Sero-Epidemiological Survey Of Human Cytomegalo Virus Infection Among Expectant Mothers In Bida, Nigeria

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Citation

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Abstract

Human cytomegalovirus (HCMV) is a major public health problem throughout the world. Serological surveys have shown HCMV infection in virtually every population that have been tested. HCMV is a known cause of congenital defects in babies of infected mothers. This work was aimed at determining the seroprevalence of HCMV among pregnant women. The prevalence of HCMV infections among two hundred and fifty three (253) pregnant women attending ante-natal clinic at the Federal Medical Centre, Bida between the months of November, 2004 and January, 2005 was studied. Serological screening for HCMV antibodies was done using Immunocomb® 11 IgG and ImmunoLISA TM CMV IgG. Two hundred and thirteen (213) (84.2%) were positive. Prevalence of HCMV was higher among multigravid women (86.1%) than primigravid women (77.1%). More of the pregnant women who are non-health workers (84.6%) had CMV antibodies in their sera than health workers (25.0%). There was a significant association in HCMV seroprevalence ($p<.05$) between health workers and non – health workers. The prevalence of HCMV was highest (87.5%) among the Teenage pregnant (TP) women. There were higher seroprevalence of HCMV in second trimester (ST) (86.2%) than the first trimester (FT) (81.4%) and third trimester (TT) (75.9%). It is concluded that there is high seroprevalence of HCMV among pregnant women investigated. It is hereby advocated that relevant vaccines should be made available to protect women of child bearing age and pregnant women.

INTRODUCTION

Cytomegalovirus (CMV) was first described in 1881 when large cytoplasmic inclusion (protozoan-like cells) were seen in the kidney of a still-born infant. The term cytomegalia was introduced in 1921, but the viral aetiology of the disease was confirmed in 1926. CMV is the leading cause of congenital viral infection in developed countries, occurring with a stable incidence of 0.4 to 2.2% of all live births [1].

Human cytomegalovirus is an enveloped double-stranded DNA virus [1,2]., a potential killer or a life long silent companion. It is the most common congenital virus in the world [3]. Both primary and recurrent infections can result in foetal infection. The signs of the disease include encephalitis, deafness, haematological disorders, neurological abnormalities, hepatomegaly, splenomegaly, Jaundice, periventricular calcification, choriorentinitis and death [3,4,5,6,7]. Congenital CMV infection is described in 30,000 to 40,000 newborns each year in United States. Approximately 9,000 of these children have developed permanent neurological sequelae. The death rate of symptomatic congenital human CMV infection is placed at approximately 30% [3]. The screening of newborn infants has been recommended to help in identifying infants at high risk. Seroprevalence of CMV has been documented in many countries including Finland [8,9,10,11]. This work was aimed at determining the seroprevalence of HCMV among pregnant women with the objective of creating awareness for its prevention among high risk group in Nigeria.

MATERIALS AND METHODS

STUDY POPULATION

A total of 253 pregnant women at the antenatal clinic of Federal Medical Centre Bida, Niger State,Nigeria, between the months of November, 2004 and January, 2005 were considered.

STUDY DESIGN

Pregnant women in this study were classified according to the following demographic data.

AGE

The pregnant women were classified into age group as described by [12,13,14] . Teenage pregnancy (13 – 19 years), adult pregnancy (20 – 34 years) and elderly pregnancy (> 35 years).

GESTATIONAL AGE

We classified gestational age into first trimester (0-14 weeks) second trimester, (15 – 28 weeks), and third trimester (29 – 42 weeks), [14] .

GRAVIDITY

These pregnant women were further categorized into primigravid if they were carrying pregnancy for the first time and multigravid if they had carried more than one pregnancy [13,14] .

ETHICAL CONSIDERATIONS

This work was granted ethical clearance by the Ethical committee, Federal Medical Centre, Bida.

COLLECTION OF SPECIMEN

From each study participant, 5ml of blood was aseptically collected by vein puncture into a plain sterile container. Sera were separated after centrifugation for 10 minutes. Sera samples that were not tested immediately were stored frozen at -20°C until required.

ANALYSIS OF SPECIMEN

Sera samples were screened for the presence of CMV antibodies by Enzyme Immuno Assay using Immuno Comb ® 11 IgG and Enzyme Linked Immunosorbent Assay (ELISA) using ImmunoLisa ™ CmvlgG (Orgenics, Yavne 70650, Isreal.hhtp://www.orgenics.com)

The automatic washing and Spectrophotometry were carried out using STATFAX 2600 and STATFAX 2100 ELISA Reader at 450nm and 630nm wave lengths respectively.

DATA MANAGEMENT

Laboratory results were entered and managed using Microsoft Excel (windows 2003, Duxbury press). Descriptive statistical analysis was done using the Kruskal-Wallis test for the comparison of the results.

RESULTS

Out of the 253 blood sample collected, 213 (84.2%) were positive for CMV antibodies. The age bracket 21-25years had the highest prevalence of 79(31.2%) reactivity to HCMV followed by the 26 – 30 years age group which showed a prevalence of 58 (22.9%) (Table 1).

Distribution of HCMV infection in relation to gravidity, Multigravidae were more often infected, (86.1%) than primigravidae (77,1%).

Non-health workers have shown a higher prevalence (84.6%) of HCMV antibodies in their sera as compared to health workers (25.0%) in (Table 2).

Table 3, depicts the distribution of HCMV antibodies in pregnant women according to age. Teenage pregnant women were more infected (87.5%), followed by elderly pregnant women (84.2%) and adult pregnant women (83.5%).

The prevalence of HCMV infection in pregnant women in relation to gestational age is shown in (Table 4). Pregnant women in their second trimester showed the highest seroprevalence (86.2%) of HCMV antibodies followed by third trimester category of 75.9%.

Figure 1

Table 1: Distribution of HCMV infection by age groups (years)

Age group (years)	HCMV Status		
	Positive (%)	Negative(%)	Total
15 – 20	44(17.4)	10 (4.0)	54(21.4)
21 – 25	79(31.2)	16(6.3)	95(37.5)
26 – 30	58(22.9)	8(3.2)	66(26.1)
31 – 35	21(8.3)	4(1.6)	25(9.9)
36 – 40	10(4.0)	2(0.8)	12(4.8)
41 – 45	1(0.4)	-	1(0.4)
Total	213(84.2)	40(15.9)	253(100)

Figure 2

Table 2: Distribution of HCMV antibodies among health and non health workers

Occupation		HCMV Status		
		Positive	Negative	Total
Health Worker	Count	1	3	4
	% within occupation	25.0	75.0	100
Non-Health worker	Count	203	37	240
	% within occupation	84.6	15.4	100
Total	Count	204	40	244
	% within occupation	83.6	16.4	100

Figure 3

Table 3: Age variations of HCMV antibodies among patients screened

Age Group			HCMV Status		
			Positive	Negative	Total
	Teenage	Count	14	2	16
		% within Age group	87.5	12.5	100
	Adult	Count	66	13	79
		% within Age group	83.5	16.5	100
	Elderly	Count	133	25	158
		% within Age group	84.2	15.8	100
	Total	Count	213	40	253
		% within Age group	84.2	15.8	100

Figure 4

Table 4: Prevalence of HCMV antibodies in relation to gestational age

			HCMV Status		
			Positive	Negative	Total
Gestational Age in Weeks	FT	Count	35	8	43
		% within Gestational Age in weeks	81.4	18.6	100.0
	ST	Count	156	25	181
		% within Gestational Age in weeks	86.2	13.8	100
	TT	Count	22	7	29
		% within Gestational Age in weeks	84.2	15.2	100
Total		Count	213	40	253
		% within Gestational Age in weeks	84.2	15.8	100

FT- First trimester
ST- Second trimester
TT- Third trimester

DISCUSSION

The prevalence of CMV antibodies among women varies with geographical location, socio – economic status and occupation [1] . One of the most important aspect of the epidemiology of the virus is its extreme high prevalence in both developed [15] , and developing countries [11] .

This study showed a seroprevalence of 84.2% among pregnant women in Bida, Nigeria. This is on the high side compared to previous reports of 70.7% and 77.5% prevalence in Finland and Japan [8,9] and lower than the work done by [10,11] with prevalence of 91.05% and 96.0% in India and Egypt respectively. Racial difference between the populations, enormous cultural and economic difference between developed countries (where the study was previously carried out) and developing countries like Nigeria (Bida) are valid factors that might be responsible for this occurrence as also reported by [13,14] . From the results obtained in this study, the prevalence of CMV is high between ages group 21 – 30 years when compared to other age groups. This trend could be attributed to the fact that age group 21 – 30 years represents active and the sexually – matured youths with the tendency toward sexual promiscuity and its resultant likelihood of high infection rates [16] .

Seroprevalence of primigravidae and multigravidae subjects might be due to anticipated increase in sexual activity as a result of longer periods of marriage among the multigravidae than in most primigravidae. Further more multiple sexual partnership could be responsible for this trend. This could be supported by previous studies where sexually transmitted infection shown to be higher among promiscuous people having sexually transmitted diseases [2,13] .

There was an increase in HCMV seroprevalence with gestational age from first trimester to second trimester in third trimester which could be due to recovery of depressed immunity.

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