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Sero-Prevalence of Hepatitis B Virus Infection and Associated Factors among Pregnant Women Attending Antenatal Care at Edna Adan University Hospital Hargeisa, Somaliland, 2022 - A Cross-Sectional Study

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Abstract

Background: Hepatitis B infection is a potentially life-threatening liver disease caused by the hepatitis B virus. More than 300 million people have chronic liver infections globally and about 600,000 people die annually from the complications of hepatitis B infection.

Objective: The aim of this study was to determine seroprevalence of HBV and associated factors among pregnant women at Edna Adan University Hospital, Hargeisa, Somaliland.

Methods: Hospital-based cross-sectional was conducted on a total of 251 pregnant women from May to June 2022. A systematic sampling method was used and pretested structured questionnaires were used to collect socio-demographic characteristics and other associated factors. Therefore, 5ml of venous blood was collected aseptically from each the participants, HBsAg was screened using SD-Bioline rapid test. Logistic regression analysis was conducted to determine associated factors of HBV infection.

Results: The overall prevalence of hepatitis B virus infection among pregnant women was (4.4%). history of abortion (AOR = 6.76 95% CI 1.21-37.87), history of blood transfusion (AOR = 9.3, 95% CI 1.57-55.10) history of tooth extraction (AOR = 14.22, 95% CI (2.050-98.330) and history of surgical procedure (AOR = 5.87 95% CI 0.910-37.740) were significantly associated with HBV seropositivity.

Conclusion: Intermediate endemicity of seroprevalence of HBV infection among pregnant women in ANC Edna Adan Hospital was reported according to WHO classification. Therefore. Health education programs should be done to avoid non-sterile tooth extraction and all facilities should strictly follow sterile procedures in all surgical procedure.

Keywords

Edna Adan hospital, Hepatitis B virus, SD-Bioline, Pregnant women, Hargeisa

Introduction

Hepatitis B infection is a potentially life-threatening liver disease caused by hepatitis B virus. Viral hepatitis is an inflammation of the liver by viruses affecting millions of people every year. Among five different types of hepatitis viruses, the most common virus that affects liver is Hepatitis B viruses [1].

More than 300 million people have chronic liver infections globally and about 600,000 people die annually from acute or chronic complications of hepatitis B infection. Hepatitis B prevalence is highest in sub-Saharan Africa and East Asia, where between 5 and 10% of the adult population is chronically infected [2].

HBV infection during pregnancy is closely related to high risks of maternal complications including: pre-eclampsia, placenta Previa, preterm delivery, placental separation, antepartum hemorrhage, preterm labour, increased incidence of intraventricular hemorrhage, gestational diabetes mellitus and mortality with a high rate of vertical transmission leading to fetal and neonatal hepatitis [3,4]. Furthermore, vertical transmission of HBV to the babies causes a serious risk

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of developing chronic liver disease, cirrhosis of the liver, as well as hepatocellular carcinoma in their later life and a significant number (25%) them will die as adults due to liver disease [5]. Somaliland is one of the sub-Saharan countries with a high endemicity of HBV. Understanding the current prevalence and risk factor is important to design health policies and interventions that can help improve pregnancy outcomes, and also reduce the risk of perinatal transmission. Considering the sever impacts of infection and diseases on pregnancy outcomes and infants born to infected mothers, exploring associated factors of the infection is of paramount importance in the prevention of the disease. Furthermore, the findings of this study would also contribute in improving the scanty of data prevalent in the study area. Therefore, the aim of this study was to determine seroprevalence and associated factors among pregnant women attending ANC at Edna Adan University Hospital, Hargeisa, Somaliland.

Methods and Materials

Study design

A hospital based cross-sectional study was conducted from May to June, 2022 in Edna Adan University Hospital, Hargeisa, Somaliland.

Study area and study period

The Edna Adan hospital was founded by Edna Adan Ismail, a famous lady in the context of Somalia and the world as well. The hospital located in Maroodi Jeex Region; the capital city of Somaliland known as Hargeisa. EAUH is found in southern of Hargeisa. Based on census conducted in 2008, Hargeisa has a total population of 1.5 million (Central Statistics Department of Somaliland). The city has one referral Hospital, two general Hospitals, seven health care centers and five private Hospitals and other several private clinics.

The EAUH is one of the largest maternity private hospitals in the city, which provides health services for the community especially, maternal and child health services, for patients from all parts of Somaliland and other neighborhood regions such as puntland, and southern Somalia.

Source population

The source population were comprised of all pregnant women attending antenatal care at Edna Adan Hospital.

Study population

Study population were pregnant women attending ANC at Edna Adan Hospital during the study period and systematic sampling methods was implemented.

Inclusion and exclusion criteria

All pregnant women whose pregnancy was previously confirmed by pregnancy test kit and having antenatal follow up who gave their consent to participate the study were included in the study, pregnant women who were critically sick and unable to answer questions, previously vaccinated women and not willing to participate the study were excluded from the study.

Sample size determination

Sample size for the study was calculated using single population proportion formula using prevalence of hepatitis B virus 6.3% [21] from Harar town, Eastern Ethiopia, hence. 251 Pregnant women were recruited in the study.

Data collection procedure

Data was collected using a validated and pre-tested structured questionnaire. Face to face Interview was conducted by the principal investigator in presence of a trained assistant female midwife, to collect socio-demographic data such as Maternal age, gestational age, residence, occupation, level of education, marital status and other variables associated with the risk of HBV infection such as abortion history, history of blood transfusion, history of surgical procedures, history of hospital admission, history of tooth extraction, previous place of delivery, needle stick injury, family history of Hepatitis B virus, after obtaining written consent from an informed client.

Blood Sample Collection and Screening of HBV

Five milliliters (5 ml) of venous blood was drawn under aseptic conditions in sterile disposable syringes by experienced laboratory personnel and then non additive sterile test tubes were dispensed. These tubes were labelled and processed at the time of sample collection. The blood samples taken from the participants was centrifuged at 3000 revolutions per minute (RPM) for at least 10 minutes at room temperature. All serum samples were tested for HBsAg using (SD-BIOLINE Standard Diagnostics, Inc.,) rapid test method according to the manufacturer's instructions. SD-BIOLINE rapid test is a qualitative, solid phase, two-site sandwich immunoassay for the detection of HBsAg in serum.

Data quality control assurance

To make sure that the questionnaires are appropriate and understandable, 5% was pretested on pregnant women at the health center other than the actual study sites. The collected data was checked daily for consistency and accuracy. Standardized procedures was strictly followed during blood sample collection, storage and analytical process.

Data processing and analysis

The collected data was checked, coded and entered into SPSS version 23 for analysis. Descriptive statistics was done using frequencies tables. Multivariate

Table 1: Socio-demographic characteristics of pregnant women at Edna Adan Hospital (N = 251).

Variables (N = 251)	Category	Frequency	Percent (%)
Age	15-25	105	41.8%
	26-35	110	43.8
	36-45	36	14.3%
Residence	Urban	215	85.7%
	Rural	36	14.3%
Occupation	Unemployed	198	74.9%
	Employed	63	25.1
Marital Status	Married	239	95.2%
	Divorced	12	4.8%
Educational Level	Illiterate	56	22.3%
	Primary Education	69	27.5%
	Secondary Education	77	30.7%
	University education	49	19.5%

logistic regression analysis was carried out to check the association between HBsAg Sero-positivity and independent variables. Finally, the strength of associations between outcome and predictor variables were assessed using adjusted odds ratio (AOR) with 95% confidence and the significance of the association was declared at a p- value of < 0.05.

Ethical considerations

Ethical approval of the study was obtained from ethical committee of Edna Adan University. Written consent was obtained after informing the purpose and importance of the study to each participants. To ensure confidentiality of participant's information, codes were used, the name of the study participants and any identifier of the participants was not written on the questionnaire.

Results

Socio-demographic and socio-economic characteristics of the study participants

A total of 251 pregnant women were recruited for the study with a response rate of 100%. The age of the study participants ranged from 15-46 years. The majority 110 (43.8) were aged between 26-35. Two hundred fifteen (85.7%) were in urban residences. Regarding the occupation, hundred and ninety-eight (74.9) of the respondents were unemployed. Two hundred thirty-nine (95.2%) of the respondents were married. Seventy-seven (30.7%) were completed secondary education (Table 1).

Seroprevalence of Hepatitis B virus infection in the study participants

In this study, the overall prevalence of HBsAg was 4.4 % 11(251). Higher prevalence of the infection 8.3% was observed in divorced women and 8.3% in the age of 36-45 years (Table 2).

Multivariable logistic regression was conducted to check factors associated with HBV and the results indicated that few predictor variables were found to be significantly associated with HBV infection.

Pregnant women with a history of abortion were 6 times more likely to be infected by the HBV than pregnant women with no history of abortion. (AOR = 6.76 95% CI 1.21-37.87, p-value 0.002) pregnant women who had a history of blood transfusion were 9.3 times more likely of being infected by HBV than their counterparts (AOR = 9.3, 95% CI (1.57-55.10), p-value = 0.014).

The odds of seropositivity for HBV were about 14 times higher among pregnant women who had tooth extraction (AOR = 14.22, 95% CI (2.050-98.330), p-value = 0.007) when compared to their counterparts. Pregnant women having history of surgical procedure were 5.8 times more likely of being infected than their counterparts (Table 3).

Discussion

In the current study, we found that the prevalence of HBsAg among pregnant women in the study area was 4.4 % with a response rate of 100%. According to the established criteria of WHO, the prevalence of HBsAg among pregnant women in this study can be classified as "an intermediate category'' [1]. This finding is in line with different studies done in the globe with these proportions 5.3% in Debre Tabor general hospital [2], 4.4% in Felege Hiwot hospital [3], 4.3% in Arba Minch hospital [4] and 5.5% in Tigray respectively [5]. Lower seroprevalence of the HBV infection has been reported from studies conducted in Khyber Pakhtunkhwa, Pakistan (3.7%) [6], in Swat General & Psychiatry Hospital 3.98% [7], 0.34% in Zainab Panjwani Memorial Hospital, Karachi [8], 3.8% in Dessie [9], 3.7% in Jimma [10] and 2.5% [8] in Addis Ababa. Similarly, higher results of seroprevalence of HBV were reported southern Ethiopia 6.1% [11], 6% in Addis Ababa [12], 7.3% in Gondar health center [13].

Table 2: Prevalence of Hepatitis B virus infection among pregnant women at EAH, June, 2022.

Variables (N = 251)	Category	HBV Status of the pregnant Women	
		Positive n (%)	Negative n (%)
Age	15-25	5 (4.8)	100 (95.2)
	26-35	3 (2.7)	107 (97.3)
	36-45	3 (8.3)	33 (91.7)
Residence	Urban	10 (4.7)	205 (95.4)
	Rural	1 (2.8)	35 (97.2)
Occupation	Unemployed	7 (3.7)	181 (96.3)
	Employed	4 (6.3)	59 (93.7)
Marital status	Married	10 (4.2)	229 (95.8)
	Divorced	1 (8.3)	11 (91.7)
Educational	Illiterate	2 (3.6)	54 (96.4)
	Primary education	2 (2.9)	67 (97.1)
	Secondary education	3 (3.9)	74 (96.1)
	University education	4 (8.2)	45 (91.8)
Gestational period	1st trimester	4 (6.3)	60 (93.7)
	2nd trimester	3 (3.2)	92 (96.8)
	3rd trimester	4 (4.3)	88 (95.7)
Abortion history	Yes	8 (12.3)	57 (87.7)
	No	3 (1.0)	283 (99)
Hospital admission	Yes	10 (14.9)	57 (85.1)
	No	1 (0.5)	183 (99.5)
Blood transfusion history	Yes	6 (50)	6 (50)
	No	5 (2.1)	234 (97.9.0)
History of surgical procedure	Yes	7 (23.3)	23 (76.7)
	No	4 (1.8)	217 (98.2)
Place of previous delivery	Health center	11 (4.8)	217 (95.2)
	Home	0 (0)	23 (23)
Sharp injury	Yes	0 (0)	4 (4)
	No	11 (4.5)	236 (95.5
Needle stick injury	Yes	0 (0)	8 (0)
	No	11 (4.5)	232 (95.5)
Splash of blood	Yes	0 (0)	4 (4)
	No	11 (4.5)	236 (95.5)
History of tooth extraction	Yes	9 (15)	51 (85)
	No	2 (1.0)	189 (99)
History of ear piercing	Yes	11 (5.5)	189 (94.5)
	No	0 (0)	53 (53)
Family history of Hepatitis B	Yes	10 (76.9)	3 (23.1)
	No	1 (0.4)	237 (99.6)

Table 3: Logistic regression result of variables associated with seroprevalence of HBV among pregnant women attending Edna Adan Hospital ANC, June 2022.

Variables	COR 95% CI	P-Value	AOR95% CI	P-Value
Age				
15-25	0.550 (0.125-2.247)	0.430	0.509 (0.109-2.375)	0.390
	0.308 (0.059-1.601)	0.162	0.299 (0.055-1.623)	0.162
26-36	1		1	
36-45				

Gestation				
1st trimester	1.467 (0.353-6.093)	0.598	0.421 (0.491-3.640	0.734
2nd trimester	0.717 (0.156-3.297)	0.670	0.797 (0.112-5.701)	0.432
3rd trimester	1			
Residence	1.707 (0.212-13.75)	0.615	2.075 (0.143-30.061)	0.593
Urban	1			
Rural			1	
Occupation		0.384	0.968 (0.201-4.651)	0.968
Unemployed	0.570 (0.161-2.017)			
Employed	1			
Education				
Illiterate	0.417 (0.073-2.381)	0.325	0.579 (0.541-6.201)	0.651
Primary education	0.336 (0.059-1.911)	0.219	0.371 (0.051-2.640)	0.323
Secondary education	0.456 (0.098-2.132)	0.318	0.481 (0.091-2.470)	0.381
University education	1		1	
Marital status				
Yes	0.480 (0.056-4.094)	0.502	0.404 (0.430-3.780)	0.427
No	1		1	
Abortion history				
Yes	6.76 (1.21-37.87)	0.002	6.76 (1.210-37.871)	0.030
No	1		1	
Blood transfusion				
Yes	46.80 (11.12-196.9)	0.000	9.30 (1.570-55.101)	0.014
No	1		1	
Surgical procedure	16.51 (4.493-60.67)	0.000	5.87 (0.910-37.740)	0.042
Yes	1			
No				
Tooth extraction	16.67 (3.49-79.60)	0.000	14.22 (2.050-98.330)	0.007
Yes	1		1	
No				

However, an earlier reported prevalence for Hepatitis B of 12.3% in pregnant women was very high compared to our study [14]. The similar high prevalence of HBV among pregnant mothers compared to our study was also reported from North America of medical sciences [15].

This variation might be due to differences in sampling method, geographical variation, differences in cultural practices, and differences in the test methods employed to detect HBV infection.

In fact, our study demonstrated that various risk factors such as abortion history, blood transfusion, history of surgical procedure, and tooth extraction were statistically significant.

In our study, pregnant women with a history of abortion (AOR = 6.76 95% CI 1.21-37.87, p-value 0.002) were 6 times more likely to be infected by the HBV compared to their counterpart. Similar result were reported from studies done in Jimma [9], Arba Minch [16], Dessie [17] and Addis Ababa, Ethiopia [10]. This is might be due to contaminated instruments used during abortion procedure might increase the probability of acquiring HBV infection. In addition, pregnant women who had a history of blood transfusion were 9.3 times more likely of being infected by HBV than pregnant women who had no history of blood transfusion (AOR = 9.3 95% CI (1.57-55.10), p-value = 0.014). This is in line with similar studies conducted in Khairpur teaching hospital, Pakistan [18], Debre markos, Ethiopia [19] and in Tanzania [20]. This is explained due the fact that the virus is transmitted through any body fluids such as mucosal, blood contact from an infected individuals easily.

The odds of seropositivity for HBsAg were about 14 times higher among pregnant women who had tooth

extraction (AOR = 14.22, 95% CI (2.050-98.330), p-value = 0.007) when compared to their counterparts. This finding is consistent with similar study done in Harar city [21]. But also contradicts to a similar study conducted in Bahir Dar city [22].

Pregnant women with a history of surgical procedures (AOR = 5.87(0.910-37.740) were 5.8 times more likely to acquire HBV infection than pregnant women who had not gone surgical procedures. The study is in agreement with similar study done in Pakistan [23]. This might be explained duet he to lack of following strict and standard sterilization of surgical instruments in the hospitals.

In this study, the overall prevalence of hepatitis B viral infection among the pregnant women was 4.4%, intermediate endemicity of sero-prevalence of HBV infection among pregnant women in ANC Edna Adan Hospital was reported according to WHO classification. History of abortion, history of blood transfusion, history of surgical procedure and history of having tooth extraction were factors independently associated with HBV infection among the pregnant women in the study area.

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Author's Contributions

HM: Wrote the Proposal, participated data collection, analyzed, drafted the paper and manuscript writing; IA: Participated sample collection and testing. All authors read and approved the final manuscript.

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