Sud Med Lab J, issue 1 vol 6 (2018): 109-116

OriginalArticle

Sudan Medical Laboratory Journal

Screening of Hepatitis C Virus among Blood Donors in the Central Blood Bank, Wad Medani Teaching Hospital - Gezira State, Sudan

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Abstract

Hepatitis C virus (HCV) infection is a major worldwide public health problem. The World Health Organization (WHO) estimates that 3% of the world's populations are chronically infected with HCV, most of these cases occur in Africa. The main objective of this study was to determine the prevalence Hepatitis C Viruses among blood donors attending to the Central Blood Bank in Wad Medani Teaching Hospital. This study was conducted during the period from 2012-2015. One thousand blood samples were collected. The mean age of the subjects was 28 1± 6.2 with a range between 18 and 49 years of age. When the selected subjects were screened for HCV by ELISA, only 2/1000 (0.2%) tested positive. This study concludes that the prevalence rate of HCV among blood donors in Wad Medani Blood Bank is 0.2%. Vaccination of HCV for the negative blood donors in is thence recommended.

Keywords: Hepatitis C, Blood Bank, ELISA, blood donors, Vaccination

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Introduction:

Hepatitis C virus (HCV) infection is a major worldwide public health problem. The World Health Organization (WHO) estimates that 3% of the world's populations are chronically infected with HCV, most of these cases occur in Africa [1]

HCV has a high rate of replication with approximately one trillion particles produced each day in an infected individual. HCV also has an exceptionally high mutation rate, a factor that may help it illude the host's immune response. HCV mainly replicates within hepatocytes in the liver. It utilizes the intracellular machinery necessary to accomplish its own replication [2].The prevalence of chronic hepatitis C ranges from 0.1 to 5% in different countries [3]. It is estimated that there are 4 million HCV chronic carriers in the US and 5 million in Western Europe. The prevalence seems to be higher in Eastern Europe compared to Western Europe. In industrialized countries, HCV accounts for 20% of cases of acute hepatitis, 70% of cases of chronic hepatitis; 40% of cases of end stage cirrhosis, 60% of cases of HCC and 30% of liver transplants [4]. Mudawi, *et al* (2007) in a cross sectional study carried out in Gezira State of Central Sudan, (an area with a high prevalence of *Schistosoma mansoni* infection), to determine the prevalence, common genotypes and risk factors for hepatitis C virus infection in Sudanese patients with hepatosplenic schistosomiasis antibodies and risks factors for HCV infection [5].

Material and Methods:

This study aimed at the prevalence determination of the Hepatitis C Virus among blood donors attending the Central Blood Bank in Wad Medani Teaching Hospital.

According to the random stratified sampling technique, 1000 samples were selected for this study, according to blood donors. All vaccinated blood

donors were excluded from the study. Five ml of venous blood were drawn from each participant into EDTA containing tube after obtaining a written informed consent. Anti-HCV antibody was screened spectrophotometrically by ELISA and the absorbancy against assay concentration was registered. Further data was collected by a questionnaire. A descriptive analysis was done by the statistical package for Social Sciences (SPSS)® version 16.

Results:

This study consisted of a total of 1000 blood donors from the Central Blood Bank in Wad Medani Teaching Hospital. All the selected subjects were screened for anti-HCV antibodies using both ELISA and ICT. The mean age of the subjects was 28 years 1 ± 6.2 with a range between 18- 49 years. All of them were males. When the selected subjects were screened for HCV by ELISA, for detection of anti-HCV antibodies, only 2/1000 (2%) were positive for HCV. Those samples, which were confirmed by ICT were also positive. Both of the individuals, who tested HCV-positive, were males with an age of 36 and 47 years. One was a labourer and the other was a driver. Both of them were from the urban areas. One out of the two had previously experienced injury and the other had undergone surgery. When the 998 samples that were tested negative by ELISA, were selected for HCV screening by ICT, all of them were found negative for HCV.

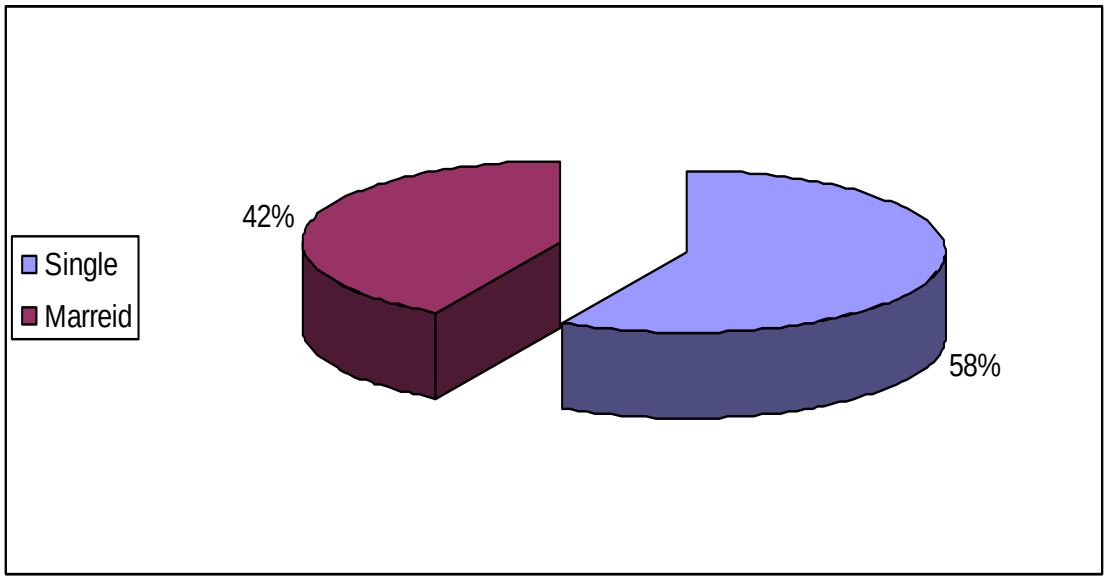
When the blood donors were classified according to age groups, the majority of them were between 21-28 years, 509 (51%), followed by 29-36 years, 320 (32%), 37-44 years, 93 (9.2%) and 45-52, 13 (1.3%) as shown in Table (1).

The majority of the study subjects were single 581/1000 (58%), while only 419/1000 (42%) were married as in (Fig 1).

Table 1: The Distribution of the Study Subjects by Age. (N=1000)

Age group	Frequency
<20	65 (6, 5%)
21-28	509 (51%)
29-36	320 (32%)
37-44	93 (9, 2%)
45-52	13(1, 3%)
Total	1000 (100%)

Figure: 1. The Distribution of the Study Subjects According to their Marital Status.



Discussion:

Hepatitis C virus (HCV) infection has been reported to be a prevalent disease since the second half of the 20th century[6]. It is also a major cause of

end stage liver disease in many parts of the world. Approximately 3% of the world populations, 170 million people, are chronically infected by HCV[7]. HCV is transmitted primarily by exposure to infected blood. However, in up to 50% of cases no recognizable transmission factor/route could be identified[8].

The studies on HCV infection in Sudan demonstrated similar seroprevalence ranging from 2.2% in the Gezira state, an area endemic with schistosomiasis to 4.8% in patients with schistosomal periportal fibroses [9]. 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%. Major risk factors for infection were the longer durations of dialysis, dialyses in multiple centers, and the age above 30 years.

These findings were again Low compared to those obtained by Abou *et al*., (2009) in Nyala, Sudan that were reactive for anti-HCV (0.65%). [10]

These results were Low compared to those obtained by Elsheikh who found that the prevalence of anti-HCV among pregnant women in Sudan was 0.6%[11]. These results were inconsistent with those reported by Sirchia, in Italy [12], who found a prevalence of (1%). Almost a bit similar to that were the results obtained by Frommel in Ethiopia (1.4%) and Aceti had reported a relatively lower result in Somalia (0.97%) [13,14]. Studies carried out in Saudi Arabia (1992) revealed that HCV infection was more prevalent among apparently healthy individuals, who were over 50 years of age (5%). However, studies conducted in Egypt (1993) among university student blood donors showed HCV prevalence of 9.2%, while a prevalence of 26.6% was obtained among blood donors in Cairo. The results of this study were high compared to those obtained by Abdelbagi M. Nagi, in Shandi, Northern Sudan who found that the Seroprevalence of anti HCV antibodies among blood donors was (1.3%) [15].

Blood Donors are often victims of occupational injuries by contaminated tools or projection of contaminated fluids in to mucous membranes and are therefore at risk for transmission of HIV, HBV and HCV. Van Wijk and Pelk-Jongen[16] stated that blood exposure incidents pose a risk for transmission of blood borne pathogens among health care workers.

Conclusion and

Recommendations:

The HCV infection is a serious menace, especially, that it can develop easily to Chronic HCV, which might, eventually, maturate into cirrhosis of the liver and hepatocellular carcinoma (HCC) both of which are fatal diseases. Notwithstanding the relatively low prevalence of HCV, locally one should bear in mind that the hovering threat of the transmission from neighboring countries. Egypt, for instance, has the highest rate of infection in the globe and the entire African states are not secure. Vaccination and proper treatment are recommended.

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