

Seroprevalence of *Hanta* Virus IgM Antibody in Febrile Patients in West Kurdofan State, Sudan

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Abstract

Background and Objective: The *Hanta* virus genus in the *Bunyaviridae* family, which contains several important human pathogens that are prevalent worldwide, depending on this point the present study aimed to determine the seroprevalence of *Hanta* Virus IgM Antibodies among Febrile Patients in West Kurdofan State, Sudan.

Methods: This was a health facility based descriptive cross - sectional study include 100 blood samples, about (5 ml) were withdrawn from each Sudanese febrile patients and centrifuged at 3000 rpm for 5 minutes to obtain plasma, which was then stored at -20°C and examined for *Hanta* virus IgM antibodies using indirect Enzyme-linked Immunosorbent Assay (ELISA) kit (Euro Immune – Germany).

Results: This study was relived a positive seroprevalence of *Hanta* virus by (16%) and the rest examined patients were representing negative results of (84%).

Conclusion: Finally this study represented significant finding of *Hanta* virus in (16%) in our individuals due to present of the IgM antibodies which unfortunately translate present of IgG antibodies of this serious virus previously by high percentage. We recommend that the screening of *Hanta* virus seroprevalence should be examined among any febrile patients to reduce the miss diagnoses mistakes.

Keywords: *Hanta* Virus; ELISA; IgM; Febrile Patients; West Kurdofan State; Sudan

Introduction and Literature Review

The *Hanta* virus genus in the *Bunyaviridae* family, that contains several important human pathogens that are prevalent worldwide [1,2]. *Hanta* viruses, negative-sense single-strained RNA viruses, represent a separate genus in the *Bunyaviridae* family. More than 20 *Hanta* virus species had been classified, and many more unclassified species were identified. They were hosted by several species of rodents (Rodentia), insectivores (Insectivora), and bats (Chiroptera) [3]. However; in contrast to other genera of the *Bunyaviridae*, *Hanta* virus is transmitted to human not by arthropod but from contact with persistently infected rodents and their secretions [4]. This group of viruses includes the etiological agents of hemorrhagic fever with renal syndrome (HFRS), which largely seen in Europe and Asia and *Hanta* viruses causing (cardio) pulmonary syndrome (HCPS) in the Americas. The clinical severity of *Hanta* virus infections ranges from asymptomatic infections to fulminate hemorrhagic shock and death [1,2]. Transmission of *Hanta* virus to humans occur mainly through inhalation of aerosolized rodent excreta and *Hanta* virus infections are therefore limited to the geographic regions inhabited by the infected animal hosts. Today; a wide array of *Hanta* viruses has been detected in numerous rodent or insectivore species [5,6]. *Hanta* virus infection could cause severe disease in human. Depending on the species type of *Hanta* virus, either Hemorrhagic fever with renal syndrome (HFRS) or Cardiopulmonary syndrome which may occur after inhalation of virus-containing aerosols [7]. The first outbreak of HFRS occurred during the Korean War and so HFRS was initially called Korean hemorrhagic fever. HFRS is the less fatal form of *Hanta* virus infection with

mortality rates in the region of 12% as compared to 60% mortality rate with HPS [8]. Clinical manifestations of *Hanta* virus Cardiopulmonary syndrome illness begins with a febrile prodrome with fever and myalgia which typically lasts 2 - 4 days, but it may be as long as a week to 10 days [9,10]. The *Hanta* virus causing pulmonary syndromes (HPS), reproduce four clinical phases, the first phase includes fever prodrome, then cardiopulmonary involved, the it followed with diuresis and convalescence [11]. This study was aim to determine the seroprevalence of *Hanta* Virus IgM Antibody in Febrile Patients in West Kurdofan State, Sudan.

Materials and Methods

Study Design and Duration

This was a health facility based descriptive Cross-sectional study included febrile patients, conducted in West Kurdofan State, Sudan.

Study Population and Sample Size

A total of 100 blood samples were collected from febrile patients including 71 females and 29 males, complained of fever and other symptoms like headache and general body pain, patient’s positive for Malaria and Typhoid fever were excluded from the study.

Laboratory Work and Protocols

A100 blood samples were collected from febrile patients then centrifuged at 3000 rpm for 5 minutes to obtain plasma which was then stored at -20°C until further analysis.

Indirect Immunoassay for *Hanta Virus* IgM Antibody Detection

Plasma samples were examined for anti-*Hanta* Virus IgM antibody by indirect Enzyme-linked Immunosorbent Assay (ELISA) kit (Euroimmun Medizinische Labordiagnostika AG D-23560 Lubeck (Deutschland). Seekamp 31.

Data Analysis

Statistical analysis was done by using Statistical Package for Social Science program (SPSS- version 16).

Results

The results of the current study showed seroprevalence of *Hanta* IgM antibodies among (16%) individuals and negative results among (84%) of the total samples which clarified in table 1. The results was also clarified according to the gender and age group criteria as the following, according to the gender the *Hanta* IgM antibodies among male show positive in 7 (24.1%) individuals and negative in 22 (75.9%) individuals, the female show positive in 9 (12.7%) individuals and negative in 62 (87.3%) individuals, according to the age group the study individuals was classified into three groups the first group < 30 show positive in 6 (30%) individuals, the second group 30 - 50 show positive results in 7 (16.7%) individuals, the last group > 50 show positive results in 3 (8.8%) individuals which clarified in table 2.

Gender	Hanta IgM antibodies		Total (%)
	Positive (%)	Negative (%)	
Male	7 (24.1)	22 (75.9)	29(29)
Female	9 (12.7)	62 (87.3)	71(71)

Table 1: The total study results.

Age group	Hanta IgM antibodies	
	Positive (%)	Negative (%)
< 30	6 (30)	14 (70)
30 - 50	7 (16.7)	35 (83.3)
> 50	3 (8.8)	31 (91.2)

Table 2: The study results according to the gender and age group.

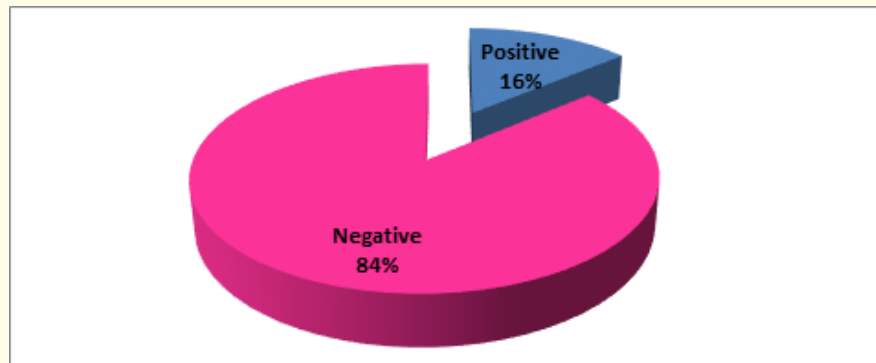


Figure 1: Showing the seroprevalence of *Hanta virus* IgM antibodies.

Discussion

Recognizing *Hanta* virus infection in humans and rodents is important not only to identify potential human pathogens, but also to understand how and from where the viruses are transmitted to humans. We detected *Hantavirus* IgM antibodies using an indirect Enzyme-linked Immunosorbent Assay in 16 people were most likely in the acute phase of infection,

There are several studies conducted on this serious virus using different techniques which were support our study strongly showing significant appearance.

Hantavirus infections of humans are reported primarily in adults [12]. Cases are usually sporadic [13], study which reported in Colombia and Brazil which done by Limongi., *et al.* [14] and Londoño., *et al* [15]. Other occupations at risk of exposure to rodents or their nesting debris include: telephone installers, oil workers, plumbers, electricians, pest control officers, certain construction and maintenance workers whose roles are to clean, demolish or otherwise work in areas that may be infested with rodents [16].

Although outbreaks have been reported [8,17]. The first outbreak of HPS identified in North America was in 1993 in the United States of America [8]. Since then, more than 2,000 cases of HPS caused by different strains have occurred in sporadic clusters throughout the Americas [8]. Cases of HPS have been reported in the following American countries: the United States, Canada, Argentina, Bolivia, Brazil, Chile, Panama, Paraguay and Uruguay [8].

HPS cases have been reported in at least 30 U.S. states, the majority in the western half of the country and occurring in residents in rural areas [8]. lastly the study of laboratory workers processing clinical specimens [18,19].

Conclusion

Understanding the dynamics of the spread of *hantavirus* infection in our population, may have important implications for public health. Such long-term study would lead to risk assessment on the possibility of turning the spot located outbreaks into endemic area of *hantavirus* occurrence in animal habitat. The significant increase of human *hantavirus* infections observed in 2014 indicates an important cognitive aspect of such research. Knowledge of the mechanisms and factors favoring the consolidation of the virus in the environment would allow for the development of evidence-based information to the public about the risk factors posing a threat to *hantavirus* infections and ways to prevent them.

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