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RESEARCH ARTICLE

The seroprevalence of hepatitis-B among pregnant women attending ANC at Tayo Hospital Baidoa-Somalia

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ABSTRACT

Background: Hepatitis B virus (HBV) infection remains a major global public health concern, particularly in high-prevalence regions such as sub-Saharan Africa. In Somalia, maternal HBV screening and vaccination programs are limited, contributing to a high risk of mother-to-child transmission.

Objective: To determine the seroprevalence of hepatitis B virus (HBV) infection and assess related awareness, testing history, and preventive knowledge among pregnant women attending antenatal care (ANC) at Tayo Hospital, Baidoa, Somalia.

Methods: A descriptive cross-sectional study was conducted among 80 pregnant women selected through simple random sampling at Tayo Hospital between July 2022 and March 2023. Data were collected using structured questionnaires on socio-demographic characteristics, HBV knowledge, and risk factors. Blood samples (3 mL) were tested for hepatitis B surface antigen (HBsAg) using rapid diagnostic test kits. Data were analyzed using SPSS version 20, with results summarized in frequencies and percentages.

Results: The majority of participants (57.5%) were aged 21–26 years, and 41.3% were illiterate. Only 18.8% had ever been tested for HBV, and 18.8% had received vaccination. HBsAg positivity was detected in 35 out of 80 respondents, yielding a high seroprevalence of **43.8%**. Knowledge of HBV prevention was generally low; only 26.3% identified vaccination as a preventive measure, and misconceptions—such as airborne transmission—were common. Major information sources were magazines (20.0%), television (16.3%), and the internet (15.0%), with limited health-professional engagement.

Conclusion: HBV seroprevalence among pregnant women in Baidoa is alarmingly high, compounded by low testing uptake, low vaccination coverage, and inadequate awareness. Strengthening routine antenatal HBV screening, increasing vaccination access, and enhancing health education are critical for preventing maternal and neonatal transmission.

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1. Introduction

Hepatitis B virus (HBV) infection is a potentially life-threatening liver disease and remains one of the major global public health challenges. It causes both acute and chronic infections, leading to serious complications such as liver cirrhosis and hepatocellular carcinoma. HBV has three major antigens: hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg), and hepatitis B core antigen (HBcAg)[1]. HBsAg and HBeAg can be detected in serum, whereas HBcAg is found only in liver tissue. The detection of HBsAg is essential for the diagnosis and monitoring of HBV infection, while HBeAg positivity indicates high viral replication and infectivity[2].

According to the World Health Organization (WHO), viral hepatitis causes approximately 1.34 million deaths annually, a number comparable to tuberculosis and exceeding that of HIV and malaria. The global seroprevalence of HBV infection is estimated at 3.5%, with the highest burden found in the Western Pacific (6.2%) and African (6.1%) regions[3]. Worldwide, around 65 million women of reproductive age are living with HBV infection, and an estimated 90% of infants born to HBV-infected mothers develop chronic infection if they do not receive timely prophylaxis with hepatitis B immune globulin and hepatitis B vaccine at birth[4].

Mother-to-child transmission is the most common route of HBV infection in high-prevalence regions. Pregnant women infected with HBV pose a risk not only to their newborns but also to healthcare workers during labor and delivery. Additionally, HBV infection in pregnancy has been associated with several obstetric complications, including miscarriage, preterm labor, gestational diabetes, and low birth weight[5]. However, evidence suggests that screening all pregnant women for HBV and ensuring administration of the HBV birth dose within 24 hours of delivery, followed by complete vaccination, can reduce the risk of mother-to-child transmission by up to 90%. Despite these proven interventions, HBV vaccination coverage remains low in most developing countries[6].

In Africa, only 11 countries have incorporated the HBV birth dose into their routine Expanded Programme on Immunization (EPI). Most East African countries, including Somalia, are yet to fully implement this recommendation. Although WHO advocates for routine antenatal HBV screening and vaccination, implementation in Somalia remains limited, particularly in public health facilities. National data on HBV seroprevalence among the general population and pregnant women in Somalia are scarce[7,8]. Reports from the Ministry of Health estimate an 8% prevalence of HBV among the general population, while regional studies have found rates ranging from 8% to 8.4%. Previous studies have identified associations between HBV infection and factors such as blood transfusion, surgical procedures, dental extraction, abortion, genital mutilation, and ear piercing. However, other studies have found no significant relationship between HBV seropositivity and these risk factors[9,10]. This lack of consistent evidence highlights the need for more localized research to understand the burden and determinants of HBV among pregnant women in Somalia.

Despite global and regional efforts to control HBV, the infection remains a significant health problem, particularly among women of reproductive age. The high rate of vertical (mother-to-child) transmission continues to contribute to the chronic HBV burden in developing countries. In Somalia, where the prevalence of HBV is estimated at 8%, there is limited data on infection rates among pregnant women and inadequate implementation of routine antenatal screening and vaccination programs[11]. This gap hinders effective prevention of maternal and neonatal transmission. Therefore, understanding the seroprevalence of hepatitis B among pregnant women attending antenatal care (ANC) is essential for designing targeted interventions and strengthening maternal health programs. The primary aim of this study is to determine the seroprevalence of

hepatitis B virus (HBV) among pregnant women attending antenatal care (ANC) at Tayo Hospital, Baidoa, Somalia.

2. Literature Review

Hepatitis B virus (HBV) infection remains a major global public health problem and one of the leading causes of chronic liver disease, cirrhosis, and hepatocellular carcinoma. According to the World Health Organization (WHO), over two billion people have been infected worldwide, with about 257–400 million being chronic carriers, and approximately 887,000 deaths occur annually due to HBV-related complications. HBV, a DNA virus that targets the liver, is highly infectious and transmitted through contact with infected blood and body fluids such as semen and vaginal secretions[12].

Globally, HBV prevalence varies widely, with the highest rates in sub-Saharan Africa and East Asia, where 5–10% of adults are chronically infected. In endemic areas, mother-to-child (vertical) transmission during childbirth is the main route of infection. Infants infected at birth have up to a 90% risk of developing chronic HBV, compared to less than 10% in adults, underscoring the importance of maternal screening and neonatal immunization[13].

Socio-demographic and behavioral factors significantly influence HBV prevalence among pregnant women. Older age, low education, low socioeconomic status, and poor awareness are associated with higher infection risk. Behavioral practices such as unprotected sexual activity, multiple partners, unsafe injections, blood transfusions without proper screening, and traditional practices like tattooing or scarification with unsterilized instruments further increase vulnerability. In some regions, cultural practices such as female genital mutilation also contribute to transmission[14].

In many developing countries, including Somalia, awareness and knowledge about HBV transmission, symptoms, and prevention remain low. This lack of awareness leads to delayed diagnosis and increases the risk of vertical transmission. Strengthening antenatal health education and encouraging HBV testing during pregnancy can reduce these risks[15].

Despite the existence of effective vaccines, HBV remains endemic in much of Africa due to low vaccination coverage, cost barriers, and inadequate healthcare infrastructure. WHO recommends administering a birth dose of the hepatitis B vaccine within 24 hours of delivery, followed by completion of the full series. Combining active vaccination with hepatitis B immunoglobulin (HBIG) for infants born to infected mothers can prevent up to 95% of perinatal infections[16,17]. The most effective prevention strategies include universal vaccination, safe sexual practices, proper sterilization of medical equipment, screening of blood donors, and public health awareness campaigns. However, in Somalia, surveillance data are limited, and HBV prevalence among the general population and pregnant women remains high, estimated at around 8%[18].

HBV continues to pose a significant health burden among pregnant women, especially in resource-limited settings. Low awareness, poor access to healthcare, and limited vaccination contribute to its persistence. Strengthening antenatal screening, expanding vaccination programs, and improving community awareness are essential to reduce HBV transmission and its adverse effects on maternal and neonatal health.

3. Materials and methods

3.1. Study design and settings

A descriptive cross-sectional study was conducted to determine the seroprevalence of hepatitis B virus (HBV) infection among pregnant women attending antenatal care (ANC) at Tayo Hospital, Baidoa, Somalia. Tayo Hospital is a major referral center in the Bay region, providing comprehensive maternal, neonatal, and laboratory services. The cross-sectional design allowed for data collection at a single point in time, providing a snapshot of HBV prevalence among the study population.

3.2. Study area and duration

The study was carried out at Tayo Hospital in Baidoa, the capital of the Bay region in southwestern Somalia. The hospital serves as a key healthcare facility for the surrounding communities, particularly for maternal and child health services. Data collection was conducted over nine months, from July 2022 to March 2023.

3.3. Study population and sampling technique

The study population comprised all pregnant women attending ANC at Tayo Hospital during the study period. Participants were selected using a simple random sampling technique from the ANC register to ensure representativeness and minimize selection bias. The sample size was determined using Slovin's formula, considering a target population of 100 and a 5% margin of error, yielding a total of 80 participants.

3.4. Inclusion and exclusion criteria

Pregnant women attending ANC at Tayo Hospital who consented to participate and were willing to provide blood samples for HBV testing were included in the study. Those who declined participation, were seriously ill, unable to respond to the questionnaire, or already diagnosed with HBV and under treatment were excluded.

3.5. Data collection instruments and procedure

Data were collected using a structured, pretested questionnaire covering socio-demographic characteristics, knowledge, and risk factors associated with HBV infection. The questionnaire was developed in English and translated into Somali for better comprehension. After obtaining informed consent, trained research assistants conducted face-to-face interviews. Approximately 3 mL of venous blood was aseptically drawn from each participant's median cubital vein and tested for hepatitis B surface antigen (HBsAg) using a rapid diagnostic test (RDT) kit following the manufacturer's protocol. Laboratory testing and interpretation were carried out by qualified personnel, and results were recorded immediately.

3.6. Data processing and analysis

Collected data were reviewed daily for completeness and accuracy before entry into SPSS (Statistical Package for the Social Sciences) version 20.0. Descriptive statistics such as frequencies and percentages were used to summarize categorical variables. The results were presented in tables and figures for clarity. Associations between socio-demographic variables and HBV seropositivity were examined using the chi-square test, and a p-value of less than 0.05 was considered statistically significant.

3.7. Ethical consideration

Ethical approval for this study was obtained from the Ethical Review Committee of Accord University. Permission to conduct the research was also secured from the management of Tayo Hospital. All participants

were informed about the study's objectives, procedures, potential risks, and benefits. Participation was entirely voluntary, and respondents could withdraw at any stage without any consequence. Written informed consent was obtained prior to data and sample collection. Confidentiality and anonymity were strictly maintained, and all collected information was used solely for research purposes.

4. Results

The socio-demographic features of the 80 respondents included in this study. The majority of participants, 46 (57.5%), were between 21–26 years, representing women in their prime reproductive age, a period often associated with increased antenatal care visits. This finding underscores the importance of targeting this age group for HBV screening and vaccination education during ANC sessions. Meanwhile, 15 respondents (18.8%) were aged 15–20 years, reflecting a noticeable proportion of adolescent pregnancies, which remains a maternal health concern in many parts of Somalia. Regarding marital status, almost half of the women (48.8%) were married, followed by 26.2% divorced, 15.0% single, and 10.0% widowed. The relatively high proportion of divorced women may indicate social instability or economic vulnerability, both of which can influence health-seeking behavior and access to ANC services (Table 1).

In terms of education level, 41.3% of respondents were illiterate, while 30.0% had completed secondary education, and 20.0% attained a university degree. The high illiteracy rate reflects limited access to formal education among women in the region, which may also contribute to poor awareness of infectious diseases such as HBV. With regard to occupation, half of the participants (50.0%) were housewives, 25.0% engaged in business, 15.0% had formal employment, and 10.0% worked as food traders. Correspondingly, employment status data show that 55.0% were unemployed, 22.5% employed, and 22.5% students. These figures imply that economic dependence is widespread among pregnant women, possibly limiting access to preventive health services like HBV testing and vaccination (Table 1). Lastly, in district of residence, the majority came from Horsed (36.2%), followed by Berdale (25.0%), Howlwadag (25.0%), and Isha (13.8%). This distribution reflects the hospital's primary catchment areas and suggests that most respondents were from urban or semi-urban localities surrounding Baidoa town (Table 1).

Table 1. Socio-Demographic Characteristics of Respondents (n = 80)

Variable	Category	Frequency	Percentage (%)
Age (years)	15–20	15	18.8
	21–26	46	57.5
	27–32	9	11.3
	33–38	4	5.0
	39–44	6	7.4
Marital Status	Married	39	48.8
	Divorced	21	26.2
	Single	12	15.0
	Widowed	8	10.0
Education Level	Illiterate	33	41.3
	Secondary	24	30.0
	Diploma	7	8.7
	University	16	20.0

Variable	Category	Frequency	Percentage (%)
Occupation	Housewife	40	50.0
	Business	20	25.0
	Formal job	12	15.0
	Food trader	8	10.0
Employment Status	Employed	18	22.5
	Unemployed	44	55.0
	Student	18	22.5
District of Residence	Horsed	29	36.2
	Berdale	20	25.0
	Howlwadag	20	25.0
	Isha	11	13.8

Table 1. (*Continued*)

Table 2 presents data on the participants' HBV testing and vaccination history. The majority of respondents (81.2%) had never been tested for HBV, while only 18.8% had undergone testing. Furthermore, when asked about their willingness to be tested at the time of the survey, only 27.5% expressed readiness, whereas 72.5% were unwilling. This finding highlights a low level of health-seeking behavior regarding HBV testing among pregnant women. Awareness about HBV vaccination was similarly poor, with 51.2% reporting that they had never heard about the vaccine, and only 48.8% indicating awareness. Actual vaccination coverage was even lower, as only 18.8% of respondents reported being vaccinated against HBV.

Table 2. HBV Testing and Vaccination History of Respondents

Variable	Response	Frequency	Percentage (%)
Ever tested for HBV	Yes	15	18.8
	No	65	81.2
Willing to be tested today	Yes	22	27.5
	No	58	72.5
Ever heard about HBV vaccine	Yes	39	48.8
	No	41	51.2
Vaccinated against HBV	Yes	15	18.8
	No	65	81.2

The laboratory results summarized in Table 3 show that 35 out of 80 respondents (43.8%) tested positive for Hepatitis B surface antigen (HBsAg), while 45 (56.2%) were negative. This 43.8% seroprevalence rate indicates a high burden of HBV infection among pregnant women attending Tayo Hospital (Table 3). The prevalence far exceeds the WHO threshold for high endemicity (≥8%) and suggests a major public health concern. The high infection rate poses a risk for mother-to-child transmission (MTCT), one of the most common routes of HBV spread in endemic regions. The findings in Table 3 underline the urgent need to strengthen routine HBV screening for all pregnant women during ANC visits, ensure immunization of newborns within 24 hours after birth, and expand community-based awareness programs to reduce new infections.

Table 3. Hepatitis B Surface Antigen (HBsAg) Test Results

Test Result	Frequency	Percentage (%)
Positive	35	43.8
Negative	45	56.2
Total	80	100.0

Table 4 assesses respondents' knowledge of preventive measures against HBV infection. Only 26.3% correctly mentioned vaccination as a preventive strategy, while 18.8% identified avoiding needle sharing and 15.0% cited avoiding contact with infected body fluids. Alarmingly, 18.7% believed that HBV could be transmitted through air droplets, a major misconception reflecting misinformation about the disease. Other misconceptions included avoidance of sharing toilets (12.5%) or clothes/towels (8.8%), which are not recognized transmission routes. The data in Table 4 indicate that knowledge gaps and false beliefs are common among pregnant women in this setting.

Table 4. Knowledge of Preventive Measures for Hepatitis B (Multiple Responses Allowed)

Preventive Measure Mentioned	Frequency	Percentage (%)
Get vaccinated against HBV	21	26.3
Avoid needle sharing/pricks	15	18.8
Avoid contact with body fluids	12	15.0
Avoid sharing toilets	10	12.5
Avoid sharing clothes/towels	7	8.8
Spread through air droplets (misconception)	15	18.7

Respondents' general perceptions about HBV are summarized in Table 5. When asked whether HBV causes behavioral change, 75.0% responded "No", while 25.0% said "Yes." This suggests limited understanding of the systemic and neurological complications associated with chronic liver disease (Table 5). However, when asked whether HBV poses risks during pregnancy, a significant proportion (62.5%) correctly acknowledged that it is risky, while 37.5% did not. The awareness among more than half of the respondents indicates a moderate level of understanding regarding the potential consequences of HBV infection in pregnancy, such as vertical transmission and neonatal hepatitis (Table 5).

Table 5. Respondents' Perceptions about Hepatitis B

Question	Response	Frequency	Percentage (%)
Does HBV cause behavioral change?	Yes	20	25.0
	No	60	75.0
Is HBV risky during pregnancy?	Yes	50	62.5
	No	30	37.5

As shown in Table 6, respondents received information about HBV from various sources. The leading sources were magazines (20.0%), television (16.3%), and the internet (15.0%), followed by family members (15.0%) and schools (11.2%). Minor sources included radio (7.5%), friends (7.5%), and brochures or billboards (7.5%). Notably, health professionals were not listed among major sources, suggesting a significant missed opportunity for direct health education during ANC visits. The dominance of mass media and informal sources implies that while information is accessible, its accuracy and depth may be limited (Table 6).

Table 6. Sources of Information about Hepatitis B

Source of Information	Frequency	Percentage (%)
Radio	6	7.5
Television	13	16.3
Internet	12	15.0
Friends	6	7.5
Magazines	16	20.0
Brochures/Billboards	6	7.5
School	9	11.2
Family Members	12	15.0
Total	80	100.0

5. Discussion

The study revealed that the majority of participants were young women aged 21–26 years, aligning with the reproductive age group prevalent in Sub-Saharan Africa. Adolescent pregnancies, comprising 18.8% of participants aged 15–20 years, remain a significant concern due to their association with increased maternal and neonatal health risks, including susceptibility to infections like HBV. The high illiteracy rate (41.3%) and limited formal education among participants underscore the challenges in health literacy and disease awareness. Additionally, the predominance of housewives and unemployed women suggests economic dependence, potentially limiting access to preventive healthcare services such as HBV screening and vaccination.

The study found alarmingly low HBV testing and vaccination rates, with only 18.8% of women having ever been tested for HBV and the same percentage vaccinated. These figures are consistent with trends observed in other African countries[19], where HBV testing and vaccination coverage among pregnant women often remain below 25%, particularly in regions with low socioeconomic development and limited health infrastructure. For instance, a study in Nigeria reported that only 12.6% of pregnant women had knowledge about the causes, mode of transmission, and prevention of hepatitis B. The low coverage in this study emphasizes the urgent need to integrate routine HBV screening and vaccination into ANC services to prevent mother-to-child transmission[20].

The seroprevalence of HBV among participants was 43.8%, a notably high rate compared to global averages and exceeding the World Health Organization's threshold for high endemicity. This prevalence is consistent with findings from some African countries, particularly in East and Central Africa, where HBV prevalence among pregnant women ranges between 5% and 20%, with pockets of hyperendemicity exceeding 40%. The elevated infection rate in this study suggests that Baidoa and surrounding regions may constitute an area of hyperendemic HBV transmission, posing serious risks for vertical transmission during pregnancy, birth, or breastfeeding[21].

The study evaluated participants' knowledge of preventive measures, revealing that only a minority correctly identified vaccination (26.3%) and avoidance of needle sharing (18.8%) as key strategies. Misconceptions were common, with 18.7% believing that HBV could spread through air droplets, and some citing incorrect routes such as sharing toilets or clothes. This pattern reflects a lack of accurate health education and is similar to observations from other African contexts, where limited awareness and widespread misconceptions hinder preventive behaviors. A study in Kinshasa, Democratic Republic of the Congo, found

that pregnant women had low knowledge about hepatitis B prevention, with many unaware of its transmission and prevention[22,23].

Analysis of sources of information revealed that most respondents relied on magazines, television, and the internet, with minimal input from health professionals. This pattern indicates that formal health education at ANC clinics may be insufficient and that health workers are underutilized as key sources of accurate information. Similar trends have been documented across Sub-Saharan Africa[24], where mass media and informal networks dominate knowledge acquisition, often leading to incomplete or inaccurate understanding. Strengthening health communication strategies, involving trained ANC providers to deliver consistent, accurate, and culturally appropriate HBV education, is essential.

6. Conclusion

This study demonstrates a high seroprevalence of HBV infection among pregnant women in Baidoa, coupled with low awareness, poor vaccination coverage, and widespread misconceptions. These results emphasize the urgent need for integrated public health strategies, including routine screening, vaccination programs, and comprehensive health education during ANC visits. Addressing these gaps will be crucial to reducing HBV transmission, protecting maternal and neonatal health, and achieving long-term public health benefits in the region.

Conflict of interest

The authors declare no conflict of interest

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