008-2009	79.3% (age <20), 91.3% (age 20-30), 99% (age >30)	1050	Healthy individuals referred for premarital screening
Tehran	Mohebbi, 2012	2006-2007	90%	551	General population
Qazvin	Ramezani, 2011	2008	94.9%	351	Healthy blood donors

studies showed a considerably lower prevalence of HAV-antibody in our subjects. To decrease the possibility of age bias, we compared our results with the reported seroprevalence in young adult subgroups of those studies. Our results were still considerably lower.

The reason for this difference could be due to an epidemiologic shift. As general health improves, the prevalence of HAV decreases. Similar shifts have been reported from neighboring countries in recent years.²¹⁻²⁴ It also could be due to a socioeconomic difference between our participants and the general population, as our participants had at least 12 years of education prior to university enrollment. However, further studies are required to prove the causality of either of these factors.

We also observed a significantly higher seropositivity among male students. We have no explanation for this finding but it might be related to the traditional Iranian culture in which boys are exposed to the community and social life earlier than girls, thus there might be more exposure to HAV.

Regardless of the cause, these results show that our study population is a group with a low prevalence of HAV-antibody and therefore prone to HAV infection and its complications. The complications and mortality of hepatitis A in adults and the older population are much more frequent which makes vaccination attractive.²⁵ The seroprevalence of HAV may still be too high in the Iranian general population for recommending routine vaccination.¹⁴ How-

ever, the trend towards lower prevalence in younger age groups and people from urban areas points towards the possible benefit of vaccination in these subgroups.²⁶ In particular, medical professions with higher exposure to HAV may require vaccination before entering clinical employment. A targeted vaccination for health science students at entrance to the university may be of benefit.

CONFLICT OF INTEREST

The authors declare no conflict of interest related to this work.

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