Hepatitis B vaccination and associated factors among dentists

Vacinação contra hepatite B e fatores associados entre cirurgiões-dentistas

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Abstract

Objective: We calculated the prevalence and studied the factors associated with hepatitis B vaccination. Reasons for non-vaccination among dentists were investigated. **Methods:** A cross-sectional study was performed in Montes Claros, Minas Gerais, from 2007 to 2008, to assess hepatitis B vaccination among practicing dental surgeons. Variables were evaluated using a previously tested structured questionnaire. Data underwent descriptive analysis. Non-conditional logistic regression was used to determine the variables associated with hepatitis B vaccination ($p < 0.05$). **Results:** There were 333 subjects eligible for the study, 297 (89.2%) participated, and 283 answered the question about vaccination; of these, 258 (91.2%) completed the three-dose schedule vaccination and 25 (8.8%) were not vaccinated or did not complete the vaccination schedule. Lack of information (48%) was stated as the main reason for not being vaccinated. Variables associated with vaccination were: tobacco use (OR = 2.50; IC95% = 1.22-7.13), alcohol consumption (OR = 2.99; IC95% = 1.16-7.74), satisfaction with the profession (OR = 4.62; IC95% = 1.50-8.25) and knowledge on the post-exposure management protocol (OR = 4.28; IC95% = 1.63-9.26). **Conclusions:** We found a high prevalence of complete vaccination among dentists in Montes Claros. It is higher among professionals who do not use tobacco and alcohol, are more satisfied with their profession and know the protocol after occupational exposure. The study suggests that the lack of information is the main reason for not being vaccinated.

Keywords: Hepatitis B. Vaccination. Occupational Health. Dentist Practice Patterns. Communicable diseases. Dentistry.

Resumo

Objetivo: Estimou-se a prevalência e investigaram-se os fatores associados à vacinação contra hepatite B e os motivos para não vacinação entre cirurgiões-dentistas. **Métodos:** Os dados foram coletados por meio de um questionário semiestruturado autoaplicável. Participaram cirurgiões-dentistas inscritos no Conselho Regional de Odontologia de Minas Gerais, subseção Montes Claros, que residiam e trabalhavam em clínicas odontológicas ou consultórios, com ou sem vínculo empregatício, no serviço privado ou público, em Montes Claros, MG. As variáveis associadas à vacinação contra hepatite B foram investigadas por meio de regressão logística não condicional. **Resultados:** Foram identificados 333 trabalhadores elegíveis, 297 (89,2%) participaram e 283 responderam à questão sobre vacinação; destes, 258 (91,2%) realizaram o esquema vacinal de três doses e 25 (8,8%) não vacinaram ou não completaram o esquema vacinal, relatando como principal motivo a falta de informação (48%). As variáveis associadas com relato de vacinação, após ajuste para todas as outras, foram: consumo de tabaco (OR = 2,50; IC95% = 1,22-7,13), consumo de bebidas alcoólicas (OR = 2,99; IC95% = 1,16-7,74), satisfação com a profissão (OR = 4,62; IC95% = 1,50-8,25) e conhecimento sobre protocolo pós-exposição ocupacional (OR = 4,28; IC95% = 1,63-9,26). Conclusões: Verificou-se alta prevalência de vacinação completa, sendo maior entre os não fumantes, os que não consumiam bebidas alcoólicas, os mais satisfeitos com a profissão e os que conheciam um protocolo pós-exposição ocupacional. O estudo sugere que os comportamentos negligentes com a própria saúde se repetem. Há necessidade de campanhas educativas sobre a transmissão da hepatite B, contribuindo para o controle e erradicação dessa grave infecção.

Palavras-chaves: Hepatite B. Vacinação. Saúde do trabalhador. Condutas na prática dos dentistas. Doenças transmissíveis. Odontologia.

Introduction

The hepatitis B virus (HBV) continues to be a public health problem worldwide, with more than one third of the world population being infected[1]. The prevalence of HBV infection is higher among dentists than the general population, especially among those who have surgical specialties[2-4]. The occupational risk of HBV infection through contaminated blood in piercing/cutting accidents among dentists varied between 6% and 30%[5,6].

In addition, other body fluids such as saliva and crevicular fluid have the HBV and could be ways of transmission[7]. The adoption of individual protection measures and the vaccination of workers who come in contact with blood, other body fluids and piercing/cutting instruments or contaminated surfaces are recommended to prevent occupational HBV transmission[7].

In Brazil, vaccination against hepatitis B is made available in the primary health care network[7] and it must be performed in three doses, in periods of zero, one and six months of interval. Seroconversion must be observed one month after the vaccination schedule is completed and booster doses are not recommended. Individuals who do not respond to the first vaccination schedule must be submitted to new vaccination with three doses[8]. After three intramuscular vaccine doses, more than 90% of young adults and more than 95% of children and adolescents develop adequate responses to antibodies[9].

Complete vaccination was previously reported by 75% of dentists in the city of Montes Claros, a value close to that observed among dentists of other Brazilian cities[7,10-13]. Length of time working as a dentist and age were factors associated with reported vaccination[11]. As the debate on the control of infection in universities and of the number of dentists performing in this area becomes more frequent, a higher proportion of vaccinated workers is expected to be found in the present study. The prevalence of vaccination needs to be analyzed throughout time with

epidemiological studies, aiming to achieve the ideal situation of 100% vaccination and immunization among Dentistry workers. Additionally, it is important to understand the reasons and factors associated with non-vaccination to guide educational actions. Thus, the prevalence was estimated and the factors associated with complete vaccination against hepatitis B and alleged reasons for non-vaccination among dentists of Monte Claros, MG, were investigated.

Methods

An analytical, cross-sectional epidemiological study was conducted in 2007-2008. Dentists registered with the Minas Gerais State Regional Council of Dentistry, City of Montes Claros subsection, who lived in this city and worked in dental clinics or practices, with or without an employment relationship, whether in public or private services, were included in this study. The following individuals were excluded: dentists who did not live in Montes Claros; those who were not performing clinical activities at the moment of this study; and those who were not found after three attempts. All workers were initially contacted by telephone or in person to define study participants.

Data were collected with a previously tested, self-administered semi-structured questionnaire[11]. Dentists were asked about the practice of vaccination against hepatitis B and the number of doses taken. In the present study, all dentists who completed the primary vaccination schedule with three doses were considered to be vaccinated, whereas those who reported not having been vaccinated or having completed the vaccination schedule (one or two doses) were considered as not vaccinated. The following groups of variables were also analyzed: characterization of dentists with regard to socio-demographic aspects (age group, sex, marital status); lifestyle (tobacco use, alcohol use, physical activity; and personal self-categorization, i.e. how dentists categorize themselves, based on their personal attitudes and behavior: excessively worried, tense and impatient or calm and patient); work-related conditions (length of time working as a dentist, highest title, updating in the last two years, monthly income in minimum wages, breaks during work, piercing/cutting accidents during professional life, hand hygiene before and after consultations, level of satisfaction with the profession, knowledge about the occupational post-exposure protocol); and characterization of the clients cared for (social class, care for patients with a positive HIV diagnosis, and care for patients with a positive HBV or hepatitis C virus – HCV diagnosis). Questionnaires were distributed and subsequently collected in up to eight weeks, in sealed envelopes to maintain participants' privacy.

After a descriptive analysis, factors associated with reported vaccination against hepatitis B were identified with unconditional logistic regression (95% significance level). All variables associated with reported vaccination with a p-value ≤ 0.20 in the bivariate analysis were maintained in the multivariate model. In the bivariate and multivariate analyses, the following variables were dichotomized: marital status, tobacco use, physical activity, length of time working as a dentist, highest title, monthly income in minimum wages, satisfaction with the profession and clients' social class. The SPSS 17.0 (Statistical Package for the Social Sciences 17.0 for Windows) software program was used in these analyses.

The present research project was approved by the *Faculdades Unidas do Norte de Minas* Research Ethics Committee (FUNORTE 001/06). Authors declared there were no conflicts of interest.

Results

A total of 505 dentists registered with the CRO/MG, city of Montes Claros subsection, were identified, of which 333 were eligible for the present study. Of the 172 excluded, 109 did not perform clinical activities or did so out of the city, 56 were retired and seven were on sick leaves.

A total of 292 dentists (87.7%) participated in this study, with a mean age of 36.9 years (± 9.6; 23 to 68) and a majority of females (52.1%).

There were 283 dentists who answered the question about vaccination, of which 258 (91.2%) had completed the vaccination schedule of three doses and 25 (8.8%) were not vaccinated or did not complete this schedule, due to the following reasons: need for more information (48%), forgetfulness (24%), lack of concern/negligence (8%), fear of vaccination (12%) and lack of vaccine in the health clinic (4%).

In the bivariate analysis, the variables associated with reported vaccination were sex (OR=2.98; 95CI%=1.19-7.43), alcohol use (OR=3.11; 95%CI=1.29-7.46), personal self-categorization (OR=3.86; 95%CI=1.51-9.81), hand hygiene before and after consultations (OR=3.23; 95CI%=1.13-7.83), level of satisfaction with the profession (OR=2.79; 95%CI=1.02-7.83), knowledge about the occupational post-exposure protocol (OR=3.64; 95%CI=1.46-9.04) and care for individuals with a positive HIV diagnosis (OR=2.99; 95%CI=0.99-8.99) (Tables 1 and 2). In the multivariate analysis, the number of reports of complete vaccination was higher among non-smoking dentists (OR=2.50; 95%CI=1.22-7.13), those who did not drink alcohol (OR=2.99; 95%CI=1.16-7.74), those who were satisfied with the profession (OR=4.62; 95%CI=1.50-8.25) and those who were aware of the occupational post-exposure protocol (OR=4.28; 95%CI=1.63-9.26), independently from the remaining variables (Table 3).

Discussion

Despite vaccination campaigns against hepatitis B, which have been performed among dental students and workers in Brazil since 1995, and the availability of the vaccine in the primary health care network for these workers, there was a group of dentists in the city of Montes Claros who were not vaccinated or did not complete the vaccination schedule of three doses against HBV. However, the percentage of vaccinated dentists was higher in Brazilian studies[7,10-15], similar to what was observed among Canadian dentists (90.6%)[16], lower than that found among English dentists (97%)[17] and higher than those of Japanese (64.3%)[18]; German (74%)[19] and Italian dentists (56.2%)[20]. In Brazil, when the results of studies from the 1990s[14,15] and 2000s[7,10-15] are compared, an increase in the percentage of vaccinated dentists is observed, varying between 9.29%[14] and 34.7%[15] among participants of a Congress on Dentistry in 1991 and 1996, and subsequently varying between 73.1% and 82.2%[7,10-13]in the 2000s. This observation probably shows the positive impact of vaccination campaigns among Brazilian dentists and the increase in adherence to infection control measures.

In the city of Montes Claros, the results of the vaccination against hepatitis B were promising, because the proportion of vaccinated dentists rose from 75% in 2000/2001[11] to 91.2% in 2007/2008. This increase throughout time is relevant, as vaccination is the most important method to prevent HBV infection[21].

Different reasons for non-vaccination have been pointed out in studies and they were also present among dentists of Montes Claros[11,19,20]. The majority of Italian dentists were not vaccinated against HBV because they believed that vaccination was useless (42.8%) and unsafe (33.3%) and 80.7% stated the need for more information about immunizations[20]. German dentists also reported that vaccination is not safe (27%), that it is not available (27%), that there is a lack of interest (22%) and that hepatitis B is not a serious disease (17%)[19]. The main reason for non-vaccination or incomplete vaccination among dentists of Montes Claros was lack of information, as observed in a previous study[11]. This is surprising, because infection control measures were and still are widely discussed. At times, it seems that such knowledge is ignored by some workers. Similarly, there was a higher number of vaccinated Italian dentists among those who had knowledge about ways of transmission

Tabela 1 - Análise bivariada entre o relato de vacinação contra hepatite B e variáveis referentes a aspectos sociodemográficos e estilo de vida entre cirurgiões-dentistas de Montes Claros, MG, 2007/2008.
***Table 1** - Bivariate analysis between reported hepatitis B vaccination and socio-demographic characteristics, and lifestyle among dentists in Montes Claros, MG, 2007/2008.*

	Vaccination against Hepatitis B						
	Yes		No		OR	95%CI	p-value
SOCIO-DEMOGRAPHIC ASPECTS							
Age group (in years)	*n*	*(%)*	*n*	*(%)*			
Older than 44	57	91.9	5	8.10	1.00		
35 to 43	54	88.5	7	11.5	1.36	0.34-5.31	0.659
30 to 34	57	89.1	7	10.9	0.71	0.21-2.83	0.584
23 to 29	62	93.9	4	6.1	0.68	0.20-2.26	0.526
Sex							
Male	115	87.1	17	12.9	1.00		
Female	141	95.3	7	4.7	2.98	1.19-7.43	0.019
Marital status							
Single/separated/divorced/widowed	94	87.9	13	12.1	1.00		
Married	163	93.7	11	6.3	2.05	0.88-4.76	0.095
LIFESTYLE							
Tobacco use							
Smoker/ non-smoker	39	84.8	7	15.2	1.00		
Non-smoker	218	92.4	18	7.6	2.17	0.85-5.55	0.104
Alcohol use							
Yes	104	86.0	17	14.0	1.00		
No	152	95.0	8	5.0	3.11	1.29-7.46	0.011
Physical activity							
No	74	90.2	8	9.8	1.00		
Yes	183	91.5	17	8.5	1.16	0.48-2.81	0.736
Personal self-categorization							
Worried about themselves and others	52	82.5	11	17.5	1.00		
Tense and impatient	34	89.5	4	10.5	3.86	1.51-9.81	0.005
Calm and patient	164	94.8	09	5.2	1.80	0.53-6.11	0.347

of hepatitis B, who reported not needing additional information and who received information through courses or manuals[20]. In a previous study, updating courses held in the previous two years increased the chance of dentists being vaccinated[11]. In the present study, reported vaccination was not associated with updating in the previous two years, although it was higher among dentists who were aware of the occupational post-exposure protocol, who probably had more knowledge about HBV infection prevention as well.

A greater prevalence of vaccination against hepatitis B was found among dentists who did not smoke or drink alcohol. This association was not previously observed[3,11,12,20,22], although these variables may refer to care for one's own health. Thus, dentists who do not consume tobacco or alcoholic beverages may be more concerned about their health, like workers who have been vaccinated. However, this hypothesis needs to be further investigated. Satisfaction with the profession influenced the decision to be vaccinated or not, with a higher number of vaccinated dentists among those who responded positively. Dentists who are dissatisfied with their profession may show lack of enthusiasm for it, resulting in negligent behavior and attitudes towards their health and that of their patients. In addition, these dentists seem to neglect the search for new knowledge, which may contribute to

Table 2 - Bivariate analysis between reported hepatitis B vaccination and work-related conditions and characteristics of the clientele among dentists in Montes Claros, MG, 2007/2008.

***Tabela 2** - Análise bivariada entre o relato de vacinação contra hepatite B e variáveis referentes a condições relacionadas ao trabalho e características da clientela atendida entre cirurgiões-dentistas de Montes Claros, MG, 2007/2008.*

	Vaccination against Hepatitis B						
	Yes		No		OR	95%CI	p-value
WORK-RELATED CONDITIONS							
Length of time working as a dentist							
More than 10 years	113	91.1	11	8.9	1.00		
Until 10 years	125	90.6	13	9.4	0.94	0.40-2.17	0.878
Highest title							
Undergraduate degree	90	89.1	11	10.9	1.00		
Specialization/Master's degree/ Doctor's degree	163	92.6	13	7.4	1.53	0.66-3.56	0.321
Updating in the previous two years							
No	51	85.0	9	15.0	1.00		
Yes	205	92.8	16	7.2	2.26	0.95-5.41	0.067
Monthly income in minimum wages							
1 to 10	179	91.3	17	8.7	1.00		
11 or more	68	89.5	8	10.5	0.81	0.33-1.96	0.636
Piercing/cutting accidents during professional life							
Yes	212	91.4	20	8.6	1.00		
No	45	90.0	5	10.0	0.85	0.30-2.38	0.756
Hand hygiene before and after consultations							
No	38	80.9	9	19.1	1.00		
Yes	218	93.2	16	6.8	3.23	1.13-7.83	0.010
Level of satisfaction with the profession							
0 to 6	26	81.3	6	18.8	1.00		
7 to 10	230	92.4	19	7.6	2.79	1.02-7.26	0.040
Knowledge about the occupational post-exposure protocol							
No	101	84.9	18	15.1	1.00		
Yes	143	95.3	7	4.7	3.64	1.46-9.04	0.005
CHARACTERISTICS OF CLIENTS CARED FOR							
Social class							
Low class/middle class	108	92.3	9	7.7	1.00		
Middle class/upper middle class/upper class	114	91.2	11	8.8	0.86	0.34-2.17	0.755
Care for patients with a positive HIV diagnosis							
No	163	88.6	21	11.4	1.00		
Yes	93	95.9	4	4.1	2.99	0.99-8.99	0.050
Care for patients with a positive HBV or HCV diagnosis							
No	178	89.9	20	10.1	1.00		
Yes	73	94.8	4	5.2	2.05	0.68-6.20	0.204

Table 3 - Multivariate analysis of factors associated with reported hepatitis B vaccination among dentists in Montes Claros, Minas Gerais, 2007/2008.

Tabela 3 *- Análise multivariada bruta e ajustada da associação entre vacinação completa contra hepatite B e variáveis sociodemográficas, de estilo de vida, relacionadas ao trabalho e à clientela atendida entre os cirurgiões-dentistas de Montes Claros, Minas Gerais, 2007/2008.*

Variables	Vaccination against Hepatitis B			
	OR_{crude} (95%CI)	p-value	$OR_{adjusted}$ (95%CI)	p-value
Tobacco use				
Smoker/Ex-smoker	1.00		1.00	
Non-smoker	1.42 (1.37-5.43)	0.03	2.50 (1.22-7.13)	0.04
Alcohol use				
Yes	1.00		1.00	
No	2.32 (0.72-7.45)	0.16	2.99 (1.16-7.74)	0.02
Level of satisfaction with the profession				
0 to 6	1.00		1.00	
7 to 10	3.29 (1.29-9.80)	0.08	4 62 (1.50-8.25)	0.01
Knowledge about the occupational post-exposure protocol				
No	1.00		1.00	
Yes	4.93 (1.57-9.43)	0.01	4.28 (1.63-9.26)	0.00

non-vaccination.

The previous observation of greater reporting of vaccination among older dentists[11,12] with a longer length of time working in this profession[3,12] was not found in this study. This finding shows that older cohorts were being replaced by others that had already had access to information about infection control measures, so that such variables could no longer distinguish groups in terms of reported vaccination. These factors probably contributed to the increase in the percentage of vaccinated dentists.

Despite the high prevalence of reported vaccination among dentists, compatible with the values obtained in developed countries, one group remained without vaccination. The present study, unlike the previous ones, showed that individual characteristics associated with professional satisfaction were determinants of the decision of being vaccinated or not. Variables such as age and length of time working as a dentist, previously associated with reported vaccination[3,7,11,13,20,22] were not significant in this group, indicating a change in the determinants of vaccination. Thus, in addition to knowledge, workers must be sensitized about the risk of non-vaccination posed to them, their patients and all individuals they live with, seeking a change in attitude. The results of the present study show internal validity, because there was a high response rate. However, these results may be overestimated, as they take workers' reports into consideration, who may choose to give correct responses, even though they do not represent the reality of their practice. Interviewers were trained to reduce bias and they explained the confidentiality of information to participants. As data were collected retrospectively with questionnaires, they were subject to memory bias, which could result in an underestimated prevalence. However, as vaccination against hepatitis B includes three doses, performed on certain dates and controlled on a vaccination card, researchers believe in the validity of results, as workers probably remember this fact. As this was a cross-sectional study, relations of causality could not be investigated, because it was not possible to determine

whether exposure was the cause or result of the outcome.

Based on the results of the present study, it could be concluded that there is a high prevalence of vaccination against hepatitis B among dentists of Montes Claros and that this prevalence is higher among non-smokers and those who do not drink alcohol, those who are more satisfied with their profession and those who are aware of the occupational post-exposure protocol. This study suggests that negligent behavior towards one's own health occurs repeatedly. Lack of knowledge is the main reason for non-vaccination. Educational campaigns to fight hepatitis B transmission are necessary, seeking to sensitize health professionals about the importance of vaccination. This theme will be approached together with others that promote self-care and life improvement, including smoking prevention and alcohol use, among others. In addition to preventing HBV infection, vaccination is also aimed at eliminating the group of chronically infected individuals[23], which restricts transmission to susceptible individuals, thus contributing to the eradication of this serious infection.

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