

The Sero-epidemiology of Measles in Children from Eastern Turkey

S Altınkaynak¹, V Ertekin¹, A Güraksın², A Kılıç¹, N Yiğit³

INTRODUCTION

Measles is a highly contagious disease usually seen in childhood. It can prove fatal and is primarily controlled by vaccination (1). In this study, the authors aimed to determine the seroprevalence of measles antibodies in children six years and under in Eastern Turkey and to identify the relationship between measles seroprevalence and several socio-demographic characteristics, and to develop the best vaccination policy for measles.

The study sample consisted of 840 children, up to six years of age, from three provinces (Erzurum, Erzincan and Kars). The cluster sampling method was used for selecting subjects of a predetermined number in the rural and urban areas (2, 3). A composite index was used to determine the socio-economic level of the family (4).

METHOD

The vaccination status of measles was obtained from vaccination cards: children were categorized as vaccinated, unvaccinated and unknown (if no vaccination status was known). All vaccinated children had one measles vaccine after nine months. The data, in this study, were obtained from 767 (91.3%) children. Measles specific IgG antibodies were screened qualitatively by enzyme linked immunosorbent assay (ELISA) test (Virotech kits) (5–7). For statistical analysis chi-square was used.

RESULTS

The numbers of subjects selected for sampling is presented in Table 1. The several socio-demographic characteristics of subjects are shown in Table 2. Positive seroprevalence was detected in 59.4% of children younger than six years. Table 3 shows the distribution of measles seroprevalence by several socio-demographic characteristics. Although the mean rate was around 50–80%, seroprevalence rates by provinces were 48% (Erzurum), 79.9% (Erzincan) and 73.7% (Kars).

Measles antibodies were detected in 58.7% of the children younger than one year, whereas rate after one year of age was between 56.3% and 63.8%. The seroprevalence was not affected by gender, sibling size and socio-economic

Table 1: Distribution of subjects selected for sampling, interviewed and undergoing blood sampling in three provinces (Eastern Turkey 2000–2001)

City	Numbers of subjects sampled	Interviewed subjects		Subjects undergoing blood analysis		Positive seroprevalence (%)
		n	%	n	%	
Erzurum	463	427	92.2	423	99.1	48.9
Erzincan	172	167	97.1	157	94.0	79.9
Kars	205	196	95.6	187	95.4	73.7
Total	840	790	94.0	767	97.1	61.1

Table 2: Socio-demographic characteristics of subjects participating in measles seroprevalence study in Eastern Turkey (2000–2001)

Characteristic	Category	Number	Percentage
Age (months)	< 12	155	20.2
	12–23	183	23.9
	24–35	163	21.3
	36–47	102	13.3
	48–59	95	12.4
	60–72	69	9.0
Gender	Boy	408	53.2
	Girl	359	46.8
No of siblings	# 3	637	83.1
	> 3	130	16.9
Educational level of mothers	No literacy	169	22.0
	Primary school	461	60.1
	Secondary-high school	126	16.4
	University	11	1.4
Educational level of fathers	No literacy	59	7.7
	Primary school	278	36.2
	Secondary-high school	355	46.3
	University	75	9.8
Socio-economic status	High	194	25.3
	Moderate	511	66.6
	Low	62	8.1
	Settlement area	Urban	237
	Suburban	343	44.7
	Rural	150	19.6

status ($p > 0.05$). While seroprevalence increased with educational level of mother and father, there was statistically significant correlation with the educational level of mothers ($p < 0.01$). It was 67.5% and 65.3%, respectively, in urban and rural areas ($p < 0.01$). Positive seroprevalence was detected in 63.4%, respectively, in vaccinated and unvaccinated children.

From: Departments of Paediatrics¹, Public Health² and Microbiology³, Atatürk University, Faculty of Medicine, Department of Paediatrics, 25200 Erzurum, Turkey.

Correspondence: Dr V Ertekin, Atatürk University, Faculty of Medicine, Department of Paediatrics, 25200 Erzurum, Turkey. Fax: +90 442 236 1301, e-mail: vildanertekin@hotmail.com.

Table 3: Measles seroprevalences for 456 children aged 0-6 years by socio-demographic characteristics in three cities of Eastern Turkey

Characteristic		Number	Positive seroprevalence (%)	p
Age (months)	< 12	91	58.7	p > 0.05
	12-23	103	56.3	
	24-35	104	63.8	
	36-47	60	58.8	
	48-59	55	57.9	
	60-72	43	62.3	
Gender	Boy	250	61.3	p > 0.05
	Girl	206	57.4	
No of siblings	# 3	389	61.1	p > 0.05
	> 3	67	51.5	
Educational level of mothers	No literacy	83	49.1	p < 0.01
	Primary school	285	61.8	
	Secondary-high school	79	62.7	
	University	9	81.8	
Educational level of fathers	No literacy	27	45.8	p > 0.05
	Primary school	171	61.5	
	Secondary-high school	208	58.6	
	University	50	66.7	
Socio-economic status	High	119	64.7	p > 0.05
	Moderate	299	59.4	
	Low	38	63.5	
Settlement area	Urban	185	67.5	p < 0.01
	Suburban	173	50.4	
	Rural	98	65.3	
Vaccination status	Vaccinated	343	63.4	p < 0.05
	Unvaccinated	49	49.0	
	Unknown	13	59.0	

DISCUSSION

In Turkey, a single-dose measles vaccine at nine months of age is being administered, as recommended by the World Health Organization (WHO). Of children included in this study, 59.4% were seropositive. According to the results in

the present study, the optimal strategy for measles immunization in Turkey may be to administer a second dose of measles vaccine at 18 months of age with the diphtheria-tetanus-pertussis vaccine, in addition to a catch-up campaign.

There was no difference in positive seroprevalence rate with respect to socio-economic status, sibling size and educational level of fathers. There was a significant difference in seroprevalence rate in respect to educational level of mothers, settlement area and vaccination status.

All vaccinated children in the study had one measles vaccine after nine months of age. Of them, 63.4% were seropositive.

This study showed that the two-dose schedule is successful in achieving high levels of immunity. The routine measles vaccination schedule in Turkey can be changed to a two-dose vaccination schedule. A catch-up vaccination campaign covering children aged one to six years could be conducted, irrespective of vaccination status.

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