High seropositivity of IgG and IgM antibodies against cytomegalovirus (CMV) among HIV-1 seropositive patients in Ilorin, Nigeria

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Abstract

Background: Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) is a major public health problem in sub-Saharan Africa. Cytomegalovirus (CMV) has been reported to enhance HIV replication and accelerate the progression of HIV infection to AIDS.

Objective: This study reports on the high seropositivity of immunoglobulin (Ig) G and M antibodies against CMV and the risk factors for CMV infection among HIV/AIDS patients in Ilorin, Nigeria.

Method: A total of 180 consented HIV-1 seropositive patients (age-range 16-56 years; 108 females and 72 males) were consecutively recruited. Socio-demographic/behavioral data and 5 ml blood samples were collected from each patient. Plasma of each sample was assayed for anti-CMV IgG/IgM using a CMV IgG and IgM Enzyme Linked ImmunoSorbent Assay (ELISA) kit.

Results: Twenty (11.1%) of the 180 HIV-1 seropositive subjects were positive for anti-CMV IgM antibody while 169 (93.9%) were positive for anti-CMV IgG antibody. Age, marital status, number of sexual partners, CD4 cells counts and previous history of blood transfusion were the main correlates of CMV seropositivity among these patients. However, occupation, sex, highly active antiretroviral therapy (HAART) were not statistically associated with CMV seropositivity in this study.

Conclusion: This study has shown that greater percentages of HIV-1 seropositive patients had active CMV infection. It has further shown that CMV is hyperendemic in HIV-1 seropositive patients in Ilorin, Nigeria.

Keywords: CD4, CMV, HIV/AIDS, IgG, IgM, Risk factors, HAART

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Introduction

Human cytomegalovirus (HCMV) is a ubiquitous agent that can cause infection at any time during the course of life and commonly infects individuals from diverse geographical and socio-economic backgrounds. By serology, 30% to 100% of the general population exhibit prior exposure to the virus. The virus often causes asymptomatic infection in healthy persons; when symptomatic, HCMV infection presents with three recognizable clinical syndromes. HCMV is also a virus most frequently transmitted to developing foetus, causing birth defects in new born and immune defect in later life and increase morbidity and mortality. About 2.0% of pregnant women have either a primary or a restricted HCMV infection during pregnancy and it is estimated that 10-20% of congenitally infected newborns show evidence of the infection.

Infections by HCMV continue to be an important health problem in certain patient populations, such as newborns, recipients of solid organs or bone marrow and AIDS patients. In these groups, HCMV is a major cause of morbidity and mortality. In various parts of the world, the prevalence of HCMV ranges from 40-100%. The risk of exposure to HCMV increases with age. As with other herpes viruses, HCMV remains latent in the infected host throughout life and rarely reactivates to cause clinical illness except in immunocompromised individuals.

HCMV infection is more prevalent in populations at...
risk for HIV infection; approximately 75% of injection
drug users and >90% of homosexual men who are
infected with HIV have detectable IgG antibodies
to CMV [10]. HCMV infection is nearly ubiquitous in
HIV-infected subjects and may lead to CMV end-organ
disease (EOD) and death as a consequence of the im-
paired immunity [23,24].

Prior to the introduction of combination antiretroviral
therapy, HCMV EOD was common in advanced HIV
infection, typically occurring with CD4 cell count of
<100 cells/mm³ [20]. The detection of virus-specific
IgG and IgM antibodies is of great value in the diagno-
sis of acute/primary virus infections or reactivation of
a latent one, in the absence of typical clinical symptoms.

This study aims to determine the prevalence of an-
ti-HCMV IgG and IgM antibodies in HIV positive
patients with and without past history of blood transfu-
sion. The findings from this work may help to develop
policy whether CMV screening should be routinely
done before transfusing HIV infected patients, or in a
case of high seroprevalence of CMV amongst the gen-
eral population, the use of leukoreduced blood units for
anaemic HIV infected patients, may be recommended,
since CMV is transmitted through the white blood cell.

Methods

Study area

This prospective study was carried out at the University
of Ilorin Teaching Hospital (UITH) Ilorin. The teaching
hospital provides healthcare services to the people of Kwara and neighboring States. UITH in con-
junction with the Institute of Human Virology of
Nigeria (IHVN) provides free health care services to
people living with HIV/AIDS in Ilorin and its environ-
ment.

Ethical consideration

A written consent was obtained from participants after
carefully explaining the concept of the study to them.
Ethical clearance was sought and obtained from the
ethical and research committee of the University of Il-
orin Teaching Hospital, Ilorin, Nigeria.

Experimental design

A total of 180 consented HIV seropositive patients at-
tending the HAART clinic of UITH, Ilorin were re-
cruited for this study. The demographic data of the
participants were entered into a structured question-
naire designed for the study. A serological survey was
done by collecting blood samples from all participants
for HCMV IgG and IgM. These samples were sent in
Gnostyle box with ice packs to preserve the cold chain
to the laboratory. Serum was extracted from each sam-
ple by centrifugation at 3000 rpm for 5 minutes using
ES5 centrifuge. All the sera obtained were stored frozen
at -20°C until analysis was done.

Blood collection and serological analysis

Five milliliters of blood was collected into sterile antic-
agulant-free bottle. Each sample was centrifuged after
the blood had clotted and serum separated into sterile
bottles on each collection day for storage at -20°C. All
specimens were screened for HCMV specific IgG and
IgM antibodies using IgM and IgG ELISA Kit manufac-
tured by DIA, PRO Diagnostic Bioprobex Srl Via Columea n031 20128 Milan – Italy. The tests were
done according to manufacturer’s instructions. The cut-
off of the device was set at 0.5 WHO IU/ml (Calibra-
tor 2) by the kit’s manufacturer. Samples with a concen-
tration higher than 0.5 WHO IU/ml were considered
positive for CMV IgG whilst samples with concentra-
tion below the cut-off were regarded as negative results.
All reactive samples were repeated in duplicate for IgM
tests and accepted as positive.

Sensitivity and specificity of the Elisa kits

The value, obtained from the analysis of more than 300
specimens, has been > 98% of sensitivity. An overall
value > 98% of specificity was found when examined
on more than 100 specimens.

Data analysis

Data was analyzed using Microsoft Excel 2007 version
to calculate the International Unit (IU) from Optical
Density (OD). Values below 0.5 were considered nega-
tive and values above 0.5 were considered positive. Sta-
tistical Package for Social Sciences (SPSS, version 19.0)
software was used to calculate descriptive statistics.

Results

Patients’ characteristics

Of a total of 180 consented HIV-1 seropositive patients
who participated in the study, 108 (60.0%) were females
while males were 72 (40.0%) in number giving a male
ratio of 1.3. Socio-demographic data of HIV-
1 seropositive patients tested for anti-CMV IgG/IgM anti-
odies are shown in Table 1 and 2. Behavioral data of
HIV-1 patients tested for anti-CMV IgG/IgM anti-
odies are shown in Table 3 and 4.

Distribution of anti-HCMV IgM antibody among
HIV-1 seropositive subjects

Twenty (11.1%) of the 180 HIV-1 seropositive patients
tested for anti-CMV IgM were positive for anti-CMV IgM
antibody while 169 (88.9%) were positive for anti-CMV IgG antibody (Table 1).

Table 1: Socio-demographic data and seropositive outcome of HIV-1 patients tested for anti-CMV
IgG/IgM antibodies

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. (%)</th>
<th>Positive (%)</th>
<th>Statistical Values</th>
<th>Positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-25</td>
<td>7(3.9)</td>
<td>1(1.43)</td>
<td>0.05</td>
<td>7(100.0)</td>
</tr>
<tr>
<td>26-35</td>
<td>74(41.1)</td>
<td>10(13.5)</td>
<td>0.05</td>
<td>74(95.9)</td>
</tr>
<tr>
<td>36-45</td>
<td>81(45.0)</td>
<td>8(9.9)</td>
<td>&lt;0.05</td>
<td>73(90.1)</td>
</tr>
<tr>
<td>46 and above</td>
<td>18(10.0)</td>
<td>1(5.6)</td>
<td>P&gt;0.05</td>
<td>18(100.0)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>108(60.0)</td>
<td>10(9.3)</td>
<td>P&gt;0.05</td>
<td>100(92.7)</td>
</tr>
<tr>
<td>Males</td>
<td>72(40.0)</td>
<td>10(13.9)</td>
<td>P&gt;0.05</td>
<td>62(85.7)</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>39(21.7)</td>
<td>4(10.3)</td>
<td>0.05</td>
<td>35(89.7)</td>
</tr>
<tr>
<td>Married</td>
<td>127(70.5)</td>
<td>14(11.0)</td>
<td>0.05</td>
<td>113(89.3)</td>
</tr>
<tr>
<td>Others</td>
<td>14(7.8)</td>
<td>1(7.1)</td>
<td>0.05</td>
<td>13(92.7)</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil servants</td>
<td>20(11.1)</td>
<td>1(5.0)</td>
<td>0.05</td>
<td>19(95.0)</td>
</tr>
<tr>
<td>Traders</td>
<td>100(55.6)</td>
<td>16(16.0)</td>
<td>0.05</td>
<td>100(100.0)</td>
</tr>
<tr>
<td>Farmers</td>
<td>10(5.5)</td>
<td>1(10.0)</td>
<td>0.05</td>
<td>9(90.0)</td>
</tr>
<tr>
<td>Others</td>
<td>30(16.7)</td>
<td>1(3.3)</td>
<td>0.05</td>
<td>29(96.7)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>20(11.1)</td>
<td>1(5.0)</td>
<td>0.05</td>
<td>19(95.0)</td>
</tr>
<tr>
<td>Total</td>
<td>180(100.0)</td>
<td>20(11.1)</td>
<td>0.05</td>
<td>169(95.9)</td>
</tr>
</tbody>
</table>

There was no significant difference (X2= 1.784, p-value=0.629) in the seropositive outcome of anti-CMV
IgM antibody among the various age groups tested (X2= 1.454, p-value=0.000) (Table 1). It showed that
the prevalence of anti-CMV IgM was higher in age
groups 16-25 years (14.3%), followed by age groups 26-
35 years (13.5%), 36-45 years (9.9%) and age group 46
years and above had the least prevalence (5.6%). In the
same vein, the prevalence of anti-CMV IgG was higher
in age groups 16-25 years (100.0%) and age group 46
years and above (100.0%), followed by age groups 26-
35 years (95.0%) and 36-45 years (90.1%) as shown in
Table 1.

Also from Table 1, it can be observed that there was no significant difference (X2 = 1.434, p-value =0.591)
in the seropositive outcome of anti-CMV IgG anti-
odies among the various age groups tested (X2= 1.454, p-value=0.000) (Table 1). The level of anti-
CMV IgM and IgG antibodies seropositivity among
the various marital groups was also statistically signi-
ficant (X2 = 1.306, p-value=0.002) (Table 1). The preva-
ience of anti-CMV IgG was higher in singles (12.8%)
than their married counterparts (11.0%) and others
(7.1%). In the same vein, the prevalence of anti-CMV
IgG was also higher in singles (97.4%) than their mar-
ried counterparts (92.9%) and others (92.7%) as shown
in Table 1.

The study shows no statistical association in the sero-
positivity outcome of anti-CMV IgM antibody among
the various age groups tested (Table 1). Also from
Table 1, it can be observed that there was no signifi-
cant difference (X2 = 1.434, p-value =0.591) in the seropositive outcome of anti-CMV IgG antibodies
to HIV-1 seropositive subjects (Table 1). The prevalence of anti-CMV IgM
antibodies among the various age groups tested (X2= 1.454, p-value=0.000) (Table 1). It showed that
the prevalence of anti-CMV IgM was higher in age
groups 16-25 years (14.3%), followed by age groups 26-
35 years (13.5%), 36-45 years (9.9%) and age group 46
years and above had the least prevalence (5.6%). In the
same vein, the prevalence of anti-CMV IgM was higher
in age groups 16-25 years (100.0%) and age group 46
years and above (100.0%), followed by age groups 26-
35 years (95.0%) and 36-45 years (90.1%) as shown in
Table 1.

The study shows no statistical association in the sero-
positivity outcome of anti-CMV IgM antibody among
the various age groups tested (Table 1). Also from
Table 1, it can be observed that there was no signifi-
cant difference (X2 = 1.434, p-value =0.591) in the seropositive outcome of anti-CMV IgG antibodies
was higher among traders (16.0%), followed by farmers (10.0%), civil servants (5.0%) and unemployed subjects (5.0%) while other occupations had the least prevalence of anti-CMV IgM (3.3%). In the same vein, the prevalence of anti-CMV IgG was higher among traders (100.0%) and farmers (100.0%), followed by other occupations (90.0%), civil servants (80.0%) and unemployed subjects (80.0%) as shown in Table 1.

Behavioral data and seropositivity outcomes of HIV-1 seropositive patients tested for anti-CMV IgG/IgM antibodies

Table 2 shows the behavioral data and seropositivity outcomes of HIV-1 seropositive patients tested for anti-CMV IgG/IgM antibodies. Our study also found significant difference (X²=24.25, p-value=0.000) in the seropositivity of anti-CMV IgM and IgG antibodies among those with single (8.5%) for IgM and 86.4% for IgG and multiple sexual partners (12.4% for IgM and 97.5% for IgG) as shown in Table 2. The study shows no significant difference (X²= 0.80, p-value=0.777) in the level of anti-CMV IgM and anti-CMV IgG antibodies among the HIV-1 seropositive patients on HAART (Table 2). The prevalence of anti-CMV IgM was higher among subjects who were not on HAART (54.4%) than those on HAART (45.0%). In the same vein, the prevalence of anti-CMV IgG was higher among subjects who were not on HAART (94.4%) than those on HAART (90.0%) as shown in Table 2. The results showed that of the 40 (22.2%) subjects with previous history of blood transfusion; 6(15.0%) were seropositive for anti-CMV IgM and 38(90.0%) for anti-CMV IgG antibody. While among those with no history, 14(10.0%) were positive for anti-CMV IgM and 131(93.6%) for anti-CMV IgG antibody. There was significant difference (X²= 1.412, p-value=0.000) in the level of anti-CMV IgM and anti-CMV IgG antibodies among the two groups (Table 2). The CD4 cell counts ranged from 17 - 321 cells/mm³. There was significant association (X²= 1.155, p-value=0.000) between CD4 cells count and seropositivity outcome of HIV-1 seropositive patients tested for anti-CMV IgM and anti-CMV IgG antibodies (Table 2).

Table: Behavioral data and seropositivity outcomes of HIV-1 patients tested for anti-CMV IgG/IgM antibodies

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. (%)</th>
<th>Positive anti-CMV IgM</th>
<th>Statistical Values</th>
<th>No. (%)</th>
<th>Positive anti-CMV IgG</th>
<th>Statistical Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual Partners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>59(32.8)</td>
<td>5 (8.5)</td>
<td>P&lt;0.05</td>
<td>51 (86.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple</td>
<td>121(67.2)</td>
<td>15(12.4)</td>
<td>P&lt;0.05</td>
<td>116(97.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On HAART</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>20(11.1)</td>
<td>9 (45.0)</td>
<td>P&lt;0.05</td>
<td>18 (90.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>160(88.9)</td>
<td>11(54.4)</td>
<td>P&lt;0.05</td>
<td>151(94.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood Transfusion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>40(22.2)</td>
<td>6(15.0)</td>
<td>P&lt;0.05</td>
<td>38(90.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>140(77.8)</td>
<td>14(10.0)</td>
<td>P&lt;0.05</td>
<td>131(93.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD4 count (Cells/mm³)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50</td>
<td>24(16.5)</td>
<td>2(8.3)</td>
<td>2(87.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-100</td>
<td>59(34.5)</td>
<td>8(13.6)</td>
<td>8(91.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>101-150</td>
<td>41(21.0)</td>
<td>4(9.8)</td>
<td>4(95.1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>151-200</td>
<td>16(8.0)</td>
<td>1(6.3)</td>
<td>1(62.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>201-250</td>
<td>8(4.0)</td>
<td>1(12.5)</td>
<td>1(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>251-300</td>
<td>16(8.0)</td>
<td>3(18.8)</td>
<td>3(100)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>&gt;300</td>
<td>16(8.0)</td>
<td>1(6.3)</td>
<td>P&lt;0.05</td>
<td>16(100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>180(100.0)</td>
<td>20(11.1)</td>
<td>P&lt;0.05</td>
<td>169(93.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Cytomegalovirus (CMV) is a very frequent infection complicating AIDS. Sexual transmission appears to be the most common route of infection in adults, though CMV can also be spread through otorhinolaryngial secretions, urine, breast milk, and blood.11-13 CMV-specific antibody of the IgM class is a marker of active or recent primary infection with the virus. Post-transfusion CMV infection correlates positively with the receipt of blood from CMV IgM-positive donors.14 A decreased incidence of Transfusion-associated CMV infection was reported when only blood products negative for CMV IgM were used.15 Most patients with AIDS who develop clinical signs and symptoms of CMV infection probably have reactivation of previous infection rather than primary infection.15-21 The prevalence of HIV/AIDS in Sub Saharan Africa is high but the description of CMV infection as opportunistic infection amongst patients is scanty.15

The aims of this study were to determine the prevalence of CMV infection in HIV positive patients with and without past history of blood transfusion and compare our findings with those of other studies. The study reports that 11.1% of the HIV-1 seropositive patients tested were anti-CMV IgM seropositive and 93.9% were positive for anti-CMV IgG antibody.

This finding is in consonance with what has been previously reported. Akinsola et al.16 reported few cases of CMV retinitis in HIV infected Nigerians. The HIV patients who developed symptomatic CMV infection may have had the infection for a long time; immunosuppression by HIV makes the virus to become pathogenic.17 The higher the prevalence of CMV in the general population, the higher should be the prevalence of CMV infection in the population of HIV infected patients.15

The 93.9% reported for anti-CMV IgG antibody seropositivity in this study is comparable to the values reported in previous studies in Nigeria and outside. The seroprevalence of CMV IgG of 96.0% was reported by Akinshami et al. in Lagos, Nigeria. Okewo et al.18 reported a seroprevalence of 84.2% among pregnant women. Similar seroprevalence rates of 90.0 - 100.0% were also found in India.19-28 The high seroprevalence in Nigeria and India contrasts with Western literature, in which seroprevalence ranges from 38.0% to 75.0%. A seroprevalence of 40.0% was found in highly industrialized nations.1 Yaru et al.1 reported a 97.3% and 1.0% seropositivity for anti-CMV IgG and anti-CMV IgM antibodies respectively in Northern Turkey.

The seroprevalence of CMV IgG of 100.0% among healthy blood donors was also found in the study of Kneib et al.20 done at Ibadan, Nigeria in 1973. A high seroprevalence of between 90 -100% was also found in India amongst immunocompetent subjects in various studies.21-23 Atal and Ramanchandiram23 found 95.0% seroprevalence of CMV IgG amongst blood donors. A study by Pal et al.24 in 1972 showed 100.0% seropositivity for CMV IgG in a population of immunocompetent adults. Madhavan et al.25 in 1974 showed that 84-96% of immunocompetent adults had the antibody.

The study showed that the seropositivity of anti-CMV IgG and anti-CMV IgM antibodies were age dependent. The positivity for anti-CMV IgG and anti-CMV IgM antibodies was not found to be the same in all age groups. The age-related distribution of anti-CMV–specific IgM antibodies among the HIV-1 seropositive subjects showed a significant difference in the levels of anti-CMV IgG and anti-CMV IgM antibodies among the various age groups tested (p=0.000). This is also in keeping with the findings of previous studies. CMV infections occurs worldwide, about four out of five people over age 35 have been infected with cytomegalovirus, usually during childhood or adulthood.26 In most of these people, the disease is so mild that it is overlooked.27

In line with a study by Dollard28, seroprevalence was also found to be age-dependent. Dollard28 reported 58.7% of individuals aged 80 and older were positive to CMV. Pal et al.18 in Chandigarh, India, showed 100.0% seropositivity for CMV in the population aged >20 years, while Madhavan et al.25 in Pondicherry showed that 84.0 – 96.0% of adults had the antibody. According to Abu-Madi et al.,29 most of the children and adolescents in Qatar, Arabian Gulf, appear to have been exposed to CMV with seroprevalences of 79.0% in the 2 to 10-year and 91.0% in the 11 to 20-year age groups.30 Kasim et al.31 reported that 91.0% of 33 mothers were seropositive for CMV compared to 33.0% of their infants.31

Our study showed that the prevalence of anti-CMV IgG and IgM antibodies was not sex dependent. The seropositivity for anti-CMV IgG and IgM antibodies was found to be the same in both males and females.
Though, there was no significant difference (p=0.591) in the level of anti-CMV IgG and IgM antibodies among the subjects, sex-related distribution of CMV IgM among the HIV-1 seropositive subjects showed that of the 108 females tested, 10(9.3%) were anti-CMV IgM positive and 10(13.9%) of the 72 males tested were anti-CMV IgM positive. Also from Table 1, it can be observed that of the 108 females tested, 100(92.6%) were anti-CMV IgG positive and 69 (95.8%) males were positive for anti-CMV IgG. Existing evidence suggests that the concentrations of IgG immunoglobulin in maternal and cord sera are essentially the same 27.

In this study, a sero-prevalence of 92.6% for CMV IgG and 9.3% for CMV IgM was observed in females. This is a deviation from what was reported by earlier workers in Nigeria and outside Nigeria 17,27-30. In Brazil, 94.7% prevalence rate was reported among females 28. In Gambia, 14.0% of 178 Gambian babies were congenitally infected despite the fact that 87.0% of their mothers were antibody positive to CMV 29. At the time of delivery 96.0% of the 150 Egyptian mothers and their newborns were CMV-IgG seropositive 30. This study has shown that those females with CMV IgG antibodies can efficiently transferred the antibodies to their developing foetus, if pregnant. This may be due to the fact that IgG antibody is unique among the major immunoglobulin classes for its active transfer across maternal placenta 25,31.

Transmission of CMV is sexual 19. Among the 59 (32.8%) HIV-1 seropositive individuals with single sexual partners, 5(8.5%) were anti-CMV IgM seropositive and 51 (86.4%) were anti-CMV IgG seropositive. Of the 121 (67.2%) HIV-1 seropositive individuals with multiple sexual partners, 15 (12.4%) were CMV IgM seropositive and 118 (97.5%) were anti-CMV IgG seropositive. The study statistical association in the seropositivity outcome of anti-CMV IgM and anti-CMV IgG antibodies and the number of sexual partners.

This study also determines the immune status of HIV-1 seropositive patients to CMV in Ilorin. In the studied population, 88.9% of the HIV seropositive patients and 97.4% of the HIV negative controls were immune to CMV. The implication of these findings is that individuals seronegative for CMV are susceptible to CMV primary infections 31. The CD4 cell counts related distribution of CMV IgM and IgG antibodies among the re-

The delivery of 96.0% of the 150 Egyptian mothers and their newborns were CMV-IgG seropositive. Also from Table 1, it can be seen that majority, 8 (13.6%) out of the 20 CMV IgM sero-positive individuals had CD4 cell counts which ranged from 51-100 cells/mm3 while 2 (8.3%) had CD4 cell counts of < 50 cells/mm3.

The distribution of anti-CMV IgM and anti-CMV IgG in relation to marital status showed statistical association (X2= 1.155, p-value=0.0000) between CD4 cells count and CMV IgM seropositivity. It showed that their CD4 cell counts ranged from 17 - 321 cells/mm3. Majority, 69 (34.5%) had CD4 cell counts which ranged from 201-250 cells/mm3 while the minority had CD4 cell counts which ranged from 201-250 cells/mm3. From Table 2, it can be seen that majority, 8 (13.6%) out of the 20 CMV IgM sero-positive individuals had CD4 cell counts which ranged from 51-100 cells/mm3 while 2 (8.3%) had CD4 cell counts of < 50 cells/mm3.

Transmission of CMV is sexual 19. Among the 59 (32.8%) HIV-1 seropositive individuals with single sexual partners, 5(8.5%) were anti-CMV IgM seropositive and 51 (86.4%) were anti-CMV IgG seropositive. Of the 121 (67.2%) HIV-1 seropositive individuals with multiple sexual partners, 15 (12.4%) were CMV IgM seropositive and 118 (97.5%) were anti-CMV IgG seropositive. The study statistical association in the seropositivity outcome of anti-CMV IgM and anti-CMV IgG antibodies and the number of sexual partners.

This study also determines the immune status of HIV-1 seropositive patients to CMV in Ilorin. In the studied population, 88.9% of the HIV seropositive patients and 97.4% of the HIV negative controls were immune to CMV. The implication of these findings is that individuals seronegative for CMV are susceptible to CMV primary infections 31. The CD4 cell counts related distribution of CMV IgM and IgG antibodies among the re-

The results showed that of the 40 (22.2%) subjects with previous history of blood transfusion; 6(15.0%) were seropositive for anti-CMV IgM and 38(900.0%) for anti-CMV IgG antibody. While among those with no history; 14(10.0%) were positive for anti-CMV IgM and 31(93.0%) for anti-CMV IgG antibody. This finding is in variance with the work of Tolpin and Stewart 18 in 1985 that provided the first biochemical and molecular evidence for transfusion associated-CMV infection. Like-

lihood of transfusion in HIV infected patient is found to be at least three times higher when compared with transfusion in all other patients in the medical wards. 35. Thus, predisposing them further to the risk of acquiring CMV infection through blood transfusion 34. Although, some authorities are of the opinion that the assertion claiming the individuals with IgM anti-CMV are more likely to transmit the virus than those with IgG anti-CMV is not proven beyond doubts 31. Lambert et al. 36 found that a decreased incidence of transfusion-associated –CMV (TA-CMV) infection occurred when only blood products negative for CMV IgM were used. Furthermore, the seropositivity of CMV varies widely in the world. A number of studies reveal a CMV sero-prevalence of 56.3% in Finnish pregnant women 32, 78.0% in Russian pregnant women 33, 87.5% in pregnant 34, and 87.7% in pregnant women from Beirut, Lebanon 35. Gratacap-Cavallier et al. 36 found that CMV seroprevalence was significant-

ly higher in women born in southern France (51.6%) than in those born in northern France (37.4%) 19. The prevalence of anti-CMV IgG antibody reported in this study was also found similar to that of other studies reported in Turkey and other developing countries. CMV seroprevalence was reported to be 84.3% from Afyon, Turkey22, 92.6% from Ankara, Turkey 22, 92.6% from Aydın, Turkey 22, 94.9% from Antalya, Turkey 22, and 97.3% from Hatay, Turkey 22.

The detection of virus-specific IgG and IgM antibodies is of great value in the diagnosis of acute/primary virus infections or reactivation of a latent one, in the absence of typical clinical symptoms. Asymptomatic infections usually happen for CMV in apparently healthy individu-

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Conclusion

This study has shown that greater percentages of HIV-1 seropositive patients had active CMV infection. It has further shown that CMV is hyperendemic in HIV-1 seropositive patients in Ilorin, Nigeria. Unfortunately, vaccines for CMV have not yet been developed 37. Preventive measures must be taken to decrease the mortality and morbidity related to CMV infections 31. There is therefore need to routinely screen blood donors and pregnant women for evidence of CMV infection during their transfusion and antenatal visits respectively.

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