HEALTH SCIENCES

SEROEPIDEMIOLOGY OF HEPATITIS A VIRUS AMONG FILIPINOS LIVING IN SELECTED COMMUNITIES IN AND AROUND METRO MANILA*

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ABSTRACT

One thousand (1000) Filipinos residing mostly in middle class subdivisions in and around Metro Manila were tested for the presence of antibodies to the hepatitis A virus. Both sexes, ages ranging from one year to seventy nine were included in the study. Students comprised 40% of the participants, 82% of whom were enrolled in private schools. The rest were gainfully employed, mostly office workers, young executives and professionals.

Overall, the data show an increasing HAV antibody positivity with age in children less than five years of age; anti-HAV positivity is only 10%. This figure doubles by age ten. By age fifteen, 42% are anti-HAV positive, and before the age of twenty, more than half or 54% tested anti-HAV positive. The positivity continues to increase in 10-15% increments until the age of forty, and from then onwards, positivity ranges from 89-96%. These figures tell us that among adults > 40 years old, some 4-11% have no detectable antibodies to HAV, and are therefore still susceptible to HAV infection. Anti-HAV positivity for all age groups is 62%.

Of the HAV antibody positive individuals, only 15% had a history of jaundice, which only confirms that the majority of cases are subclinical.

The results of this study show a relatively high endemicity of Hepatitis A infection in Metro Manila. The figures we obtained from this seroprevalence study are comparable with data obtained in Bangkok, Thailand where anti-HAV

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positivity among children attending primary schools is 22-69%. In urban areas in Malaysia, figures may be in the range of 50-55% for all age groups which approaches that of our data.

These are in contrast to the statistics obtained in Singapore in 1985 where overall anti-HAV positivity was 32%. Obviously, differences in standards of living and general sanitation explain the contrasting figures.

Keywords: *hepatitis A seroepidemiology, subclinical HAV infection, HAV susceptibility.*

Viral hepatitis is a fairly common infection in the Philippines. The term implies the viral etiologic agent to be primarily any of the following: the hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C (HCV) and most recently, the hepatitis E virus (HEV).

With the discovery of these viral agents, it became possible to develop reagents that allowed laboratory diagnosis of the specific agents responsible for the hepatitis infection. Sentinel data from the San Lazaro Hospital (Sy *et al.* 1990) show that among acutely ill hepatitis patients (clinically jaundiced, suspected to have primary viral hepatitis), approximately 30% are due to HAV, 40% due to HBV and the rest are non-A-non-B (NANB) hepatitis cases. The latter may be classified as HCV infection on HEV infection. Most of these cases occur among the lower socio-economic groups.

Among these five viral agents, the hepatitis A virus appears to be the most innocuous as far as symptomatology and outcome are concerned. However, it is probably the most ubiquitous and easiest to acquire, via contaminated food or drinks.

The hepatitis A virus is primarily spread via the intestinal-oral route. Infectivity studies performed in human volunteers have demonstrated fecal shedding of virus from 2-3 weeks before onset (period of greatest infectivity), 1-2 weeks after the onset of jaundice, (Hollinger 1985; CDCMM 1985; Feinstone *et al.* no date) Its infectivity can be preserved for years at -20°C and for at least one month after being dried and stored at 25°C. Because the virus survives in fecal contaminated water, outbreaks had been associated with ingestion of contaminated water, milk or shellfish. Recent studies have reported the concentration of HAV in mussels or "tahong" (Enriquez *et al.* 1992), oysters or cockles (ENB 1992).

Transmission is facilitated by poor personal hygiene, poor sanitation and intimate or intrahousehold contact (Hollinger 1985). It is believed that in areas where overcrowding occurs such as in institutions or in areas where general environmental sanitary conditions are substandard, anti-HAV marker positivity is very high. Among institutionalized children below 10 years of age, around 95% of children were found to be positive for anti-HAV at a very young age (Bile *et al.* 1992). Among children housed in relatively better or cleaner surroundings and less crowded conditions, anti-HAV positivity is markedly reduced.

In our country, type A viral hepatitis occurs as an endemic and epidemic infection. It usually spreads among children, in whom some 90% of the cases are subclinical or non-icteric. Among adults, anicteric infections range from 25-50% (ICD1975). Severity of infection is related to age.

The illness tends to be more serious or prolonged when the patient is malnourished or pregnant (ICD1975). The Department of Health has reported that Hepatitis A results in more deaths than Hepatitis B during the "more acute stage" of the disease(DOH 1991).

Complete recovery is the usual outcome of infections (Hollinger 1985). IgC class anti-HAV which appears in the convalescent phase of disease and remains detectable in serum thereafter, apparently confers enduring protection against the disease. Past infection or past exposure to HAV may therefore be determined by testing for anti-HAV levels in serum.

So far in the Philippines, we have no population-based data on the prevalence of anti-HAV marker. Such data are necessary for planning a hepatitis A control strategy. This particular study defines the epidemiology of HAV infection through a prevalence serosurvey in selected middle and upper middle income class communities in Metro Manila. These groups are deemed to have a relatively low exposure to HAV. It could well be that inadvertent exposure to HAV contaminated food or drinks would place them at a higher risk for acquiring HAV infection.

Specifically, this study was undertaken to determine the presence of antibodies among various age groups in selected communities in Metro Manila.

MATERIALS AND METHODS

Study Population and Study Sites

A total of 1,000 Filipinos, male and female, of all ages belonging to middle and upper middle income families were recruited into the study. Representative numbers of participants from the following subdivisions in Metro Manila were included: BF Homes, Xavierville Subdivision, PhilAm Life Village, Filinvest Homes, SSS Village, Pacita Subdivision, as well as other middle class residential areas. Office workers, young executives and professionals were recruited, whose children attended mostly private schools.

Each participant was asked to fill up a patient data form relevant to the objectives of the study, as well as a consent form for venipuncture.

Blood Collection and Anti-HAV Testing

Approximately 3-8 ml of blood was collected from each participant by venipuncture, allowed to clot at room temperature for 2-3 hours, and the serum separated by centrifugation and stored at-20°C prior to testing.

HAVAB-EIA from Abbot Laboratories was used to determine the presence of antibodies to HAV. Only a qualitative detection of anti-HAV was performed as specified in the kit brochure.

RESULTS

Socio-demographic Characteristics of Study Population

A total of 1,000 Filipinos residing mostly in middle and upper middle class subdivisions in and around Metro Manila were recruited into the study.

Each group included approximately 200 subjects (± 16), with more females participating, at 56%. This may be due to the fact that there are more females than males in the general population, or that the females have a more positive attitude in participating in researches such as this.

The areas of residence of the participants were divided into four (Table 1). Approximately 39% of participants were from the northeastern part of Metro Manila, an equivalent number from the southwestern part, 22% from the central Manila area and 0.3% commuted daily from Manila to Pampanga.

By occupation, approximately 40% are students, 20% are employees, most of whom hold supervisory or junior executive positions. The professionals (health, academe, business, technical) comprise ~19% of the study population. Only about 2% belonged to the low-income group. Among the student participants, 82% were enrolled in private schools, 11% attended public schools, and ~6% were in state universities. The private schools covered were: Miriam College, Ateneo de Manila University, De La Salle University, Perpetual Help College, Colegio de San Agustin, and many other Catholic schools.

Table 1. Number of Participants by Sex and Area of Residence, 1993

Area	Male	Female	Both Sexes	Percentage
NEastern Metro Manila	172	218	390	39
SWestern Metro Manila	178	210	388	38.8
Central Manila	92	127	219	21.9
Other Areas	2	1	3	0.3
Total	444	556	1000	100

Legend:

I = Quezon City, Marikina, Caloocan, Valenzuela, Bulacan, Makati, Mandaluyong, Pasig, San Juan, Taguig, Rizal

II = Las Pinas, Paranaque, Pasay City, Alabang, Laguna, Cavite, Batangas

III = City of Manila

IV = Pampanga

Prevalence of Anti-HAV Marker

In the age-group <10 years, anti-HAV positivity being contributed more by males (24%) than females. This positivity (12.5%) starts at 3 years of age onwards, increasing to some 30% by age nine. In the group 11-20 years, overall anti-HAV positivity in 48%, the highest reactivity recorded at 69% in the age group 21-30, 85% in the 31-40 age group, and 90% in those 41 years and above. It must be noted that the age-specific prevalence in certain groups tested reached 100%, in those above 30 years old. The sample size for participants in the age group 41 and above is small, but most subjects were anti-HAV positive. However, in certain groups, small number of adults remain non-reactive to anti-HAV. Anti-HAV positivity for all age groups is 62% for both male and female.

Stratifying the age groups by five (Table 2) shows a more clear cut pattern. In children less than five years of age, anti-HAV positivity is only 10%, and this figure doubles by the time the age of ten is reached. By age fifteen –42% are anti-HAV positive, and before the age of twenty, more than half or –54% tested anti-HAV positive. The positivity continues to increase in 10-15% increments until the age of forty, and from then onwards, positivity ranges from 89-96%. Again, these figures tell us that among adults >40 years old, some 4-11% have no detectable antibodies to HAV, and are therefore, still susceptible to HAV infections.

If one were to look at anti-HAV reactivity among different categories of students in different levels of schooling the trend approximates the five-year age-group specific prevalence shown in Table 2.

Table 2. Age-Group (Five and Ten Years Stratification) Specific Prevalence of Anti-HAV in Filipinos Living and Around Metro Manila, 1993.

Age-Group	No. (+)	% (+)
0 – 5	6/60	10
06 – 10	28/125	22.4
11 – 15	37/88	42
16 – 20	67/124	54
21 – 25	68/112	68.7
26 – 30	78/104	75
31 – 40	173/203	85.2
41 – 50	112/126	88.8
51 – 60	31/34	91.2
61 up	23/24	95.8

History of Jaundice/Clinical Hepatitis

Among the anti-HAV positive individuals, only 15% had either a personal history of hepatitis or jaundice, or family history of jaundice. Some 47% had no personal or family history of hepatitis or jaundice. There were a few, ~ 6%, who had a history of jaundice, but were anti-HAV non-reactive.

Per five year age-groups, a personal history of jaundice (clinical hepatitis) was elicited in only 2.7% among the 6-10 year old age group, in ~5% among the 11-15 age group, and in ~10% (+/-6) in the age group 16-30. In the age group 31-40, ~40% gave a history of clinical hepatitis acquired before the age of 10 in 23%, between the ages of 1-20 in 33%, between 21-30 in 20% and after age 31 in 23% of cases. From 41 years, 3-9% had a history of jaundice.

DISCUSSION AND CONCLUSION

The results of this study show a relatively high endemicity of hepatitis A infection in Metro Manila. Overall, the data show an increasing % anti-HAV positivity with age. This presumably reflects increasing exposure to contaminated food and drinks, even in areas where sanitation standards are deemed to be high. Nineteen of the participants in the age-group 1-2 years, were anti-HAV non-reactive. This may be explained by the fact that in this age group, precautions are usually taken to feed the child with sterile milk, or even solid food that has been prepared cleanly. After this age, it becomes difficult to closely monitor and supervise feeding habits of toddlers who are prone to put most things that they pick up from the environment into their mouths. At this time, too, parents in general are more relaxed in choosing and preparing food for their children.

At school age, exposure to food prepared outside the home increases. As each individual ages, exposure may help explain the high anti-HAV positivity in our population. The exposure is certainly possible even in a population of individuals who are presumed to have high standards of hygiene and are more discriminating in their eating preferences and habits.

The figures obtained from this seroprevalence study in Metro Manila are comparable with data obtained in Bangkok, Thailand in 1988 (Poovorawan 1992). In Bangkok, anti-HAV positivity among children attending primary schools, 22% to 69%, the figures increasing with each age group. In urban areas in Malaysia (SBH 1993) figures may be in the range of 50-55% for all age groups, which is similar to what we have obtained in this study. These are in contrast to the statistics obtained in Singapore in 1984-1985 (ENB 1992) where only 4.3% were anti-HAV positive in the age group 15 years and below, and 15.5% positive in the age group 15-24 years. Overall, for that year, Singapore had 31.85% anti-HAV positivity. Obviously, differences in standards of living and general environmental sanitation accounted for the contrasting figures. Worthy to note is that in 1991, the overall anti-HAV positivity in Singapore dropped from 31.8% to 21.4%, and in the age group 10-19 years, seropositivity dropped drastically to a low of 0.9%. This changing pattern of HAV infection in Singapore reflects an even higher standard of living and sanitation that this small country has achieved in only about six years.

The foregoing date are consistent with findings in many other countries on the inverse relationship of anti-HAV positivity and socio-economic status. In an unpublished study among middle and upper middle income medical students from the University of the Philippines in 1986-1987 (Lingao, Liver Study Group, UP-PGH), only 42% of the 20-21 year old medical students were anti-HAV positive. This is a little lower than the seropositivity we obtained for the same age group in our study, which is 50-60%. The figure, however, is still much lower than what has been obtained from two rural areas in the Philippines. Dr. Lingao's group found that in rural areas in Laguna and Batangas, majority of the rural population become infected with HAV early in life. By age five, 90-98% of the subjects were already anti-HAV positive. Thus, it suggests that acute hepatitis cases among adults in the rural areas may not be due to HAV anymore. In contrast, among the higher income bracket population in the urban areas, as we have found here, acute viral hepatitis due to HAV is a distinct possibility. At least half of the adult population remain susceptible to HAV infection. It appears that upper social classes are less likely to be exposed at an early age.

Overall, of the anti-HAV positive individuals, only 15% had a personal or family history of jaundice. Clinical hepatitis in these anti-HAV positive individuals developed in 2.7% among the 6-10 years age group, and in 40% in the age group 31-40 years. This finding confirms that most cases of HAV infection are subclinical. This is especially true among the younger age group, whose infection may only be picked up by mild increases in serum transaminases. They are, however, potential sources of HAV infection through inapparent fecal viral shedding. Among the individuals who developed clinical hepatitis presumably due to HAV, infection was acquired between the ages of 11-20 in 33%.

In summary, hepatitis A infection is highly endemic in our setting. Overall exposure as measured by anti-HAV reactivity is 62% for both males and females, and increases with age. Whereas most adults after the age of 40 are anti-HAV positive, there are some individuals who, even up to 62 remain anti-HAV non-reactive. This may reflect real non-exposure to HAV contaminated food, or may reflect a subset of population who may have been exposed, produced antibodies, but have lost these antibodies with time. This finding may also be explained in terms of immunologic mechanisms at work in certain individuals that make them more resistant or less susceptible to HAV infection. Whatever the mechanism, these seronegative individuals remain susceptible to HAV infection, and are more likely to develop the clinical form of hepatitis A.

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