Seroprevalence of Cytomegalovirus Antibodies in Pregnant Women, Benue State, Nigeria

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Received date: September 7, 2015; Accepted date: October 2, 2015; Published date: October 10, 2015

Keywords: Cytomegalovirus; CMV IgG Antibodies; CMV IgM Antibodies; Benue state; Nigeria

Introduction

Human CMV is an enveloped DNA virus and a member of the herpes family that belongs to a group of vertically transmitted infections known as TORCH – Toxoplasmosis, Rubella, Cytomegalovirus and Herpes Simplex. The virus is ubiquitous and the infection it causes is generally asymptomatic. It is a leading cause of congenital viral infections. Although the infection has been detected in Nigerian neonates, its awareness is limited particularly in a growing metropolitan city like Makurdi, Nigeria. In this study, the prevalence of CMV antibodies and their association with some socio-demographic factors in pregnant women was evaluated. Pregnant women (N=375; age range=15 to 50 years) attending ante-natal clinic in different hospitals in Makurdi were screened for the infection. Five-mI Venous blood was collected from each participant for serological studies, and a structured questionnaire was used to obtain socio-demographic data. Serum samples were assayed using enzyme-linked immunosorbent assay (ELISA) technique. The overall prevalence of anti-CMV IgG-antibodies was 93.3% (n=350) and was 3.5% (n=13) for anti-CMV IgM-antibodies. The prevalence of anti-CMV IgG and IgM antibodies was significantly associated with gravidity (P=0.012; P=0.001), while prevalence of anti-CMV IgM only was associated with marital status (P=0.035). The prevalence of anti-CMV IgG antibodies was highest (100%) in older pregnant women aged 41-50 years, but was lowest (85.0%) in younger ones aged 15-20 years. Risk factors for the disease such as history of blood transfusion, scarification, and multiple sexual partners were important, even though not statistically significant (P>0.05). Women of child-bearing age in the growing metropolitan city of Makurdi, Nigeria need to be educated on precautionary measures that will prevent cytomegalovirus infection.

Materials and Methods

Study area

Makurdi is the capital of Benue State, in the middle-belt region of Nigeria. It is located on latitude 7°43′32″ N and longitude 8°33′51″ E, and has a population between 250,000 and 500,000. Temperature ranges between 23°C and 35°C depending on the time of the year. Farming is the main occupation of the inhabitants; other professions include civil service, business, and petty trading.
Study population

Cross-sectional data were collected from 375 pregnant women (age range, 15 to 50 years) attending ante-natal clinic at the Federal Medical Centre, Makurdi (a referral health-care facility) and Madonna Hospital, Makurdi (primary health-care facility).

Sampling technique

Consecutive sampling technique was employed in this study. This is a non-probability sampling technique which involves taking every subject who meets the selection criteria over a specified time interval.

Ethical consideration

Ethical approval was obtained from the Research Ethics Committee of Federal Medical Centre Makurdi. Permission for the study was sought from Head of Medical Microbiology Laboratory. Written informed consent was obtained from all participants after detailed explanation of nature and objectives of the study was given to them in English and local languages. The study was at no cost to the study was at no cost to the participants, while the option to opt out of the study at any time was left open to them without any prejudice.

Inclusion criterion: Consenting pregnant women aged 15-50 years.

Exclusion criterion: Non-consenting pregnant women.

Statistical analysis

Data were analysed using SPSS version 19 (2010). Pearson chi-square test was used to determine associations between seroprevalence and the socio-demographic variables. Significance was set at 0.05 level.

Results

The seroprevalence of CMV specific IgG and IgM antibodies for the 375 women enrolled in this study were 93.3% (350/375) for IgG seropositivity (IgG+) and 3.5% (13/375) for IgM (IgM+) seropositivity. As shown in Table 1, 3.5% of the pregnant women who were IgG+/IgM+ were classified as having primary CMV infection, 89% who were IgG+/IgM- as having previous exposure of the infection, and 6.7% who were IgG-/IgM+ were classified as susceptible. None of the study population was IgG-/IgM- indicating that none of them (0%) had recent primary infection.
IgM seroprevalence (P>0.05). CMV seroprevalence (for both IgG and IgM antibodies) was higher in multiparous pregnant women than in those who had never been pregnant. Nonetheless, seroprevalence increased with increase in number of earlier pregnancies. In the same way, gestational age was not associated with marital status of the pregnant women (Table 3). On the other hand, seroprevalence of anti-CMV IgG antibodies was not significantly associated with number of times miscarriage occurred. As shown in Table 2, seroprevalence increased from 85.0% in the youngest age group to 100.0% in the oldest age group for IgG, but these differences in seroprevalence according to age group were not statistically significant. A similar result was obtained for anti-CMV IgM seroprevalence (P=0.05). CMV seroprevalence (for both IgG and IgM antibodies) was higher in multiparous pregnant women than in those who had never been pregnant.

Table 3: CMV seroprevalence by marital status, history of miscarriage and number of times miscarried.

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Table 4: CMV seroprevalence by some socio-demographic factors.

Table 4 shows the relationship between seroprevalence of anti-CMV antibodies and some socio-demographic characteristics. Even though most of the subjects screened had tertiary education, there was no statistically significant difference between them and those with lower levels of education. Likewise, seroprevalence did not differ significantly between the different occupational groups and type of residential house owned by the subjects.

As shown in Table 5, none of the bloodletting risk factors (or practices) investigated was significantly associated with anti-CMV IgG/IgM antibodies.
The results of this study have shown that most of the pregnant women screened have been infected with CMV, while only few had antibodies (indicating recent CMV infection) in pregnant women was newborn babies with its entire associated clinical conditions.

As portrayed in this study, age was not significantly associated with CMV infection, but the increase in seroprevalence with age could be attributed to weakening of the immune system with increase in age as suggested by Redwan et al. [2].

Although not statistically significant, occupation, parity, place and type of residence appeared to have shown group variations in seroprevalence. In addition, such factors as miscarriage, tattoo, scarification, blood transfusion intravenous drug use and increase in number of partners seemed to be predisposing the women to CMV infection: infection seroprevalence was highest in those who indulged in bloodletting practices and in those who had history of blood transfusion [15-19].

Out of 375 women, 25 have never been exposed to CMV, indicating that these women are susceptible to CMV infection, and are at risk of coming in contact with the virus for the first time during pregnancy (primary infection). The likelihood of giving birth to congenitally infected infants is therefore high. Preventive measures which includes strict hygienic practice should be adhered to in order to avoid primary infection during pregnancy [20-23]. The high seroprevalence may be the result of ignorance about the infection, poor hygiene, inadequate health care facilities and low socio-economic level [24].

In Makurdi, few people are aware of CMV disease, and as a result of this, little or no control measures are put in place by either governmental agencies or non-government organizations to curb the infection [25,26]. In more developed parts of the world, several intervention measures that would reduce the incidence of CMV infections are being executed. We recommend that such intervention measures (e.g., minimising close contact with possible sources of infection, maintaining good hygiene especially during pregnancy, use of prophylactic drugs in susceptible individuals, use of anti-viral drugs in treatment of acute cases of the infection) be adopted in areas where the prevalence of the infection is high as in Makurdi, Benue State. Awareness on the dangerous consequences of CMV to the newborn baby should be created [27].

### References


