


Prevalence of Viral Hepatitis B in the Workplace in Gabon: Case of a Mining Company

Laurent I. Makosso^{1*}, Hervé M. Ekomy², Patrice Landimi³, Franck L. Nguema⁴, Gilvirh Bigouagou¹, Annie-P. A. Mvighe¹, Alain Boulende⁵

¹Département de Santé au Travail de COMILOG, Moanda, Gabon

²Polyclinique du Haut Ogooué, Franceville, Gabon

³Department of Community and Social Medecine, Université des sciences de la santé, Owendo, Gabon

⁴Service de médecine du travail, Hôpital régional de Port-Gentil, Port-Gentil, Gabon

⁵Laboratoire d'analyses médicales, Hôpital Marcel ABEKE, Moanda, Gabon

Email: *laurentirwinmakosso@yahoo.fr

How to cite this paper: Makosso, L.I., Ekomy, H.M., Landimi, P., Nguema, F.L., Bigouagou, G., Mvighe, A.A. and Boulende, A. (2026) Prevalence of Viral Hepatitis B in the Workplace in Gabon: Case of a Mining Company. *Occupational Diseases and Environmental Medicine*, **14**, 131-139.
<https://doi.org/10.4236/odem.2026.143012>

Received: April 26, 2026

Accepted: May 31, 2026

Published: June 3, 2026

Copyright © 2026 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Context and Objectives: Globally, and in sub-Saharan Africa in particular, viral hepatitis infection is a major public health problem due to its prevalence and its impact on workplace productivity. The study aimed to determine the seroprevalence of hepatitis B and the factors associated with the infection among workers at a mining company in Gabon. **Methods:** Our study was a descriptive and analytical cross-sectional study, conducted by the occupational health department of a mining company between 1st October and 31st December 2023. The records of the mining company's permanent employees were included. Socioprofessional and biological data on the mining company's employees were collected. Sampling was non-random. Statistical analysis was performed using R software. Logistic regression was used to identify associated factors ($p < 5\%$). **Results:** We included 1504 participants. The sample was predominantly male (87.9%). The seroprevalence of hepatitis B infection was 12.4%. The mean age was 41.26 years, with a range of 27 to 60 years. The risk factors associated with hepatitis B infection were gender (OR = 5.71 [2.55 - 16.3], $p = 0.001$) and marital status (OR = 1.46 [1.01 - 2.06], $p = 0.038$). **Conclusion:** This study reveals a significant prevalence of hepatitis B virus infection (12.4%) and the socio-demographic factors associated with it. It highlights the need to raise awareness among workers and to implement appropriate preventive measures in order to effectively combat this condition in the workplace.

Keywords

Viral Hepatitis B, Virus, Prevalence, Workplace

1. Introduction

Infection with the hepatitis B virus (HBV) constitutes a public health problem in many parts of the world, due to its prevalence, complications and socio-economic consequences [1]. Two billion people worldwide have a confirmed HBV infection, and around 70% of global hepatitis B cases are concentrated in Africa [2]. The number of deaths caused by complications of hepatitis B ranges from 500,000 to 1,200,000 per year. This is therefore of a similar magnitude to the number of deaths caused by HIV or malaria [3].

This virus is highly contagious, a hundred times more so than HIV/AIDS. This characteristic is partly explained by the fact that the hepatitis B virus can survive for a week in the open air (and therefore on objects). It is transmitted through contact with the blood of an infected person and their bodily fluids: semen, vaginal secretions and breast milk [4]. Its prevalence in the general population of Gabon is 7.4% [5]. Its association with kidney failure among workers has an impact on absenteeism linked to the time spent on haemodialysis [6].

Data from the workplace are scarce, particularly in the mining sector in Gabon. The aim of this study was to address this gap, with the objective of assessing the prevalence of HBV among workers at a mining company based in Moanda, Gabon.

2. Materials and Methods

2.1. Scope of the Study

Our study was carried out at a mining facility located in Moanda, in the Haut-Ogooué province of Gabon. It is a manganese mining and processing company operating open-cast mines.

2.2. Type and Duration of the Study

This is a retrospective, cross-sectional, descriptive and analytical study based on a review of workers' medical records held by the company's occupational health service during the period from 1st October to 31st December 2023.

2.3. Study Population and Inclusion Criteria

The study population consisted of all the records of employees of the mining company who visited the occupational health service during the study period. The study included all records of employees at the mining company found in the company's occupational health department during the study period, provided that the employees had been with the company for at least one year, were permanent staff, and had undergone hepatitis B serology testing. Incomplete records and those of employees who were absent during the study period were excluded. Of the 2002 employees, we recorded 1504 workers who attended their medical check-ups, giving a participation rate of 75.12%, all of whom underwent the HBsAg test.

2.4. Study Variables

The dependent variable was a positive result for hepatitis B virus infection. The

independent variables were: sociodemographic factors (age, gender, length of service, occupation, marital status).

2.5. Methodology, Data Collection and Analysis

Serological tests were carried out in a clinical laboratory. The biological parameter analysed was the HBs antigen using the Accu-tell® rapid test. Positive results were confirmed using the Vidas automated analyser; in cases of doubt, a PCR test was performed. The kit components and samples were brought to room temperature (15°C - 30°C). A 100 µL sample of plasma or serum was placed in the sample well. Results were interpreted after 15 to 30 minutes. The test was considered positive when a coloured band appeared on the control line (C) and another on the test line (T). All data were collected from the occupational health service (OHS) records.

In addition, telephone calls were essential for obtaining further information (marital status). The data were entered into Excel for Windows 2010 and analysed using R version 4.4.1. For the descriptive results, the data were expressed as counts and percentages for the qualitative variables. Quantitative variables were expressed by calculating the mean, standard deviation and extreme values (minimum and maximum). The tables and graphs were produced using Microsoft Office Excel. Bivariate analysis was used to highlight the relationships between the variables, with a significance level set at 5% ($p = 0.05$). The statistical tests used were Pearson's chi-square test and Fisher's exact test for qualitative variables where the conditions for the chi-square test were not met. The Wilcoxon-Mann-Whitney test was used to compare distributions between groups for quantitative variables. To investigate an association between the dependent variable (HBsAg) and a presumed risk factor, logistic regression was performed. In the multivariate analysis, the covariates were considered at a significance threshold of $p < 0.20$. The reference method took into account the fact that a significant number of HBsAg-positive individuals were found among this group of single people.

2.6. Operational Definitions

In the study, any worker who tested positive in the qualitative HBsAg test was considered to be a carrier of the hepatitis B virus (HBV).

2.7. Ethical Considerations

The confidentiality and anonymity of the study participants were guaranteed. The study had been approved by the company's management.

3. Results

3.1. Sociodemographic Characteristics

A total of 1504 workers were included out of a workforce of 2002 at the time of the study, representing a participation rate of 75.12%. The average age was 42 ± 7.13 years, with ages ranging from 22 to 60. The 30 - 40 and 41 - 50 age groups

accounted for 42.3% of the sample respectively. Men were in the majority, with a male-to-female ratio of 7.9. Married workers numbered 345 out of 1504, or 22.9%.

3.2. Prevalence

In our study, 186 out of 1504 tested positive for HBsAg, representing a prevalence of viral hepatitis B of 12.4%.

Table 1 shows the socio-demographic and biological characteristics of the workers.

Table 1. General characteristics.

General characteristics	Effectifs (N = 1504)	Pourcentage (%)
Sexe		
Female	182	12.1
Male	1322	87.9
Age		
22 - 32 years	163	10.8
33 - 42 years	660	43.9
43 - 52 years	574	38.2
53 - 62 years	107	7.1
Socio-occupational categories		
Supervisors	242	16.1
Managers	166	11
Workers	1096	72.9
Marital status		
Single	1159	77.1
Married	345	22.9
HBs status		
Negative	1318	87.6
Positive	186	12.4
Total	1504	100

HBsAg-positive cases were more common among men (181/186, 97%) than among women (5/186, 2.7%); this difference is statistically significant ($p = 0.001$). Men are 5.62 times more likely to be exposed to hepatitis B than women (OR = 5.62 [2.53 - 16]). Unmarried individuals were more affected, with 135/186 (72.6%), than married workers. However, there was no statistical correlation based on marital status. Manual workers were the socio-occupational group most likely to test positive for HBsAg, although this showed no statistical correlation. **Table 2** summarises the results of the bivariate analysis according to socio-demographic characteristics. **Table 3** summarises the results of the multivariate analysis.

Table 2. Results of the bivariate analysis of the AgHBs test and the participants' socio-occupational characteristics.

Characteristics	HBsAg- (n = 1318)	HBsAg+ (n = 186)	p-value*	OR [IC95%]
Sex				
Female	177 (13%)	5 (2.7%)	-	
Male	1141 (86.1%)	181 (97%)	0.001	5.62 [2.53 - 16]
Age				
22 - 32 ans	145 (11%)	18 (9.7%)		
33 - 42 ans	568 (43%)	92 (49%)		
43 - 52 ans	507 (38%)	67 (36%)	0.3	
53 - 62 ans	98 (7.4%)	9 (4.8%)		
Socio-occupational category				
Supervisors	210 (16%)	32 (17%)		
Managers	152 (12%)	14 (7.5%)	0.3	
Workers	956 (73%)	140 (75%)		
Marital status				
Single	1024 (78%)	135 (72.6%)		
Married	294 (22.7%)	51 (27.6%)	0.12	

Fisher's exact test; Pearson's Chi-squared test.

Table 3. Results of the multivariate analysis of the HBsAg test and the participants' socio-occupational characteristics.

Characteristics	OR	IC 95%	p-value
Sex			
Female	-	-	
Male	5.71	2.55 - 16.3	0.001
Age			
	0.99	0.97 - 1.01	0.2
Marital status			
Single	-	-	
Married	1.46	1.01 - 2.06	0.038
Socio-occupational category			
Supervisors	-	-	
Managers	0.71	0.35 - 1.37	0.3
Workers	0.91	0.61 - 1.42	0.7

OR = rapport de côtes, IC = intervalle de confiance.

4. Discussion

In our study, we found that 97% of the workforce were men, compared with 3% women. This gender imbalance can be explained by the difficult working conditions faced by women in this sector, but also by their marginalisation in certain sectors within our African context. This finding is also reflected in other studies in industrial settings, such as those by Traore Issa *et al.* [7] in Burkina Faso, where men accounted for 78.57% of the study population, compared with 21.43% for women.

With regard to marital status, 72% of HBsAg-positive workers are single, compared with 28% who are married. Similarly, Akator Adjo Enyonam reported in his study a higher proportion of single individuals, accounting for 61.0% of the total sample [8]. The same was found by Guindo O. in his study, which identified 66.51% of single individuals [9]. This finding could be explained by the lifestyle of single people (freedom of action, lack of marital commitments), who are more often exposed to risk factors than married workers. This should be investigated through specific measures.

4.1. Prevalence of Viral Hepatitis B

Our study revealed a prevalence of 12.4%. Similar prevalence rates have been reported by Sawadogo A *et al.* [10] in Bobo-Dioulasso, Pietra V *et al.* [11] in Nanoro, Agbenu E *et al.* [12] in Togo, Noubiap JJN *et al.* [13] in Cameroon, and Kadidj NJIMOGNA in Mali [14], who found prevalence rates of 11.2%, 12.1%, 10.87%, 10.1% and 13.6%, respectively. As for Sbai A *et al.* [15] in Morocco and Zayet S *et al.* [16] in Tunisia, they found low prevalences of hepatitis B, at 1.66% and 2% respectively. The difference between our results and those of Sbai A *et al.* and Zayet S *et al.* could be explained by the fact that our study region is an area of high prevalence [15]. Men are statistically significantly more exposed to HBsAg (97%) than women (2.7%) ($p = 0.001$). These findings are consistent with those observed in the general population of Gabon, where men were more affected (8.9%) compared with 5.4% for women. Other studies have reported similar results; for example, Dao S *et al.* found a prevalence of 63.3% among men in Mali, compared with 36.7% among women [17]. Finally, Tao I *et al.* [18], Camara Toumin *et al.* [19] and Sbai *et al.* reported, respectively, a higher prevalence of HBsAg carriage among men than women: 18.58% versus 11.60%; 71% versus 29%; and 2.16% versus 0.90%. In our study, men are at greater risk of infection with viral hepatitis B, probably because the population engages in risk behaviours associated with transmission of this virus to a greater extent than women (alcohol, tobacco, risky sexual behaviour). However, Ouédraogo HG *et al.* [20], also in Burkina Faso, found a higher prevalence of viral hepatitis B among women than men: 59.8% compared with 40.2%.

The age group most affected was between 33 and 42 years (43%); however, we found no correlation between age and hepatitis B infection. Traoré *et al.* in Bobo-Dioulasso [7] and Agbenu *et al.* in Togo [12] found that the age group of workers

most affected was between 40 and 50 years old, at 42.86% and 22.73% respectively. However, these various results show that the most affected workers are under 50 years of age and that this is a young and strong workforce. This could, in the long term, have negative socio-economic effects on both the workers and the company. The majority of workers were carriers of HBsAg 140/186 (75%). However, there was no statistical link between HBsAg carriage and occupational category. The high prevalence of hepatitis B among manual workers in our study could be explained by the fact that this group has a relatively low level of education and is less aware of the dangers of the virus compared to managerial staff. Traoré *et al.* reported the same trend, with a prevalence of hepatitis B among skilled workers who tested positive for HBsAg, who constituted the majority compared to supervisors and managers at 42.86%, 35.71% and 21.43% respectively [7]. However, Pietra V *et al.* [11] reported findings contrary to our own, with a higher prevalence of HBsAg positivity among supervisory and managerial staff compared with skilled workers—13.3% versus 9.1% respectively—with no statistical association between HBsAg positivity and staff category.

4.2. Limitations of Study

The limitations of the study included the fact that certain employee details in medical records had not been updated and that some workers could not be reached by telephone. The study included only one of the three companies operating in the region. Another limitation is the non-random selection of participants and the cross-sectional nature of the study. The lack of information regarding participants' hepatitis B vaccination status and behavioural risk factors. The sex ratio was skewed towards men in our study, as we are in an industrial environment where the work involves considerable physical exertion.

5. Conclusion

Our study of workers in the mining sector in Gabon found a prevalence rate of 12.4%. This significant prevalence rate results in costs associated with the care of these workers. Indeed, our study site is located in the interior of the country, whilst workers are monitored in the capital, generating travel, accommodation and medical costs borne by the company. This highlights the importance of conducting awareness-raising sessions for all workers on this condition, which is a silent killer. Annual medical check-ups, awareness-raising, screening and vaccination against hepatitis B should also be encouraged in other companies, regardless of their sector of activity. This is because, in the workplace, viral hepatitis B can have a lasting impact on workers' health and lead to a decline in productivity, particularly when complications arise.

Acknowledgements

The authors would like to thank the company for granting permission to carry out this study.

Protection of Human and Animal Rights

The authors state that the work described did not involve any experiments on patients, human subjects or animals.

Funding

This study did not receive any specific funding from a public, commercial or non-profit organisation.

Contribution and Responsibility of the Authors

All the authors contributed to the conduct of this research and to the drafting of the manuscript. They have all read and approved the final version.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References

- [1] (2016) Collège des universitaires des maladies infectieuses et tropicales E. PILLY 2016 ; 25 :389-393.
- [2] Institut Pasteur (2023) Hépatite B: Vers une meilleure prise en charge des personnes infectées en Afrique.
- [3] Dieng, N. (2023) ENDA Santé. *Journée mondiale de lutte contre l'hépatite*. <https://www.enda-sante.org/journee-mondiale-de-lutte-contre-lhepatite/>
- [4] VIDAL (2024) La transmission de l'hépatite B.
- [5] Groc, S., Abbate, J.L., Le Gal, F., Gerber, A., Tuailon, E., Albert, J., *et al.* (2018) High Prevalence and Diversity of Hepatitis B and Hepatitis Delta Virus in Gabon. *Journal of Viral Hepatitis*, **26**, 170-182. <https://doi.org/10.1111/jvh.12991>
- [6] H. Ekomy, M., M. Ngoubadjambo, A., M. Ntsounga, E., Begouabe, H., P. A. Ekouaghe, L., Togola, M., *et al.* (2026) Seroprevalences and Factors Associated with HBV, HCV and HIV Infections in Haemodialysis Patients in Rural Areas of Gabon. *Ghana Medical Journal*, **59**, 260-268. <https://doi.org/10.4314/gmj.v59i4.11>
- [7] Traore, I., Sanon/Lompo, M.S., Kabore, M., Winninguiri, J.B.K., Adama, F.O., Souka, G.K., *et al.* (2020) Prévalence de l'Hépatite Virale B chez les Travailleurs d'une Entreprise Agro-alimentaire de la Ville de Bobo-Dioulasso. *Health Sciences and Disease*, **21**, 100-104.
- [8] Akator, A.E. (2007) L'antigène de surface de l'hépatite B et Paludisme chez les donneurs de sang à Bamako: Evaluation de certains marqueurs biologiques. Ph.D. Thesis, Université de Bamako.
- [9] Guindo, O. (2003) Infections à VIH et VHB chez les donneurs de sang au CNTS de Bamako. Ph.D. Thesis, Université de Bamako.
- [10] Sawadogo, A., Kyelem, C.G., Yaméogo, T.M., Barro, L., Kamboulé, B.E. and Dahourou, H. (2015) Statut du portage du virus de l'hépatite B (VHB) au sein du personnel de santé du CHU Sourô Sanou de Bobo-Dioulasso, Burkina Faso. *Journal Africain d'Hépatologie Gastroentérologie*, **9**, 30-34. <https://doi.org/10.1007/s12157-014-0582-4>
- [11] Pietra, V., Kiema, D., Sorgho, D., Kabore, S.P.C.G., Mande, S., Castelli, F., *et al.*

- (2008) Prévalence des marqueurs du virus de l'hépatite B et des anticorps contre le virus de l'hépatite C parmi le personnel du District Sanitaire de Nanoro, Burkina Faso: Prevalence of hepatitis B virus markers and hepatitis C virus antibodies in health personnel in the District of Nanoro, Burkina Faso. *Sciences de la Santé*, **31**, 53-59.
- [12] Agbenu, E., Banla, A., Kolou, M., D'Almeida, A., Kpotsra, A., Dorkenoo, A., *et al.* (2009) Serologic Markers Used for Hepatitis B Surveillance in Togo: Status Report and Action Proposals. *Médecine tropicale. Revue du Corps de santé colonial*, **68**, 621-624.
- [13] Noubiap, J.J.N., Joko, W.Y.A., Nansseu, J.R.N., Tene, U.G. and Siaka, C. (2013) Seroepidemiology of Human Immunodeficiency Virus, Hepatitis B and C Viruses, and Syphilis Infections among First-Time Blood Donors in Edéa, Cameroon. *International Journal of Infectious Diseases*, **17**, e832-e837.
<https://doi.org/10.1016/j.ijid.2012.12.007>
- [14] Njimogna, K. (2023) Etude de l'hépatite virale B chez le Personnel d'une société minière au Mali. Ph.D. Thesis, USTTB.
- [15] Sbai, A. (2012) Epidémiologie, génotype et facteurs de risque de l'hépatite B au Maroc. Thèse de Doctorat, Université Mohamed V Agdal.
- [16] Zayet, S., Osman, M., Besghaier, H., Ben Moussa, M., Belhadj, A. and Bellaaj, R. (2019) Prévalence des marqueurs de l'hépatite B et statut vaccinal du personnel de santé. Expérience de l'hôpital militaire principal d'instruction de Tunis. *Revue d'Épidémiologie et de Santé Publique*, **67**, 261-266.
<https://doi.org/10.1016/j.respe.2019.03.120>
- [17] Dao, S., Bougoudogo, F., Traoré, S., Coulibaly, K., Diallo, S. and Oumar, A.A. (2009) Portage de l'AgHBs au Mali: Bilan de dix ans de dépistage à l'Institut national de recherche en santé publique (INRSP). *Journal africain du cancer/African Journal of Cancer*, **1**, 68-71. <https://doi.org/10.1007/s12558-009-0012-5>
- [18] Tao, I., Compaoré, T.R., Diarra, B., Djigma, F., Zohoncon, T.M., Assih, M., *et al.* (2014) Seroepidemiology of Hepatitis B and C Viruses in the General Population of Burkina Faso. *Hepatitis Research and Treatment*, **2014**, Article ID: 781843.
<https://doi.org/10.1155/2014/781843>
- [19] Toumin, C., Ibrahim, K., Mamoudou, C., Binan, I., Michel, K. and Toussaint, T. (2021) Aspects Cliniques et Paracliniques de l'Hépatite Virale B Chronique chez des Patients Vus en Consultation au Service de Médecine Interne du CHU de Treichville. *Health Sciences and Disease*, **22**, 16-19.
- [20] Ouedraogo, H.G., Kouanda, S., Yetta, C.E., Konseimbo, G.A., Tiendrébeogo, E., Tiendrébeogo, S., *et al.* (2012) Connaissances et pratiques des professionnels de santé concernant l'infection par le virus de l'hépatite B au Burkina Faso. *Sciences de la Santé*, **35**, 53-52.