

# High Prevalence of Antibody against Hepatitis A Virus in an Institution for the Mentally Handicapped

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Hepatitis A virus (HAV) infection has a world-wide distribution and is especially prevalent in developing countries. Transmission is faecal-oral and is facilitated by overcrowding and poor hygiene or sanitation practices.<sup>1</sup> Improvement in living standards in Thailand has postponed the onset of infection from childhood into adulthood. HAV infection in early childhood is usually subclinical, while symptomatic hepatitis is more common with increasing age.<sup>2,3</sup> In industrialized countries, high standards of public health have led to fewer infections in young children, which has resulted in an increased number of adults who are susceptible to symptomatic infection.<sup>4</sup> This factor may lead to outbreaks. HAV produces severe or fulminant viral hepatitis in approximately 0.1% to 0.35% of symptomatic cases.<sup>5</sup> In spite of its low mortality, HAV infection can lead to epidemic outbreaks resulting in very large financial losses. High-risk groups are children in day-care centers, homo-

**SUMMARY** Hepatitis A virus infection constitutes a world-wide public health problem, predominantly in developing countries. Mentally handicapped children, due to their incapacity for looking after themselves, comprise one of the high risk groups for hepatitis A virus infection. The aim of the present study was to determine the prevalence of hepatitis A virus antibody (anti-HAV) among the children and adults in the Institute for the Mentally Handicapped located in Nonthaburi, Thailand. The prevalence of anti-HAV IgG antibody was 92%. Immunity acquired against HAV was shown to increase in direct proportion to the age. To prevent future outbreaks of hepatitis A, water supply, sanitary conditions and personal hygiene should be improved at this and similar institutions. Furthermore, persons new to the institution (patients and staff) should be screened for anti-HAV and vaccinated with hepatitis A vaccine if non-immune.

sexuals, workers who handle faeces, travellers and military personnel travelling to areas of high endemicity.<sup>6</sup>

The risk of HAV infection among the mentally handicapped living in institutions is significantly higher than in the general population of the same area.<sup>7</sup> However, our previous study showed very low prevalence of anti-HAV among young children with mental retardation in Bangkok.<sup>8</sup>

This study aimed to deter-

mine the seroprevalence of anti-HAV in an institution for the mentally handicapped in Nonthaburi, Thailand. The purpose of screening was to identify susceptible members of the population studied, who might benefit from preventive measures during an outbreak of HAV.

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## MATERIALS AND METHODS

In July 1996, there was an outbreak of hepatitis in the Institute for the Mentally Handicapped in Nontaburi, Thailand, just north of Bangkok. Neither the mentally handicapped patients nor the staff at the institution had received vaccination against hepatitis A. Our unit (the Viral Hepatitis Research Unit, Chulalongkorn University) was asked to help control the outbreak approximately one to two weeks after the first seven index cases had been diagnosed by the provincial hospital in Nonthaburi. Blood samples were collected from all mentally handicapped individuals who resided in the same three out of ten buildings as the patients suffering from acute hepatitis, as well as from staff, yet on a voluntary basis, and separated into sera within 24 hours for anti-HAV antibody testing. Among the residents of the remaining seven buildings where no cases of hepatitis had been reported no studies were performed. Serum samples were maintained at  $-20^{\circ}\text{C}$  until tested for anti-HAV IgG and, in case of clinical symptoms like jaundice, for IgM by the ELISA technique (Abbott Laboratories, North Chicago, Illinois). The distribution of anti-HAV antibodies among different age groups was calculated.

The ones found negative for anti-HAV antibody were vaccinated against hepatitis A with hepatitis A vaccine (Havrix, Smithkline Beecham, Belgium) according to the manufacturer's recommendations and remained under permanent surveillance by a nurse employed at the institution. Children below the age of 15 years received three doses of 360 EIU. (elisa units) at time zero,

after one and six months, respectively. Children above the age of 15 years received three doses of 720 EIU. according to the same time schedule.

## RESULTS

The mentally handicapped children and adults living together in the institution had a high prevalence of immunity against hepatitis A. Out of the 255 individuals tested only 19 were found negative for anti-HAV antibody. Those were vaccinated against HAV, yet five of

them developed clinical hepatitis approximately two days to two weeks post vaccination. The overall prevalence of individuals positive for anti-HAV was 92.5%. Higher antibody prevalence was associated with increasing age. Nearly 85% of children between 6 and 15 years of age and over 95% of adults had HAV specific antibody. Seven children with acute hepatitis A virus infection had both anti-HAV IgG and IgM antibodies indicating recent infection (Table 1). The results of age distribution and prevalence of anti-HAV antibody among the mentally handicapped are shown in Table 2.

**Table 1.** Cases of acute hepatitis A (Index cases)

| No. | Sex | Age | SGOT | SGPT  | anti-HAV IgG | anti-HAV IgM |
|-----|-----|-----|------|-------|--------------|--------------|
| 1   | M   | 7   | 157  | 329   | +            | +            |
| 2   | M   | 8   | 83   | 56    | +            | +            |
| 3   | M   | 15  | 29   | 7     | +            | +            |
| 4   | M   | 20  | 86   | 145   | +            | +            |
| 5   | F   | 14  | 72   | 71    | +            | +            |
| 6   | M   | 14  | 175  | 268   | +            | +            |
| 7   | F   | 20  | 437  | 1,073 | +            | +            |

Blood tests were performed one to two weeks after onset of jaundice.

**Table 2.** Age specific prevalence of anti-HAV among the mentally handicapped

| Age (years) | No. | Anti-HAV positive |      |
|-------------|-----|-------------------|------|
|             |     | No.               | (%)  |
| 6 - 10      | 11  | 6                 | 54.5 |
| 11 - 15     | 85  | 75                | 88.2 |
| 16 - 20     | 76  | 73                | 96   |
| 21 - 30     | 76  | 75                | 98.7 |
| 31 - 40     | 6   | 6                 | 100  |
| 41 - 45     | 1   | 1                 | 100  |
| Total       | 255 | 236               | 92.5 |

## DISCUSSION

In this study, we showed that the overall seroprevalence in mentally handicapped children and adults in the institution was 92.5%. The immunity against HAV increased with age. The results when compared with those from an earlier study in students in Bangkok<sup>9</sup> showed considerably higher seroprevalence among the mentally handicapped than in the general population. Such high prevalence resembled the general Thai population in the previous two decades.<sup>10</sup>

Mentally handicapped children were at a higher risk of being infected with hepatitis A because of poor personal hygiene. Outbreaks of hepatitis A occur easily and spread rapidly in institutions. When an outbreak occurred in this institution, some children developed clinical hepatitis. However, the virus had spread well before the appearance of clinical jaundice. We immunized all children who were seronegative with hepatitis A vaccine within one week after blood screening, or two to three weeks after the seven index cases had been diagnosed. Five of nineteen children with negative anti-HAV developed clinical hepatitis with jaundice between two days and two weeks after they had been immunised. This was apparently due to the fact that they had already been infected when receiving the vaccine and were incubating the virus.

Improvements in the water supply, sanitary conditions and personal hygiene are essential to the prevention of outbreaks. The inactivated hepatitis A vaccination program also plays a role in outbreak prevention. A seroconversion rate

of over 90% was achieved on day 15 after a single-dose vaccination without immune serum globulin.<sup>11-13</sup> It is advisable that all newcomers admitted to such institutions be screened for anti-HAV and vaccinated with hepatitis A vaccine if needed. The need for a vaccination program against HAV infection would become a more immediate problem especially in high-risk groups. Passive and active immunization may be needed as urgent prophylactic measures.

In the course of several clinical trials, the hepatitis A vaccines have been demonstrated to be safe, as well as efficient,<sup>14,15</sup> and they are available in many countries. However, due to its high cost at present the vaccine ought to be given to selected high risk groups, such as for example the inmates of institutions for the mentally handicapped, as well as children attending day-care centers together with the staff employed at those facilities, health care personnel working in infectious wards, military personnel and travellers. In countries where the disease is moderately endemic, the vaccine should be administered during childhood or adolescence. However, the cost-effectiveness of the vaccine ought to be carefully considered.

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