

Is vaccination against hepatitis B a reality among Primary Health Care workers?

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Objective: To verify the prevalence and factors associated with vaccination against hepatitis B among Primary Health Care workers in Montes Claros/MG. **Method:** A cross-sectional, analytic study was undertaken. Data were collected through a form, which contained sociodemographic, occupational, general health and behavioral variables. Associations were investigated through bivariate analysis and Poisson's multivariate regression, using SPSS 17.0. **Results:** 95.5% answered the question about vaccination; 47.5% did not complete the vaccination scheme. The prevalence of vaccinated professionals was lower among older workers, who were hired, did not participate in occupational health updates and consumed alcohol. Prevalence levels were higher among professionals with more years of education and who reported contact with piercing and cutting instruments. **Conclusions:** Professional education, knowledge and perception of infection risks are important determinants of the vaccination scheme. Instability at work may lead to negligence and negligent behaviors may repeat themselves. The characterization of professionals who did not get vaccinated will direct educative actions in occupational health.

Descriptors: Hepatitis B; Vaccination; Occupational Health; Primary Health Care.

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Introduction

Hepatitis B represents an important public health problem around the world and one of the main morbidity and mortality causes among human beings⁽¹⁾. Among health workers, the prevalence of infection by the hepatitis B virus (HBV) can range between 4.8 and 11.1% and may be up to thrice as high as in the general population⁽¹⁾. Possible justification for this situation include the high risk of occupational exposure, reaching up to 40% for percutaneous exposure in case of source patients who are serologically reactive to HBsAg⁽²⁾.

Vaccination is the most effective form of prevention against hepatitis B and, in Brazil, three vaccination doses are recommended (0, 1 and 6 months) for newborns, adolescents up to 19 years of age and health workers who may be exposed to biological materials in their activities, including workers who are not directly active in patient care⁽²⁾. Vaccination is also recommended before professionals (or students, trainees) are admitted to health services. In addition, seroconversion should be checked between one and two months after the final dose⁽²⁾.

Most studies on vaccination against hepatitis B include health professionals in specific areas, like Dentistry⁽³⁾ and Nursing⁽⁴⁾, undergraduate health students⁽⁵⁾ and professionals working in hospital institutions⁽⁶⁾. Only two studies on vaccination against hepatitis B were identified among Primary Health Care (PHC) workers in Brazil⁽⁷⁻⁸⁾ and, despite its acknowledged importance, many workers still neglect it, which non-vaccination prevalence rates ranging between 23.8%⁽⁷⁾ and 35.39%⁽⁸⁾.

In Brazil, the Family Health Strategy (FHS) is the health care model that proposed the organization of PHC. Human resources working in FHS are organized based on multiprofessional team work, minimally including a physician, a nurse, a Nursing assistant, between four and six community health agents, a dentist and an oral health assistant and/or technician. These professionals experience a complex and peculiar work process, with large and increasing responsibilities⁽⁹⁾. This process demands technical and interpersonal relationship skills from these professionals, besides a collective understanding of the health-disease process⁽⁹⁾.

This work process determines different occupational health risks that can lead to workers' physical and/or mental illness, including biological risks⁽¹⁰⁻¹²⁾. Hence, adherence to vaccination against hepatitis B should be considered in the context of FHS workers' health-

disease process, including the study of variables that can be associated with different health behaviors, such as sociodemographic, lifestyle, health condition and occupational variables. In earlier studies, the prevalence of vaccination against hepatitis B among health workers was lower among workers with lower education levels, a precarious employment contract⁽⁸⁾ and who did not participate in health recycling programs⁽⁷⁾. Contact with biological material and piercing-cutting instruments and smoking were also associated factors⁽⁸⁾.

Research on the prevalence and factors associated with vaccination against hepatitis B among PHC workers, characterizing professionals who did not get vaccinated, can contribute to guide actions aimed at reducing the incidence of this severe condition. Ideally, these actions should be part of other occupational health initiatives aimed at risk prevention and control in work environments.

In this study, the prevalence and factors associated with vaccination against hepatitis B were investigated among PHC workers, simultaneously analyzing factors that are considered important in determining vaccination against hepatitis B and which have not been studied earlier.

Method

This analytic and cross-sectional study was undertaken between August and December 2010 and included all 797 PHC workers of all 59 FHS teams in Montes Claros/MG: physicians, nurses, dental surgeons, nursing technicians and assistants, oral health technicians and assistants and community health agents. Data were collected through an interview, following a form that had been pilot tested among workers not considered in the main research. In the data collection form, besides questions elaborated for the research, the following scales validated in Brazil were included: Effort-reward imbalance⁽¹³⁾, General Health Questionnaire (GHQ)⁽¹⁴⁾, Whoqol-bref⁽¹⁵⁾ and the International Physical Activity Questionnaire (IPAQ)⁽¹⁶⁾.

The dependent variable was reported vaccination, assessed through the following question "Have you been vaccinated against hepatitis B? If yes, how many doses have you taken?", with the following alternative answers: yes, 3 doses; yes, 2 doses; yes, one dose; yes, I do not know how many doses; not vaccinated. Workers who had received three doses of the vaccine against hepatitis B were considered as vaccinated, while those who took one, two, none or did not know how many were considered as not vaccinated.

The independent variables were grouped as follows: sociodemographic, occupational, general health variables and health-related behaviors.

As regards sociodemographic aspects, gender, age, education in years of study, marital situation (with or without partners) and monthly income in minimum wages were assessed. The quantitative variables age and monthly income were dichotomized, considering the median as the cut-off point.

With respect to occupational variables, the following were evaluated: function in FHS [categorized in three levels: higher (physicians, dental surgeons and nurses), technical (oral health technicians and nursing technicians) and primary and secondary (community health agents)]; professional experience in months; work regimen (fixed or hired); presence of other job; participation in recycling programs in occupational health during the last two years; contact with piercing-cutting instrument and biological material in current practice; accident history involving piercing-cutting instruments, stress level at work and satisfaction with work (satisfied or dissatisfied). The quantitative variable "professional experience in months" was dichotomized, considering the median as the cut-off point.

Among occupational variables, stress levels at work were assessed with the help of the Effort-reward Imbalance scale, which consists of 23 questions⁽¹³⁾, covering two extrinsic (effort and reward) and one intrinsic component (excessive commitment). The index between effort and reward at work was obtained by dividing the sum of effort scores by the sum of reward scores, considering the correction factor (0.545455). Next, this variable was dichotomized as scores ≤ 1 (effort smaller than reward) or > 1.01 (effort bigger than reward)⁽¹⁷⁾. Excessive commitment was analyzed as a quantitative variable, which means that, the higher the score, the greater the commitment at work.

General health assessment included self-classified health, evaluated through the following question: "How do you classify your health?", with the following response options: excellent, good, regular, bad or very bad. Two other questions assessed the presence of systemic illness(es) diagnosed by a physician (yes/no) and use of medicines prescribed by a physician (yes, no). The presence of mild mental disorders was assessed with the help of the General Health Questionnaire-12 (GHQ-12)⁽¹⁴⁾, which contains 12 questions with a four-point Likert scale for response. To analyze this instrument, the scoring system 0011 was used, in which answers that indicated the absence or presence of alterations in the

aspect evaluated in the question were scored as 0 and 1, respectively, with a possible total score between 0 and 12. The cut-off point 3/4 was adopted to define individuals without and with mild mental disorders, respectively⁽¹⁸⁾. The WHOQOL-bref⁽¹⁵⁾ was used to assess the general quality of life and its physical, environmental, social and psychological domains, scored between 0 and 100 according to World Health Organization orientations⁽¹⁹⁾. Quality of life scores were analyzed as a quantitative variable.

Physical exercise, alcohol consumption (yes/no) and smoking (current smoker, former smoker or never smoked) were assessed as health-related behaviors. To evaluate physical exercise, the International Physical Activity Questionnaire (IPAQ)⁽¹⁶⁾ was used, analyzed according to the orientations of the Study Center of the Physical Fitness Laboratory in São Caetano do Sul⁽²⁰⁾, classifying workers as very active, active, irregularly active and sedentary. This variable was later categorized as active (very active, active) and sedentary and irregularly active.

Statistical analyses were developed in SPSS® version 17.0 for Windows. After descriptive analysis, the association between reported vaccination and the independent variables was investigated through bivariate analysis and Poisson's multivariate regression. Variables associated with reported vaccination in bivariate analysis and $p < 0.30$ were included in the multivariate analysis. Significance was set at 95%. The final model was adjusted and those variables associated with $p < 0.05$ were maintained.

The research project *Factors associated with immunization against hepatitis B among Primary Health Care workers*, which gave rise to this study, received approval from the Institutional Review Board at Funorte (CEP/SOEBRAS: 0208/08).

Results

At the time of data collection, 797 workers were active in FHS in Montes Claros. The response rate obtained was 95.6% ($n=762$), with 761 (95.5%) workers answering the question about vaccination against hepatitis B. Approximately half (52.5%) reported having taken three doses of the vaccine against hepatitis B. The 4.4% loss referred to workers who were not met after three attempts.

The following factors were associated with reported vaccination against hepatitis B in bivariate analysis ($p < 0.05$): education in years, monthly income, function

in FHS; professional experience; having another job; participation in occupational health recycling programs in the last two years; contact with piercing-cutting materials in current practice, contact with biological material in current practice, accident history involving piercing-cutting instruments, general quality of life and in the physical, psychological, social and environmental domains, smoking and physical exercise (Tables 1, 2 and 3).

Table 1 – Bivariate analysis result between reported vaccination against hepatitis B and sociodemographic variables among Primary Health Care workers, Montes Claros, MG, Brazil, 2010 (n=761)

	Vaccination against hepatitis B				PR	95% CI	p-value
	Yes		No				
	N	%	N	%			
Gender							
Male	74	48.4	79	51.6	1.00		
Female	326	53.6	282	46.4	1.11	0.92-1.33	0.26
Age range							
≤ 30 years	222	55.4	179	44.6	1.00		
> 31 years	178	49.4	182	50.6	0.89	0.78-1.02	0.11
Education (years of study)					1.07	1.06-1.09	0.00
Marital Situation							
Partner	196	50.6	191	49.4	1.00		
No partner	204	55.0	167	45.0	1.09	0.95-1.24	0.23
Monthly income							
≥ 1.17 Minimum Wages	214	61.1	136	38.9	1.00		
Up to 1.16 Minimum Wages	167	44.1	212	55.9	0.72	0.63-0.83	<0.001

Table 2 – Bivariate analysis result between reported vaccination against hepatitis B and occupational variables among Primary Health Care workers, Montes Claros, MG, Brazil, 2010 (n=761)

	Vaccination against hepatitis B				PR	95% CI	p-value
	Yes		No				
	N	%	N	%			
Function in Family Health Strategy							
Physician, Nurse and dentist	133	82.6	28	17.4	1.00		
Nursing technician and Oral health technician	70	58.3	50	41.7	0.71	0.60-0.83	<0.001
Community health agent	197	41.0	283	59.0	0.50	0.44-0.57	<0.001
Professional experience							
< 40 months	231	61.9	142	38.1	1.00		
≥ 40 months	169	43.6	219	56.4	0.70	0.61-0.81	<0.001
Work regimen							
Fixed	166	49.8	167	50.2	1.00		
Hired	233	54.6	194	45.4	1.09	0.95-1.26	0.20
Other job							
No	324	50.6	316	49.4	1.00		
Yes	76	63.3	44	36.7	1.25	1.07-1.46	<0.001
Participation in occupational health recycling in last two years							
Yes	181	57.6	133	42.4	1.00		
No	218	49.0	227	51.0	0.85	0.74-0.97	0.02
Contact with piercing-cutting instruments in current practice							
No	119	35.2	219	64.8	1.00		
Yes	281	66.9	139	33.1	1.90	1.62-2.23	<0.001
Contact with biological material in current practice							
No	116	36.5	202	63.5	1.00		
Yes	282	64.8	153	35.2	1.78	1.51-2.09	<0.001

(continue...)

Table 2 - (continuation)

	Vaccination against hepatitis B				PR	95% CI	p- value
	Yes		No				
	N	%	N	%			
Occupational accident history							
No	335	50.2	332	49.8	1.00		
Yes	65	69.1	29	30.9	1.38	1.18-1.61	<0.001
Effort – Reward Index at work							
≤ 1.00(Effort < Reward)	128	54.0	109	46.0	1.00		
> 1.01(Effort > Reward)	249	53.7	215	46.3	0.99	0.86-1.15	0.93
Excessive commitment at work					1.02	0.99-1.05	0.18
Satisfaction with work							
Satisfied	321	53.1	284	46.9	1.00		
Dissatisfied	78	50.3	77	49.7	0.95	0.80-1.13	0.55

Table 3 – Bivariate analysis result between reported vaccination against hepatitis B and general health variables and health-related behaviors among Primary Health Care workers, Montes Claros, MG, Brazil, 2010 (n=761)

	Vaccination against hepatitis B				PR	95% CI	p-value
	Yes		No				
	N	%	N	%			
Self-classified health							
Excellent, good and regular	374	53.7	323	46.3	1.00		
Bad and very bad	24	40.0	36	60.0	0.74	0.54-1.02	0.07
Presence of mental disorder							
No	305	53.5	265	46.5	1.00		
Yes	82	49.7	83	50.3	0.93	0.78-1.10	0.39
Quality of life							
Physical Domain					1.01	1.00-1.01	0.03
Psychological Domain					1.01	1.00-1.02	<0.001
Social Domain					1.01	1.00-1.01	<0.001
Environmental Domain					1.02	1.01-1.02	<0.001
General quality of life					1.01	1.00-1.01	<0.001
Alcohol consumption							
No	234	54.3	197	45.7	1.00		
Yes	166	50.3	164	49.7	0.93	0.81-1.06	0.28
Smoking							
Non smoker	382	53.8	328	46.2	1.00		
Smoker or former smoker	18	35.3	33	64.7	0.66	0.45-0.96	0.03
Physical exercise							
Active	299	50.3	296	49.7	1.00		
Sedentary/Irregularly active	101	60.8	65	39.2	1.21	1.05-1.40	0.01
Presence of systemic disease(s)							
No	270	51.6	253	48.4	1.00		
Yes	124	55.4	100	44.6	1.07	0.93-1.24	0.34
Medication use							
No	295	52.3	269	47.7	1.00		
Yes	98	53.3	86	46.7	1.02	0.87-1.19	0.82

In multivariate analysis, a lower prevalence of vaccinated workers was found among older, hired professionals, who had not participated in occupational health recycling program in the last two years and

who reported alcohol consumption. The prevalence of vaccination was higher among workers with more years of education and who reported contact with piercing-cutting instruments in current practice (Table 4).

Table 4 – Final model of factors associated with reported vaccination against hepatitis B among Primary Health Care workers. Montes Claros, MG, Brazil, 2010

Independent Variables	PR	95%CI	p-value
Age range			
≤ 30 years	1		
> 31 years	0.84	0.74-0.95	0.007
Education in years of study	1,06	1.04-1.08	<0.001
Work regimen			
Fixed	1		
Hired	0.84	0.72-0.97	0.017
Recycling in occupational health in the last two years			
Yes	1		
No	0.80	0.70-0.91	0.001
Contact with piercing-cutting instruments in current practice			
No	1		
Yes	1.70	1.43-2.02	<0.001
Alcohol consumption			
No	1		
Yes	0.84	0.74-0.96	0.009

Discussion

Prevalence rates of reported vaccination were low among PHC workers in Montes Claros/MG. This fact is concerning, as the Ministry of Health recommends vaccination against hepatitis B for 100% of health workers⁽²⁾. In Brazil, the prevalence of vaccination among PHC workers in Florianópolis⁽⁶⁾ and Mato Grosso do Sul⁽⁷⁾ corresponded to 64.61% and 76.2%, respectively, higher than the 52.5% observed in this study. Health workers need to follow this recommendation, as the vaccine has been proven safe⁽³⁾ and the most effective way to prevent infection by HBV⁽⁷⁻⁸⁾. Besides vaccination, adherence to standard precaution measures and caution by workers are fundamental to avoid HBV transmission in health services, not only with a view to their own, but also their patients and relatives' protection⁽⁵⁾.

Those study results evidenced the importance of professional education and knowledge in determining vaccination against hepatitis B, as its prevalence was higher among younger professionals who had participated in occupational health recycling programs in the last two years. These associations can reflect differences in these professionals' knowledge on occupational protection measures, including vaccination. Younger workers possibly had further access to information on infection control as a result of the AIDS epidemic. Another benefit for this group was that the Ministry of Health made hepatitis B vaccination available as from 1995⁽³⁾.

Vaccination prevalence rates were higher among workers with more years of education, possibly due

to the greater perception of occupational risks^(7,21) and further knowledge on occupation health^(4,8) among professionals with higher education levels. In addition, professionals with a higher education degree may have been vaccinated during their undergraduate program⁽²¹⁾. Similarly, in a cross-sectional study in a hospital context, lower vaccination prevalence rates were observed among nursing auxiliaries, related to their low education level and higher vaccination prevalence in occupations with higher education levels⁽²²⁾. Related to this finding, among dental surgeons in Montes Claros, higher prevalence of reported vaccination was observed among professionals who participated in occupational health training, demonstrating that, even among higher-education professionals, further occupational health knowledge is a factor that favors vaccination against hepatitis B⁽²¹⁾.

As previously observed⁽⁷⁾, because they are more exposed to occupational accident risks, workers who have contact with piercing-cutting instruments in their current practice reveal higher prevalence rates of reported vaccination. These professionals possibly know that cases of percutaneous exposure are associated with greater risk of pathogen transmission and responsible for higher prevalence rates of occupational accidents⁽²⁾, making them adopt self-care measures more frequently. It should be highlighted that workers who have contact with piercing-cutting instruments face greater accident risks and may have been more emphatically oriented to get vaccinated. The variable "accident history involving piercing-cutting instruments" was not significantly

associated with reported vaccination and the prevalence of workers who got vaccinated was similar among workers who were victims of accidents or not. Whether the accident made the professionals seek vaccination is a matter of discussion, increasing the prevalence of vaccinated workers among accident victims. Nevertheless, even among victims, approximately 1/3 did not get vaccinated. In the present study, the measures professionals adopted after an accident involving biological material were not assessed, but should be considered in future research.

In this study, vaccination prevalence rates were lower among workers who consumed alcohol, which may mean a repetition of negligent behavior towards their own health, including non-vaccination. Alcohol consumption does not necessarily mean negligence towards health though and, depending on the type of beverage and usage characteristics, it can be considered a self-care measure; to give an example, moderate red wine consumption as an auxiliary prevention measure against diabetes and cardiovascular diseases⁽²³⁾. The abuse of liquor and distilled beverages, on the other hand, can be considered a marker of negligence towards one's own health. In this study, the variable "alcohol consumption" was assessed dichotomously, without the possibility to discuss variations in vaccination prevalence regarding the type, quantity and frequency of alcohol consumption. Despite this limitation, the dichotomous variable was capable of identifying workers whose alcohol consumption behavior was associated with another health-related behavior: vaccination. As the sense of this association was inverse, the hypothesis of health negligence was raised. The consistency of this finding could not be verified, as this variable had not been previously investigated among PHC workers⁽⁷⁻⁸⁾.

Considering vaccination as a preventive and self-care measure, recommended for health professionals, its prevalence was studied in the broader health context, in the attempt to identify its association with positive and negative factors that could interfere in health behaviors. Dissatisfaction and stress at work, mental illness, low quality of life and high prevalence of sedentariness⁽²⁴⁾ have been reported among health professionals, who recognize many risks of illness in their own work process⁽¹²⁾. Therefore, variables like stress at work, quality of life, physical exercise, mental health, systemic illnesses, which had not been tested in earlier studies, were included in the analysis, in the belief that unfavorable situations in this respect could interfere in health behaviors and self-care measures, including

vaccination against hepatitis B. This hypothesis was not confirmed. The work regimen variable, however, who assessed the worker's situation in terms of job stability, was significantly associated with reported vaccination.

The prevalence of reported vaccination among hired workers was lower than among fixed workers. In an earlier study, workers with a precarious job contract revealed lower vaccination rates⁽⁸⁾. Precarious employment may be associated with deteriorated occupational health in terms of accidents, disease risk, dangerous exposures and knowledge on occupational safety and health. Absence of professional benefits, increasing requirements with regard to productivity and new skills, lack of stability at work, low professional acknowledgement and high turnover levels can discourage workers who, in general, may be less concerned with their health⁽²²⁾ or present less wellbeing at work^(11,25).

This study indicated the need to train PHC workers in Montes Claros as regards biosafety, health and occupational safety, including clarifications about the benefits of vaccination against hepatitis B. Updates need to be part of a long-term continuing education plan, followed by evaluation mechanisms. Human resource guidelines and proposals for the Unified Health System, in accordance with Decree 1.125 issued in 2005⁽³⁾, establish support for training with emphasis on biosafety for workers exposed to risk situations. In addition, the decree establishes the reduction of occupational accidents and illnesses through prevention and health surveillance actions, including comprehensive health care. In the same sense, workers can be attended in State and Regional Occupational Health Referral Centers (Ceres), which are medium and high-complexity care institutions capable of diagnosing health problems related to work, including hepatitis B.

Also, vaccination campaigns need to be highlighted as fundamental actions as, besides reducing the prevalence of hepatitis B, they may positively affect workers' satisfaction, who may feel valued at work and, therefore, more motivated. In Montes Claros, a favorable result in the prevalence of reported vaccination against hepatitis B among dental surgeons in 2002, the highest rate described in Brazil at that time, 74.9%, may have been due to a vaccination campaign for health professionals and students, held before the study⁽¹⁴⁾. The result also evidenced that negligent behaviors towards health seem to be recurrent. This points towards joint occupational health promotion actions, adding alcoholism prevention for example.

The present study results demonstrate internal validity, considering the high response rate, but may be overestimated as they consider workers' reports, who may choose answers that are considered correct, even if they do not represent the reality of their practice. To minimize this bias, the interviewers were trained, informing participants about the confidentiality of any data provided.

Conclusion

The prevalence rate of vaccination against hepatitis B is low among PHC workers in Montes Claros. The results reveal the importance of professional education, knowledge and infection risk in the determination of hepatitis B vaccination. They also suggest that instability at work can lead to negligence through non-vaccination and that negligent health-related behaviors are repeated.

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