

# Seroprevalance of Hepatitis B Virus Markers Among Village Midwives in Khartoum State, Sudan, 2014

Yosra Mohammed Osman Abu Swait<sup>2, \*</sup>, Taha Ahmed Elmukashfi Elsheikh<sup>1</sup>,  
Abdelgadir Ali Bashir<sup>2</sup>, Siham Ahmed Balla<sup>1</sup>, Asma Abdelaal Abdalla<sup>1</sup>, Zeinab Swareldahab<sup>1</sup>

<sup>1</sup>Department of Community Medicine, Faculty of Medicine, University of Khartoum, Khartoum, Sudan

<sup>2</sup>Khartoum State Ministry of Health, Khartoum, Sudan

## Email address:

yosraabuswait@yahoo.com (Y. M. O. A. Swait)

\*Corresponding author

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**Abstract:** Background information: HBV infection is a serious health problem and a leading cause for morbidity and mortality. Objective: To determine HBV markers ((Anti-HBcore (IgM), Anti-HBcore (IgG), HBsAb, HBsAg, and HBeAg)) among Village Midwives in Khartoum State, Sudan, 2014. Method: It is a cross sectional study where 335 village midwives were surveyed. A pre-tested close ended questionnaire was used for demographic data. Five ml of venous blood was collected; sera were separated and stored at -20° centigrade for Eliza testing. All specimens were tested for Anti-HBcore (IgM), Anti-HBcore(IgG) and HBsAb. Positive specimens for Anti-HBcore were tested for HBsAg and positive specimens for HBsAg were tested for HBeAg. Data was analyzed by using statistical package of social sciences (SPSS) version (16). Z-test for single proportion was used to compare between the actual prevalence of HBV markers and the expected rates in the absence of risk. P value equal or less than 0.05 was considered statistically significant value. Result: Positive Anti-HBcore (IgG) accounted to 113 (34%), positive HBsAg was 57 (57%), and positive HBsAb was 7%. The results were significant at 5% confidence level, since all P-values were less than 0.001. There was no positive HBeAg to express high infectivity rate or Anti-HBcore (IgM) to reflect acute infection rate among the respondents. Conclusion: Infection rate of HBV was high, while the related immunity was low among Village Midwives in Khartoum State, Sudan.

**Keywords:** HBV, Village Midwives, Khartoum State, Sudan

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## 1. Introduction

### 1.1. Background Information

HBV infection is a serious health problem and a leading cause for morbidity and mortality. As a carcinogen, it is second to tobacco [1, 2]. Unsafe injections, invasive procedures, equipment reuse, occupational exposures and unsafe transfusion are the main mode of transmission in the health care setting [2, 3]. Sudan situated in the area of high endemicity for HBV where HBsAg level is above 8%; and the transmission is vertically from mother during early childhood [4-7]. In Sudan, positive Anti-HBcore reported to be 47% - 78%, and HBsAg 6.8% - 26% [6]. HBV markers

are significantly correlated with hazards of occupation [8]. Positive HBsAg was reported in 70% of women of child bearing age in Gezira State in Central Sudan [4]. The degree of exposure to infected contaminated instruments and the duration of work are occupational risks [9]. In a study of HBV markers among HCWs in Public Teaching Hospitals in Khartoum State, Sudan, the prevalence of Anti-HBc, HBsAg, HBsAb, and HBeAg is 57%, 6%, 37% and 9% respectively; while that of Anti-HBcore total among midwives equal 73.3%.  $P < 0.05$ . [10, 11]. In a community base study in Um Zukra village in Gezira State in Sudan; Anti-HBcore is positive in 47.5% of the respondents [12]. Home delivery is preferred by 80% of women in Sudan [13]. Aim of the study was to determine the seroprevalence of HBV markers among

village midwives in Khartoum State, Sudan; 2014. To our knowledge no published studies were conducted among Village Midwives in Khartoum State, Sudan. So this study will provide information about seroprevalence of HBV markers among Village Midwives in Khartoum State.

**1.2. Objective**

To determine HBV markers (Anti-HBcore (IgG), Anti-HBcore (IgM)), HBsAg, HBsAb, and HBeAg among Village Midwives in Khartoum State, Sudan; 2014

**2. Materials and Methods**

**2.1. Study Design**

Cross-sectional study

**2.2. Study Area**

The study was carried out in Khartoum State which is the capital of Sudan. The total population estimated as 6.430.000 according to the census of the year 2008. It includes seven localities as shown in the map below:

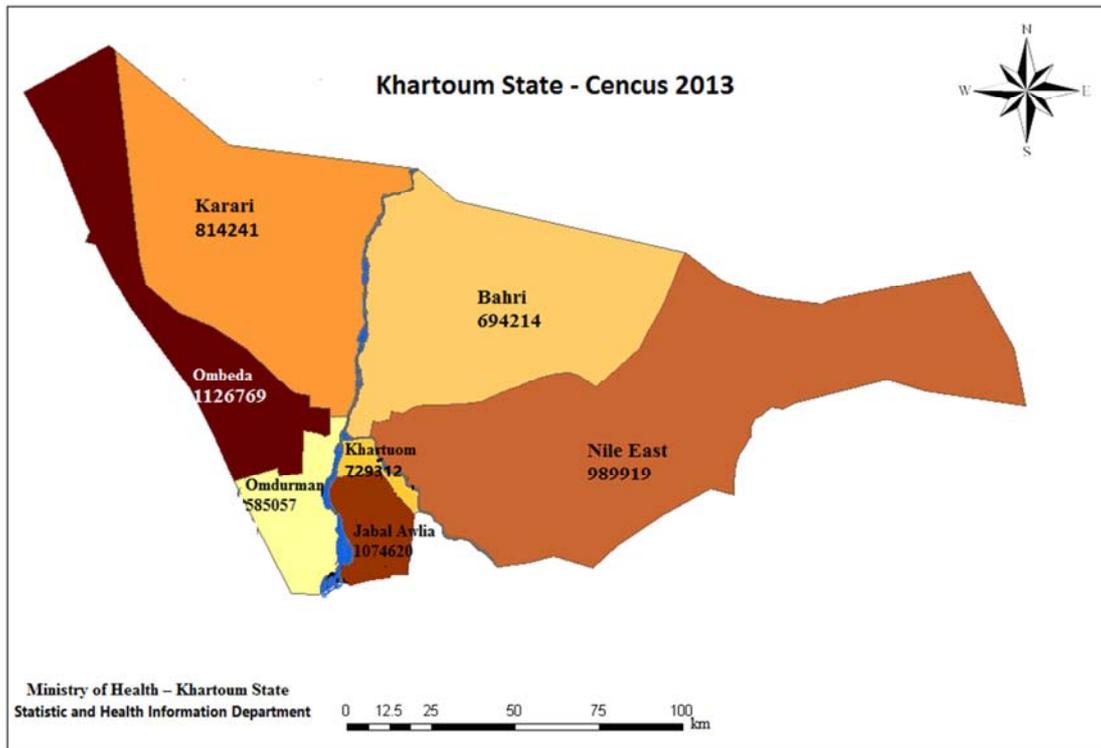


Figure 1. Khartoum State Map.

**2.3. Study Population**

*Village midwives:-*

They are midwives receiving training program for one year and who licensed their bags in Khartoum State, Sudan, 2013.

**2.4. Sample Frame**

The study includes all village midwives in Khartoum State providing reproductive health services for at least the last twelve months.

Table 1. Sample Frame.

Locality	No. of VMW
BAHRI	217
NILE EAST	480
KHARTUOM	68
JABAL AWLIA	293
OMDURMAN	165
OMBEDA	390
KARARI	235
TOTAL	1848

**2.5. Sampling Technique**

One stage stratified sampling

**2.6. Calculation of the Sample Size**

According to the formula:

$$n = \frac{N}{(N-1)d^2+1} = \frac{1848}{1847 \times 0.0025+1} = 329 \quad (1)$$

n=the required sample size

N=Total number of VMWs in Khartoum State

d= 5%= 0.05desired margin of error

NRR = Non-response rate = 1.8%

So, n =329+6 = 335

The distribution of the sample among the seven localities was proportionally according to their contents of village midwives.

*Sample Size:*

**Table 2.** Distribution of the Sample Size among Khartoum State Localities.

Locality	No. of VMW	Sample Size
BAHRI	217	39 (11.6%)
SHARG-ANIL	480	87 (26.0%)
KHARTUOM	68	13 (3.9%)
JABAL AWLIA	293	53 (15.8%)
OMDURMAN	165	30 (9.0%)
OMBEDA	390	71 (21.2%)
KARARY	235	42 (12.5%)
TOTAL	1848	335

**2.7. Data Collection**

- Study variables are:
  - 1 Sero-prevalence of HBV markers.
  - 2 Age
  - 3 Marital status
  - 4 Level of education
- Tools of data collection:
  - Questionnaire
  - Blood sample for investigation for HBV markers.

**2.8. Data Analysis**

Eliza was used to test for Anti-HBcore (IgG and IgM), and HBsAb in the sera of all respondents, and HBsAg, HBeAg for positive Anti-HBcore and HBsAg samples respectively. Data was analyzed by using statistical package of social sciences (SPSS) version (16); Z-test for single proportion was used to

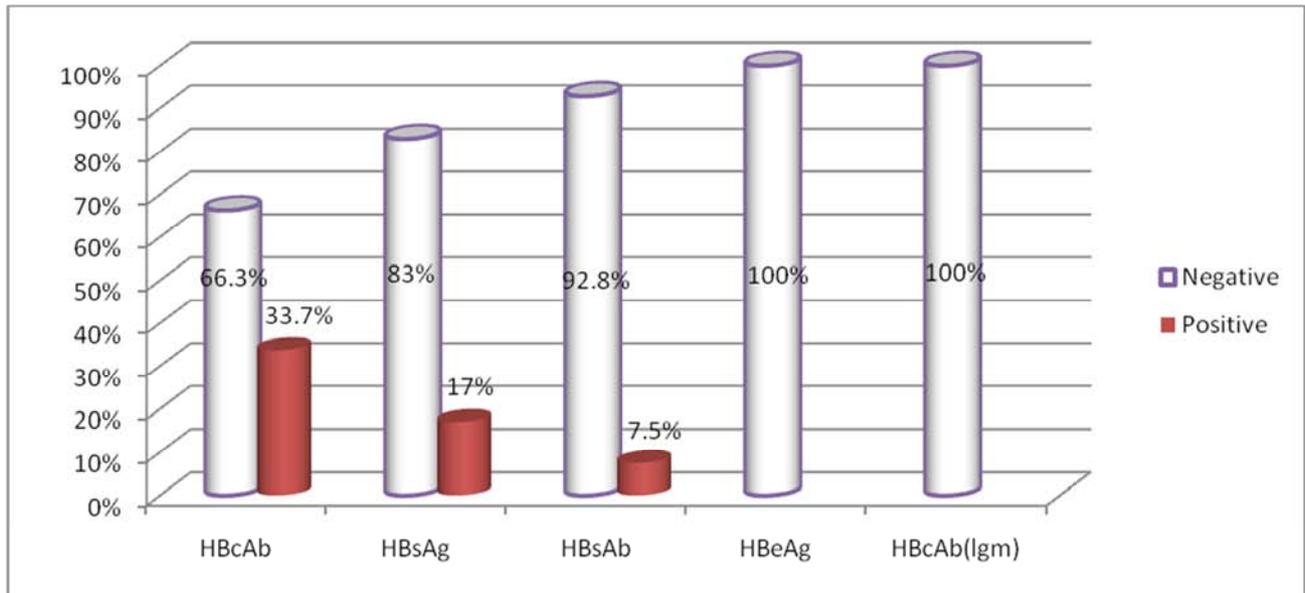
compare between the actual prevalence of HBV markers and the expected rates in the absence of risk. P value equal or less than 0.05 was considered statistically significant.

**3. Ethical Consideration**

Approval was obtained from the Sudan Medical Specialization Board; then from the Ministry of Health of Khartoum State. Finally written consent was obtained from each participant.

**4. Results**

Three hundred and thirty five respondents were surveyed. They are distributed among the seven localities of the state; 21.2% in Ombada, 26.0% in Sharg-anil, 15.8% in Jbal-Aawlia, 11.6% in Bahri, 12.5% in Karary, 9.0% in Omdurman, and 3.9% in Khartoum localities. Out of them 61.8% were married, 16.4% widow, 11.3% divorced and 4.8% were not married. For education 0.9% university graduate, 9.8% secondary certificate, 14.2% intermediate, 50.2% primary, 1.9% Quranic School and 23% illiterate. The mostly represented age group in the study is the age group 30-49 with a percentage of 65.8% followed by the age group of more than 50 years (29.5%), and the least one is the age group of <30 years (4.6%).



**Figure 2.** Prevalence of HBV markers among village midwives in Khartoum State, Sudan, 2014 (n = 335).

Figure 2 indicated that 113 (33.7%) of the participants had positive Anti-HBcore (IgG), 57 (50.4%) had positive HBsAg and 24 (7.5%) were positive for HBsAb. There is no HBeAg (high infectivity rate) or Anti-HBcore (IgM) (acute infection rate) among the respondents.

**Testing Research Hypothesis:** There is a high prevalence of infection, carrier, immunity, profile of high infectivity and acute infection rates of HBV among Village Midwives in Khartoum State, Sudan, 2014.

The argument is that, given the greater risk to HBV exposure by Village Midwives in Khartoum State, we expect high prevalence of infection, carrier, immunity, profile of high infectivity and acute infection rates of HBV among them. To test this hypothesis, Z-test was used to compare between the actual prevalence of infection, carrier, immunity, profile of high infectivity and acute infection rates and the expected rates in the absence of risk. The results of the tests were given in Table 3 below.

**Table 3.** Z-test for single proportion testing prevalence of HBV markers among village midwives in Khartoum State, Sudan, 2014 (n = 335).

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
Anti-HBcore (IgG)	Group 1	Positive	113	.34		
	Group 2	Negative	222	.66	.50	.001
	Total		335	1.00		
HBsAg	Group 1	Positive	57	.50		
	Group 2	Negative	56	.50	.50	.001
	Total		113	1.00		
HBsAb	Group 1	Positive	24	.07		
	Group 2	Negative	311	.93	.50	.001
	Total		335	1.00		
HBeAg	Group 1	Negative	57	1.00	.50	.001
	Total		57	1.00		
Anti-HBcore(IgM)	Group 1	Negative	335	1.00	.50	.001
	Total		335	1.00		

Table 3 indicate the findings of the Z-testas follow:

- 1 *Anti-HBcore (IgG)*:Village midwives who were have past HBV infectionaccounted for 113(34%). P-value of Z-test is 0.001.
- 2 *HBsAg*:There were 57 (57%)village midwives currently infected; which considered as carriers. P-value of Z-testis 0.001.
- 3 *HBsAb*: The prevalence of immunity in the study population is 7%. P-value of Z-test is 0.001.

The above results are significant at 5% confidence level, since all P-values are less than 5%. Even if the level of confidence is 1%, also all results are significant since the P-values are less than 1% (P<0.001).

## 5. Discussion

Hepatitis B virus infection is a blood borne viral infection that affect the liver and cause chronic liver cirrhosis. Village Midwives, a cadre of paramedical workers responsible for at home normal deliveries. They are at high risk of exposure to HBV infection because they deal with the blood, amniotic fluid and other body fluids during handling the clients. Their low basic education level and the inadequate midwifery training make them more prone to blood-borne infection such as hepatitis B and human immunodeficiency viruses.

This study showed that the prevalence of Anti-HBcore (IgG), an indicator for past or ongoing infection among this group of midwives was 34% which was less than the prevalence of HBV infection rate among health workers in Uganda, 2003 where a prevalence of Anti-HBcore is 59.3% among midwives [14]. This was,also, less in comparison to local studies including midwives as a sub group of health care workers. In study of a socio demographic characteristic of health care workers and HBV infection in Public Teaching Hospitals in Khartoum State, 2011, which showed 57% infection rate, also other study (hazards analysis within departments and occupations for HBV among Health Care Workers in Public Teaching Hospitals in Khartoum State, 2011, showed 73.3% infection rate among midwives, this high prevalence difference may be due to that Village

Midwives work at home with limited exposure because they only provide services to those live in the catchment's area they live in, in comparison to those work at hospitals may be due to handling much more clients. [10, 14]. The study showed that none of the participants had HBeAgor positiveAnti-HBcore (Igm).

## 6. Conclusion and Recommendations

This study showed that infection rate of HBV is high,while immunity against it is low among Village Midwives in Khartoum State, Sudan. Screening for HBV infection,vaccination for all VMWs in the Midwifery school or at least before starting job practice and a study of seroprevalence of HBV markers among them to cover all States of Sudan to show a clear picture of prevalence of HBV markers among them in Sudan, is highly recommended.

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