Assessing the risk factors for cytomegalovirus and prediction the relationship between abortion and virus in Kirkuk City Hospitals

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Abstract

Background: Cytomegalovirus belongs to the Herpesviridae family of subfamily Betahrpesvirnae. CMV is one of the major causes of perinatal and congenital viral infection. Also can cause spontaneous abortion in pregnant women in the first trimester of gestation.

Objective: To identify the relationship between CMV and women's demographic variables of age, parity, occupation, residence and socioeconomic status etc. To determine the prevalence rate of CMV in aborted women in the 1st trimester. To assess the relationship between abortion and CMV. To determine anti CMV IgM and IgG in women after abortion. To find out the consequences of risk factorsof CMV on fetus and maternal.

Methodology: A descriptive correlational design was used in this study. Data were collected from three maternity hospitals in Kirkuk city. A convenience sample of (100) aborted women in the first trimester of gestation were selected in this study, who were admitted in maternity hospitals. A questionnaire designed about assess the risk factors for cytomegalovirus and prediction the relationship between abortion and virus. Assessment tool was constructed by the researcher after extensive review of previous studies and relevant literature. The study instrument consists of two main parts; part one was Demographic data for. And the part two include (Test result and Risk factors for cytomegalovirus on pregnant women). The data were

described statistically and analyzed through the use of descriptive and inferential statistical analysis procedures

Results: The prevalence rate of CMV IgG seropositivity was reported (37%), while the prevalence rate of CMV IgM seropositive results was lower (1%). The majority of the study sample was within middle age group (26 – 36 years, live in urban areas, housewives, Barely

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Sufficient economic status and Consanguineous). There is significant correlation of CMV and (abortion, stillbirths, Age at Menarche, Regularity of Menstrual Cycle, Age at Married, Interval between last pregnancy & present Pregnancy, Causes of Abortion, Number of Para,

Type of Previous Delivery to Present Delivery, IgG & IgM Test Results.(

Conclusion: CMVI showed significant effects on the abortion rates among pregnant women in the first trimester of gestation. In this study the socio-economic status of the tested women has no significant effects on the rates of anti-CMV IgG and IgM seropositive results.

 Keywords: Cytomegalovirus, prevalence rate of CMV, anti-CMV IgG and IgM, risk factors of CMV   .

Introduction

Cytomegalovirus (CMV) belongs to the Herpesviridae family of subfamily Betahrpesvirnae. It is also called Human Herpes Viruses type 5 (HHV-5) according to (ICD) International Classification of Diseases. Cytomegalovirus can maintain hidden inside the body for a long time. Cytomegalovirus energizing is associated with hormonal changes and immunosuppression (Andrievskaya et al., 2015). Human Cytomegalovirus (HCMV) causes the first typical infection of the Betaherpesvirinae subfamily (Yeroh et al., 2015). CMV similar to all of the other herpes viruses founds hiding inside the human host. Primary HCMVI results in a latent or persistent contagious that can be found within endothelial cells, different tissues, and (PBMCs) peripheral blood mononuclear cells. The majority of babies would have a subclinical infection (O'Connor & Murphy, 2012). Reactivation of hidden cytomegalovirus outcomes in at least negative results as initial infections. Placenta infection with the movement of trans-placenta of cytomegalovirus across the interface of materno-fetal and is a pre-requisite to infection the fetus. While CMV infection also can be limited to the placenta and there is rising guide that indirect impacts cytomegalovirus infection of placenta contributes to negative pregnancy result (Hamilton et al., 2012). At first cytomegalovirus infection occurs in the seronegative defenseless host and the frequent exposure reasons reactivation of inactive (contamination or re-infection) in a seropositive in immune host Seropositive of recurrence cytomegalovirus was higher among people with lower socioeconomic status (Al-musaw, 2018). The CMV may result from primary or recurrence cytomegalovirus illness. While the recurrence cytomegalovirus is the most common cause for an extreme disease which increases with age and higher in the developed countries among lower financial strata (Hamid et al.,2014; Schoenfisch et al., 2011). The involuntary loss of pregnancy from conception to twenty-four weeks of pregnancy is called a miscarriage. Cytomegalovirus is caused by spontaneous abortion in more than 70% of abortion fettles (Jihad et al., 2015). The clinical manifestations range of cytomegalovirus from asymptomatic about (90%) of cases to more severe fetal damage and in uncommon cases, CMV causes death due to abortion. CMV can be lifethreatening of all persons suffering from immune-compromised such as organ transplant recipients, newborn infants, and Human Immune Virus-infected persons (Zhou et al., 2015). CMV can be done in several methods: directly from ascending CMVI or by direct contact the newborn baby during labor with the infected mucus of cervical and by infected tissue of a placenta. Transmission of contagion is possible after delivery through breastfeeding of the baby or by

contacting the secretions of the mother's body containing cytomegalovirus. The infections of CMV are not high. CMV predisposition in households and its spread among young children in the centers of daycare. The susceptibility rate of cytomegalovirus during childbearing age is well established. Among pregnant women between 40-80 % will be cytomegalovirus susceptible at the beginning of childbearing age. The susceptibility rate of CMV differs by racial or ethnic, age groups, and socioeconomic status (Gao et al., 2018; Revello et al., 2015). Intracellular continuous contributes to the virus to the long hiding of infection. The location of the intracellular protects the CMV from the act of determining antibodies. The changes in the humoral immunity combination with childbearing age depending on the repetition of CMVI and gestational age (Andrievskaya et al., 2015). The congenital of CMVI appear as a non-primary infection, primary infection with CMV a new strain, or reactivation of a hidden infection (Gaur et al., 2020). The infection of fetal and risk of associated harms is higher after the initial infection. The fetal contiguous risk is greatest with maternal initial CMVI and much less with frequent infection as the CMV stays hidden after primary infection in the host cell. CMV perhaps shed in the fluids of the body in any person infected with this virus CMV can be found in breast milk, saliva, tears, and semen (Abdul Wahab et al., 2012).

During childbearing age at any time, non-primary or primary contagious of maternal (including reinfection or reactivation with a various cytomegalovirus strain) CMV can cross the placenta and cause infecting the fetal that leading to congenital cytomegalovirus infection. In the USA, approximately 1 quarter of congenital CMVIs was ascribable to primary contiguous of maternal and 3 quarter were ascribable to nonprimary contiguous of maternal (Wang et al., 2011). Also, the initial infection shows to be more probable to reason symptoms at birth and long-term inability than non-primary infection of maternal. Berger et al. reported 2 cases of an acute initial CMVI with no symptoms of the disease that was found in the child and mother and a frequent CMVI that perform to encephalitis cytomegalovirus necrotizing in the fetus (Berger et al.,2011). During primary maternal cytomegalovirus occurs increment in placental volume because enlarges in placental vasculature to compensate the fetus. The beneficial effect of antibodies perhaps mediated through the enhanced function of the placenta and improved nutrition and supplies oxygen to the fetus. Thus, it has been lately hyper-immunoglobulin therapy observed for CMVI is help to reduce the size and fetal ultrasound abnormality and inflammation of the placenta (Akunaeziri, 2018).

Objectives of Study

-To identify the relationship between CMV and women's
demographic variables of age, parity, occupation, residence and socioeconomic status etc.
-To determine the prevalence rate of CMV in aborted women in the 1st trimester.
-To assess the relationship between abortion and CMV
-To determine anti CMV IgM and IgG in women after abortion
-To find out the consequences of risk factors of CMV on fetus and maternal.

METHODS AND MATERIALS

Study design and setting

A design of this study was descriptive correlational study conducted for aborted women whom pregnant loss.

The setting of study in Kirkuk City hospitals (General Kirkuk hospital, Azadi Teaching Hospital, Al-Nasr Hospital) was the designated site for data collection.

Study sample

A sample of (100) women was selected in this study. Those women with pregnant loss (abortion) who were admitted in maternity hospitals. Collected data and blood sampling after abortion occurs by curettage or spontaneous abortion. The study sample included (43) participants from Al-Nasr Hospital, (26) participants from Azadi Teaching Hospital and (31) participants from General Kirkuk hospital.

Data collection

Data collected by using a self-reported questionnaire; except for women who were unable to read and write and those who cannot sit to write because of their health status, for those women a structured interview was used to collect data. The data were collected after obtaining the agreement from women to participate in the study through interview and informed them about the study objectives this was done written and orally by the researcher, the data were collected after approximately from (1-2) hours of abortion in general and private wards at the maternity hospitals in Kirkuk city.

Blood Sampling collection

Blood samples were collected from aborted women under highly aseptic conditions about (Five ml) blood samples were obtained by vein puncture from all studied women after cleaning the skin. Blood samples were incubated to clot, after that were centrifuged at (3000 rpm) for 5 minutes. The serum was collected in sterile containers and stored at (-20°C) until tested. Samples were examined for IgM and IgG antibodies using ELISA test.

Statistical Analysis

The data summarized and analyzed through using application statistical package for social science (SPSS) version 21 and the following procedures used in Data Analysis: Descriptive data analysis approach frequency distribution, percentage, means, standard deviations, Independent Sample t-test and Analysis of Variance (ANOVA) test.

RESULTS

This chapter presents the findings of the data analysis systematically in tables and these correspond with the objectives of the study as follows: Table (4-1) shows that more than half of sample (59%) were their age are between 26 – 36 years old, and who living in urban area are (64%), regarding to the educational level; were preliminary graduated and college graduated (22%) are more than other levels, based on the employment status, Housewife are the higher proportion (72%) of the study sample,

according to the family income; barely sufficient makes a third of the sample about (43%) and the same percentage (43%) to whom have own house at house property, based on consanguinity, Consanguineous degree made about two thirds (60%) of the study sample, while 2nd degree of consanguinity is a greater percentage (42%) more than 1st degree. Table (4-2): about the reproductive variables, shows that near to the half of sample (45%) was their age of menarche at 13-14 years, while higher percentage of the sample (74%) was their age of marriage at 16–26 years, regarding to the Regularity of Menstrual Cycle, regular cycle period was (59%) are more than irregular. About half of the sample (51%) their age at 1st pregnancy is between 16-22 years, according to the period of interval between last pregnancy and present pregnancy, who have less than one year are (38%) more than others, the sample that not attending the health center are (73%) more than who attending, so the percentage is same in the type of follow-up to health center. The sample that attending the external specialist clinic are (60%) more than who attending, and the percentage is (34%) of them have irregular follow-up based on the type of follow-up to external specialist clinic, regarding to the current abortion in weeks, more than third sample size (36%) are between 10-15 weeks.

Majority proportion (71%) of the sample when the causes of the abortion are diagnosed and higher percentage (38%) of these causes is CMV and (28%) are unknown causes. According to the last age of pregnancy, less than 20 weeks made near to the half of the sample (41%). an according to the number of gravida, (1-2) gravida makes (37%) of the sample, the same number (1-2) makes (48%) according to the number of para, while regarding to the number of abortion, (67%) of the sample who have one abortion, but according to the number of stillbirths, higher percentage (88%) is who have no stillbirth, the majority of the study sample (48%%) that have no Previous delivery to the present delivery, while based on the type of previous deliveries, NVD made (58%) of sample is higher than other types. Finally, the date of the test results periods is between 15/12/2019 – 7/3/2020. Table (4-3): This table shows the distribution of the women's knowledge Scores (sample responses) regarding to all risk factors items. So, as shown; the responses of the study sample range from the matter (yes) meaning have a risk factor and the matter (no) means don't have a risk, and the matter (not sure) means the woman not sure 100% of some risk factors. Table (4-4) shows the number of those women who participated in the present study and suffering of risk factors. As shown the higher percentage (29%) is in 1st degree to

women who had no risk factors, then (20%) in 2nd degree who had two risk factors.

Table (4-5) shows the types of the test and its results, majority proportion (62%) is who have negative results, while the positive result in IgG type is higher percentage (37%) was more than positive in IgM that had (1%) only.

Table (4-1): Distribution of the Demographic Data Characteristics of the Study Sample–Part I (No.: 100).

The Characteristics	Subgroups	*f.*	%
Age Groups	15 – 25 years	22	22
	26 – 36 years	59	59
	37 – 47 years + more	19	19
	Mean + S.D.	1.97 + .643	
Residence	Urban	64	64
	Rural	30	30
	Suburban	6	6
Education Level	Illiterate	7	7
	Read and Write	16	16
	Preliminary Graduated	22	22
	Intermediate Graduated	8	8
	Preparatory Graduated	7	7
	Institute Graduated	13	13
	College Graduated	22	22
	Higher Studies	5	5
Employment Status	House wife	72	72
	Free Lancer	6	6
	Student	5	5
	Government Employee	17	17
Family Monthly Income	Sufficient	38	38
	Barely Sufficient	43	43
	Insufficient	19	19
House Property	Owns	43	43
	Rented	29	29
	Shared	26	26
	Other	2	2
Consanguinity	Non Consanguineous	40	40
	Consanguineous	60	60
Type of Consanguinity	Non Consanguineous	40	40
	1st Degree	18	18
	2nd Degree	42	42

Table (4-2): Distribution of the Reproductive Data Characteristics of the Study Sample–Part II (No.: 100).

The Characteristics	Subgroups	*f.*	%
	11 – 12 years	39	39
	13 – 14 years	45	45

Age of Menarche	15 – 16 years	16	16
	Mean + S.D.	1.77 + 0.709	
Regularity of Menstrual Cycle	Regular	59	59
	Irregular	41	41
Age at Married	13 – 19 years	25	25
	20 – 26 years	74	74
	27 – 33 years	1	1
	Mean + S.D.	1.76 + .452	
Age at 1st pregnancy	16 – 22 years	51	51
	23 – 29 years	46	46
	30 – 37 years	3	3
	Mean + S.D.	1.52 + .559	
Interval between last pregnancy & this Pregnancy	< 1 year	38	38
	1 – 2 years	36	36
	> 2 years	16	16
	None	10	10
	Mean + S.D.	1.98 + .974	
Follow-up pregnancy in Health Center	Yes	27	27
	No	73	73
Type of Follow-up in Health Center	No Follow-up	73	73
	Follow-up Regularly	11	11
	Follow-up Irregularly	16	16
Follow-up pregnancy in External Specialist Clinic	Yes	60	60
	No	40	40
Type of Follow-up in External Specialist Clinic	No Follow-up	40	40
	Follow-up Regularly	26	26
	Follow-up Irregularly	34	34
Current Abortion	< 4 Weeks	6	6
	4 – 9 Weeks	34	34
	10 – 15 Weeks	36	36
	16 – 20 Weeks	24	24
Was the Cause of Abortion Diagnosed	Yes	71	71
	No	29	29
Causes of Abortion	Unknown	28	28
	CMV	38	38
	Toxoplasmosis	3	3
	Rubella	3	3
	Coagulation of Placenta	7	7
	Heavy Lifting	6	6
	Obesity	1	1
	Deformation of the Uterus	3	3
	H. mole Pregnancy	2	2
	Ovarian Cysts	8	8
	Exposure to Psychological Disorders	1	1
Last Age of Pregnancy in Weeks	≤ 20 Weeks	41	41
	36 – 37 Weeks	26	26
	38 – 39 Weeks	23	23
	None	10	10
	Mean + S.D.	2.02 + 1.025	
Number of Gravida	1 – 2 Gravida	37	37
	3 – 4 Gravida	33	33
	5 – 6 Gravida	20	20
	7 – 8 Gravida	8	8
	9 – 10 Gravida	2	2
	1 – 2 Para	48	48

Number of Para	3 – 4 Para	18	18
	5 – 6 Para	10	10
	7 – 8 Para	4	4
	None	20	20
Number of Abortions	None	0	0
	1 Abortion	67	67
	2 Abortions	26	26
	3 Abortions	4	4
	4 Abortions	3	3
Number of Stillbirths	None	88	88
	1 Stillbirth	12	12
Type of Previous Delivery to Present Delivery	NVD	40	40
	C/S	12	12
	None	48	48
Type of Previous Deliveries	NVD	58	58
	C/S	8	8
	Both	23	23
	None	11	11
Date of Test Results	15/12/2019 – 7/3/2020	100	100

Table (4-3): Distribution of the Women's Knowledge Responses Regarding to All Items about the Risk Factors.

Knowledge Items about the Risk Factors	Sample Responses					
	No		Yes		Not sure	
	f.	*%*	*f.*	*%*	*f.*	*%*
1- You Smoking cigarettes less than 20 cigarettes	99	99	1	1	0	0
2- You Smoking cigarettes more than 20 cigarettes	99	99	1	1	-	-
3- You Smoking Hookah	100	100	-	-	-	-
4- Your husband Smoking less than 20 cigarettes	59	59	41	41	-	-
5-Your husband Smoking more than 20 cigarettes	60	60	40	40	-	-
6- Your husband Smoking Hookah	81	81	19	19		
7- Test result IgG Positive (+ve)	63	63	-	-	37	37
8- You underwent CMV test during pregnancy	62	62	38	38	-	-
9- Drink alcoholic beverages	100	100	-	-	-	-
10- You suffer from viral hepatitis	97	97	3	3		
11- You suffer from AIDS	100	100	-	-	-	-
12- You suffer from anemia	89	89	11	11		
13- Your husband is married to an infected second wife	89	89	-	-	11	11
14- Your husband is infected with CMV	97	97	-	-	3	3
15- You have a child with CMV	98	98	-	-	2	2
16- The presence of sexual diseases in your husband, such as (AIDS, syphilis and wart)	100	100	-	-	-	-
17- You suffer from cancer	100	100	-	-	-	-
18- You are taking immunosuppressive drugs	100	100	-	-	-	-
19- You had previous surgical operations	80	80	20	20		
20- You had an organ transplant previously	100	100	-	-	-	-

Table (4-4) Distribution the Number of Risk Factors to those Women who suffering it as a total.

Number of Risk Factors	*f.*	*%*
Women had (No) Risk Factor	29	29
Women had (One) Risk Factor	16	16
Women had (Two) Risk Factors	20	20
Women had (Three) Risk Factors	16	16

Women had (Four) Risk Factors	10	10
Women had (Five) Risk Factors	5	5
Women had (Six) Risk Factors	2	2
Women had (Seven) Risk Factors	2	2
Total	**100**	**100**

Table (4-5) Distribution of the IgG and IgM Test Type and Results among Study Sample.

Test Type	The Result	f.	%	Mean	S. D.
IgG	Positive	37	37		
IgM	Positive	1	1		
Negative		62	62	0.39	0.510
Total		100	100		

Discussion

Distribution of the Demographic Data Characteristics of the Study Sample. Table (4-1):

Age groups: The mean and S.D. is 1.97 + .643; more than half of sample (59%) were

their age are between (26 – 36) years old, this result is consistent with that obtained by Willame et al., (2015) who stated that the age of their study sample was (26-35) years.

Residency: The majority of subject reported that they live in urban areas (64%),

these result is consistent approximately with Alghalibi et al., (2016) who stated of their study sample that they live in urban areas was (71,1%).

Level of Education: Concerning the level of education; were preliminarily graduated and college graduated (22%) are more than other levels. This finding is higher than that obtained by Ali, (2020) who reported that the level of education Primary school level was (12.5 %). Aljumaili et al., (2014) reported the high prevalence the level of education was Primary school.

Employment Status: The employment status, Housewife is the higher proportion (72%) of the study sample this result agrees with the study done by Mamuye et al., (2015) who indicate that the majority of the study sample was a housewife (66.5%).

Family Monthly: According to the family income; barely sufficient makes a third of the sample about (43%), this result is consistent with that obtained by Wizman et al., (2016) was middle (48%).

House Property: About (43%) to whom have own house at house property this result is inconsistent with Demmler (1991) who stated in his study the high rate of house property was rent house.

Consanguinity: Consanguineous degree made about two thirds (60%) of the study sample, while the 2nd degree of consanguinity is a greater percentage (42%) more than 1st degree. This result is higher than that reported by Karatas et al., (2008) was18% Consanguineous.

Distribution of the Reproductive Data Characteristics of the Study Sample Table (4-2):

● **Age of Menarche**

The menarche age mean and S.D. were (1.77 + .709) that near to the half of sample (45%) was their age of menarche at 13-14 years, these result consistent with Firth & Hurst (2017) who reported the menarche age was (13) years in their studies.

● **Regularity of Menstrual Cycle**

Regarding the Regularity of the Menstrual Cycle, regular cycle period was (59%) are more than irregular. These studies were inconsistent
with Mostad et al., (2000) who reported in his study irregular menstrual cycle.

● Age at Married

A higher percentage of the sample (74%) was their age of marriage at 16–26 years, Mean + S.D. (1.76 + .452), according to the study of Iraqi CSO (2011) recommended that the mean age for marriage was 22 years old.

● Age at 1st pregnancy

The Mean + S.D. of the sample their age at 1st pregnancy is (1.52 + .559). About half of the sample (51%) of their age at 1st pregnancy is between (16-22) years, according to the study of Iraqi CSO (2011) reported that only (14.3%) was starting their reproductive life at (15-19) years old.

● Interval between last pregnancy & this Pregnancy

According to the period of interval between last pregnancy and present pregnancy, who have less than one year are (38%) more than others, according to the study of Iraqi CSO (2011) reported that 25% of women need for family planning for regulating the intervals between pregnancies for two years and more.

● Follow-up pregnancy in Health Center

The sample that not attending the health center is (73%) more than those attending, so the percentage is the same in the type of follow-up to the health center (no follow-up) and only (27%) follow-up pregnancy in the health center. These studies were consistent with Willame et al., (2015)

who reported only (10.5%) follow-up pregnancy in the health center.

● Follow-up pregnancy in External Specialist Clinic

The sample that attending the external specialist clinic is (60%) more than who attending and the percentage is (34%) of them have irregular follow-up based on the type of follow-up to an external specialist clinic, these studies consist with Willame et al., (2015) who reported (78.6%) follow-up pregnancy in external specialist clinic.

● Current Abortion

Regarding the current abortion in weeks, more than a third sample size (36%) are between (10-15) weeks. These studies are consistent with Bonalumi et al., (2011) who reported the higher prevalence of current abortion in weeks from (12-16) weeks.

● Causes of Abortion

Approximately (71%) of these study samples are diagnosed. A higher percentage (38%) of these causes is CMV and (28%) are unknown causes. This result is less than the result that reported with Hussan (2013) was (56%) of aborted women with unknown causes of abortion and reported CMV IgM (21%), (29 IgG) causes of abortion.

● Last Age of Pregnancy in Weeks

According to the last age of the pregnancy, less than 20 weeks made near half of the sample (41%). weeks. This study is less than reported with Pass & Arav-Boger (2018) who reported the higher prevalence of the last age of a pregnancy from (20-21) weeks.

● Number of Gravida.

An according to the number of gravidae (1-2) gravida makes (37%)

of the sample, these studies supported by Bagheri et al., (2012) who reported when Prim gravid makes (32.1%), Multiparous makes (67.9%).

• Number of Para.

the same number (1-2) makes (48%) according to the number of para, these study consistent with Lee et al., (2020) who reported the number of para (1) makes (47.7%) and reported (39.0%) in his study when the number of para. (2).

• Number of Abortions

While regarding the number of abortions, (67%) of the sample who have one abortion, these studies higher than reported by Umeh et al., (2015) who reported the number of abortions when (one) abortion makes (54%).

• Number of Stillbirths

According to the number of stillbirths, higher percentage (88%) is who have no stillbirth, these study consistent with Alvarado-Esquivel et al., (2018) Who reported (89.3%) have no stillbirth.

Type of Previous Deliveries

The type of previous deliveries, NVD made (58%) of sample is higher than other types, these studies consistent with Marin et al., (2016) who reported (56 %) NVD.

Distribution the Women's Knowledge Responses Regarding to All Items about the Risk Factors. Table (4-3):

In the table of the women's knowledge responses regarding all items about the risk factors discussion the women smoking cigarettes less than 20 cigarettes per day is only 1%, and more than 20 cigarettes per day are also 1%. These results supported by Hussain & Sullivan (2017) who reported 4% of women smoking cigarettes. In addition, the husband smoking cigarettes less than 20 cigarettes about 41%, and Smoking more than 20 cigarettes about 40%. This study is almost higher than the study reported by Hussain & Sullivan (2017) who reported (31%) among males whom cigarettes smoking. In addition, these study higher than reported by Lachmann et al., (2018) who reported (21%) of males whom cigarettes smoking. Also in this study the husband Smoking Hookah only 19%. These results support by Hussain & Satar (2013) who reported (13.9) hookah smoking

The women underwent a CMV test during pregnancy in this study was (38%). These study less than reported by Ross et al., (2018) who reported from (50-80) women underwent CMV test during pregnancy. Only three samples in these studies suffer from viral hepatitis. These studies are consistent with Hughes et al.,

(2017) who reported (1-2.5%) pregnant women suffer from hepatitis. In addition, these studies inconsistent with Alvarado-Esquivel et al. (2018) who reported (14%) pregnant women suffer from hepatitis. Only (11%) from samples in these studies suffer from anemia. These finding less than reported with Gautam (2019) who reported (38%) pregnant women suffer from anemia. Also, these studies inconsistent with WHO/CDC (2008) who reported (42%) of pregnant women suffer from anemia. About (20%) of the samples in these studies had previous surgical operations. These results are less than reported by Joffe & Oguro (2012) who reported (45%) of samples had previous surgical operations. Also, these studies inconsistent with Alvarado-Esquivel et al., (2018) who reported (71%) of samples had previous surgical operations.

Distribution the IgG and IgM Test Type and Results among Study Sample Table (4-5).

the types of the test and its results in these study, majority proportion (62%) is who have negative results, while the positive result in IgG type is a higher percentage (37%) was more The prevalence rate of CMV IgG seropositivity was reported (37%), while the prevalence rate of CMV IgM seropositive results was lower (1%). CMVI showed significant effects on the abortion rates among pregnant women. This study confirmed the significant association between CMVI and (abortion, stillbirths, Age at Menarche, Regularity of Menstrual Cycle, Age at Married, Interval between last pregnancy & present Pregnancy, Causes of Abortion, Number of Para, Type of Previous Delivery to Present Delivery, IgG & IgM Test Results, residence, education level and employment status). It was concluded that socio-economic status of the tested women has no significant effects on the rates of anti-CMV IgG and IgM seropositive results.

Recommendations

There is need to increase public awareness about cytomegalovirus and their effect on maternal and fetal as well as it correlation with history abortion and congenital cytomegalovirus infection. Encourage the women to AND RECURRENT PREGNANCY LOSS IN JOS, PLATEAU STATE. *FACULTY of OBSTETRICS AND GYNAECOLOGY*.

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than positive in IgM that had (1%) only. Thes study consistent with De Paschale et al., (2009) in an Urban Area of Northern Italy who reported (0.9%) CMV IgM but this result less than reported by De Paschale et al., (2009) CMV IgG (68.3%).

Conclusion

attained regular antenatal visit to conduct Routine screening of CMV IgM and CMV IgG. And any women with a history of abortion must be investigated before and after pregnancy. Educational program about risk factor and consequences of cytomegalovirus and Educational program about practice good

personal hygiene to reduce the risk of congenital CMV infection and transmission, especially hand washing after hand ling diapers or oral secretions shout be conducting on nurses in maternity ward to give care to cases with cytomegalovirus. Adoption of psychological support program to pregnant women or aborted women with cytomegalovirus. Women were more frequently aware of CMV if they were followed by an obstetrician than by a midwife or a general practitioner. Although most women were followed by an obstetrician, theinformation rate remained low. It is crucial to improve CMV information to pregnant women from the 1st trimester in order to prevent the risks for the fetus/newborn.

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