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Seroprevalence of Epstein-Barr Virus Antibody among Children in Various Age Groups in Bangkok, Thailand

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SUMMARY **There are no current data on previous Epstein-Barr virus (EBV) infections in different age groups of Thai children. This study was conducted to determine the prevalence of anti-EBV IgG antibody in healthy children of various age ranges in Bangkok, Thailand. Between June and December 1998, blood samples were collected from 425 volunteers aged 6 months to 15 years who attended a well baby clinic in the northern suburban part of Bangkok, Thailand. Serum samples were assayed for specific anti-EBV IgG antibodies using a commercial enzyme-linked immunosorbent assay kit. The percentage of children with positive anti-EBV IgG antibody increased with advancing age. The overall seropositivity rate was 72.7%. Children with anti-EBV IgG antibody were significantly older than those without the antibody. Seronegative children were reared at home significantly more frequently than seropositive children. These seroepidemiologic data will guide calculation of the appropriate age for administration of an EBV vaccine to children, when it becomes available.**

Epstein-Barr virus (EBV) is the most common cause of infectious mononucleosis (IM) which is manifested typically by fever, exudative pharyngotonsillitis, lymphadenopathy, hepatosplenomegaly and atypical lymphocytosis. The spectrum of EBV infection ranges from no symptom in infants and young children to more serious illness in older children and adults.[1] Infection frequently occurs early in life, particularly among lower socioeconomic groups. At present, there is no current data on the prevalence of anti-EBV IgG antibody in different age groups of Thai children. This research was conducted in order to collect this data.

MATERIALS AND METHODS

This cross-sectional survey was carried out in the Division of Preventive Medicine, Directorate of Medical Services, Royal Thai Air Force. From June to December 1998, 425 healthy children (230 boys and 195 girls) aged 6 months to 15 years who attended a well baby clinic were recruited on a voluntary basis without any randomization after their parents had provided written informed consents. Those who were diagnosed with a primary immunodeficiency, HIV infection, cancers, chronic hepatic or renal diseases, and those who had received blood or blood components in the past three months were excluded.

Most of the subjects were living at Don Muang area and Pathumtani province at the time of the survey. The subjects were divided into four age groups: 6 months to 2 years (n = 101), 3 to 5 years (n = 108), 6 to 8 years (n = 104) and 9 years or older (n = 112). Their mean age was 6.3 years. All subjects' parents were interviewed with structured questionnaires to collect details about their children's age, sex, socioeconomic background

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(income and family size) and place of child rearing.

Two milliliters of blood were obtained and the separated serum was stored at -20°C until testing. Specific EBV IgG antibodies were detected using a commercial enzyme-linked immunosorbent assay (ELISA) kit (Enzygnost Anti-EBV IgG kit, Behringwerke, Germany) according to manufacturer's instructions.

Demographic data were analyzed by calculating mean, range and percentage. Categorized variables were analyzed by Chi-square test and noncategorized variables were analyzed by Student t-test. The level of significance was set at alpha = 0.05.

RESULTS

The presence of specific EBV IgG antibodies was assayed in all enrolled subjects. The overall seroprevalence rate among 425 subjects tested was 72.7%.

The seropositivity rates tended to increase with age, i.e. from 34.7% in the 6 month to 2 year age group, 77.8% in the 3 to 5 year age group, 91.4% in the 6 to 8 year age group and reached 84.8% in the 9 years or older age group (Table 1).

After classifying subjects into seropositive and seronegative groups, age was found to be significantly higher in the former group, whereas children in the latter group were significantly more likely to have been reared at home (Table 2).

DISCUSSION

In 1969, two reports from developed countries showed that the seroconversion rate of EBV infection was 56% and 45% in the age groups of 0-4 and 0-2 years old children, respectively.[2,3] In Thailand, Puthavathana *et al.*[4] reported in 1980 that the seroprevalence rate of EBV infection was 48%, 30%, 83%, 90% and 93% in Thai people aged 0-6 months, 6-12 months, 1-5 years, 5-15 years and > 15 years, respectively. Poovorawan *et al.*[5] in 1997 studied the seroprevalence of EBV antibody among school children of the low to middle socioeconomic class in Bangkok and found a very high seroconversion rate of 99%. Pancharoen *et al.*[6] in 2000 reported that the rate of previous EBV infection in children whose sera were tested for anti-VCA IgG for any reasons was 70.2%. The seroprevalence rate in this study was expected to be lower due to the improvement in standard

Table 1. Prevalence rate of Epstein-Barr virus antibody in all age groups

Age group (years)	Number tested	Anti-EBV IgG positive	
		Number	%
0.5-2	101	35	34.7
3-5	108	84	77.8
6-8	104	95	91.4
≥ 9	112	95	84.8
Total	425	309	72.7

Table 2. Age, sex, income of family, number of children in family, place of child rearing of study children aged 6 months-14 years, classified by EBV seropositivity

Characteristics	Anti-EBV IgG positive (n = 309)	Anti-EBV IgG negative (n = 116)	*p*-value
1. age (years)	7.30	3.84	< 0.05
2. boys:girls	1.11 : 1	1.39 : 1	NS
3. income of family (Baht per month)	17976.7	17411.1	NS
4. number of children	2.15	2.01	NS
5. place of rearing, home:others	0.17 : 1	0.54 : 1	< 0.05

Note: home = children were reared at home during the daytime of the working days, NS = no statistical significance

of living since 1990. However, it was still very high. This may be explained by the fact that EBV is highly contagious and therefore transmission is not significantly reduced in higher socioeconomic households. Additionally, several other factors influence the EBV seroconversion rate among Thai children including the way of feeding children. The data from this study are similar to those reported among Chinese children in 1986.[7]

Our study showed that two factors influencing the rate of EBV seroconversion were age of children and place of rearing. This is logical, as the older the children, the higher the opportunity to contract the virus.

In conclusion, the seroprevalence rate of EBV infection in children aged 6 months to 15 years in this study was 72.7%. The seropositivity rate increased with age and was up to 90% by the age of six years. Seronegative children tended to be reared at home. These data will suggest the appropriate age for administration of an EBV vaccine to the Thai children, when it becomes available. This vaccine may have an important impact in the prevention of certain EBV-related malignancies.

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