

A PILOT SEROEPIDEMIOLOGICAL STUDY OF CYTOMEGALOVIRUS INFECTION IN WOMEN OF CHILD BEARING AGE

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Abstract

Three hundred and forty serum samples collected from women of child bearing age, without any clinical evidence of cytomegalovirus (CMV) infection, were screened for the presence of IgG antibodies against CMV by ELISA test. The IgG antibodies were detected in 297 which gave prevalence rate of 87.4%. Significantly higher prevalence rates ($p < 0.001$) were observed with increasing age and with increase in parity. There was significant difference in the antibody prevalence in different socioeconomic groups. Seroprevalence rate was also found to be more in women from rural area than those from urban area, although the difference was statistically not significant ($p > 0.05$). Marital status showed no impact upon the seroprevalence of IgG antibodies in women.

Key words: *Cytomegalovirus, seroprevalence, IgG*

Cytomegalovirus, an ubiquitous agent, is one of the important causes of intrauterine infections. The infection is usually asymptomatic in adults but its significance is many times increased when it occurs during pregnancy.¹ It is endemic throughout the world affecting most of the population where the seroprevalence of CMV IgG antibodies varies greatly with a variety of epidemiological factors such as age, geographical distribution, socioeconomic status, marital status and parity.¹⁻⁹ However, most of the reported epidemiological information from northern India is related to the effects of age and socioeconomic status.^{1,3,6} The present study was therefore undertaken to determine the prevalence of CMV IgG antibodies and the various factors affecting it in the women of child bearing age group of Amritsar.

Materials and Methods

A total of three hundred and forty women of child bearing age of district Amritsar were included in the present study using the convenient sampling approach. These women belonged to different geographical areas (rural/urban) and to different socioeconomic classes (upper, middle and lower) based upon Kuppuswamy socioeconomic status criteria). The marital status and parity of married women were also recorded. Institutional review board clearance was obtained and the patient's consent was taken before including in the study.

Blood samples were collected from all women, serum was separated and stored at 4°C until tested. IgG

antibodies against CMV were detected by following the manufacturer's instruction of Pathozyme CMV IgG ELISA Kit (Omega Diagnostics). The results were interpreted as seropositive if the antibody titre was more than 11 IU/mL and seronegative if less than 9 IU/mL. Samples with titre between 9-11 IU/mL were considered equivocal and were retested after two weeks. Statistical analysis was performed by using chi-square test and Z test.

Results

Of the 340 women of child bearing age (16-42 years) included in the study, 182 (53.5%) were from the rural area and 158 (46.5%) from the urban area. Majority 145 (42.7%) of them were from lower socioeconomic class and only 66 (19.4%) belonged to upper class of socioeconomic status. Of these, 310 (91.2%) were married and 30 (8.8%) were unmarried. Amongst the married women 50 (16.1%) were of parity ≥ 3 , 173 (55.8%) of parity 1-2 while 87 (28.1%) were nulliparous.

CMV IgG seropositivity in women of child bearing age was found to be 87.4% (297/340). There was an increasing trend in seropositivity from 79.6% in 16-25 years of age group to the maximum incidence of 98% in age group 36-42 years and the difference was found to be statistically significant (Table).

A decline in seropositivity with rising socioeconomic status was also observed and the difference between the upper class and lower class was statistically highly significant ($p < 0.001$). Prevalence rate was found to be more in women residing in rural area (91.2%) as compared to those of urban area (82.9%). However, statistically the difference was insignificant (Table).

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Table: Comparison of CMV IgG to various parameters in women

Parameter	No. of women tested	No.(%)of women positive	p value*	OR
Age group (Years)				
16-25	172	137 (79.7)		
26-35	119	112 (94.1)		
36-42	49	48 (98)	<0.001	0.08
Socioeconomic status				
Upper	66	42 (63.4)		
Middle	129	115 (89.2)		
Lower	145	140 (96.6)	<0.001	0.06
Geographical area				
Urban	158	131 (82.9)		
Rural	182	166 (91.2)	>0.05	
Marital status				
Unmarried	30	26 (86.7)		
Married	310	271 (87.4)		
Parity				
P ₀	87	58 (66.7)		
P1-P2	173	161 (93.1)		
>=P3	50	48 (96.)	<0.001	0.08

Figures in parenthesis represent percentages.

*Compared to the first mentioned characteristics in each group

Significant <0.05

Considering the marital status, seropositivity did not show much difference between the married (87.4%) and unmarried (86.7%) women. Among the married women gradual increase in seropositivity was observed with increasing parity. In nulliparous women it was 66.7% as compared to 96% in women of parity ≥ 3 and the difference was statistically significant.

Odds ratio analysis revealed that age, socioeconomic status and parity had no impact on the prevalence of CMV IgG antibodies.

Discussion

The prevalence of CMV antibodies during child bearing age varies greatly in different population groups. Lower prevalence rate of CMV IgG antibodies (40-80%) has been reported from developed countries, and higher rate (90 – 100%) from developing countries, depending upon the variability of accessibility of virus and its circulation rate in the community.¹⁰ In India, the reported

figures vary between 80 to 90% and the prevalence rate (87.4%) of our study falls within this range.^{1,11,12}

Age is one of the factors affecting the prevalence of CMV IgG antibodies in a community. In our study stepwise rise in seropositivity was observed with increasing age, reaching to maximum of 98% in age group 36-42 years (Table). These findings are in accordance with other studies from India and abroad.^{1,3,8,9}

In our study, statistically significant difference in prevalence rates was observed between the lower and upper socioeconomic classes. IgG antibody levels were also found to be higher in women of rural background as compared to the women residents of urban area. Adverse living conditions, poor hygiene and closeness of contact in women of lower socioeconomic class and rural area increases the probability of contracting the infection. Similar observations have been reported from other studies.^{4,7}

Seropositivity rates of married and unmarried women showed that the marital status had no influence upon the prevalence of antibodies to CMV. However, in married women, statistically significant difference in prevalence rate was observed between women of parity ≥ 3 and nulliparous women which indicates child to mother transmission of CMV infection. Other studies have also suggested similar effect of parity on the seroprevalence of CMV antibodies and role of child to mother transmission.^{8,9}

The present study shows that CMV infection is widespread among the women of child bearing age group of Amritsar. Significant association of the various epidemiological factors (age, socioeconomic status and parity) with CMV suggests also revealed that women of child bearing age are more exposed to this infection. As no effective treatment and vaccine against the CMV is available, more emphasis should be laid upon educating women (to maintain good hygiene, limited contact with infected children and responsible sexual practices) and their prospective screening to reduce the foeto maternal transmission.

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