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Seroprevalence of Hepatitis C Virus among Pregnant Women Attending Omdurman Maternity Hospital

SARA AL ASHA ALHASSAN KHALID[1]
MSc student, Microbiology Department
Faculty of Medical Laboratory Sciences
AL-Neelain University, Sudan
BAHA AL DEEN KHALID
Associate Professor, Microbiology Department
Faculty of Medical Laboratory Sciences
Khartoum University, Sudan
WAFA IBRAHIM ELHAG
Assistant Professor, Microbiology Department
Faculty of Medical Laboratory Sciences,
AL-Neelain University, Sudan

Abstract:

***Background**: Hepatitis C virus (HCV) is a blood borne RNA virus. Its infection and associated sequelae is of major public health importance worldwide. During pregnancy, HCV infection is associated with high-risk maternal complications and has become of a leading cause of fetal death. Therefore, this study aimed to measure the seroprevalence of HCV among Sudanese pregnant women and determine the relationship between the presence of HCV and factors of age, trimester, gravidity, social status, history of abortion and history of blood transfusion.*

***Methods:** It is a descriptive cross-sectional study included 90 apparently healthy pregnant women who attended Omdurman Maternity Hospital during the period from March to May 2015. HCV was detected in serum samples using commercially available enzyme-*

[1] Corresponding author: saraalasha123@gmail.com

linked immunosorbent assay (ELISA) kit. Data were analyzed using a chi-square test in SPSSprogram.

***Result**: The investigated pregnant women (n=90) with an age ranging from 18–48 years, were found sero-negative for HCV infection. Sero-prevalence of HCV infection among Sudanese pregnant women attending Omdurman Maternity Hospital was 0.00%.*

***Conclusion**: There is no HCV infection among study group. Further confirmation by studying larger sample size of population is recommended.*

Key words: Hepatitis C, Pregnant women, Khartoum State, Seroprevalence, ELISA.

INTRODUTION:

Hepatitis C virus (HCV) is a member of flaviviridae family. It is a blood borne RNA virus. It is efficiently transmitted through exposures to blood, such as blood transfusions or organ transplants from infected donors. In addition, in advertent contamination of supplies shared among patients undergoing chronic hemodialysis or sharing of injection equipment among drug users, high-risk sex and perinatal exposure all can transmit the HCV [(1)]. HCV infection with its associated sequelae is of major public health importance worldwide [(2)]. It is a major cause of end stage liver disease in many parts of the world [(3)]. One hundred and seventy million people are estimated to be infected all over the world[(1)]. The highest prevalence of HCV infection in Sudan was noted in patients with end stage renal disease on regular hemodialysis with a seroprevalence of 23.7%. Prevalence of HCV infection amongst asymptomatic blood donors was 4.4 %[(4, 5)]. A study done on HCV infection in Sudan demonstrated a low seroprevalence ranging from 2.2% to 4.8% in patients with schistosomal periportal fibroses in Al-Gezira state. Furthermore; in Sudan a seroprevalence rate of 0.6%

(3/423) among Sudanese pregnant women who were not aware of their carriage status, was reported in 2007 [6]. Similar seroprevalance rate was reported (3.6%; 206/5760) among pregnant women in Benin City for HCV antibodies carrier status. In the same study the prevalence of HBV was 12.5% (720/5760), where 33/5760 (0.57%) were found to have mixed infections of both. The relationship between these risk factors (age, parity and the other socio-demographic characteristics) and sero-positivity for HBV and HCV was not detected. [7]Comparable HCV seroprevalence rates were reported in other African countries such as Ethiopia (2%) and Libya (7.9%) [8, 9, 10]. Lower seroprevalence (0.8%) rate was reported in England (inner London obstetric department) among 4729 pregnant women who were significantly more likely to have a history of drug abuse [11].

Studying the HCV epidemiology in Egypt showed that the Nile delta region has one of the highest HCV seroprevalence rates in the world approaching 20% in villagers over the age of 30 years. [12]The difference between the low seroprevalence of HCV infection in Sudan compared with that of Egypt which has one of the highest seroprevalence rates worldwide, may be due to the fact that equipment sterilization was more strictly observed in Sudan due to low volume of patients treated per session when compared with the Egyptian side. [8]Viral hepatitis during pregnancy is associated with high risk maternal complication and has become of leading cause of fetal death. There is a high-risk rate of vertical transmission causing fetal and neonatal hepatitis, which can have serious effects on the neonate, leading to impaired mental and physical health later in life. Detection of hepatitis C virus during pregnancy is of great importance for health planners and program managers [8].

This study aimed to determine the seroprevalence of HCV infection among Sudanese pregnant women through

detecting IgM and IgG antibodies using ELISA. Determining the possible major risk factors predisposing to HCV as well as detecting the relationship between sero-positivity and others factors (age, trimester, history of abortion, gravidity, and history of blood transfusion).

MATERIALS AND METHODS:

Design:

This descriptive cross-sectional study included 90 pregnant women. It was conducted in Omdurman Maternity Hospital, Khartoum state, Sudan during the period from March to May 2015. The data was collected by structured questionnaire. Ethical approval was obtained from Al Neelain University Research Ethical Board. Written informed consent was obtained from each individual pregnant woman as well as verbal agreement.

Experimental work:

A total of 90 blood samples were collected from pregnant women and screened for hepatitis C IgM and IgG antibodies using enzyme linked immune sorbent assay (ELISA) technique in research laboratory at AL- Neelain University.

Collection of specimens and processing:

Five (5) ml of blood specimen were collected by ordinary vein-puncture technique in plain container and allowed to clot, and then subsequently sera were separated at room temperature by centrifugation, and kept frozen at -20 °C until IgM and IgG antibodies were qualified by ELISA till used.

ELISA protocol:

It was performed according to the manufacturer instructions (4^{th} generation ELISA, fortress-diagnostic limited, United

Kingdom). All reagents were brought to room temperature before assaying. Both IgG & and IgM antibodies were detected in the blood samples which were following incubation together with the fixed HCV antigen fixed in in the wells of micro plates wells. Then, 0.15 ml of the diluted buffer was pipetted in each well. Then 0.05 ml of the patient serum, which was pre-diluted 1:4, was added into the first well of each dilution series. 0.05 ml of diluted serum was transferred from one well to next well and 0.05 ml from the last well was discarded. The well was incubated for one hour in moist chamber at 37 °C. 0.2 ml of washing solution was added then 0.05 ml (IgG or IgM) conjugate solution was added to each well. The wells were incubated for 45 minutes at 20 – 25 °C. 0.05 ml 2N (NaOH) was added to each well.

Measurement:

The absorbance of each specimen was measured with a photometer at 450 nm within one hour of adding the blocking reagent**.**

Calculation and interpretation of result:

The results were calculated by relating each sample optical density (OD) value to the cut off value of plate.

Calculation of cut off (CO) value was Co= NC 2.1, where NC is the main absorbent value for the three negative controls.

Samples giving absorbent less than cut off value was considered negative for this assay.

Sample giving absorbent equal to or greater than cut off value was considered initially reactive. Samples with absorbent to cut off value were considered borderline and retesting of these samples in duplicates is highly recommended.

Data analysis:

The generated data were analyzed by using master sheet and Statistical Package for Social Sciences (SPSS) program (version 11). Categorical data was analyzed by the chi-square test. A P-value of less than 0.05 was considered statistically significant.

RESULTS:

A total of 90 apparently healthy pregnant women, who attended Omdurman Maternity hospital, Khartoum state, Sudan, during March to May 2015, were enrolled in this study, The average age of them was 28 years old; most of them (54.4)% were between the age group of 18-28 years, 35.6% were between 28-38 and 10% between 38-48 years old (Table 1). Regarding pregnancy stages, 89% of participant pregnant women were in their 3th trimester, 7.7% in the 2nd trimester, and 3.3% in the 1st trimester of pregnancy (Table 2). 80% were multi-gravidae and 20% were prime gravidae (Table 2). There was a history of abortion in 37% (Table 2), and a history of blood transfusion only in 4% of those pregnant participants. (Table 2).

Tables:

Table No. 1: Frequency distribution of subjects according to age groups.

Age (years)	Frequency	%	Valid %	Cumulative %
18-28	49	54.4	54.4	54.4
28-38	32	35.6	35.6	90.0
38-48	9	10.0	10.0	100.0
Total	90	100.0	100.0	

Table No.2 Demographic characteristics of the pregnant women studied

Gravida status		
Primigravidae	18	20
Multigravidae	72	80
pregnancy stage		
First	3	3.3
Second	7	7.7
Third	80	89
History of Abortion		
Yes	37	41
No.	53	59
History of Blood Transfusion		
Yes	4	4.4
No.	86	95.6
Total	N=90	100%

Table 2 shows the demographic characteristics of the pregnant women studied. In the majority of the study, in relation to gravidity, more of the subjects were multiparous (80%). (37%) of participants had history of abortion while (96%) had no history of blood transfusion.

DISCUSSION:

Several researches have been made on the HCVseroprevalence and different results were reported in various countries. This study aimed to estimate seroprevalence of HCV among pregnant women attending Omdurman Maternity hospital, Khartoum state, Sudan. This study found that there is no seropositivity (0%) among all the enrolled 90 pregnant women. This result was in agreement with another study that showed a very low percentage of sero-positivity among pregnant women in Sudan 2007(0.6% out of 423 women) [(5)]. The sero-positivity of HCV infection among pregnant women is lower than it among patients with schistosomal periportal fibroses in Al-Gezira state (2.2- 4.8%) [(7)] This study indicated that the percentage of HCV infection among pregnant women in Sudan might be near the

percentage in other countries like England, (0.8%) [10], generally, sero- positivity of HCV is seem to be higher in all other countries than in Sudan [8, 9], especially in Egypt which has the highest prevalence (20%) among other countries.

The low seroprvalence rate of HCV infection in Sudan may be due to the absence or low residence rate of the virus in our country.

Finally, the sero-positivity of HCV antibodies must be confirmed by another supplemental test such as polymerase chain reaction (PCR) and recombinant immunoblot assay (RIBATM).

RECOMMENDATIONS:

Further confirmation by studying larger sample size of population is recommended**.**

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