

SHORT COMMUNICATION

Declining Hepatitis A Seroprevalence Among Medical Students in Bangkok, Thailand, 1981-2001

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Hepatitis A virus (HAV) is a small, non-enveloped RNA virus of the Hepatovirus genus, in the *Picornaviridae* family. Transmission happens usually via the fecal-oral route through contaminated food and water. Because the virus has no lipid envelope, it resists biliary lysis, therefore, allowing efficient fecal-oral transmission. The likelihood of developing clinical hepatitis after HAV infection depends on the age of the patient. Most infections in children aged under 6 years are asymptomatic, whereas those in older children and adults are usually symptomatic, with jaundice occurring with increasing age.^{1,2} However, the hepatitis A virus has just a single serotype and long-lasting immunity develops after infection. Improvement of personal hygiene and environmental sanitation has led to a decline in the number of persons with natural immunity against the virus. This leads to an increasing number of susceptible adults within the population.

In the past decade, the in-

SUMMARY The severity of clinical symptoms following hepatitis A virus (HAV) infection is age dependent. Hepatitis A in children is mostly an asymptomatic disease while adolescents and adults usually show symptoms of clinical hepatitis. Improved personal hygiene and environmental sanitation has led to a decline in natural immunity acquired in childhood, creating a population of susceptible adults. In the past decade, the incidence and prevalence of hepatitis A disease in Thailand have decreased significantly. In this study, we used enzyme-linked immunosorbent assay to determine the prevalence of anti-HAV antibodies among medical students at two different time points in 1996 and 2001. We then compared these results with data from previous studies in 1981 and 1992. The seroprevalence was 73.01%, 30.23%, 16.67% and 6.67% in 1981, 1992, 1996 and 2001, respectively. A significant decline has happened over the past two decades ($p < 0.001$). Considering the decreasing immunity to HAV in the younger generations, more cases of symptomatic HAV infection could be anticipated. Further seroprevalence studies in other adolescence groups from different socioeconomic status are needed to elucidate the current situation of HAV infection in the young generation more comprehensively and to develop an appropriate prevention program.

cidence and prevalence of HAV infection in Thailand have significantly decreased. Over the past 25 years, there has been a shift in the epidemiology of hepatitis A in Thailand, from high to moderate endemicity. The prevalence of HAV infection has fallen especially among the younger age groups.³ This resulted in a growing population of susceptible adolescents and adults, which are the groups more likely to become symptomatic when infected with HAV.

Medical students represent a group within the younger generation. The data on hepatitis A seroprevalence in this group can help reflect the status of HAV infection in adolescents and young adults. In 1982 Viranuvatti *et al.*⁴ reported that anti-HAV antibodies were

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present in 73% of second year and third year medical students. A decade later, in 1992 our group tested sera from fifth-year medical students, aged 20-21 years, in Bangkok, and found that the HAV seroprevalence in this population had declined to 30%.³ This represents a significant reduction compared to the status in 1982.

In this study, our objective was to determine the prevalence of anti-HAV antibodies in a group of medical students at intervals of 5 and 9 years after our previous study in 1992,³ and compare the data with those collected in 1982.⁴ This information should demonstrate the trend of the HAV immune status of the adolescent and young adult population, and will be useful in formulating HAV control programs in Thailand, as well as countries with a similar socioeconomic development.

MATERIALS AND METHODS

Population

Sera from two groups of medical students were tested for anti-HAV antibodies. The first group consisted of sixty fourth- and fifth-year medical students at Chulalongkorn University, Bangkok, who participated in HAV antibody screening for a clinical trial of immunogenicity and reactogenicity of an inactivated hepatitis A vaccine in 1996.⁵ This group consisted of 36 males and 24 females, aged 20-22 years.

The second group consisted of seventy-five fourth and fifth-year medical students at Chulalongkorn University, Bangkok, who participated in a hepatitis A pre-vaccination screening program in 2001. There were 35 males

and 40 females, aged 20-22 years. Subjects who were previously immunized against HAV were excluded.

All of them were informed regarding the purpose and objective of the study and written consent was obtained before blood collection.

Laboratory methods

Sera were separated by centrifugation and kept at -20°C until testing. The specimens were tested by enzyme-linked immunosorbent assay for anti-HAV antibodies using a commercially available ELISA kit (HAV AB, Abbott Laboratories, North Chicago, Ill., USA). The cut-off level for immunity to HAV was calculated as specified by the manufacturer.

Data analysis

Data were analyzed by

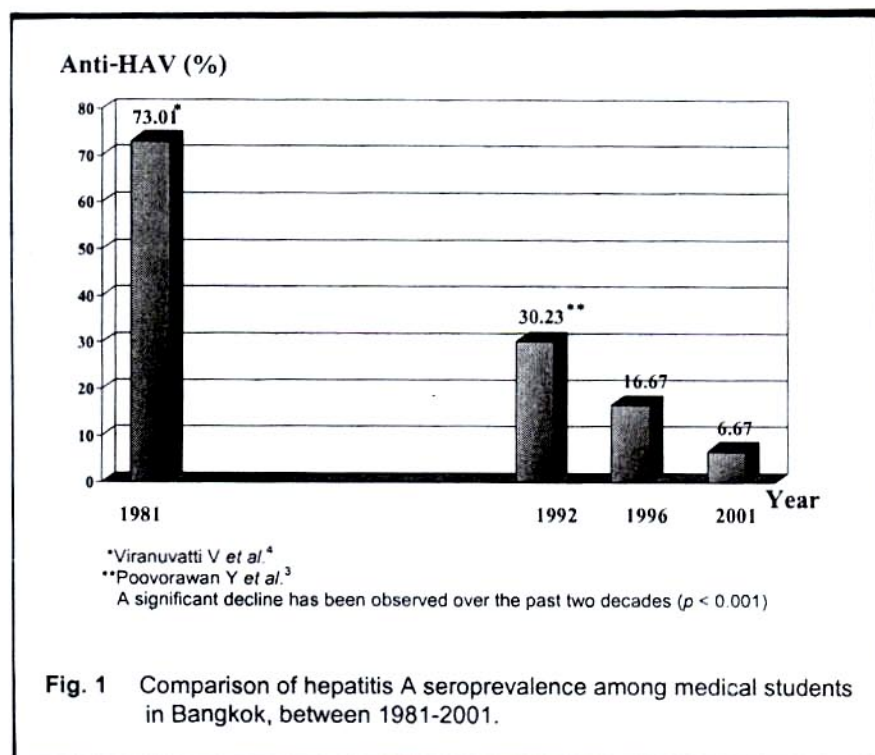
determining the percentages of anti-HAV antibodies obtained in the population studied. Chi square test was used for statistical analysis.

RESULTS

Ten of 60 serum samples (16.67%) drawn in 1996 were positive for anti-HAV-antibodies while 5 of 75 serum samples (6.67%) in 2001 were positive for anti-HAV antibodies. The sero-prevalence reduced by half over a period of 5 years. Moreover, the sero-prevalence in 1996 and 2001 was significantly reduced ($p < 0.001$) from the 73% prevalence in second- and third-year medical students in 1982,⁴ and the 30% prevalence in fifth-year medical students in 1992.³ The declining trend in HAV sero-prevalence is shown in Fig. 1.

DISCUSSION

We demonstrate a signifi-



cant decline in HAV seroprevalence in a group of young adults in Bangkok. Interestingly, the rate of decline was approximately 50% every 4-5 years from 1992 to 1996 and 1996 to 2001. Declining seroprevalence of HAV has also been shown among other groups of adolescents in Thailand. In 1996, we compared HAV seroprevalence in primary school children from the same school over a 10-year period. The data showed a significant decline in HAV seropositivity.⁶ The same results were seen in secondary school children, aged 12-19 years, in which the seropositivity decreased from 50% in 1987 to 28.6% in 1996.⁷ In 1999, a HAV seroprevalence study of children and adolescents randomly selected from five different provinces representing the major geographical areas in Thailand showed that the seroprevalence in the population aged 1 to 18 years-old was 7.9%. However in children aged 15-18 years, the seroprevalence was 15.9%,⁸ which is twice as high as the data obtained from this study. This discrepancy may be due to varying socioeconomic status and living standards, represented by the different geographical areas of the country.

HAV infection in childhood is mostly asymptomatic, whereas infection in adolescence and adulthood leads to clinical hepatitis. The decrease in prevalence of naturally acquired immunity to HAV in adolescents can lead to an increase in the number of cases with symptomatic disease. Epidemics of HAV hepatitis can occur when large groups of the population beyond childhood are susceptible to infection, as evidenced by the 1987 outbreak in Shanghai.^{9,10} In 1992, an outbreak occurred in Nakorn Si Thammarat,

a province in the southern part of Thailand. The outbreak caused a profound public health burden.¹¹ Considering the decreasing natural immunity to HAV in groups of adolescents and young adults in Thailand, more cases of symptomatic HAV infection can be anticipated.

Preventive measures of hepatitis A include improvement in the standard of living conditions, health education, disease surveillance, and outbreak control. Even though the available hepatitis A vaccine is highly immunogenic and shows long-term effectiveness,^{5,12-14} its high cost renders mass immunization unaffordable, especially for developing countries. A cost effectiveness study in Thailand using the previously reported seroprevalence of 15% in a population aged 12-18 years and of 70% in a population aged 19-40 years showed that the benefit of universal vaccination of the general population aged 3-40 years, would not justify the expenses incurred.¹⁵ Anyhow, in this study, our data revealed a much lower HAV seroprevalence in the population aged 20-22 years. Therefore, further studies in other adolescent groups of different socioeconomic status, especially in rural areas, are needed to understand the current situation of HAV infection and to develop an appropriate hepatitis A prevention strategy for Thailand, as well as other countries with a similar pattern of HAV epidemiology.

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