

# World Viral Hepatitis Day in Burkina Faso, 2020: awareness, prevention and hepatitis B vaccine to achieve the WHO eradication goal by 2030

## Running title: Hepatitis B vaccine coverage in Ouagadougou, Burkina Faso

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### Abstract

Burkina Faso is located in a region where hepatitis B is endemic with low vaccination coverage. The aim of this study was to evaluate the vaccine coverage during Hepatitis B screening campaign organized by "SOS Hepatitis Burkina" in Ouagadougou in July 2020.

A rapid HBsAg detection test (Abon Biopharma Guangzhou, Co., Ltd. China; sensitivity > 99.0%; specificity, 96.8%) was performed on 252 individuals who voluntarily agreed to participate in the study. This study was approved by the Institutional Ethics Committee of the Centre de recherche Biomoléculaire Pietro Annigoni (CERBA).

We included 252 participants aged 2 to 77 years (mean age 31.77±14.07 and 29.67±13.71 for males and females, respectively). The prevalence of HBsAg was 18.25% (46/252) and was slightly high in the age groups 21-30 years (23.71%) and 31-40 years (23.73%). Out of 252 participants, 25 HBV-negative participants were vaccinated, giving a vaccination rate of 9.92%.

This study reports a high prevalence of HBV infection in Burkina Faso with low vaccination coverage. The study suggests that more attention should be paid to HBV prevention in Burkina Faso

**Key words:** Hepatitis B, Awareness, Screening, Vaccination, Burkina Faso.

### Introduction

Hepatitis B is an infectious disease considered as a major public health concern worldwide. The number of chronic carriers of Hepatitis B virus (HBV) is estimated at 257 million (1). The prevalence of Hepatitis B antigen (HBsAg) varies in different parts of the world. It is particularly high in Africa and Southeast Asia, low in northern Europe and the United States (2).

Hepatitis B virus is a virus that infects the liver. When an infection goes on for a long time, it is known as chronic hepatitis B, and can lead to cirrhosis and liver cancer. HBV is the cause of nearly 900,000 deaths per year worldwide and is mainly passed on through infected blood, but also from mother to baby in the womb. This infection is transmitted parenterally via apparent percutaneous or per-mucous exposure to blood or other infected body fluids (3,4). In Africa and Asia, Hepatitis B carries high risks for the unborn baby when acquired during pregnancy. Usually there are no symptoms in the early stages of infection. However, up to 85% of infants infected

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by their mothers at birth develop chronic HBV infection (3). Vaccine programs have transformed global epidemiology but liver cancer remains a heavy burden globally with nearly 360,000 cases attributable to the disease. HBV is the most common cause of hepatocellular carcinoma in the world with nearly 2.2 million new cancer cases due to HBV infection in 2018 (5).

In Burkina Faso, the hepatitis B carriage rate was 8% in the general population (6); a rate relatively high in this poor country of Sub Saharian Africa. A prevalence between 9.5 to 14.5% of HBV infection has been reported in Ouagadougou, the capital city. (7). In addition, prevalence rate of 12.1% was reported among pregnant women in Ouagadougou, (8). It varied between 13 and 19% among blood donors in Burkina Faso (9-12). Diarra et al., (11) reported in 2018 a prevalence of occult HBV infection of 7.3% among HBsAg seronegative patients in Burkina Faso. A prevalence of 10.4% (230/2216) of HBsAg was obtained in Ouagadougou in 2017 during the SOS Hépatite campaign. In 2020, World hepatitis day was celebrated during the worst period of covid-19 infection in Burkina Faso and worldwide. All data on hepatitis prevalence indicate that hepatitis B is a major public health concern in our country and vaccination against the virus should be done to protect the population. It is important to follow up the country's strategy in fighting against the virus in Burkina Faso. This study aimed to evaluate the vaccine coverage among people during awareness campaigns of voluntary hepatitis B screening in Ouagadougou especially in this period of covid-19 propagation.

## **I. Method**

### **1.1. Study population**

The present study was approved by the Institutional Ethics Committee of the Centre de Recherche Biomoléculaire Pietro Annigoni (CERBA). The study was conducted in Ouagadougou, Burkina Faso in July 2020 on World Hepatitis Day. SOS Hépatite Burkina located in Karpala in Ouagadougou, is a nationwide non-profit association created in 2000 with the ambition of preventing hepatitis transmission. The association tools that contribute to eliminate the disease 2030 are awareness via communication with the population and vaccine promotion through vaccination campaigns. So, this present study was carried out in collaboration with this non-profit "SOS Hépatite Burkina" during the awareness and screening campaign, on July 05–15, 2020. Media like radio and television were used to inform on this campaign especially on the period and participation conditions. During this period, it was difficult to regroup more than fifty (50) persons at the same time because of covid-19.

These conditions of participation were based on free and voluntary consent. People were invited to join SOS Hépatite Burkina site for blood sample collection in order to screen for HBsAg serology. To raise awareness on this viral infection, we focused on the routes of transmission, risk groups, symptoms, complications, and prevention. In practice, participants answered a questionnaire on age, sex, marital status, profession, and vaccination status for HBV before blood sample collecting.

### **1.2. Sample collection**

An individual counseling has been done for all people who came to the site of SOS hépatite Burkina. All participants gave their free written and informed consent according to the Helsinki Declarations during this pretest counseling and all volunteers were included in the study, regardless of age, gender, profession, or social status. Consented people and volunteers were invited to give venous blood sample for analysis. Exclusion criteria were people known to be HBsAg-positive.

### 1.3. Serology of HBsAg

Venous blood samples, collected from HBsAg-positive subjects, were centrifuged, and the plasma was stored at  $-20^{\circ}\text{C}$  until further use

HBsAg serology was done as described by Diarra *et al.*, (11). The HBV rapid test kit (ABON Biopharm Hangzhou Co. Ltd., China; sensitivity  $> 99.0\%$ ; specificity,  $96.8\%$ ; accuracy,  $98.3\%$ ) (12) was used for the rapid diagnosis of HBsAg. The results were presented to the participants during individual posttest counseling. Vaccination with a recombinant hepatitis B vaccine (EUVAX-B®) was recommended to HBV-negative participants, based on the absence of HBV vaccination history (AbHBc and AbHBs) (11).

“SOS Hepatitis Burkina” association is in close collaboration with general practitioners and gastroenterologists for follow-up and adequate management of study participants tested positive for hepatitis B and vaccination of HBsAg-negative individuals throughout the year. However, the latter should contribute (32 Euros for the 3 doses) for vaccination against hepatitis B because of lack of funding for vaccination in this study. On-site vaccination was provided by the association during the study period and at its headquarters throughout the year, thus making it possible to track the vaccination rates. When they received the first dose of the vaccine during the study period, participants were then follow-up by a text message reminder for the next vaccine dose, within the week of its due date until the completion of the vaccine three doses (11).

### 1.4. Statistical analysis

Analyzes were performed using R.4.0.2 software and stata version 16. Excel software was also used for data entry and table formatting. Bivariate analysis makes possible to verify the association between two variables. The frequencies of the various parameters were calculated and compared by means of the Chi2 (Chi squared) test at the 5% threshold. Chi-square provides information on the degree of association between two categorical variables

## II. Results

### 2.1. Sociodemographic characteristics of the study population

A total of 252 participants have participated in the study and the sociodemographic characteristics of the study population are summarized in table 1. Among these 252 participants, 131 (51.98%) were men and 121 (48.02%) women aged 2 and 77 years (mean age  $31.77 \pm 14.07$  and  $29.67 \pm 13.71$  for men and women, respectively).

People aged 21-30 (38.49 %) are the majority who participated to this screening campaign, followed by people aged 31-40 (23.41 %) and by young people under 20 years (18.65 %). In terms of work activity, pupil and students were the majority (36.51%) with the mean age of  $21.26 \pm 10.04$ ; followed by people who did not specify their occupation (33.33 %) (mean age  $35.54 \pm 14.24$ ). The informal and formal sector (civil servants) activities were 18.65 % with a mean age of  $35.29 \pm 10.32$ , and 11.51 % with the mean age of  $39.75 \pm 12.15$ , respectively. For the marital status, 51.98 % (mean age  $25.06 \pm 10.28$ ) were single and 43.25 % (mean age  $39.34 \pm 12.70$ ) were married or living together.

After HBsAg screening, 46 people (18.25%) were HBsAg-positive and 206 (81.75%) were HBsAg-negative with a mean age of  $31.41 \pm 8.20$  and  $30.62 \pm 14.90$ , respectively (Table 1).

**Table 1:** Sociodemographic characteristics of the Study Population

Variables	N	%	Mean age
<b>Gender</b>			
Male	131	51.98	31.77±14.07
Female	121	48.02	29.67±13.71
<b>Age</b>			
≤20	47	18.65	12.89 ±5.24
21-30	97	38.49	25.89 ±2.78
31-40	59	23.41	35.30 ±2.90
41-50	31	12.30	45.77 ±3.44
>50	18	7.14	63 ±9.55
<b>Profession</b>			
Pupils / Students	92	36.51	21.26 ±10.04
Civil servants	29	11.51	39.75 ±12.15
Informal workers	47	18.65	35.29 ±10.32
Others	84	33.33	35.54 ±14.24
<b>Marital status</b>			
Unmarried	131	51.98	25.06 ±10.28
Married or in couple	109	43.25	39.34 ±12.70
Others	12	4.76	15.08 ±14.15
<b>Study level</b>			
Unlettered	56	22.22	39.92 ±12.58
Elementary	41	16.27	26.43 ±18.76
Post-Primary	41	16.27	26.41 ±10.22
Secondary	30	11.90	30.83 ±12.98
University (Supérieur)	77	30.56	29.77 ±9.58
Others	7	2.78	19 ±20.29
<b>HBsAg serology</b>			
Positive	46	18.25	31.41 ±8.20
Negative	206	81.75	30.62 ±14.90

\*\*: Significant at p= 5%, NS: Not significant, NA : Not applicable

### HBV infection by sociodemographic characteristics of study population

In table 2, we have the sociodemographic characteristics of study population in relation with the HBV infection (N = 252). A global HBV prevalence of 18.25% was found in the study population.

The prevalence of HBV is similar in men (18.32%) and women (18.18%) and there is no statistically significant difference between the two (p=0.9796).

Participants of 21-30 years old (23.71%) and 31-40 years old (23.73%) were the most infected by hepatitis B virus with some statistically significant differences (p=0.012 and p=0.015, respectively). HBV infection was more prevalent among civil servants (p=0.021).

Among infected people, according to education level, 19.64% were unlettered, 12.20% has elementary school level, 17.07 the primary school level, 30.00% Secondary School and 16.88% the superior level with no statistically significant difference (p≥ 0.05) (Table 2).

**Table 2:** HBV infection by sociodemographic characteristics of study population

Variables	HVB		
	Positif/Total	%	Khi-deux p-value
<b>Gender</b>			
Male	24/131	18.32	NS
Female	22/121	18.18	0.979
Total	46/252	18.25	
<b>Age</b>			
≤20	2/47	4.26	Réf
]20-30]	23/97	23.71	0.012 **
]30-40]	14/ 59	23.73	0.0154 **
]40-50]	6/31	19.35	0.055 **
>50	1/18	5.56	0.823
<b>Profession</b>			
Pupil/students	11/ 92	11.96	Réf
Civil servants	10/ 29	34.48	0.021 **
Informal workers	11/47	23.40	0.096 NS
Others	14/84	16.67	0.508
<b>Marital status</b>			
Unmarried	25/131	19.08	Réf
Married and in couple	21/109	19.27	0.896 NA
Others	0/12	0.0	0.135
<b>Study level</b>			
Unlettered	11/52	19.64	Réf
Primary	5/41	12.20	0.348
Post-Primary	7/41	17.07	0.672 NS
Secondary	9/30	30.00	0.465
University	13/77	16.88	0.627
Others	1/7	14.29	0.799

\*\* : Significant at p= 5%, NS: Not significant, NA : Not applicable

## 2.2. Vaccination rate following HBV screening by sex and age group

For each HBV-negative participant, the vaccination is recommended for all three (3) doses. The vaccination rate following HBV screening was only 9.92% (25/252). These vaccination rates were 10.69% (14/131) for men and 9.09% (11/121) for women with no significant difference. The mean age in vaccinated men and women was  $26.57 \pm 14.45$  and  $25.25 \pm 11.01$ , respectively. In fact, 25/252 persons have been vaccinated, 16 for the first dose, 4 for the second dose and 5 for the third dose (Table 3). Participants under 20 (14.89%), between 21-30 (10.31%) and 31-40 (8.47 %) were most vaccinated people but without a significant difference (Table 3).

**Table 3:** Vaccination rate following HBV screening by sex and age group

Variables	Vaccinated/total	%	1 <sup>st</sup> dose	2 <sup>nd</sup> dose	3 <sup>rd</sup> dose	Mean age
<b>Age</b>						
≤20	7/47	14.89	3	2	2	8.28±4.68
21-30	10/97	10.31	6	2	2	26.8±2.44
31-40	5/ 59	8.47	5	0	0	36.6±2.70
41-50	2/31	6.45	1	0	1	45.5±3.53
>50	1/18	5.56	1	0	0	57±0
Total	25	9.92	16	4	5	26.28±14.01
<b>Vaccination rate</b>						
Male	14/131	10.69	9	3	2	26.57±14.45
Female	11/121	9.09	7	1	3	25.90±14.11
Total	25/252	9.92	16	4	5	26.28±14.01
Not vaccinated	227/252	90.08				31.26±13.85

### III. Discussion

World Hepatitis Day has been worldwide instituted by WHO in order to enable people to better understand this infection and ways to protect themselves. Thus, every year, on this day, the “SOS Hepatitis” association conducts voluntary screening tests in Ouagadougou city.

This year the majority of persons participating to the campaign are young people. Similar results were found by Diarra, et al., (11). These young people constituted also the most important group of volunteer screening. Makuwa et al., (13) also reported in 2009 that 22.2% among young people in Gabon were most concerned. They also indicated that the prevalence of hepatitis B virus surface antigen was significantly higher in urban than in rural populations.

A global hepatitis B prevalence of 18.25% was found after participant screening with a mean age of 31.41. The high prevalence suggests an active circulation of the virus in the country. Young people are more concerned by this infection. In fact, prevalences around 10.0% of HBsAg were obtained during two consecutive years by Diarra et al., (11,14) in 2018 and in 2017 from hepatitis campaigns. From another study, the results revealed that the HBs antigen carriers in the general population represented 14.47%. The difference of prevalence between men (18.58%) and women (11.60%) was statistically significant ( $P = 0.002$ ). The most affected groups were undergraduated students (19.57%) and persons working in the informal sector (15.98%) (7). Screening of Hepatitis B viruses among voluntary non-remunerated blood donors in Burkina Faso by Tao et al., (15) in 2013 indicated the overall seroprevalence of HBV were of 12.9%, at the Centre Régionale de Transfusion Sanguine in Ouagadougou.

The current hepatitis B prevalence was high despite the covid -19 impacts on this campaign 2020. In fact, the global sample was lower (252 participants in 2020 vs 2216 in 2017) in the study respect the sample numbers in ‘SOS hépatite Burkina’ association in precedent campaigns.

The high prevalence of HBV among young people could be explained by use of nonsterile syringes among intravenous drug users, customary scarification rites, male and female circumcision with soiled blades (7). In parallel we observed a reduction in prevalence from 23.71% to 5.56% in the age groups of 21-30 to > 50 years. In fact, the number of deaths following liver cirrhosis or hepatocellular carcinoma in patients > 50 years could highlight this fact.

The variations of prevalence rates could be explained by the size and type of the study population, by the limitations of serological tests use, immunity and other socioeconomic characteristics. It should be also mentioned that voluntary participation in a screening program introduces self-selection bias (11). Despite the consequences that may be caused by HBV infection, there is no national strategy or plan for awareness and to fight against viral hepatitis B in Burkina Faso, because viral hepatitis B is not considered as a priority disease (11).

The previous study from 2017 campaign achieved 60.5% of vaccine coverage against the virus after screening. The high participation rate to vaccination is an affirmation of the Burkinabe people's concern about viral hepatitis B (11). The low vaccine coverage rate of 9.92% in this present study in 2020 versus 60.5% in 2017 could be explained by Covid -19 impact on this campaign; so due to negative impact of covid-19 infection on all activities it was not possible for many people to go for vaccine. Besides, its impact on HIV patient management was important. In fact, many structures that performed viral load tests have been requisitioned for the management of COVID 19 cases (16).

In May 2016, WHO adopted a global hepatitis strategy with the goal of eliminating viral hepatitis as a public health threat by 2030. The targets to be achieved by 2030 are ambitious: a 90% reduction in new cases of chronic hepatitis B and C, and a 65% reduction in mortality due to HBV and HCV infection, both of which rely on 80% of treatment-eligible individuals with chronic HBV and HCV infections being treated globally (17). So in Burkina Faso, strategies in order to reach this ambitious goal must be consequent with the goal importance. Prioritize implementation of elimination strategies are revealed to be strongly considered.

In fact, a recent study reports that to achieve the WHO goals of eliminating HBV by 2030, sub-Saharan Africa will need to actively prioritize implementation of several elimination strategies (18). Strategies could consider the subsidy of vaccine cost.

In reality, in absence of a subsidy, the cost of the vaccine remains expensive and constitutes a barrier despite the willingness of participants to be vaccinated against hepatitis B. The challenges include also curtailing mother-to child transmission (MTCT) with implementation of the HBV birth-dose vaccine and full coverage of the HBV vaccination schedule; access to affordable diagnostic assays to identify individuals who are infected with HBV and enable efficient linkage to care and treatment with nucleoside analogue therapy for HBV-monoinfected individuals; and redressing of social stigmas associated with the diagnosis of HBV (18).

In addition, antenatal HBsAg screening, prevention of mother-to-child transmission should form the cornerstone of any HBV elimination strategy. Treatment with antiviral therapy during pregnancy is one strategy under consideration to reduce HBV mother to child transmission. Antivirals that are active against HBV like tenofovir disoproxil fumarate may reduce the risk of mother to child transmission by reducing the HBV DNA during pregnancy to preferably undetectable at the time of delivery and this might be a more feasible option than the passive immunoprophylaxis with hepatitis B Immunoglobulin in a resource limited setting (19). Others authors also reported that HBV transmitted from mother to child can be prevented via birth dose vaccine combined with three follow up hepatitis B vaccines, hepatitis B immunoglobulins (20) and maternal antiviral treatment with Tenofovir Disoproxil Fumarate and indicated the importance of HBV screening among pregnant women and the need to vaccinate newborns within 24 h of birth (21).

This paper on hepatitis and the work of *SOS Hépatite Burkina* will draw the government attention on this viral infection that destroys many lives in Burkina Faso. We strongly wish that the government will consider viral hepatitis B as a priority disease, commemorate World Hepatitis Day and promote other awareness raising activities.

## IV. Limit of the study and recommandations

The best protocol to follow for hepatitis B screening is by testing for HBs antigen (HBsAg), testing for anti-HBc antibodies and detection of HBe antigen (HBeAg). This screening taking into account the three (3) parameters should be accessible to the population in terms of costs and technical platform. Currently, testing for hepatitis B is neither affordable nor publicly funded. Due to limited financial resources and lack of vaccine subsidies, we were unable to vaccinate all HBsAg-negative subjects. In fact, the distribution of HBV infection and vaccination rate according to the districts of Ouagadougou city has not been done like in the study of 2018 and limit information on vaccination coverage. Despite of metting difficulties regarding limited financial resources and we also got the problem of covid-19 infection, which put all the country into confinement. So, sensibilization, prevention and mangement of patients' activities were blocked. Finally, we could not also perform HCV screening for all participants.

## Conclusion

Many countries in sub-Saharan Africa are now in the process of developing viral hepatitis management guidelines and strategic plans to achieve these goals for viral hepatitis elimination. Hepatitis constitutes a live threaning disease in our country. HBV and HCV also remain the greatest threats to blood safety in Burkina Faso.

The voluntary screening campaign of the non-profit "SOS Hépatite Burkina" in 2020 reported a prevalence of (18.25 %) % of HBsAg in the population of Ouagadougou. Prevalence was relatively high among young people. This campaign achieved very low vaccination coverage of 9.92% after screening and has to be considered by the government politics. We invited the gouvernement of Burkina Faso to improve the fight against viral hepatitis. The study suggests an active involvement of the government in this fight through the recognition of viral hepatis as a priority disease. In addition, they should commemorate World Hepatitis Day and promote other awareness raising activities and reduce the vaccine cost. A collective perspective of clinicians and research hepatologists and gastro-enterologists from sub-Saharan Africa will allow reaching the WHO global vision for hepatitis elimination. Covid-19 should be managed in order to limit its negative impact on hepatitis fight.

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