

Frequency of Hepatitis B Virus Surface Antigen (HBsAg) Positivity in a Rural Population of Burkina Faso

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Abstract

Introduction: Hepatitis B virus (HBV) infection remains a major public health challenge in sub-Saharan Africa, including Burkina Faso. However, data on HBV prevalence in rural populations remain scarce. This study aimed to determine the prevalence of hepatitis B surface antigen (HBsAg) carriage and to describe the sociodemographic characteristics of infected individuals in the rural commune of Moussodougou, Burkina Faso. **Methods:** A cross-sectional descriptive study was conducted from April to June 2021 in four villages of the rural commune of Moussodougou, located in the Cascades region of Burkina Faso. Participants were recruited on a voluntary basis following community sensitization sessions and pre-test counseling. Blood samples were analyzed at the Immunology Laboratory of the National Centre for Malaria Research and Training (CNRFP) in Banfora. Qualitative detection of HBsAg was performed using the Alere Determine™ HBsAg rapid diagnostic test. Data were analyzed using the R software version 4.5.1 (R Foundation for Statistical Computing, Vienna, Austria). **Results:** A total of 770 participants were enrolled, including 469 women (60.9%) and 301 men (39.1%), yielding a male-to-female ratio of 0.64. The mean age of the participants was 33.6 years $\pm$ 18.2 years. Sixty-seven participants tested positive for HBsAg, corresponding to an overall prevalence of 8.7% among participants who had received community-based hepatitis B awareness and counseling. HBsAg prevalence was significantly higher among men than among women (12.96% vs. 5.97%). The highest prevalence was observed among participants aged [20 - 30[years (15.2%). Across the four vil-

lages, prevalence ranged from 6.1% to 9.7%. **Conclusion:** The prevalence of HBsAg carriage in the rural commune of Moussodougou remains high and confirms that the area falls within the WHO high-endemicity category for HBV infection. Variations according to sex, age group, and village of residence were observed. Further studies are needed to investigate factors associated with HBV infection in rural settings.

Keywords

Hepatitis B, HBsAg, Prevalence, Rural Population, Burkina Faso

1. Introduction

Hepatitis B virus (HBV) infection remains a major public health problem worldwide. According to the World Health Organisation (WHO), more than 296 million people were living with chronic HBV infection in 2019, with approximately 820,000 deaths linked mainly to complications such as cirrhosis and hepatocellular carcinoma [1]. Sub-Saharan Africa is among the most affected regions, with high levels of endemicity.

The hepatitis B virus is transmitted mainly through exposure to infected blood or body fluids, particularly during unprotected sexual intercourse, mother-to-child transmission at birth, or during unsafe medical procedures [2]. Following an acute infection, some individuals become chronic carriers of the HBV surface antigen (HBsAg), putting them at high risk of severe liver complications [3].

The prevalence of HBV infection varies considerably across different regions of the world. It is low in Western European and North American countries, but remains high in several countries in Africa and Asia [4]. In Burkina Faso, HBV infection also constitutes a major public health problem. The WHO, as a high-endemicity zone, classifies the country, with an estimated national prevalence of around 9% in the general population [5].

Despite this high endemicity, epidemiological data on HBV in rural areas remain limited in Burkina Faso. Most of the available studies have been conducted in urban settings or among specific groups such as blood donors, pregnant women, or healthcare workers. However, rural populations may have specific sociodemographic and behavioral characteristics that influence HBV transmission.

Against this background, the aim of this study was to determine the prevalence of HBsAg carriage and to describe the sociodemographic characteristics of infected individuals in the rural commune of Moussodougou, located in the Cascades region of Burkina Faso.

2. Methods

2.1. Study Setting and Period

This study was conducted in the rural commune of Moussodougou, situated in

the Comoé province within the Cascades region of Burkina Faso. It covered the four main villages of the commune, namely Moussodougou, Mondon, Kolokolo, and Diamon.

Fieldwork was carried out at the Health and Social Promotion Centres (CSPS) in these various localities.

Data collection took place over a three-month period, from April to June 2021.

2.2. Study Design and Population

This was a descriptive cross-sectional study conducted amongst the population residing in the commune of Moussodougou.

Prior to data collection, community awareness-raising sessions on hepatitis B virus infection were organised in the various villages concerned. Following these activities, volunteers were welcomed into dedicated spaces for counselling and voluntary testing, ensuring the confidentiality of discussions and results.

The study included individuals residing in the municipality of Moussodougou who had freely agreed to participate following the counselling sessions and had given their informed consent. For participants under the age of majority, consent was obtained from a parent or guardian. Consequently, no pre-specified sample size was calculated; all volunteers meeting the inclusion criteria were recruited during the study period.

Individuals who refused a blood sample or did not give their consent were not included in the study. Participants were recruited consecutively throughout the study period. The overall study process is summarized in **Figure 1**.

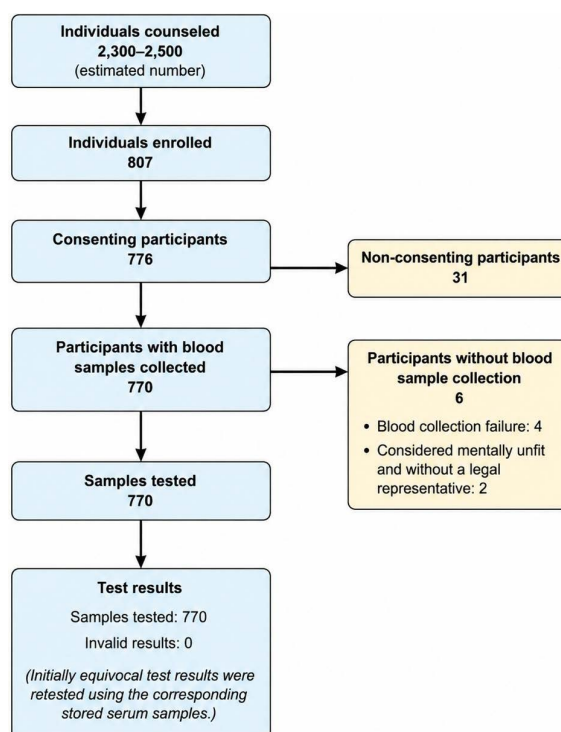


Figure 1. Flow diagram of participant recruitment and inclusion in the study.

2.3. Variables Studied

The sociodemographic variables collected included age, sex, and village of residence. The biological variable studied was serological status with regard to the hepatitis B virus surface antigen (HBsAg).

For the purposes of statistical analysis, participants' ages were grouped into ten-year age groups.

2.4. Blood Sampling and Laboratory Tests

A 4 mL sample of venous blood was collected from each participant into a dry tube in accordance with standard biological sampling procedures. The whole blood was centrifuged at 5000 rpm for 10 minutes. The resulting serum was separated and stored at -20°C until analysis.

Biological analyses were carried out at the Immunology Laboratory of the National Centre for Research and Training on Malaria in Banfora (CNRFP/Banfora).

Qualitative detection of HBsAg was carried out using the Alere Determine™ HBsAg rapid test (Abbott, Japan), based on a sandwich-type immunochromatography technique. All tests were conducted in accordance with the manufacturer's recommendations.

Results were interpreted as positive where both a test line and a control line were present, negative where only the control line was present, and invalid where no control line was present.

2.5. Data Collection and Analysis

Sociodemographic and biological data were collected using a standardised questionnaire. Data were entered into Microsoft Excel, and statistical analyses were performed using R software version 4.5.1 (R Foundation for Statistical Computing, Vienna, Austria). Quantitative variables were described by their mean and standard deviation, whilst qualitative variables were presented as frequencies and proportions.

Proportions were compared using Pearson's chi-square test. The threshold for statistical significance was set at 5 percent, corresponding to a p-value of less than 0.05.

2.6. Ethical Considerations

The study received administrative authorisation from the regional health authorities in Cascades. Authorization for the use of the study data was also obtained from the Institutional Ethics Committee of the Souro Sanou University Hospital Center (CHUSS), Bobo-Dioulasso, under approval No. CEI/CHUSS-2025/2026, dated April 10, 2026.

Participation in the study was voluntary and preceded by informed consent. To ensure the anonymity and confidentiality of the data, a unique identifier was assigned to each participant. The results of the analyses were provided to participants individually. Hepatitis B vaccination was recommended for HBsAg-negative participants, whilst HBsAg-positive participants were referred to the gastroenterology department for further management.

3. Results

A total of 770 participants were included in the study, comprising 469 women (60.9 percent) and 301 men (39.1 percent), giving a sex ratio of 0.64. The mean age of the participants was 33.6 years $\pm$ 18.2 years, ranging from 1 year to 85 years.

Testing for the hepatitis B surface antigen identified 67 positive cases, corresponding to an overall prevalence of 8.7% (67/770). The prevalence of HBsAg varied by sex. It was significantly higher in men, at 12.96% (39/301), than in women, where it was 5.97% (28/469); this difference was statistically significant (**Table 1**).

HBsAg prevalence varied across age groups (**Table 2**). The highest prevalence was observed among participants in the [20 - 30[year age group (15.2%; 95% CI: 9.0 - 24.1), followed by those in the [40 - 50[year age group (11.9%; 95% CI: 6.8 - 19.9) and the [30 - 40[year age group (11.4%; 95% CI: 7.0 - 17.9). However, no statistically significant association was found between age group and HBsAg positivity ($p = 0.49$). Geographically, HBsAg prevalence varied across the villages of the study area (**Table 3**). The prevalence was 9.7% (95% CI: 7.1 - 13.0) in Mousodougou, 9.0% (95% CI: 4.6 - 16.3) in Kolokolo, 8.2% (95% CI: 3.8 - 15.9) in Mondon, and 6.1% (95% CI: 3.0 - 11.6) in Diamon. However, these differences were not statistically significant ($p = 0.624$).

Table 1. Prevalence of hepatitis B virus infection by sex, determined using the Determine™ HBsAg test (n = 770).

Variable	Positive Cases/Total	Prevalence, % (95% CI)	p
Overall Participants	67/770	8.7 (6.9 - 11.0)	—
Males	40/301	13.3 (9.8 - 17.8)	
Females	27/469	5.8 (3.9 - 8.4)	<0.001

Note. CI: 95% confidence interval. Prevalence estimates were compared between males and females using Pearson's χ^2 test.

Table 2. Prevalence of hepatitis B virus infection by age group, determined using the Determine™ HBsAg test (n = 770).

Variable	Positive Cases/Total	Prevalence, % (95% CI)	p
[0 - 10[	4/108	3.7 (1.2 - 9.8)	
[10 - 20[	8/121	6.6 (3.1 - 13.0)	
[20 - 30[	15/99	15.2 (9.0 - 24.1)	0.039
[30 - 40[	17/149	11.4 (7.0 - 17.9)	
[40 - 50[	13/109	11.9 (6.8 - 19.9)	
[50 - 60[	6/94	6.4 (2.6 - 13.9)	
[60 - 70[	4/54	7.4 (2.4 - 18.7)	
[70 - 80[	0/26	0.0 (0.0 - 16.0)	
≥ 80	0/10	0.0 (0.0 - 34.5)	

Note. CI: 95% confidence interval. Prevalence estimates were compared across age groups using Pearson's χ^2 test.

Table 3. Prevalence of hepatitis B virus infection by village of residence, determined using the Determine™ HBsAg test (n = 770).

Variable	Positive Cases/Total	Prevalence, % (95% CI)	p value
Diamon	9/147	6.1 (3.0 - 11.6)	0.624
Kolokolo	10/111	9.0 (4.6 - 16.3)	
Mondon	8/98	8.2 (3.8 - 15.9)	
Moussodougou	40/414	9.7 (7.1 - 13.0)	

Note. CI: 95% confidence interval. Prevalence estimates were compared across villages using Pearson’s chi-square test.

4. Discussion

The present study estimated the prevalence of hepatitis B surface antigen (HBsAg) carriage in a rural population of the Moussodougou municipality, Burkina Faso. The overall HBsAg prevalence was 8.7%, classifying this population as a highly endemic area according to the World Health Organization (WHO) criteria [6].

This prevalence is consistent with that reported in the general population of Burkina Faso, estimated at approximately 9% [5], and is comparable to the prevalence observed among blood donors in Mali (8.2%) [7]. It is also similar to that reported in a recent community-based study conducted between 2023 and 2024 in four rural municipalities of Burkina Faso, which reported an HBsAg prevalence of 6.5% [8]. However, it remains lower than the prevalences reported in studies conducted among populations at higher risk of exposure, particularly healthcare workers and certain occupational groups, where HBsAg prevalences exceeding 12 - 15% have been documented [9] [10]. These differences may be explained by variations in the characteristics of the study populations, levels of exposure to infection, and risk-related behaviors.

In our study, HBsAg prevalence was significantly higher among men than among women (12.96% vs. 5.97%). This finding is consistent with several studies conducted in sub-Saharan Africa, which have reported a greater exposure or susceptibility of men to HBV infection [11]. Similar findings were reported in a recent community-based study conducted in rural Burkina Faso, where HBsAg prevalence was significantly higher among men (8.4%) than among women (2.9%), confirming a sex-related difference in the distribution of HBV infection [8]. Several factors may account for this disparity, including a higher frequency of risk-related behaviors, lower utilization of preventive healthcare services, and hormonal and immunological factors that may confer greater protection against HBV infection in women.

Age-stratified analysis showed a higher HBsAg prevalence among young adults, particularly those aged 20 - 29 years. This finding is consistent with reports from other studies conducted in West Africa, where young adults have been identified as a population at increased risk of HBV infection [12]. It is also in agreement with recent data from rural communities in Burkina Faso, where adults aged 18 - 49 years exhibited the highest HBsAg prevalence [8]. Furthermore, a study con-

ducted in the rural district of Nanoro reported a low prevalence of HBsAg among children born after the introduction of hepatitis B vaccination into the Expanded Programme on Immunization (EPI), suggesting a beneficial impact of this vaccination strategy on younger generations [13]. The higher prevalence observed among young adults may be explained by greater sexual activity, lower vaccination coverage in this age group, and cumulative exposure to HBV risk factors over time.

Geographically, variations in HBsAg prevalence were observed across the study villages, although these differences did not reach statistical significance. These disparities may reflect local differences in cultural practices, access to health information, or risk-related behaviors; however, further investigations are needed to better understand the underlying determinants [14].

The high HBsAg prevalence observed in this rural population confirms that HBV infection remains a major public health concern in rural areas of Burkina Faso, where access to prevention and vaccination programs is often limited. This persistent high endemicity is consistent with findings from recent community-based studies conducted in Burkina Faso, which have emphasized the need to strengthen HBV screening, vaccination, and community awareness interventions in rural settings [8]. These findings further highlight the importance of reinforcing strategies for HBV screening, universal vaccination, and community-based awareness campaigns, particularly among young adults and men [15].

These findings are consistent with the recent recommendations of the World Health Organization (WHO), which call for accelerating the elimination of viral hepatitis as a public health threat by 2030. In the Burkinabe context, strengthening community-based screening campaigns, improving hepatitis B vaccination coverage among non-immune adults, and ensuring access to antiviral treatment for infected individuals should be considered public health priorities to achieve sustained reductions in HBV transmission.

5. Limitations

This study has certain limitations. Firstly, participant recruitment was voluntary, which may introduce selection bias. Secondly, diagnosis was based on a rapid HBsAg test, without confirmation by more sensitive molecular biology or serological techniques. Finally, this is a cross-sectional study, which does not allow causal relationships to be established between the factors studied and the infection.

Despite these limitations, this study provides useful data on the HBV situation in rural areas of Burkina Faso and may help to guide local prevention policies.

6. Conclusions

This study highlights a high prevalence of HBs antigen carriage in the rural commune of Moussodougou, confirming a high level of hepatitis B virus endemicity according to the World Health Organisation's criteria. Variations were observed

according to gender, age, and village of residence, with a predominance among men and young adults.

These results underscore the continued circulation of HBV in rural areas and the need to strengthen prevention strategies, particularly vaccination, early screening, and raising awareness amongst at-risk populations.

Further studies incorporating behavioral and socio-economic factors would be useful to better understand the determinants of this infection and improve public health interventions.

What Is Known about This Topic

The prevalence of HBsAg carriage in the general population of Burkina Faso. Men are more affected by HBV than women.

What Does Your Study Contribute That Is New?

The prevalence of HBV carriage in the commune of Moussodougou is slightly lower than the national prevalence but remains within the WHO's "high endemicity" zone. The prevalence varies significantly between villages. The highest HBsAg prevalence was observed in the [20 - 30[years age group.

Author Contributions

Study conception and supervision: Adrien Marie Gaston Belem and Yacouba Sourabié.

Sample collection and laboratory handling: Mafama Siribié; Aristide Ouattara; Hanmoussa Theguera; Gertrude Marilyse Sawadogo.

Data analysis and interpretation: Adrien Marie Gaston Belem, Yacouba Sourabié, René Kinda, and Mafama Siribié.

Preliminary drafting of the article, critical review, and final approval of the version to be published: all authors; and commitment to taking responsibility for all aspects of the research.

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Conflicts of Interest

The authors declare no conflicts of interest.

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