

SEROEPIDEMIOLOGICAL STUDY OF HERPES VIRUSES IN NEPAL

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Abstract. The antibody positive rates among Nepalese, in a community, to herpes simplex virus (HSV), varicella-zoster virus (VZV) and cytomegalovirus (CMV) were studied. Immune adherence hemagglutination test (for VZV) and complement fixation test (for HSV and CMV) were used to measure the antibodies. An 80% positive rate of anti-HSV antibodies was found in early childhood (1-4 years) that further increased with age (96.1% positive in > 15 years age). Only 25% of children 1-4 years old showed antibodies to VZV but the number of positives increased rapidly with age (82.9% in > 15 years age). Antibody against CMV was positive in all the subjects studied.

INTRODUCTION

The term "herpesvirus" refers to several human and animal viruses. The human herpesviruses include herpes simplex virus (HSV-1 and HSV-2), varicella-zoster virus (VZV), cytomegalovirus (CMV), Epstein-Barr virus (EBV) and herpesvirus type 6 (HSV6). These viral infections are common in children and produce various clinical manifestations that range from mild to fatal. This herpes group of viruses have a unique character of undergoing latency that can be reactivated at intervals. Immunocompromised subjects (eg AIDS patients) are more susceptible to these viral infections. CMV and EBV have also been linked with malignant conditions. Varying degrees of antibody response have been shown to occur against these viruses. Seventy one percent of selected adult Nepalese subjects were reported to have antibodies against HSV (Rai *et al*, 1988). One report of a serological study of EBV infection is available from this country (Rai *et al*, 1987), and none on other viral infections (VZV and CMV). We, therefore, conducted a seroepidemiological study of HSV, VZV and CMV infections in a community in eastern Terai, Nepal, to find out the prevalence of these virus infections. This report constitutes the first report of its kind from Nepal.

MATERIALS AND METHODS

Test sera : A total of 119 serum samples were collected from apparently healthy subjects residing

in the Itahari area of the Terai region in south-eastern Nepal. The serum samples were collected in September, 1987 and were stored at -70°C until used.

Serological test : Antibodies against VZV were measured by IAHA test (Gurshon *et al*, 1976) as modified for microtiter system (Baba *et al*, 1984). A complement fixation test (CFT) was used to measure antibodies against HSV and CMV (US Department of Health, Education, and Welfare, 1969). The antigens used were prepared from respective viral tissue culture fluids. Just before use, sera were heat inactivated keeping at 56°C for 30 minutes.

RESULTS

Prevalence rates of antibodies against HSV, VZV and CMV were studied in the serum samples collected from the subjects inhabiting the Terai region in southeastern Nepal. The results are shown in Table 1 and Fig 1, 2 and 3. The subjects were divided into 4 groups (1-4, 5-9, 10-14 and \geq 15 years). More than 80% subjects of all the groups showed antibodies to HSV, with the highest positive rate in the > 15 years old group. Only 25% subjects of 1-4 years old showed anti-VZV antibodies; the % positive increased with age and reached 80% in 10-14 years old group. All the subjects studied were found to possess antibodies to CMV, indicating that CMV infection is acquired during the very early stage of childhood.

Table 1

Antibody positive rates to HSV, VZV and CMV in different age groups.

Age	Positive (%)		
	HSV	VZV	CMV
1-4	80.0	25.0	100.0
5-9	94.4	64.7	100.0
10-14	80.9	81.8	100.0
15+	96.1	82.9	100.0

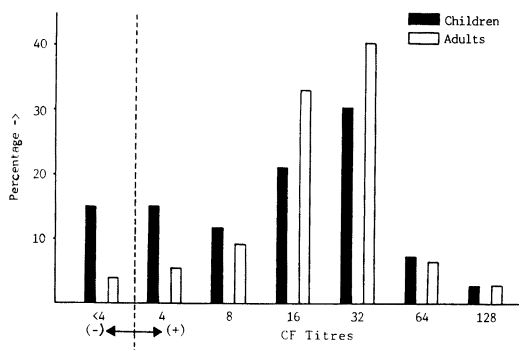


Fig 1—Titers of antibody of HSV as measured by CF test.

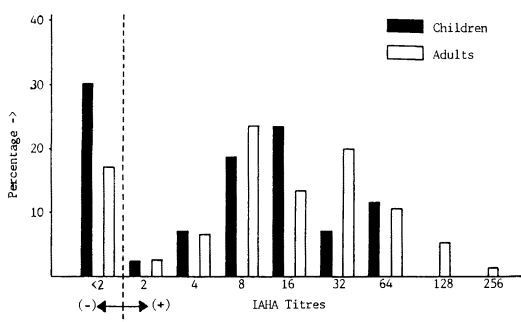


Fig 2—Titers of antibody of VZV as measured by IAHA test.

DISCUSSION

The herpes group of virus consists of more than 80 viruses that infect humans and a wide range

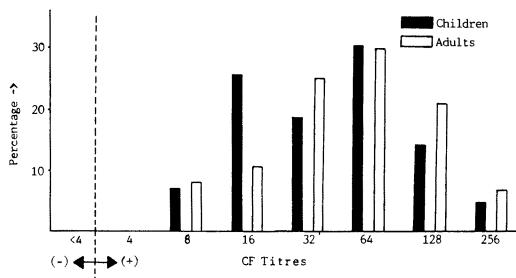


Fig 3—Titers of antibody of CMV as measured by CF test.

of animals, predominantly mammals. These viruses have the characteristic of undergoing latency in the infected host. HSV infections are virtually universal regardless of geography or race (Nahmias *et al*, 1984). More than 75% of the population over the age of 30 years has been reported to be seropositive (Duguid *et al*, 1978). In Nepal, anti-HSV antibodies have been demonstrated in 71% of selected adult populations (Rai *et al*, 1988). In the present study antibodies were observed in more than 80% of the study population. The highest positivity rate (96.1%) was found in the adult population (> 15 years) (Table 1). These findings reflect that infection is acquired in early childhood as the antibody was demonstrated in 80% of children of 1 to 4 years old.

Varicella-zoster is a common infection of childhood with a peak incidence in the winter season. The clinical disease is caused by reactivation of endogenous virus. The antibody response is reported to increase with age and by late middle age serological evidence of infection is virtually universal (Weller, 1983). A similar trend was observed in the present study (Table 1). Twenty-five percent sero-positivity found in the 1-4 years old group and increased rapidly with age reaching as high as 82.9% in the > 15 years old group. This was in contrast to the observation made for HSV infection where even the 1-4 years old group showed 80% sero-positivity.

CMV antibody has been reported to be present in 50 to 80% of adult populations (Duguid *et al*, 1978). In the present study, however, 100% sero-

positivity was observed in all the groups studied (Table 1). This finding clearly shows that the infection in the Nepalese community is acquired during early childhood (1-4 years old group). This could be attributed to poverty, overcrowding, perinatal infections and congenital infections. The effect of special factors in the Nepalese community, however, remains to be elucidated.

The present study showed that 100% of Nepalese children acquire CMV infection during early childhood. In the same age group HSV and VZV antibodies were found to be encountered by 80% and 25% of children, respectively. This could be influenced by modes of infections of viruses and various socio-economic factors. The present study was carried out only in the Terai (plain) area with a relatively small sample size. Therefore, a large scale study covering all terrains needs to be conducted in future to ascertain the prevalence of these common viral infections.

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