The Prevalence of Poliovirus Infection in a Lower Socioeconomic School Population

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OBJECTIVE : To define the prevalence of poliovirus antibodies in a school population in a lower socioeconomic environment in Bangkok.

BACKGROUND : Improved sanitation is a key element of the public health program of a developing country. As a consequence, one might predict that naturally-acquired infections with polioviruses in early childhood would become less prevalent as living conditions improved. A possible risk of postponed exposure to wild polioviruses is an increase in apparent, paralytic poliomyelitis cases. As the cost of vaccination of large groups may be too great for countries with limited economic resources, periodic studies to evaluate the immune status to poliovirus among children may be very useful in public health planning.

METHODS : Sera were obtained from volunteer students of the Pibulprachasan School in Din Daeng area of Bangkok. A questionnaire requesting the student's past history of immunization was completed by the parents of participating students. Metabolic inhibition tests for detection of the presence of neutralizing antibody to the three types of polioviruses were performed. The method of detection is briefly as follows : heat-inactivated sera were diluted to 1:5 and 1:10; 0.05 ml of diluted sera were mixed with an equal volume of 100 TCID 50 of either Polio I, Polio II, or Pilio III virus in suspension in sterilized microtiter plates. The virus-serum mixtures were incubated at room temperature for 30 minutes; then 0.05 ml of a Hela cell suspension (100,000 cell/ml) was added and covered with mineral oil. Plates were incubated in a 35°C. incubator and results read at 7 to 8 days. The inhibition of cell metabolism, as shown by a red color of the Phenol red PH indicator in the medium, indicated lack of Poliovirus antibody. A neutralizing antibody titer of less than 1:5 was interpreted as negative.

RESULTS : Forty-five percent of the 4-year-old school children studied had serum neutralizing antibodies against all three types of polioviruses. By age nine, almost ninety percent had antibody to all three types of polioviruses (Table 1 and Figure 1). Of the total of 1989 students, 83% had had exposure to poliomyelitis viruses of all three types. Information collected by questionnaire suggested that most had never received polio vaccine. By comparing the present study to a similar study of Thai children in 1961 (1), when 50% of study population had antibody to all three types of polioviruses at the age of four,

it appears that factors influencing exposure to polioviruses have not significantly changed. Children continue to be exposed to polioviruses early in life, and the probability of paralitic poliomyelitis continues to be relatively low.

Table 1. Age specific prevalence of polio antibody in school children of lower socioeconomic status, 1977.

Age (yrs)	No. Tested	No. and % of Positive* Individuals Against							
		Polio I		Polio II		Polio III		All three types	
		No.	%	No.	%	No.	%	No.	%
4	60	43	71.1	47	78.3	39	65	27	45
5	66	51	77.3	61	92.4	44	66.7	37	56
6	91	76	83.5	86	94.5	82	90.1	68	74.7
7	188	169	89.9	187	99.5	172	91.5	156	83
8	199	184	92.5	194	97.5	165	82.9	151	75.91
9	227	215	94.7	223	98.2	208	91.6	200	88.1
10	258	248	96.1	248	96.1	237	91.9	225	87.2
11	211	198	93.9	203	96.2	185	87.7	173	81.99
12	243	238	97.9	241	99	225	92.6	217	89.3
13	259	247	95.4	253	97.7	242	93.4	232	89.6
14	134	130	97.0	132	98.5	123	91.7	119	88.8
15	53	51	96.2	52	98.1	49	98.1	49	92.4
Total	1989	1850	93.0	1927	96.88	1774	89.19	1634	83.16

* Positive neutralization antibody for dilution 1:5

REFERENCE :

1. Snitbhan, R., Sukhavachana, P., *et al.* Distribution of antibodies against the three types of polioviruses in different age groups. J. Micro. Soc. of Thailand, 6, 5-10, 1962.

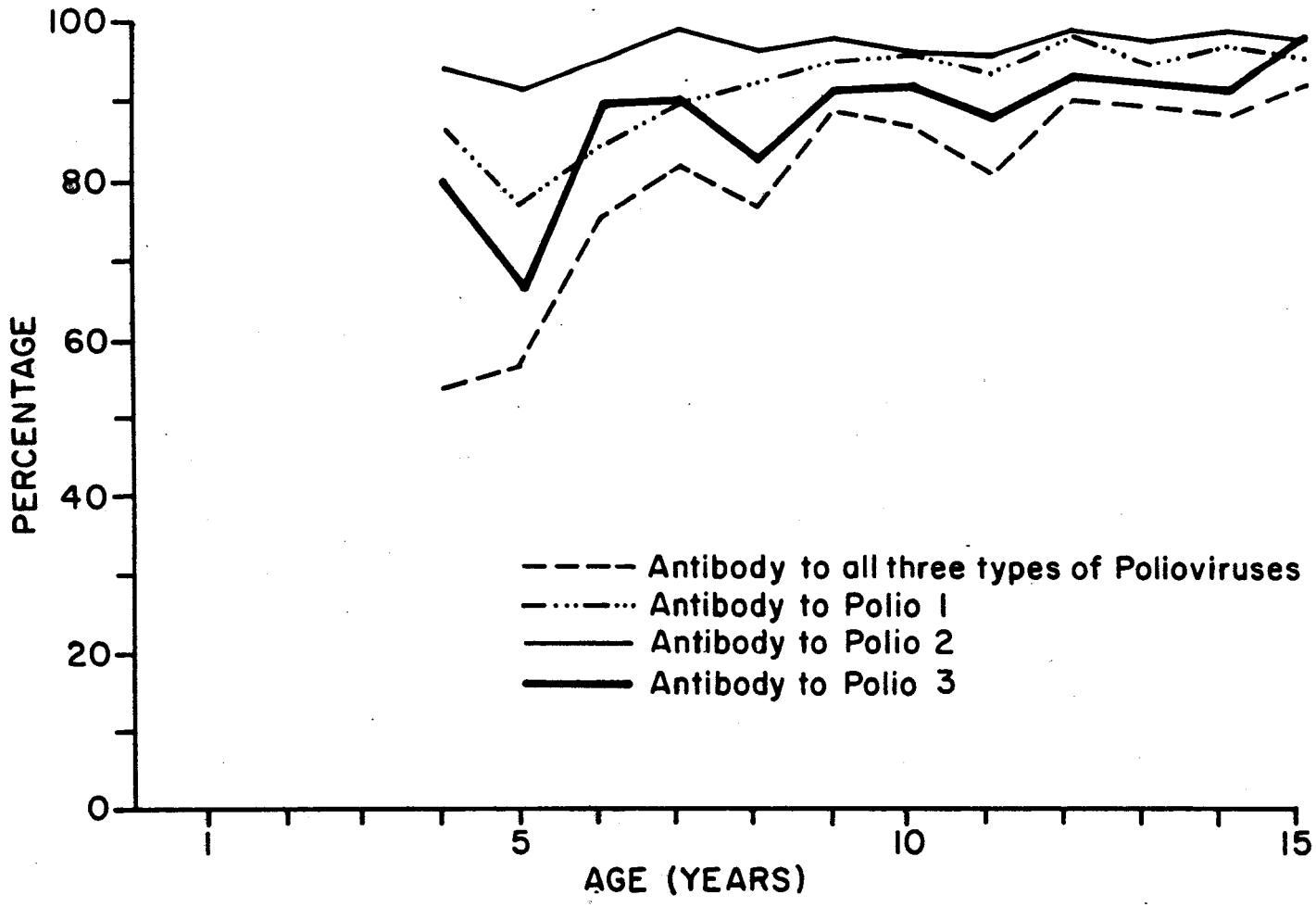

FIGURE I. AGE DISTRIBUTRITION OF NEUTRALIZING ANTIBODY TO THREE TYPES OF POLIO VIRUSES, PIBUL PRACHASAN SCHOOL. 1977-78