

## Recent Hepatitis E Virus Infection in Group of Sudanese Males Blood Donors

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### Abstract

**Background:** Hepatitis E is a liver disease caused by infection with a virus known as the hepatitis E virus (HEV). The Hepatitis E Virus (HEV) is a significant international public health problem and it is estimated that 2.3 billion people are infected globally. HEV can be transmitted by blood transfusion and has recently been found in donated blood in a number of countries and the increased HEV incidence raises concerns about the safety of blood and blood products.

**Objective:** This study aimed to determine the prevalence of acute HEV infection in a group of Sudanese males blood donors, and the potential risk of infection by blood transfusion.

**Methods:** Hospital-based Cross-sectional Study was carried out among 90 Sudanese males blood donors who attended blood bank of Omdurman Teaching Hospital during the period from April to July (2014). Serum samples from the blood donors were tested for the marker of acute HEV infection (IgM anti-HEV antibody) using a specific enzyme-linked immunoassay (ELISA) kit. A structured questionnaire was used to gather socio-demographic data and clinical data.

**Results:** Out of the 90 Sudanese males blood donors tested, 7.8% (7/90) were positive for the marker of acute HEV infection (HEV IgM).

**Conclusion:** The detection of HEV IgM reflects acute Hepatitis E virus infection among blood donors and is a wake-up call for the potential risk of HEV infection by blood transfusion.

**Keywords:** Hepatitis E Virus, Blood Donors, ELISA, IgM Anti-HEV, Sudan

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## Introduction

Hepatitis E virus (HEV) is a spherical, non-enveloped, single-stranded RNA virus that belongs to the new genus, *Hepevirus* [1]. HEV is the major cause of enterically transmitted non-A, non-B (NANB) hepatitis in many parts of the world [2]. Hepatitis E is an acute disease with an abrupt onset of nonspecific symptoms followed by jaundice, anorexia, malaise, nausea, and vomiting [3]. It affects primarily young adults and is generally mild [4]. Among all the responsible hepatitis viruses, HEV is associated with the largest number of fulminant hepatitis cases (3.0%) in the general population, and up to 20% in pregnant women [5]. Epidemiological studies have shown that HEV infection is quite common in some areas of the world, such as India, Africa, and Southeast Asia, where it can represent the main cause of acute hepatitis [6]. Hepatitis E virus causes sporadic infections, but also large epidemics, usually transmitted through orofecal routes due to contaminated food or water [7, 8]. HEV can be transmitted by blood transfusion and has recently been found in donated blood in a number of countries, and the increased HEV incidence raises concerns about the safety of blood and blood products [9]. Patients who are immunosuppressed (such as solid organ transplant recipients, patients treated for malignancies, or those infected with HIV) which commonly receive blood transfusions; these patients are at risk of fulminant hepatitis or chronic rapidly progressive liver disease from an HEV infection [10]. Therefore, this study was aimed to investigate the presence of HEV infection among blood donors.

## Methods

This cross-sectional study was carried out between April to July 2014. A total of ninety subjects ( $n = 90$ ) were included in this study. The blood donors' ages ranged from 22 to 50 and all of them were males. From the study participants, serum samples were obtained and personal and clinical data were collected and tested for HEV IgM antibody using Enzyme-Linked Immunosorbent assay (ELISA) (Wantai, China).

## Statistical analysis

Data were entered into the computer using Statistical Package for the Social Sciences (SPSS) and double-checked before analysis. Significance of difference was determined using the chi-square test. Statistical significance was set at  $P$  values  $< 0.05$ .

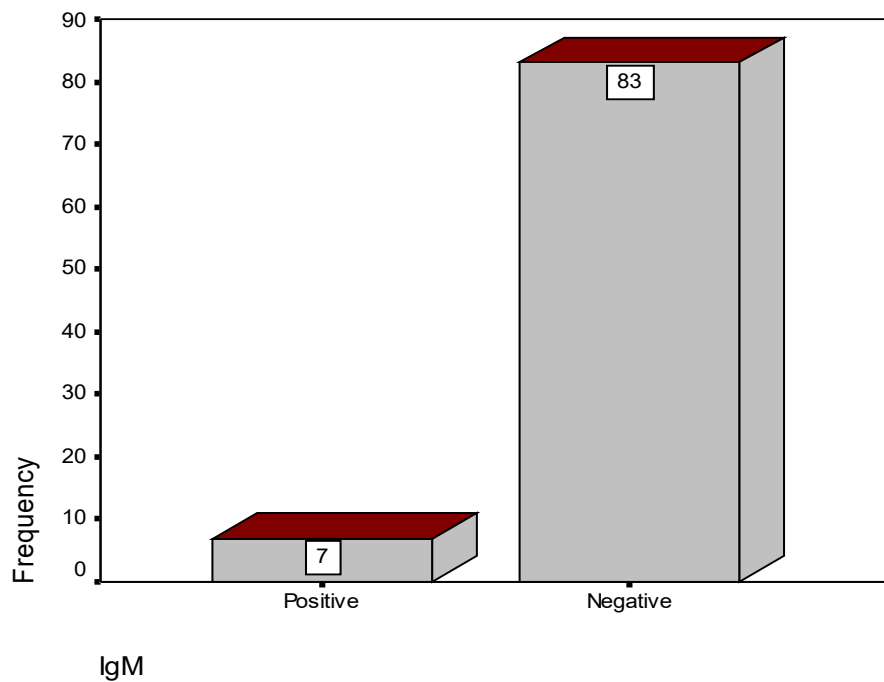
## Results

### Detection of HEV IgM among Sudanese males blood donors

Out of the 90 blood donors tested, 7 subjects (7.8%) were HEV IgM positive, while 83 subjects (92.2%) were negative for HEV IgM (Figure 1).

### Gender and age characteristics for the participants' blood donors

All the participants were males, the age range of the donors was from 22 to 50 years, with a mean age of 31 years, subjects were divided into two age groups ( $\leq 31$  years and  $> 31$  years) in order to evaluate the effect of age on HEV seropositivity, there was no significant difference ( $P > 0.05$ ) between the two age groups on HEV IgM seropositivity (Table 1).



**Fig. 1. Detection of HEV IgM among Sudanese males blood donors.**

### **Residence characteristic for the participants' males blood donors**

The results presented in table 2 demonstrate that there was no significant difference ( $P > 0.05$ ) between the residence and HEV IgM seropositivity.

**Table 1: Age characteristic for the participants' males blood donors**

Serological marker (IgM Anti-HEV antibody)		Age groups (Years)			
		≤ 31 years		> 31 years	
		NO	%	NO	%
IgM Anti HEV	Positive	3	3.4	4	4.4
	Negative	52	57.8	31	34.4

**Table 2: Residence characteristic for the participants' males blood donors**

Serological marker (IgM Anti-HEV antibody)		Residence			
		Urban		Rural	
		NO	%	NO	%
IgM Anti HEV	Positive	5	5.6	2	2.2
	Negative	48	53.3	35	38.9

## Discussion

There are accumulating reports which suggest a potential risk of HEV transmission by blood transfusion. However, detection of serological markers for HEV infection or HEV RNA in Sudan blood banks is not routinely performed and screening of the blood supply for HEV infection would not be cost-effective.

The prevalence rate of the marker of acute HEV infection (IgM anti-HEV) observed in this study was 7.8% which is considerably higher than those findings previously reported by Johargy *et al.* (2013)<sup>[11]</sup> in Makkah, Saudi Arabia (4.3%), Ibrahim *et al.* (2011)<sup>[12]</sup> in Egypt (0.45%) and others have reported prevalence rates of 0.94% in China to 3.6% in Hong Kong Guo *et al.* (2010)<sup>[13]</sup>. There was no association between the IgM anti-HEV Ab and ages. The probability of exposure to HEV was higher in urban than rural population. This was similar to Bortoliero *et al.* (2006)<sup>[14]</sup> but disagrees with Mansuy *et al.* (2011)<sup>[15]</sup> in South West France, which stated that the prevalence rate was higher in rural subjects as compared to that in urban subjects. These results indicate the occurrence and magnitude of outbreaks are strongly associated with hygienic conditions and population density.

## Conclusion

This study demonstrates the incidence of HEV infection among Sudanese males blood donors at Omdurman Teaching Hospital. This is a wake-up call for the potential risk of HEV infection by blood transfusion and may be a source of the outbreak. Preventive strategies such as serological screening of anti-HEV IgM among blood donors should be introduced to reduce the transfusion-transmitted risk for HEV infections in the recipient's patients. Blood and blood units screened positive for HEV are recommended to be discarded. This may be of special importance to individuals who are immunocompromised or who are unable to achieve viral clearance and thus may suffer from other clinical consequences.

## Ethical approval and consent

This study was approved by the Sudan University of Science and Technology ethical committee board and all subjects examined were informed of the purpose of the study before collection of the specimens and verbal consent was taken from them.

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