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SERO PREVALENCE OF CYTOMEGALO VIRUS ANTIBODIES (IgG and IgM) AMONGST PREGNANT WOMEN ATTENDING ANTE-NATAL CLINICS IN SOKOTO METROPOLIS, SOKOTO STATE-NIGERIA

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Abstract: **The aim of this research is to assess the sero prevalence of Cytomegalovirus antibodies among pregnant women attending antenatal clinics in Sokoto Metropolis.The study was carried out in Specialist Hospital Sokoto and also Maryam Abacha Women and children hospital sokoto. The study was conducted using onsite CMV IgG/IgM Duo Rapid Test-Cassette. Demographic and clinical data were collected using questionnaires.Three hundred pregnant women (150 from specialist Hospital and 150 from Maryam Abacha Women and children Hospital) attending antenatal clinics were collected in sterile vacutainer EDTA containers from the subjects. Of the 300 pregnant women screened, 43 (14.3%) had CMV IgG antibodies while 3 (1%) were positive for both CMV IgG and IgM. The seroprevalance of anti-CMV IgG among pregnant women was low in this study while for anti-CMV IgM was 1%. It is suggest that other more advanced techniques like histological examination of tissue or nucleic acid amplification methods such as polymerase chain reaction (PCR) should be employ to conduct further research in the area for the infection.also recommended that anti-CMV IgG and anti-CMV IgM specific serological test should be carried out by other investigators in other to compare the findings found in this area.**

Keywords: **sero prevalence, Sokoto Metropolis, CMV, Abacha Women, IgG/IgM.**

I. INTRODUCTION

Cytomegalovirus (CMV) is a double-stranded DNA virus (35). The species that infects human is commonly known as human CMV (HCMV) or human herpes virus-5 (HHV-5), and is the most studied of all cytomegaloviruses (26). Within Herpesvirdae, CMV belongs to the Betaherpsvirinae subfamily (11). CMV establishes a latent state following primary infection, reactivating when there are changes in immune status (15, 16). In immunocompetent patients, primary CMV infection typically runs an undifferentiated viral syndrome, or is manifested by a mononucleosis-like syndrome (33).

CMV infections result from contact with infected body fluids, transfusion of blood products, or transplantation of solid organs from CMV-seropositive individuals. Fortunately, the virus is not highly contagious, and transmission requires direct and often prolonged contact with the infected fluid, tissue, or blood. Persons infected with CMV acutely shed considerable quantities of infectious virus (105 or more infected particles/mL of fluid) for extended periods (18).

Primary infections caused by human cytomegalovirus (CMV) can lead to serious complications in pregnant women. Due to the latency following primary infection and periodic reactivation of CMV replication, in utero transmission of CMV may follow either primary or recurrent infections in pregnancy (19). Transplacental transmission can occur and primary infection in the first 16 weeks of pregnancy is associated with higher rate of damage in fetal development (13, *32*, 22, 14,3).

For most healthy people who acquire CMV infection after birth or through blood transfusion, there are few symptoms and no long term sequelae . Approximately 10% to 15% of infants with congenital CMV infection are symptomatic at birth may develop late sequelae, especially hearing defects, after a period of months or years (32) with manifestations including growth retardation, jaundice, purpura, hepatosplenomegaly, microcephaly, intracerebral calcifications, and retinitis. The risk of long-term neuro developmental disabilities is high in these children and include microcephaly, hearing loss, motor deficits, cerebral palsy, mental retardation, seizures, ocular abnormalities and learning disabilities (21, 2, 12, 30).

II. MATERIALS AND METHODS

Ethical Clearance:

Ethical clearances were obtained from the managements of Specialist Hospital Sokoto and Maryam Abacha Women and Childrens Hospital Sokoto.

Informed consent was obtained at the point of blood collection from 300women, 150 from Specialist Hospital Sokoto and 150 subjects from Maryam Abacha Women and Children Hospital, Sokoto. Questionnaires were also used to obtain bio data and to assess risk of Cytomegalovirus infections. The questionnaires were self-administered except those who were not lettered then explanation was done by laboratory assistant.

Study area:

The area where the study was carried out were Maryam Abacha Women and Children Hospital, (MAWC) and Specialist Hospital Sokoto, Sokoto state-Nigeria, West Africa.

Study Population:

The study populations in this research were pregnant women. The pregnant women were being selected from both hospitals and tested for the infection based on their type of marriage, age, and number of birth.

Sampling Method:

A bout 5ml of blood sample was aseptically collected from each subject by venipuncture into sterile anti-coagulant free blood sample tubes. The clotted blood was centrifuged for about 10 minutes at 2000 rpm to separate the serum from the blood clot. The sera was then stored at 2-8^{0}c until screening for antibodies specific for IgG and IgM of CMV.

Method: Sera were tested for IgG and IgM CMV using onsite CMV IgG/IgM Duo Rapid Test-Cassette. The CMV-specific IgG and IgM antibodies were studied according to the manufacturer's instructions. All specimens were analyzed using the enzyme immunoassay test. Each serum sample was screened for IgG and IgM of CMV specific antibodies at room temperature using onsite CMV IgG/IgM Duo Rapid Test-Cassette. (Duo R Laboratories Inc., UK). The devices were correspondingly labeled prior to the test with specimen ID numbers. The pouch was opened at the notch and the device was removed. The device was placed on a clean flat surface, the pipette dropper was filled with the specimen, one drop of specimen was dispensed vertically into the sample well, one drop of the sample diluents was added immediately to the sample well on each and then the result was read within 10 minutes.

The results were read immediately after 10 minutes. Hence the results were reported as positive, negative, or invalid against the appropriate patient's identification number. Care was taken to ensure that the test kits used in this study were not expired.

Interpretation of *Test* Results:

Positive test results were recorded as red colours which appeared on the control (C) and on test (T) bands indicating the presence of CMV IgG/IgM antibodies in the serum samples,negative test results were recorded as red colour which apperared only on the control (C) and not on test (T) bands indicating the absence of antibodies in the serum samples. Invalid test results were recorded as no visible colour on the test strip or red colour at control (C) bands.

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III. RESULT

A total of 300 pregnant women were enrolled into the study. About 37.3% of them where between the ages of 21-25 years and 1% were above 40 years of age (table 4.1). Of the 300 pregnant women screened, 43 (14.3%) had CMV IgG antibodies, 254 (84.7%) women were negative for CMV while 3 (1%) women tested positive for both IgG and IgM antibody within the age groups 21-25, 36-40 and > 40 years with one person positive within each group as shown in table 4.4 and figure 4.6. The age group of 26-30 years had the highest number of women who tested positive for Anti-CMV IgG and about 17 (36.9%) out of 91 pregnant women screened between the age group were positive (table 4.4). Out of the 46 women who tested positive for CMV, 14 (30.4%) had history of abortion, 35 (76.1%) were in there third trimester and has the highest prevalence of CMV antibody among the trimesters. 40 (86.9%) had been pregnant more than once (table 4.5)

TABLE 1: Age distribution of patient recruited for the study

Age group (years)	Frequency	Percentage
15-20	55	18.3
21-25	112	37.3
26-30	91	30.3
31-35	27	9
36-40	12	4
>40	3	1
Total	**300**	**100**

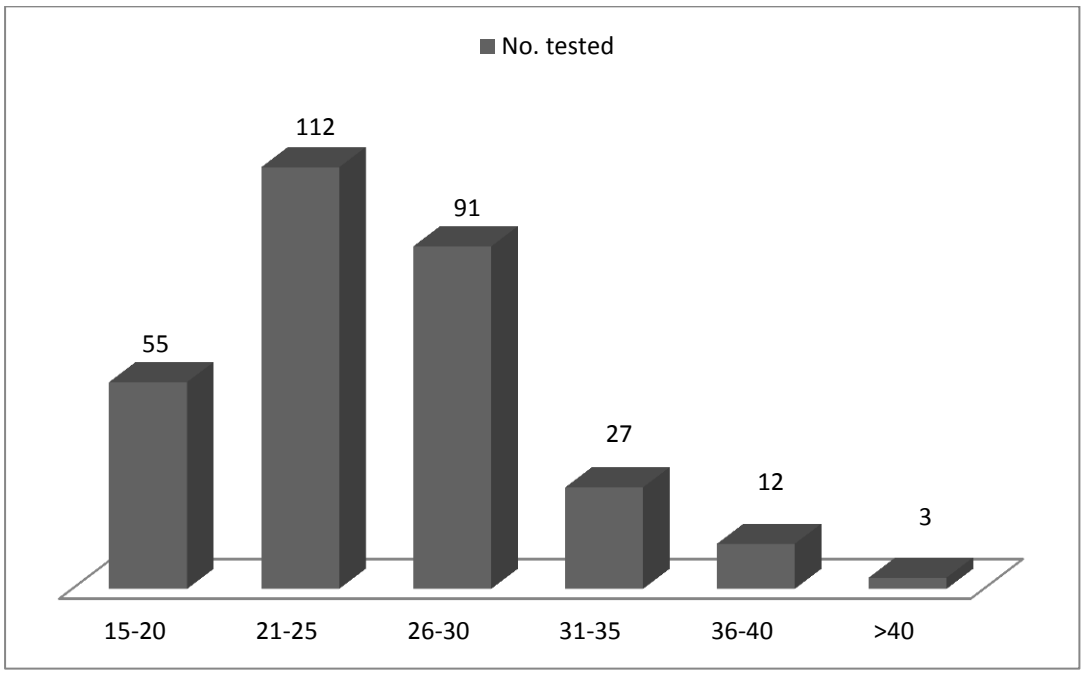

Figure 1: Showing age distribution of patient recruited for the study

TABLE 2: Ethnicity of patient recruited for the study

Tribe	Frequency	Percentage
Hausa	223	74
Fulani	26	9
Yoruba	18	6
Igbo	7	2
Others	26	9
Total	**300**	**100**

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TABLE 3: Distribution of CMV seropositive women according to age group

Age group (Years)	No. tested	Anti-CMV IgG positive		Anti-CMV IgM positive	
		No.	%	No.	%
15-20	55	3	6.5	0	0
21-25	112	16	34.8	1	33.3
26-30	91	17	36.9	0	0
31-35	27	6	13	0	0
36-40	12	3	6.5	1	33.3
>40	3	1	2	1	33.3
Total	**300**	**46**	**100**	**3**	**100**

TABLE 4: Distribution of CMV seropositive women according to history of abortion, trimester and number of pregnancy

S/N	Variable	No. (%)	CMV IgG positive (%)	CMV IgG negative (%)
1	**Number of pregnancy**			
	1	74 (24.7)	6 (13)	68 (26.8)
	2	51 (17)	2 (4.3)	49 (19.3)
	3	48 (16)	6 (13)	42 (16.5)
	>3	127 (42.3)	32 (69.6)	95 (37.4)
	Total	300 (100)	46 (100)	254 (100)
2	**History of abortion**			
	Yes	53 (17.6)	14 (30.4)	39 (15.4)
	No	247 (82.3)	32 (69.5)	215 (84.6)
	Total	300 (100)	46 (100)	254 (100)
3	**Trimester**			
	1st	17 (5.7)	1 (2.2)	16 (6.3)
	2nd	104 (34.6)	10 (21.7)	94 (37)
	3rd	179 (59.7)	35 (76.1)	144 (56.7)
	Total	300 (100)	46 (100)	254 (100)

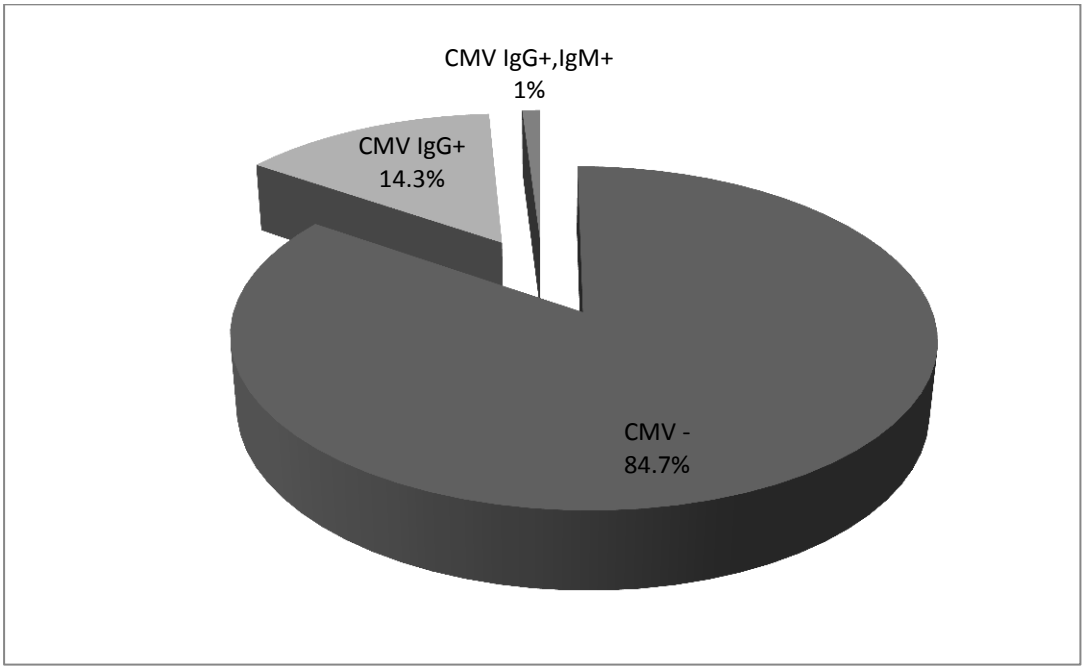

FIGURE 2: Seroprevalence of CMV antibody

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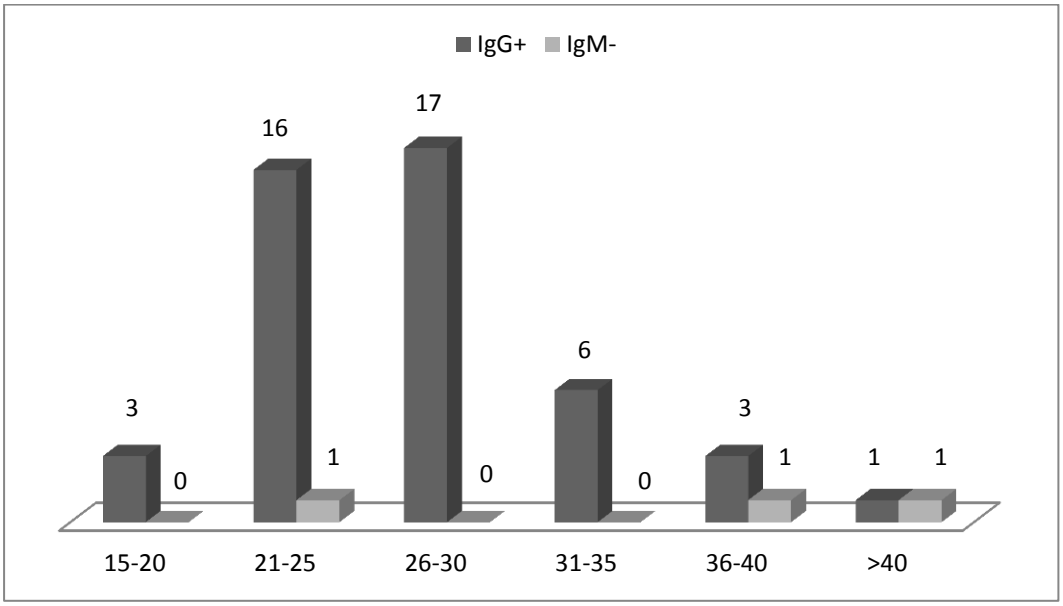

FIGURE 3: Seroprevelence of IgG and IgM according to age groups.

IV. DISCUSSION

This study involved the use of onsite CMV IgG/IgM Duo Rapid Test-Cassette. The results obtained from this study shows the prevalence of HCMV is low. The seroprevalence of anti- CMV IgG antibodies among pregnant women was found positive in 14.3% of the test subject while 1% of the subjects tested positive for anti-CMV IgG and anti-CMV IgM. The result in this study was different with those of other reports within Nigeria and from developing countries. In a study conducted in Lagos by (1) shows 97.2% of the pregnant women were positive for anti-CMV IgG . A recent study conducted by (7) in kano shows the prevalence of anti-CMV IgG were 91.1%. In Northern Italy, the prevalence of anti-CMV IgG was found to be 68.3%. The seroprevalance of anti-CMV IgG was found to be 42.3% in of another study conducted in France (24) which was about 46.2% was found similar to that of Germany. The lowest prevalence was reported in Ireland (30.4%) by(9).

The seroprevalance of CMV IgM observed in this study was 1% and is similar to the result reported in Turkey (34) which is 1% and in Korea (1.7%) by (31). A study conducted by (10) in Sudan shows the seroprevalence of anti-CMV IgM was found to be 6% which made it higher than the findings in Western Sudan (2.5%) by Hamdan *et al*. (8). There were regions where higher value of anti-CMV IgM where found which include; in Malaysia (7.2%), by (29) Poland (13%) by *l* (5).Although the prevalence of primary infection among pregnant women was low, they were critical group because the risk of congenital CMV infection was much higher during primary infection in the mother (6,4).

In this study, it was also observed that the prevalence of CMV antibodies increases with age. The reason adduced for the increased in seroprevalance with age, in other studies, was that majority of women have already been exposed and recovered from primary infection by the time they reach childbearing age . There was association between history of miscarriage and CMV IgG seropositivity which may be due to CMV infection which causes miscarriage. There was no association between trimester and CMV IgG seropositivity and also no association between number of pregnancy and anti-CMV IgG.

V. CONCLUSION

Sokoto metropolis has a low Cytomegalo Virus (CMV) Infections because, Maryam Abacha Women and Children Hospital (MAWC) and Specialist Hospital Sokoto form the major Hospitals for Ante-natal care sessions in Sokoto city of Nigeria. Though, there is no single optimal test for the detection of the antibody or the viral particles. As far as this research is concerned, the Sokoto metropolitan area is suspected to have very low cytomegalovirus Infections , but is suggest that other more advanced techniques like histological examination of tissue or nucleic acid amplification methods such as polymerase chain reaction (PCR) should be employ to conduct further research in the area for the infection.

REFERENCES

[1] Akinbami, A.A., Kabiru, A.R., Adeniyi, A.A., Kikelomo, O., Adedoyin, O.D., Titilope, A.A., Adewumi, A., Vincent, O.O. (2011). Seroprevalence of cytomegalovirus antibodies amongst normal pregnant women in Nigeria. International Journal of women. vol:(3) 423–428

[2] Boppana SB, Fowler KB, Vaid Y, Hedlund G, Stagno S, Pass RF, et al. 1997.Neuroradiographic findings in the newborn period and long-term outcome in children with symptomatic congenital cytomegalovirus, Pediatric. vol (3):409-14.

[3] Donner C, Liesnard C, Brancart F, Rodesch F, 1994. Accuracy of amniotic fluid testing before 21 weeks gestation in prenatal diagnosis of congenital infection. Prenat Diagn;14(11):1055-9. .

[4] Fowler, K. B., and S. B., Boppana,(2006). Congenital cytomegalovirus (CMV) infection and hearing deficit. J. Clin. Virol. (35):226-231.

[5] Gaj Z, Rycel M, Wilczyński J, Nowakowska D. (2012). : Seroprevalence of cytomegalovirus infection in the population of Polish pregnant women. Ginekol Pol ;(83):337-41.

[6] Griffiths PD, Mclean A, Emery VC. (2001). Encouraging prospects for immunization against primary cytomegalovirus infection. Vaccine; 19:1356-1362.

[7] Hamid, K.M.,Onoja, A.B., Tofa, U.A.and Garba, K.N.(2014). Seroprevalence of cytomegalovirus among pregnant women attending Murtala Mohammed Specialist Hospital Kano, Nigeria. African Health Science;14(1): 125-130

[8] Hamdan ZH, Abdelbagi IE, Nasser NM, Adam I (2011). Seroprevalence of cytomegalovirus and rubella among pregnant women in western Sudan. Virol. J. 8:217-220.

[9] Knowles SJ, Grundy K, Cahill I, Cafferkey MT, Geary M. (2005). Low cytomegalovirus seroprevalence in Irish pregnant women. Ir Med J;98:2102.

[10] Khairi S. I., Intisar K. S., Enan K. H., Ishag M. Y., Baraa A. M. and Ali Y. H. (2013).Seroprevalence of cytomegalovirus infection among pregnant women at Omdurman Maternity Hospital, Sudan. Journal of Medical Laboratory and Diagnosis; Vol. 4(4), pp. 45-49.

[11] Koichi Yamanishi; Arvin, Ann M.; Gabriella Campadelli-Fiume; Edward Mocarski; Moore, Patrick et al., (2007). Human herpesviruses: biology, therapy, and immunoprophylaxis. Cambridge, UK: Cambridge University Press.

[12] Kylat RI, Kelly EN, Ford-Jones EL, 2006. Clinical findings and adverse outcome in neonates with symptomatic congenital cytomegalovirus (SCCMV) infection. Eur J Pediatr. 165(11):773-8.

[13] Lazzarotto, T., Varani, S., Gabrielli, L., Spezzacatena, P., Landini, M.P., 1999. New advances in the diagnosis of congenital cytomegalovirus infection. Intervirology.;42(5-6):390-7.

[14] Liesnard, C., Donner, C., Brancart, F., Gosselin, F., Delforge, M.L, Rodesch, F., 2000. Prenatal diagnosis of congenital cytomegalovirus infection: prospective study of 237 pregnancies at risk. Obstet Gynecol ; 95 (6 Pt 1):881-8.

[15] Mocarski, E.S., Shenk, T., Pass, R.F., (2007). Chapter 69 Cytomegaloviruses. In Fields Virology. Volume 1, Section II. 5th edition. Edited by Knipe DM, Howley PM. Lippincott Williams & Wilkins

[16] Mocarski, E.S., Jr, Tan, C.S., 2001. Cytomegaloviruses and their replication. In: Knipe DM, Howley PM, editors. Fields' Virology. 4th ed. Philadelphia: Lippincott Williams & Wilkins. p.2629-73.

[17] Mocarski, E.S., Jr, (1993). Cytomegalovirus biology and replication. In: Roizman B, Whitley RJ, Lopez C, editors. The human herpesviruses. New York: Raven Press, p. 173-226.

[18] Murph, J.R., Bale, J.F Jr, (1988). The natural history of acquired cytomegalovirus infection among children in group day care. Am J Dis Child (142):843-S847.

[19] Munro, S.C., Hall, B., Whybin, L.R. (2005) Diagnosis of and screening for cytomegalovirus infec¬tion in pregnant women. J Clin Microbiol; 43: 4713-8

[20] Murph, J.R., Bale, J.F. Jr, 1988. The natural history of acquired cytomegalovirus infection among children in group day care. Am J Dis Child 142:843-847.

[21] Noyola, D.E, Demmler, G.J., Nelson, C.T., Griesser, C., Williamson, W.D, Yow, M.D.2001. Early predictors of neurodevelopmental outcome in symptomatic congenital cytomegalovirus infection. J Pediatr;138 vol (3):325-31

[22] Pass, R.F., Fowler, K.B., Boppana, S.B., Britt, W.J., Stagno, S., 2006. Congenital cytomegalovirus infection following first trimester maternal infection: symptoms at birth and outcome. J Clin Virol;35(2):216-20.

[23] Pass, R.F., Zhang, C., Evans, A.,Simpson, T., Andrews, W., Huang M.,L., Corey L., Hill, J., Davis, E., Flanigan, C., Cloud G. (2009). "Vaccine prevention of maternal cytomegalovirus infection". N Engl J Med 360 (12)

[24] Picone, O., Vauloup-Fellous, C., Cordier, A.G, Parent, Du, Châtelet I, Senat, M.V., Frydman, R.Grangeot-Keros, L. (2009). A 2-year study on cytomegalovirus infection during pregnancy in a French hospital. BJOG ;116:818-23.

[25] Revello, M.G., Gerna, G., 2002. Diagnosis and manage¬ment of human cytomegalovirus infection in the mother, foetus and newborn infant. Clin Microbiol Rev ;15: 680-715.

[26] Ryan, K.J., Ray, C.G. (editors) (2004). Sherris Medical Microbiology (4th ed.). McGraw Hill. pp. 556; 566–9.

[27] Saffert, R.T., Penkert, R.R., Kalejta, R.F. (2010). Cellular and viral control over the initial events of human cytomegalovirus experimental latency in CD34+ cells. J Virol, (84):5594-5604.

[28] Saraswathy, T.S., Az-Ulhusna, A., Nurul Asshikin, R., Suriani, S and Zainah, S. (2008). Seroprevalence of Cytomegalovirus Infection in Pregnant Women and associated role in obstetric complication. Southeast Asian J Trop Med Public Health VOL (42) NO 2.

[29] Saraswathy TS, Az-Ulhusna A, Asshikin RN, Suriani S, Zainah S (2011). Seroprevalence of cytomegalovirus infection in pregnant women and associated role in obstetric complications: a preliminary study. Southeast Asian J. Trop. Med. Public Health. 42(2):320-322.

[30] Sharon, B., Schleiss, M.R, 2007. Congenital cytomegalovirus infection: an unrecognized epidemic. Infect Med;24 VOL (9):402-15.

[31] Seo, S., Cho, Y., Park, J. (2009). Serologic screening of pregnant Korean women for primary human cytomegalovirus infection using IgG avidity test. Korean J Lab Med;29:557-62

[32] Stango, S., Whitely, R.J. (1985). Herpesvirus infections of pregnancy. Part I: Cytomegalovirus and Epstein Barr virus infections.

[33] Staras. S.A., Dollard, S.C., Radford, K.W., Flanders, W.D., Pass, R.F., Cannon, M.J. (2006). Seroprevalence of cytomegalovirus infection in the United States, 1988–1994. Clin Infect Dis, 43(9):1143-5

[34] . Uyar Y, Balci A, Akcali A, Cabar C (2008). Prevalence of rubella and cytomegalovirus antibodies among pregnant women in northern Turkey. New Microbiol. J. 31(4):451-455.

[35] Zhang, L.J., Hanff, P., Rutherford, C., Churchill, W.H., Crumpacker, C.S.(1995) Detection of human cytomegalovirus DNA, RNA, and antibody in normal donor blood. J Infect Dis. Apr;171 (4):1002-6.