

SEROEPIDEMIOLOGY OF HEPATITIS A VIRUS ANTIBODY IN PRIMARY SCHOOL CHILDREN IN KHON KAEN PROVINCE, NORTHEASTERN THAILAND

Pensri Kosuwan¹, Sumitr Sutra¹, Pope Kosalaraksa¹ and Yong Poovorawan²

¹Department of Pediatrics, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand; ²Viral Hepatitis Research Unit, Department of Pediatrics, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Abstract. Hepatitis A is a disease commonly found in Thai children. Since 1984, there have been very few reports on the age specific prevalence of hepatitis A virus infection in the northeastern part of Thailand, which has the largest population and is the poorest area of the country. We studied the seroprevalence of hepatitis A virus (HAV) antibody in 3 primary school children in different areas of Khon Kaen Province, northeastern Thailand. Anti-HAV level was assayed by ELISA. Four hundred and forty-one children age 6-12 years were selected from one primary school in the urban area and two from rural areas. The highest prevalence was 22.6% at age 12 years and 0 at age 6 years. The seroprevalence was highest, 45%, in rural school children of the lowest socioeconomic status as compared to 10.8% and 2.6% in other urban school children. The overall prevalence was 12.7% and the age specific prevalence with 95% CI are presented. These data indicated a much lower seroepidemiological prevalence than previously reported and might be related to the level of socioeconomic and standard of public sanitation and living conditions.

INTRODUCTION

Hepatitis A is a disease commonly found in many developing countries, especially in Asia and Africa. For Thailand, over the last ten years, the economic situation has changed rapidly as the country has become industrialized, with improvement in the quality of drinking water, sanitation and education provided to decrease transmission of enteric communicable diseases such as hepatitis A. Twenty years ago almost everyone born and raised in Thailand was infected with the hepatitis A virus before reaching adulthood. In 1971, 97% of Thai adults had antibody to hepatitis A virus (anti-HAV) and 50% of children age of 8-9 years in rural villages were positive for anti-HAV (Burke *et al*, 1981). During recent years, the prevalence of anti-HAV has declined to less than 30% in children under 10 years old (Poovorawan *et al*, 1991). However, among children aged 6-15 years in rural communities, the HAV prevalence rates varied from 16 to 62% (Innis *et al*, 1991). Since 1984, there has been no information on the prevalence of anti-HAV in northeastern region of Thailand which has the

largest population and is the poorest area of the country. To provide information for planning the prevention program for hepatitis A, the age specific prevalence of HAV is required. This study aimed to determine the age specific prevalence of anti-HAV in primary school children age 6-12 years in Khon Kaen Province, northeastern Thailand.

MATERIAL AND METHODS

Study population

Sample size (323 samples) was calculated according to expected prevalence of HAV antibody at 30% and acceptable error at 10%.

Serum samples were collected from primary school children, age 6-12 years in Khon Kaen Province, an agriculture area; Khon Kaen city is 440 km northeast of Bangkok. Three primary schools were randomly selected, one from an urban area (group A) and two from rural areas (groups B and C).

Group A was comprised of 231 children in a Khon Kaen primary school, representing a low-middle income urban population. The samples were taken by random cluster technique by selection of one out of six classes from each of grades 1-

Correspondence: Dr Yong Poovorawan, Viral Hepatitis Research Unit, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.
Tel: (662) 2564909, Fax: (662) 2564929

6 with a total number of 1,707 children in August 1994.

Group B was comprised of 130 children of Ban Don Chang school, a low income population in a rural area, 23 km from Khon Kaen. The blood samples were drawn by simple randomization from the total number of 282 children in grades 1-6 in December 1994.

Group C contained children of Ban Lad Na Peang school, a low income population in a rural area, 33 km from Khon Kaen. The samples were selected in the same manner as group B from a total number of 167 children in grades 1-6 in December 1994.

Written informed consent and completion of self assessment questionnaires were granted by their parents or guardians. Questionnaires consisted of baseline data including education, occupation, socioeconomic status and history of jaundice in the family.

Serologic study

HAV antibody determination was done by ELISA

technique, using a commercially available kit (Abbott Laboratories, North Chicago, Ill, USA). All sera were collected and kept at -20°C until tested.

RESULTS

In the total samples of 441 children, there were 233 boys and 208 girls. The characteristics of the sample in each group were presented in Table 1. Group A had higher socioeconomic status and parental education than the groups B and C. Group C had the lowest socioeconomic status and educational level. Age specific prevalence of anti-HAV among the three groups of primary school children is presented in Table 2 and Fig 1. The highest seroprevalence was 22.6% at age 12 years, while at the age of 6 years it was 0. The seroprevalence in the three groups were different, the highest prevalence being 45% in group C. The lowest seroprevalence was 2.6% in group A, followed by 10.8% in group B. The overall seroprevalence was 12.7%. Age specific prevalence (with 95% CI) of anti-HAV is presented in Fig 2. Positive serology was

Table 1

Comparison of socio-economic status of the three primary school children in Khon Kaen Province.

	Group A (No. = 231)	Group B (No. = 130)	Group C (No. = 80)
Sex Male	119	62	52
Female	112	68	28
No. of member in family			
means	5.07	5.44	5.13
range	(2-14)	(3-12)	(3-10)
Percentage of father/mother income per month			
< 3,000 bahts	6.6/10.9	87/97.4	97.4/97.5
> 3,000 bahts	93.4/89.1	13/2.6	2.6/2.5
Occupation of father/mother (%)			
farmer	0.4/0.5	67.3/75.2	92.4/94.9
Government service	67.3/49.5	4.0/0.9	-
others	32.3/50	28.7/23.9	7.6/5.1
Educational level of father/mother (%)			
primary school	8/16.6	84.3/94.7	92.3/96.2
secondary school	26.3/24	13.9/4.4	7.7/3.8
high school and higher	65.7/59.4	1.9/0.9	-

Table 2

Comparison of age specific prevalence of anti-HAV among three primary school children in Khon Kaen Province.

Age	Group A		Group B		Group C		Total	
	No. tested	No. anti-HAV+	No. tested	No. anti-HAV+	No. tested	No. anti-HAV+	No. tested	No. anti-HAV+(%)
6	11	0	1	0	0	0	12	0
7	36	0	18	1	8	3	62	4 (6.5)
8	41	2	19	4	12	5	72	11 (15.3)
9	43	1	20	1	18	5	81	7 (8.6)
10	27	0	27	2	20	12	74	14 (18.9)
11	49	2	27	1	11	5	87	8 (9.2)
12	24	1	18	5	11	6	53	12 (22.6)
Total	231	6 (2.6%)	130	14 (10.8%)	80	36 (45%)	441	56 (12.7)

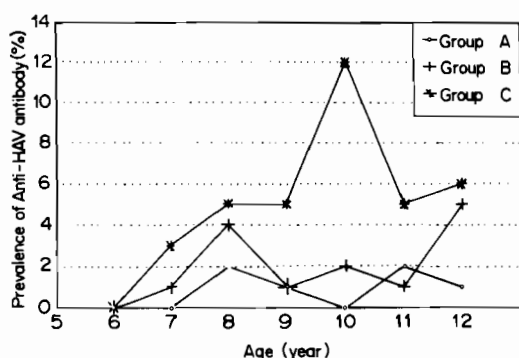


Fig 1—Comparison of age-specific prevalence of anti-HAV among three primary school children in Khon Kaen Province, northeastern Thailand.

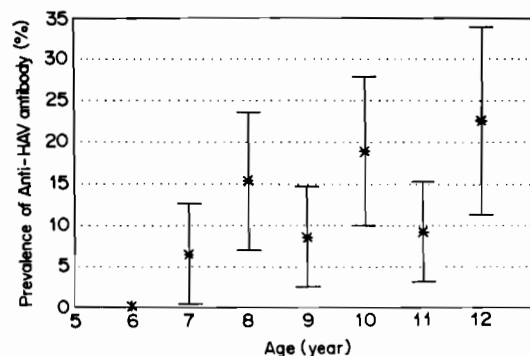


Fig 2—Age-specific hepatitis A (HAV) antibody prevalence (with 95% confidence interval) among children in Khon Kaen Province, northeastern Thailand.

more common in males (38/233 cases) than in females (18/208 cases) as shown in Table 3.

DISCUSSION

Seroepidemiological study of hepatitis A virus in Thailand had been studied since 1971 (Burke *et al*, 1981). The age specific seroprevalence of hepatitis A virus has steadily declined. Among primary school children in Bangkok with lower socioeconomic status, the prevalence was formerly around 40%. The prevalence at age 12 years old was almost 100% in 1971 and 60% in 1988 (Poovorawan *et al*,

1993). In a rural community in the northeastern region of Thailand, 50% of children age 6-8 years old were positive for anti HVA (Echeverria *et al*, 1983). During 1985 to 1993, there were many studies on seroprevalence of HAV in different communities (Burke *et al*, 1981; Innis *et al*, 1991; Poovorawan *et al*, 1993), indicating the decline in age-specific seroprevalence of anti-HAV in Thailand. According to the report of Innis (1991) in Kamphaeng Phet Province, hepatitis A transmission was a focal phenomenon and age independent. The infection rate was 1.1% of susceptible children per year of risk. They postulated that intermittent contamination of drinking water or food, but not a

Table 3

Comparison of prevalence of anti-HAV among male, female in three primary school children in Khon Kaen Province.

	Group A		Group B		Group C		Total	
	No. tested	No. anti-HAV+	No. tested	No. anti-HAV+	No. tested	No. anti-HAV+	No. tested	No. anti-HAV+
Male	119	1	62	10	52	27	233	38
Female	112	5	68	4	28	9	208	18
Total	231	6	130	14	80	36	441	56

particular behavior, was responsible for most hepatitis A infection. In the present study, the sample in group C had the highest prevalence, which may possibly be due to an outbreak of infection in the school recently. There were 3 children who had a history of jaundice 8 months before our study. The lowest prevalence was in group A which represents an urban community with better public sanitation and clean municipal water supply. Surprisingly, the prevalence of anti-HAV in our study was significantly more common in males than females, which is different from the previous study (Burke et al, 1981). Increase of the susceptible population may pose a problem for hepatitis A infection outbreaks later in adults whose clinical presentation is more severe than children. A program for hepatitis A vaccination in the low prevalence of HAV community should be considered when there is an index case and after 6 years of age, and cost-benefit analysis of such a program should be conducted to guide the health care providers.

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