vaccines may be as a result of stimulating Th1 immunity,[7] similar to the BCG (bacille Calmette-Guérin) vaccine.[11]

In India, a high powered vitamin A supplement is administered with measles vaccine when the infant is 10 months old, and repeated every 6 months until the child is 3 years old.[2] Studies have shown a positive association between vitamin A supplementation and child survival.[12,13] This intervention was also implemented in the study area and may have positively influenced child survival. In addition to vitamin A supplementation, there are possible 'individual' effects of routine vaccination in reducing child mortality from 'all' causes in developing countries as argued recently.[9] This association may be exploited to reduce the absolute number of child deaths in developing countries even in areas of high vaccination coverage with relatively lower child mortality rates.

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The Prevalence of Antibodies to Hepatitis A Among Preschool Children in an Urban Setting in Turkey

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Summary

The prevalence of antibodies to hepatitis A virus (HAV) was investigated in 114 children (59.7 per cent males) aged 4–6 years, in the campus area of Middle East Technical University, Ankara, Turkey. The prevalence of hepatitis A antibody in this age group was 11.4 per cent (13/114). The rate of immunized children against hepatitis A was 3.65 per cent (5/137). In conclusion the prevalence of anti-HAV demonstrates the susceptibility of other preschool children to hepatitis A. This may be a cause for considering hepatitis A vaccination before preschool attendance in Turkey.

Introduction

Young children in day-care centers may be an important source of hepatitis A virus (HAV) infection. Very few data are available regarding the seroprevalence of HAV IgG antibodies and of the use of the hepatitis A vaccine in 4–6-year-old Turkish children.[1] Our major aim was to access the

Correspondence: Dr Mehmet Ungan, Middle East Technical University Medical Centre, Department of Family Medicine, Inonu Bulvari—ODTU Kampusu, 06531 Ankara, Turkey. Tel. 90 312 2104930; Fax 90 312 2104999. E-mail <mungan@metu.edu.tr>.

seroprevalence of anti-HAV IgG antibodies in the 4–6-year-age group and also the rate of immunized children. A day-care center (preschool) population, which can be monitored by the family medicine department's available medical records and which includes children from relatively better educated families, was thought to be a good source to estimate the need for HAV vaccination.

Material and Methods

Study population

The trial was conducted at the Middle East Technical University (METU) by the Department of Family Medicine, and Microbiology and Virology Laboratories. The trial population was children attending METU preschool and day-care center between the ages of 4–6 years. Prior to collecting samples a meeting with the patients was organized. The parents were informed about the study and asked for their consent. Written informed consent was received from all parents. A questionnaire was administered to all parents considering their child's age, gender, history and vaccination status. The children were physically examined in order to consider them healthy. This trial was held between 1 May and 1 July 2000.

Sampling procedure

A list of all children was obtained from the school directory and random sampling was used. The required sample size was calculated by using 95 per cent confidence level and the 5 per cent (worst acceptable 1 per cent) expected prevalence of anti-HAV for the age range 4–6 years. The estimated figure was 114. In order to safeguard the desired level of precision and confidence after possible refusals, we increased the calculated sample size by about 20 per cent, and the sample size was raised to 137.

Laboratory procedure

The anti-HAV IgG was assessed from blood samples using a commercially available test for total anti-HAV, which is recommended for prevaccination testing.

Children with antibody titers higher than 20 mIU/ml were recorded as 'immune'. Children with a history of HAV vaccination ($n = 5$) were also tested for their antibody titer.

Results

Eighteen of the parents among 137 did not give permission for a blood sample due to various reasons, including mild common cold, but all of them completed the questionnaire. Out of 137, five children (3.65 per cent) were found to have had at least one injection of HAV vaccine. They were excluded from the study while calculating the prevalence but included in the blood test procedure in order to determine the antibody titer. None of the parents gave a history of HAV infection for their children but one of the parents declared that his older child (9 years old) had HAV infection with jaundice. A total of 119 healthy children, born between 1994 and 1996, were screened for HAV antibodies. One hundred and fourteen healthy children with no positive history of jaundice were included in the prevalence study (age = 5.184 ± 0.771 years).

Among all children ($n = 114$), 12 were found to have HAV IgG over 20 mIU/ml (one of the children was found to have borderline HAV IgG titer, 20 mIU/ml) and they were all ($n = 13$) accepted as seropositive (11.4 per cent). The five excluded children who had primary immunization were found to have antibody titers of at least 400 mIU/ml. The rate of immunized (vaccinated) children against HAV was 3.65 per cent (5/137).

Discussion

According to a Turkish study held in Trabzon, 63 per cent of the children up to 10 years are naturally immunized.[1] This overall result was not comparable with the result of our study. Hospital records may show higher prevalence because of the selected referrals. The socioeconomical status was also different between these areas. Turks (1–17 years) living in Germany had higher anti-HAV levels than German children (30.7 vs. 4.1 per cent).[2] Both studies reported that being in low or middle socioeconomical status was associated with a higher seroprevalence for anti-HAV.

The relatively low prevalence found in our study reflects the high level of socioeconomical status and better health conditions. On the other hand we did not expect to find such a prevalence rate in our population for this age group at the beginning of the study. Excluding the anti-HAV positive children ($n = 13$) and also the previously vaccinated children ($n = 5$), almost 85 per cent of preschool children living in our region seemed to be susceptible to HAV and, considering the previous study in Trabzon, outbreaks are possible.[1]

We could not find any difference among the seroprevalance of the different age groups (4, 5 and 6 years). It is possible that the interval was too small to observe a statistical significance. In other studies,[2–4] an elevation of the anti-HAV seroprevalence has been reported by age. This is logical because as time passes, the probability of exposure to HAV should increase. A shift in the prevalence pattern of HAV infection from a low to a high age group has appeared in Mediterranean countries.[5] In Turkey, especially in urban settings, continued improvement of environmental and socioeconomical conditions may decrease the probability of exposure to HAV,

thereby changing a predominantly childhood infection to one that is more apt to occur in adults. Hence, a study held in METU medical center in recent years revealed the HAV IgG positivity as 73 per cent among the graduate students and staff.[6] This shift has been attributed to an improvement in the socio-economical and hygienic conditions.[7] Thus, more susceptibility and hence a greater risk of outbreak is likely in the future.[8] Outbreaks may still occur in day-care centers and in schools. To avoid outbreaks, existing pockets of high endemicity for HAV infection with surrounding areas shifting towards intermediate endemicity must be controlled and widespread vaccination should be considered.

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Checklist for Authors

Originality

Does the study make an original scientific contribution or new observation on the topic?

Usefulness

Are the findings likely to contribute to improved standards of care?

Would the findings have an impact on preventive/promotive care?

Design Features

Is the objective of the study clearly defined?

Is the study design appropriate for the objective?

Are the subjects for the study, their source, the method of recruitment as well as the inclusion/exclusion criteria defined?

Are the sampling methods likely to give rise to bias?

Is there a statement included about sample size?

Is the method for collection of data clearly described?

Are all laboratory methods used clearly referenced?

Are the study and comparison groups similar in all respects except for the topic of inquiry?

Is the response rate satisfactory?

Is the method of data collection likely to be open to bias?

If intervention has been used was the allocation random and blind?

Have the outcome measures been defined?

Are there any drop outs?

Was the method of outcome measurement open to bias?

Analysis and Presentation

Is the statistical procedure employed (including the software used) clearly stated?

Are the statistical tests used relevant?

Do the results adequately answer the research question?

Is the interpretation of results reasonable?

References

Are the references relevant to the study and up to date?

Are the references cited in the style required?

Ethics

Are the design and conduct of the study ethical?

Has the permission of the local ethical committee been sought and received?

Adapted from *Mother and Child Health: Research Methods* (www.tropej.oupjournals.org)