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Hepatitis B Knowledge, Vaccine Coverage and Prevalence among Workers Admitted in Ouagadougou Workers Health Office

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ABSTRACT

Objective: *Viral hepatitis B (HBV) represents a serious public health issue worldwide, and particularly in Burkina Faso. The virus existence, the virus transmission modes, the disease complications and existence efficient means of prevention are quite unknown in general population; this fact contributes to its spreading. Thus, our work consisted in assessing knowledge, immunization coverage and the prevalence of the HBV among workers, from both the public and private sector in the City of Ouagadougou, in order to improve sensitization strategies.*

Patients and methods: *It was a cross-cutting study on a sample of civil workers who undergo regular medical check-up. Data have been collected through an auto-administered questionnaire, followed by blood samplings which have been tested in laboratory for immunization and infection HBV.*

Results: *A total number of 300 voluntary workers have been screened. The majority was made of men (76.7%) and the average age was 32 ± 8.32 years. The HBV was known by 87% of workers through media (51.7%) as major source of information. Knowledge on the modes of transmission, complications and immunization were insufficient. The study revealed very low vaccination coverage (10%), mainly due to the lack of information (84.1%). A previous screening was performed and in (24%) of cases, the systematic check-up (11.7%) was the main circumstance of the detection of the infection, followed by blood donation. HBsAg and the anti-HBs antibody carrying prevalence rate was 10.7% and 15.7%, respectively. Neither the accidental or professional risk factors, nor the nosocomial risk factors seemed to influence the prevalence of HBsAg in this study.*

Conclusion: *The results of this study will enable to reinforce information, sensitization, and screening and mass immunization campaign strategies against HBV by improving conditions to have access to these.*

Keywords: HBV, Knowledge, Vaccination, Immunization, Prevalence, Civil workers

INTRODUCTION

Viral hepatitis B is a major public health issue. According to the World Health Organization (WHO), nearly two billion people are hepatitis B virus infected, among whom about 350 million living with chronic liver disease [1]. Furthermore, about six hundred thousand people die every year from viral Hepatitis B infection [1].

In Burkina Faso, public health concerns are huge (notably those related to communicable diseases), hiding therefore the deadly disease that constitutes the viral hepatitis B. However, effective prevention measures to reduce its overspread exist. This is why the fight against viral hepatitis appears as a public health priority. Viral hepatitis B is classified by WHO at the same level than the Human Immunodeficiency Virus (HIV), malaria and tuberculosis [2]. Indeed, WHO has implemented a global hepatitis B control policy based on preventive immunization. In Burkina Faso, immunization against hepatitis has been introduced in 2006 into the immunization schedule for infants, the Enlarged Program of Immunization (EPI). Strategies such as reinforcing infection prevention in healthcare centers and transfusion safety measures have also been adopted by the Burkina Faso Ministry of Health. Despite the introduction of the hepatitis B vaccine in the EPI, HBV transmission continues spreading among teenagers and unimmunized adults [3].

Though tremendous progress made to improve knowledge about the viral hepatitis B, this infection remains the most widespread one and deadly sexually transmitted infection (STI) in the world and the second most common cause of cancer after tobacco [1,4]. While HIV epidemiology is well known in our country, hepatitis B virus remains less known. Thus, in Burkina Faso, as in several African countries, the screening of viral hepatitis is not systematic and several persons are HBV infected without being aware. This ignorance contributes to the spread of this virus through blood, sexual and vertical transmission [5].

Burkina Faso epidemiological context of HBV infections remains characterized by poor national prevalence data available related to chronic HBV infection. Data available have been collected from various studies involving different populations such as blood donors, health workers, pregnant women, prisoners.

Therefore, a study conducted among blood donors at the Regional Center for Blood Transfusion (CRTS) in Koudougou (Burkina Faso) in 2009 showed a seroprevalence rate of 14.96% for HBV [6]. Another study conducted in 2008 among health workers in the Nanoro Rural Health District showed an overall prevalence of 12.1% for HBsAg and a prevalence of 63.7% for at least one HBV marker [7]. Sangare et al. found in 2009, 11.4% of pregnant women infected by HBsAg in Ouagadougou [8], while Diendere et al. had 27.3% prevalence rate for HBsAg among prisoners at the main Prison of Ouagadougou in 2009 [9]. Those studies had revealed a high prevalence of viral hepatitis B among target group of the study in Burkina Faso. However, the prevalence of HBV in Burkina Faso in general population and among workers in general is less known. Indeed, since workers constitute the productive force of Burkinabe population, a particular attention must be paid to them in terms of monitoring in order to prevent the development of disabling diseases such as chronic hepatitis B, liver cancer, cirrhosis caused by the viral hepatitis B. The care costs for these diseases remains high in our context and their socio-economic impact is considerable for both the State, patients and their families. Therefore, this study aimed to assess the knowledge, coverage and prevalence of hepatitis B virus carriage among workers in Ouagadougou City (Burkina Faso).

MATERIALS AND METHODS

This was a cross-cutting descriptive study conducted from February 2015 to March 2015, in Ouagadougou City, in ten (10) companies, affiliated to the "Workers Health Office (OST)"; the companies have been randomly selected among those whose workers' Periodic Medical Visit (PMV) should be held during the period of the study.

In our study, has been considered as worker any person regard less of sex, race, ethnic group, working in a public or private sector with a monthly pay. Any worker from the selected companies who had blood sampling during the PMV and who gave his informed consent to participate in the study has been included in the study.

The recruitment of workers took place in companies during the blood sampling of the PMV with their consent. At the sampling sites, a detailed explanation of the purpose and procedure of the study has been provided to each worker, followed by a verbal request for consent to participate.

Data have been collected using a self-administered, confidential and anonymous individual data collection sheet.

The variables of the study included:

- Socio-professional characteristics, such as age, sex, marital status of the respondent;

- Knowledge about HBV transmission patterns and complications, classified into scores as follows: score 1: the respondent knew the answer and score 0: the respondent did not know the answer. Thus, the level of knowledge of transmission patterns and complications has been classified as follows: 0 to 1: poor knowledge; 2 to 3: average knowledge; 4: good knowledge;

- Knowledge of natural history and prevention of hepatitis B;

- Knowledge of HBV serological status and circumstances of previous screening;

- Immunization status, history of nosocomial, accidental or occupational risk;

- HBV infection markers such as HBsAg and anti-HBs antibody;

- Hepatitis B risk factors

The immunology unit of the Workers Health Office Medical Biology Laboratory has been used to analyze blood samples.

A venous blood sample was collected (about 5 ml on vacutainer BD® heparin tubes) from each employee. After centrifugation at 3000 rpm, serum samples were used for qualitative HBs antigen and anti-HBs antibody testing, using HBs Ag SD Bioline and HBsAc SD Bioline tests. Tube number was reported on the corresponding data sheet. All laboratory tests were performed in accordance with the of the reagent manufacturers' recommendations.

The internal quality controls of the various kits were appropriately made to ensure the validity of the results.

SD-HBs Ag and anti-HBsAc SD tests used were immuno-chromatographic tests designed for the qualitative screening of HBsAg and Ac anti-HBs in human serum or plasma. The test is made of a cassette containing a membrane band, pre-coated with anti-mouse monoclonal Ac HBs or HBsAg of HBVs on the portion of the test strip. The monoclonal anti-mouse anti-HBs sample moves along the chromatographic membrane to the test area (T) and forms a visible line to the naked eye (Ag-Ac complexes). The cassette bears letters T and C defined respectively as "test line" and "control line" on its surface. Both lines are visible only when the test is positive. In case of negative result, only the "control line" must appear. Color intensity in the test area varies depending on the concentration of antibodies or antigens in the test sample. Therefore, a test with low color is considered positive.

The test was performed according to the instructions and the manufacturer's procedure, consisting in:

Removing tests from the refrigerator and leaving it at room temperature for 30 min.

Removing the test from its packaging and placing it on a flat, horizontal and dry surface.

Depositing 100 µl of serum in the sample well (S).

Setting the timer to 20 min

When the test runs, a purple color movement through the result window at the center of the cassette is visible.

After 20 min (never more than 30 min) results were interpreted.
The test was considered negative if only one red line appears in the Control area C and no lines in the Test area (T) and; it was Positive if there were two red lines on the Test area (T) and Control (C); it was invalid when the control line (C) did not appear or a line appeared only in the TEST area (T). Main reasons of invalid tests were insufficient amount of serum deposited or failure in following testing procedures (Figure 1).

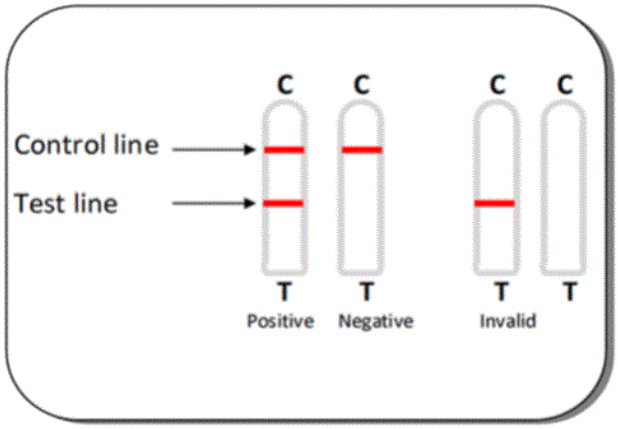

Figure 1: Interpretation of results for SD HBsAg test (following the test note)

Data collected were checked before entering and analyzing with Epi-info version 7 Software. The statistical comparisons were made using the chi-square test, at the significance level of 5%.

RESULTS AND DISCUSSION

Study participation rate

All the three hundred and twenty-five (325) workers who were invited to participate in the study agreed to participate, achieving a 100% participation rate. However after clearance, 300 people have been selected for the study.

Socio demographic characteristics and knowledge on HBV

There was a male predominance with a sex ratio of 230/70 (3.3). The 30-39 age group was the most represented (44.3%). The mean age was 32.5 ± 8.3 years with extremes of 21 and 58 years. Participants living in a couple accounted for 57.0% (171/300).

Among those interviewed, 261 (87%) had heard of hepatitis B, while 39 (13%) were unaware of it. The media accounted for the main source of information in 51.7%, followed by health workers: 24% and lastly through an acquaintance or family circle: 12%.

Concerning the knowledge of the transmission patterns of the HVB, 63% of the workers said they know the virus transmission pattern. In fact, blood transfusion was the main transmission pattern given by participants, i.e., 49.7% against 39.3% who mentioned the sexual source of transmission of the disease.

210 participants knew that HBV can get complicated; accounting for 70%, while 28.3% did not know that hepatitis B could be complicated. Among the complications given, nearly 62% of respondents mentioned death; the other complications mentioned was respectively liver cirrhosis: 40%; primary liver cancer: 32% and pain as potential complications of viral hepatitis B: 30%.

With regard to the means of preventing hepatitis B and the perception of workers against this disease, nearly 58% (173/300) of respondents knew that means of protection exist while 61% (183/300) of them knew that a vaccine exists against the disease. More than half of the workers surveyed: 55.3% (166/300) said that hepatitis B was a very life threatening disease, and nearly 81% of them were afraid of it. However, about 55% (164/300) said it was curable.

Exposure risk factors

The Table 1 shows the respondents' distribution, according to their exposure risk.

Table 1: Distribution of subjects according their exposure risk (n=300)

Exposure risks	Number (n)	Rate (%=n/300)
Blood transfusion	20	6.7
Surgery operation	39	13
Endoscopic examination	38	12.6
Acupuncture	5	1,7
Tattooing	10	3,3
No risk factor	153	51
Total	265	88.3

Immunization coverage

Thirty (30) workers or (1/10) of the study population declared having been immunized against hepatitis B. The Table 2 shows their distribution.

Table 2: Distribution of the study population immunized per number of doses of anti HBV vaccines received

Number of doses received	Number of persons immunized (n)	Rate (%=n/300)
One	9	30
Two	5	16.6
Three	8	26.7
Does not remember	8	26.7
Total	30	100

For those who have not been immunized, the reasons mentioned are as follows in the Table 3.

Table 3: Distribution of persons surveyed according to the reasons of non-immunization

Reasons	Number (n)	Rate (%=n/300)
Lack of information	227	84,1
High cost	27	10
Negligence	15	5.5
Test already positive	1	0.4
Total	270	100

Prevalence of hepatitis B markers

Prevalence of HBsAg

Over 300 serums sampled, 32 were tested HBsAg positive, giving a prevalence rate of 10.7%.

Table 4 shows the prevalence of HBS Ag among respondents according to their socio-demographic characteristics.

Table 4: Prevalence of HBs Ag according to socio demographic characteristics (n=300)

Items	Number of persons sampled (n)	Prevalence:(%=n/N)	P
Age Group			
(20-29)	86	10 (11.6%)	
(30-39)	133	18 (13.5%)	
(40-49)	56	2 (3.6%)	
≥ 50	25	2 (8%)	
Gender			
Male	230	26 (11.3%)	0,6
Female	70	6 (8.6%)	
Marital Status			
Living in couple	171	15 (8.8%)	
Not living in couple	129	17 (13.2%)	

The Table 5 represents the HBV prevalence according to risk factors:

Table 5: HBV Prevalence according to risk factors

Risk factors and HBV antecedents	Antigen HBs		Total	P
	Positive	Negative		
Blood transfusion	0 (0.0%)	20 (100%)	20	
Suffering from jaundice	3 (8.6%)	32 (91.4%)	35	
Surgery interventions	1 (2.6%)	38 (97.4)	39	
Endoscopic exams	6 (15.8%)	32 (84.2%)	38	0,4
Tattooing	0 (0%)	10 (100%)	10	
Acupuncture	0 (0%)	5 (100%)	5	
Piercing	0 (0%)	14 (100%)	14	
Contact with blood	15 (10.7%)	125 (89.3%)	140	0,64

DISCUSSION

Most of the participants of our study were male (76.7%) and the majority of respondents were 30-39 years-aged workers (44.3%).This is consistent with Burkina Faso's labor statistics, which showed that the number of men was three times higher than number of women in the labor force: 72% of men versus 28% of women [10]. Indeed, girls under-enrollment in schools in comparison with boys and the girls early age marriage are all factors that may contribute to the higher number of men in workplaces, nationwide.

This also confirms the data provided by the National Institute of Statistics and Demography (INSD), which reported in 2006 that 47% of the young professional population in Burkina Faso was between 30 and 40 years old [10].

It should be noted that 87% of workers surveyed said they had heard about the HVB and media was their main source of information (51.7%). As civil workers, the respondents' had a certain education level may explain their relative easy access to media information in comparison with general population. Although the data provided in our study are higher than those reported in schools in Côte d'Ivoire by the team of Marie-Jeanne et al., media was also the main source of information for students (76.6%) and pupils (69.4%) surveyed concerning the source of knowledge of the existence of the HVB [11]. However, a study carried out in 2010 in France among the general population noted that 96.1% of respondents had already heard of hepatitis B [12] and Vignier in France showed in 2009 that the main sources of information for the respondents in the general population included general practitioners and the family circle [13]. This could be justified by the fact that France, a developed country, has sufficient health facilities to cover the population, in contrast to an underdeveloped country such as Burkina Faso where, according to the 2013 statistical yearbook, there are more than 20,000 inhabitants for a doctor

Moreover, the lack of universal health insurance scheme is one of the factors limiting health centers attendance by the population in Burkina Faso.

On the whole, 63% of the workers surveyed claimed to know HBV transmission patterns and blood was reported by more than two thirds (49.7%), followed by transmission through saliva (39.7%). This is similar to the results of the study carried out in France in 2009 by the team of Vignier et al [13]. In addition, while in our series, sexual and mother-to-child transmission was known as transmission patterns of the HVB by respondents respectively in 39.3% and 33.7% of cases, a study conducted on pregnant women by Oudou et al. in Cameroon showed lower knowledge levels related to transmission through these two patterns, respectively 31.3% and 25.9% of total [14]. This could be justified by the fact that our population was selected among workers who have an acceptable education level, making possible a better awareness by the media.

It should be noted that, in general, workers knowledge about all patterns of hepatitis B transmission was limited, accounting for 24%. This was found in other studies, notably those conducted in Cameroon [15] and Côte d'Ivoire [11].

After the transmission of the virus, the evolution of the disease goes through several phases, including complete recovery and the evolution toward complications which are very lives threatening. Indeed, 90 to 95% of acute cases of hepatitis B are cured without treatment. There are also effective therapeutic protocols that make it possible to slow the evolution of the disease. In this study, more than half of the participants (54.7%) had referred to a possible cure after being infected. In our study, nearly 20% of workers were able to give the four main complications of hepatitis B

(cirrhosis, cancer, liver pain, and death) against 28.3% of the respondents who did not know that HVB could have progressive complications.

On the whole, most workers (69.9%) are afraid of this disease and perceive it as life threatening (55.3%). This corroborates the results of studies conducted in France on people born in sub-Saharan Africa who perceive hepatitis B as the most dangerous infectious diseases [13].

This highly dangerous oncogenic virus can be avoided through vaccines which exist and have proven effective when administered properly. The majority of the people surveyed in our study (61%) know that a vaccine exists against this virus. However, the team of Marie-Jeanne in Côte d'Ivoire reported that 67.4% of students were not aware of the existence of an effective vaccine against HBV [11].

This vaccine against hepatitis B has been introduced in Burkina Faso only in 2006, in the national immunization program. Since then, children have benefited from this immunization at birth free of charge; the relatively recent year of introduction (2006) may explain the fact that in our study, 90% of workers, who were adults, reported that they had never been vaccinated against hepatitis B. However, 10% said they had received at least one dose. This observation made in our series was low compared to other studies conducted in Burkina Faso, notably those conducted among health workers in 2012 and among nursing students in 2014, which reported immunization rates of 47.7% and 17% [16,17], respectively. The same applies to results reported in other countries, particularly among migrant populations in France, students in Australia, and in Brazil at 41%, 70.5% and 86.8% respectively [13,18-20]. Almost all workers (84.1%) pointed out the lack of information and of sensitization on the importance of this immunization; this situation points out the importance of taking in account vaccination in the preventive strategies to control hepatitis B in Burkina Faso.

At epidemiological level, Burkina Faso, like other Sub-Saharan African countries, is located in HBV hyper-endemic area (prevalence>8), [21], this may explain the high prevalence of HBsAg carriage in our study, 10.7%. In these countries, there is an early transmission of the disease, usually in the perinatal period or in early childhood, which usually enables the evolution towards chronicity [22]. The results of our study were almost similar to those reported in other studies conducted among pregnant women in Saint Camille Medical Center (CMSC) in 2010 in Burkina Faso and among militaries in 2015 in Senegal; in these studies, the carriage prevalence were respectively10% and 10.8% [23,24]. However, higher rates were recorded in patients attending the CMSC in 2012, and among blood donors in Koudougou in 2009 (Burkina Faso) and in Niamey in 2013 (Niger), these rates were respectively 29.4%, 14.96% and 15, 4% [25-27], respectively.

HBsAg carriage prevalence in our study was significantly higher than those reported in the general population in France in 2006, Morocco in 2012 and India among medical students in 2011, which were respectively 0.65%, 1.66% and 3.7% [28-30]. This seems normal because France, Morocco and India, unlike Burkina Faso are not located in the high endemic area. However, it was almost similar to that recorded in China among childbearing-aged women in 2013, which reported a prevalence rate of 9.51% [31].

Among the risk factors studied in our series, HBsAg was found among those who had at least one endoscopic examination: 15.8% (6/38), those who were in contact with blood: 10.7% (15/140) and those with a jaundice history, 8.6% (3/35). It’s important to note that HBV can be transmitted during an endoscopic examination when hygiene measures, aseptic conditions and sterilization rules are not met. This is the same for the exposure to biological fluids, which requires the adoption of preventive measures in case of exposure in order to prevent any possible transmission of the disease. However, none of these associations was statistically significant in our study.

The anti-HBs antibody, a marker that confirms the presence of immunity against HBV, may it be natural (contact with the virus) or acquired (vaccine), was found in 47 workers, i.e., 15.7%. This low immunization coverage of workers may partly explained by the low vaccination coverage due the lack of information and sensitization on the importance of immunization.

Indeed, among respondents who claimed to have been immunized, 50% actually had immunization immunity. This low rate reported in our study is different from the results of the study conducted by Kiendrebeogo et al. [16] in Burkina Faso among health worker who found 76.7% of respondents who had immunization immunity, as well as those reported in Italy by Vignier et al. [13] in 2009, reporting nearly 90% and in Germany by Torda et al. [19] in 2008,who reported nearly 80% .This immune response is influenced by several factors such as: age, adherence to immunization schedule, gender, lack of information, smoking etc. In addition, 11.8% of the unimmunized participants were carriers of anti-HBs antibodies. This could be due to natural protection acquired through the contact with the virus, hence the presence of anti-HBs Ac has been found in 22.9% of workers with a history of jaundice. It

should be noted that vaccine remains the only reliable and effective means of protection against hepatitis B. However, administration of three (03) or more doses of the vaccine should be necessary to achieve optimal protection. Indeed, 55.6% of respondents who had received a single dose of hepatitis B vaccine were carriers of immunization markers against respectively 60% and 62.5% for those who received two (02) and three (03) doses of anti-HBV vaccine, showing therefore that the quality of the immune response depends on the number of doses received.

CONCLUSION

Viral hepatitis B remains a major public health issue in Burkina Faso despite the introduction of the vaccine in immunization schedule for children, EPI in 2006. In several cases of cirrhosis and liver cancer, the disease is generally discovered fortuitously, making this virus a "silent killer". Thus, a better knowledge of viral hepatitis B is a necessary prerequisite for everybody to assess his own risks in order to take ownership of prevention measures, including vaccination and screening and to receive an appropriate medical monitoring in case of illness.

From this study, it was found that the level of knowledge of workers on viral hepatitis B was insufficient, notably related to its transmission patterns, its various possible complications and the need for vaccination. In addition, it highlighted the low vaccination coverage and the high level of HBsAg carriage among workers surveyed. Given this, it is highly important to review the national prevention strategy to control hepatitis B by reinforcing information and sensitization campaigns for voluntary screening and by making vaccines available to the population in general and to workers, particularly.

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