

Knowledge, attitudes and practice of dentists concerning the occupational risks of hepatitis B virus in Al Jouf Province, Saudi Arabia

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Abstract

Introduction: Hepatitis B virus (HBV) is a well-recognized occupational risk for all health care workers (HCWs) worldwide. In Saudi Arabia, very little is known about knowledge, attitudes, and practice of dentists toward occupational risk of HBV. Our study was conducted to assess the same parameters.

Methods: During February 2012, a cross-sectional survey of 48 dentists with mean age 38 ± 11.2 years was carried out at the primary health care centers in Al Jouf Province of Saudi Arabia. The dentists were asked to fill a valid questionnaire containing their socio-demographic data, and well-designed questions about their knowledge base, attitudes and practice toward occupational risk of HBV. The data were processed and analyzed using the SPSS (version 17) (IBM SPSS Inc., Chicago, IL, USA) program and the level of significance were set at $P < 0.05$.

Results: Response rate of 85.4% yielded 41 questionnaires for analysis. Majority of the dentists surveyed 34 (82.9%) perceived that they are at high risk of contracting and spreading HBV, and 28 (68.3%) had a concern to get HBV. More than half 23 (56.1%) were willing to achieve continuity of care for HBsAg-positive patients. The vast majority 39 (95.1%) believed that HBV vaccine is safe, and 34 (82.9%) were vaccinated. Less than half 17 (41.5%) recognized that HBV is resistant to alcohol and some detergents. During surgical procedures, only 14 (34.1%) always use double gloves and 19 (46.3%) always use goggles. Almost all dentists surveyed were willing to subscribe in a regular training programs about HBV.

Conclusion: More education focusing on occupational risk of HBV is recommended for dentists.

Key words: Attitude, continuity of care, hepatitis B virus, knowledge, Saudi Arabia

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Introduction

Hepatitis B virus (HBV) causes serious human health problems.^[1] It is estimated that 30% of the global population (about 2 billion persons) have serologic evidence of HBV infection whereas over 350 million people are carriers of chronic HBV worldwide.^[1] HBV is one of the most highly infectious diseases without seasonal distribution and the tenth leading cause of death globally.^[1,2] The virus is transmitted through blood and secretions, which can be diagnosed during acute and chronic phases.^[2,3] Acute infection may cause self-limited disease, or fulminant

hepatitis that requires liver transplantation.^[3] Chronic hepatitis B causes death associated with cirrhosis, liver failure, and hepatocellular carcinoma.^[3,4] Dentists handle patients and come into contact with blood and body fluids when doing minor surgery.^[4] The rate of HBV infection is higher among dentists than that in the general population worldwide; 6 times higher in the USA, 4 times higher in Germany and 2.5 times higher in Japan.^[5] An additional risk factor for acquisition of HBV among health care workers (HCWs) is the underlying prevalence of HBV

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infection in the population.^[6] The disease is thus has a particular implication for dentists in Saudi Arabia, a country with high prevalence of HBV.^[7] It was assumed that dentists practicing in our community are lacking the important knowledge about and appropriate practices toward infectious, occupational risks of HBV. Although, many studies in different countries have evaluated the knowledge, attitudes and practice of dentists about infectious, occupational risk of HBV either in the hospitals or in primary health care (PHC)-settings.^[4-6,8,9] There have been a very few attempts to identify a specific impact of this condition among dentists practicing in Saudi Arabia. Therefore, our study had the objectives to evaluate knowledge base, attitudes, and practice of dentists toward occupational risks of HBV.

Methods

During February 2012, “a cross-sectional descriptive study was carried out on dentists practicing in primary health care centers (PHCCs) in Al Jouf Province of Saudi Arabia (population 3.5×10^5),” the province contains many towns such as Domat alJandal, Sowair, and Sakaka. There were around 63 dentists practicing in a total 30 PHCCs distributed equally in this province. After taking permission from the health care authorities, 48 newly designed self-administered anonymous, confidential questionnaires with explanatory letters were sent to the dentists practicing in 25 PHCCs. The study protocol was discussed and approved by The Research and Ethical Committee in Al Jouf University College of Medicine. The well-structured questionnaire comprised of 26 “closed-ended questions,” the first part covered demographic characteristics of dentists, and the second part of the questionnaire contained 22 closed-ended questions with variable items 2-15 focusing on dentists’ knowledge, attitudes and the most important clinical points regarding infectious occupational risk of HBV.

On 12th January 2012, a questionnaire was pretested during a pilot study that was conducted in four PHCCs inside Sakaka city. This was carried out to ensure clarity, relevance and to determine the amount of time needed to answer all items. The result of the pretest was evaluated critically, and some modifications were accordingly made. The average time needed to fill all items in the questionnaire was about 20 min. Results of a pilot study were not included in the final analysis.

Statistical analysis

Data were analyzed using SPSS packed version 17.0 (IBM SPSS Inc., Chicago, IL, USA). $P < 0.05$ was considered as significant; Chi-square test was applied for analysis of categorical data. Mean \pm standard deviation (SD) and proportions were used to describe continuous and dichotomous data respectively.

Results

Out of the 48 questionnaires distributed; 41 (response rate: 85.4%) were collected and analyzed. The general characteristics of dentists are shown in Table 1. The majority of the participants were males ($n = 27$; 65.9%), and the number of female dentists was only 14 (34.1%). The male to female ratio was found to be 1.93:1; with mean \pm SD age were 38 ± 11.2 years, range 27-60 years. Dentists with ≥ 10 years of practice constituted more than half of the sample ($n = 23$; 56.1%). Almost half of the dentists surveyed had master’s degree 20 (48.8%), and only three were Saudi nationals (7.3%).

Majority of the dentists surveyed 34 (82.9%) perceived that they are at high risk of contracting and spreading HBV. Perception among male dentists was more than that found among females (88.9% vs. 71.4%; $P < 0.05$). More attention should be offered to the infectious, occupational risk of HBV suggested by almost all dentists 40 (97.7%). The vast majority of the dentists 36 (87.8%) believed that HBV vaccine is safe and effective for all ages. Thirty-four (82.9%) were vaccinated and reported having received three doses of vaccine. Of the dentists, only 31 (75.6%) were aware of their anti-HBs titers; immune due to HBV vaccination ranked first among 24 (58.5%), followed by immune due to natural infection among 4 (9.8%), whereas, 3 (7.3%) dentists were susceptible.

Table 2 shows dentists’ correct answer rates on knowledge about HBV distributed by their qualifications. Overall, only 60.5% of the answers were correct. As such, in each area the mean proportion of the correct answers varied. HBV is resistant to alcohol and some detergents was recognized by minority of the dentists 17 (41.5%), HBV could be

Table 1: Distribution of the study sample according to their general characteristics

Characteristics	Dentists (n=41)
	Number (%)
Gender	
Male	27 (65.9)
Female	14 (34.2)
Age (years)	
<30	7 (17.1)
30-40	19 (46.3)
41-50	6 (14.6)
51-60	9 (22)
Qualifications	
BDS	21 (51.2)
Master degree	20 (48.8)
Years in practice	
≤ 10 years	18 (43.9)
> 10 years	23 (56.1)

Table 2: Dentist's knowledge about HBV distributed by their qualifications (correct answer rates)

Question item: Correct answer [‡]	Correct; n=41 (%)	Dentist's qualifications		χ^2	P
		BDS; (n=21)	Master degree, (n=20)		
HBV is resistant to alcohol and some detergents; (true)	17 (41.5)	11 (52.4)	6 (30)	1.918	0.383
HBV transmissible less than HIV; (false)	29 (70.7)	14 (66.7)	15 (75)	1.954	0.376
HBV is not infectious outside the body (in the environment); (false)	21 (51.2)	11 (52.4)	10 (50)	5.168	0.075
HBV can survive for prolonged amount of times on unsterilized surfaces; (true)	27 (65.9)	18 (85.7)	9 (45)	11.649	0.003
Prevention and control remain the main methods for addressing HBV; (true)	39 (95.1)	20 (48.8)	19 (95)	2.002	0.367
Vaccine for hepatitis B is safe and effective for all ages; (true)	39 (95.1)	20 (95.2)	19 (95)	2.002	0.367
The incubation period of HBV; (range of 6 weeks to 6 months after infection)	22 (53.7)	10 (47.6)	12 (60)	3.159	0.368
approximately 2 billion people worldwide (1/3 th of world) are infected; (true)	22 (53.7)	13 (61.9)	9 (45)	3.705	0.157
HBV genotypes are 8 genotypes; (true)	12 (29.3)	7 (33.3)	5 (25)	5.916	0.206
HBV replicates only in the liver; (true)	20 (48.8)	12 (57.1)	8 (40)	2.728	0.604

[‡]HBV=Hepatitis B virus; HIV=Human immunodeficiency virus

infectious outside the body (e.g. in the environment) recognized by 21 (51.2%), HBV can survive for prolonged amount of times on unsterilized surfaces recognized by 27 (65.9%), HBV transmissible more than HIV recognized by 29 (70.7%). On the basis of their qualifications, there were a statistical significant correlations noted between dentists' qualifications and their correct answers regarding HBV can survive for a prolonged amount of times on unsterilized surfaces $P < 0.05$.

When inquired about what would they do if they suffer from needlestick from patient with active HBV infection; 28 (68.3%) dentists responded that they will take HBV vaccine with HBV immunoglobulin immediately, 3 (7.3%) will take vaccine only, and 2 (4.9%) will take vaccine plus lamivudine. Whereas, 8 (19.5%) dentists were not sure about their action.

Regarding the possible modes for HBV transmission [Table 3], all the participants 41 (100%) reported through vertical transmission, 40 (97.6%) through needlestick injuries or blood, 40 (97.5%) sexual intercourse, 29 (70.0%) through saliva followed by breast milk 16 (39.0%). Whereas, transmission by drinking from the same cup used by an infected person was recognized by only 14 (34.1%). Regarding hugging of, or sharing a toilet with infected persons believed by (90.2% and 61.0%, respectively) as a safe practices.

When asked about practical measures that might help to prevent HBV, there was a very strong agreement that ensuring safe injection practices (100%), followed by active immunization (97.6%), sterilization of the surgical instruments (95.1%), routine blood screening for HBsAg (92.7%), wearing of disposal medical gloves (90.2%), condom use (87.8%). Of the dentists, those with more than 10 years in practice use to sterilize their instruments more frequent than those with <10 years in practice (95.7% vs. 83.3%; $P < 0.05$), (data not shown).

Table 3: Dentist's knowledge on modes of HBV transmission (n=41)

Question item regarding modes of HBV transmission	Agree; n (%)	Disagree; n (%)	Not sure; n (%)
NSIs	40 (97.6)	1 (2.4)	0 (0.0)
Could be transmitted in the blood	40 (97.6)	1 (2.4)	0 (0.0)
Infected mothers during delivery to their infants	41 (100)	0 (0.0)	0 (0.0)
Sexual intercourse	39 (95.1)	1 (2.4)	1 (2.4)
Sharing of a toilet with an infected person	15 (36.6)	25 (61.0)	1 (2.4)
Hugging of an infected person	2 (4.9)	37 (90.2)	2 (4.9)
Sneezing and coughing of an infected person	15 (36.6)	22 (53.7)	4 (9.8)
Could be spread by saliva	29 (70.7)	10 (24.4)	2 (4.9)
An infected mother may transmit hepatitis B to her newborn baby through breast milk	16 (39.0)	16 (39.0)	9 (22.0)
You may get hepatitis B by drinking from the same cup used by an infected person	14 (34.1)	24 (58.5)	3 (7.3)

HBV=Hepatitis B virus, NSI=Needlestick injuries

Table 4 shows dentists' attitudes toward HBV. Almost all the dentists 40 (97.7%) believed that more attention should be offered to the infectious, occupational risks of HBV. Nearly all 39 (95.1%) suggested "vaccination against HBV must be compulsory for all HCWs in Saudi Arabia." Twenty-eight (68.3%) had a concern about being infected with HBV. The proportion of concern among female dentists was found more than that among males (87.7% vs. 59.6%; $P < 0.05$). Having an infected-colleague in the same workplace was accepted by 25 (61%) of the participants and 31 (75.6%) did not agree with stigmata that has been attached with HBV-infected patients. This study has shown that 29 (70.7%) dentists feel confident in dealing with HBsAg-positive patients. Confidence among males is found more than that among female dentists (81.5% vs. 50.0%; $P < 0.05$; confidence interval = 0.031, 0.040).

Table 4: Dentist's attitudes toward HBV (n=41)

Attitudinal items	Agree; n (%)	Disagree; n (%)	Not sure; n (%)
Chronic infection with viral hepatitis B is shameful	10 (24.4)	30 (73.2)	1 (2.4)
More attention should be offered for occupational risk of HBV	40 (97.7)	0 (0.0)	1 (2.4)
Do you accept a colleague with HBV in the same working place?	25 (61.0)	15 (36.6)	1 (2.4)
Do you have concern about being infected with HBV?	28 (68.3)	10 (24.4)	3 (7.3)
Do you feel confident in dealing with patient who is infected with HBV?	29 (70.7)	9 (22.0)	3 (7.3)
Do you feel comfortable to take care of patient being positive for HBsAg?	21 (51.2)	13 (31.7)	7 (17.1)
Training programs about HBV should be offered for all health care providers	40 (97.7)	0 (0.0)	1 (2.4)
In Saudi Arabia, HBV vaccination must be mandatory for all the HCWs	39 (95.1)	2 (4.9)	0 (0.0)
People positive HBsAg should not be allowed to work in restaurants or cafeterias	32 (78.0)	7 (17.1)	2 (4.9)

HBV=Hepatitis B virus, HCW=Health care worker, HBsAg=Hepatitis B surface antigen

In the area of dentists' practice toward protective barriers during their surgical procedures. We found, 14 (34.1%) always reported use double gloves, 25 (61%) sometimes, and 2 (2.9%) never use double gloves. 19 (46.3%) reported always use goggles, 15 (36.6%) sometimes, and 7 (17.1%) never use goggles. Whereas, 35 (85.4%) always use masks, and 6 (14.6%) sometimes use masks. There were no statistical significant differences noted between males and female dentists regarding use of protective barriers ($P > 0.05$) (data not shown).

Discussion

At the beginning of the third millennium, HBV remains a major public health concern worldwide.^[1] Fortunately, infection with this virus is not only treatable but also preventable.^[1,3,4] Dentists play an important role with safety from risk of blood born infectious agents like HBV.^[1,4-6] They can augment the knowledge and improve skills to reduce the infectious, occupational risks of HBV.^[1,4-6] Among all the HCWs, dentists have the highest incidence of HBV infection and this incidence increase with the length of clinical practices.^[1,4-6] Clearly, this study proves that dentists practicing in our community were aware of magnitude of the infectious, occupational risk of HBV. It was found 40 (97.6%) suggested more attention should be offered to the infectious, occupational risk of HBV. Majority 34 (82.9%) perceived that they are at high risk of contracting and spreading HBV and more than 2/3th had concern to get HBV. Our findings are not dissimilar to a survey recently conducted in Iran, which evaluated the knowledge, attitudes, and behavior of physicians concerning HBV and HCV. The referred study

revealed that the concern about being infected with HBV was 69.4 ± 2.1 among the surveyed participants.^[8]

It was encouraging to find that the vast majority of the participants considered prevention and control remain the main methods to address HBV. As such the most feasible and effective means to prevent HBV, and its consequences are by vaccination and avoidance of exposure to blood and secretions.^[8-10] Interestingly, the vast majority of the dentists surveyed believed that HBV vaccine is safe and effective for people of all ages.^[10,11] Worldwide, HBV vaccination coverage among dentists is highly variable.^[1] Fortunately, our study has shown that the rate of vaccination coverage among our dentists was 82.9% that is equal to or more than that found in other countries.^[4-6,8-10] The finding of (85.7% females, vs. 77.8% males; $P > 0.05$) who have been vaccinated against HBV is in agreement with results of a previous study carried in Brazil to examine factors associated to the self-reporting of HBV vaccination and immunization status among dentists.^[4] The referred study revealed that women had a 1.06-fold greater frequency of vaccination against HBV than men.^[4] Findings in an Italian study, majority of the dentists did not take the vaccine since 42.8% believed it as useless and 33.3% as unsafe.^[4] Fortunately, our findings do not support this data.

It was strongly recommended that, dentists should be aware of their anti-HBs titer.^[1,4-6,8] We found 3/4th of the dentists knew their immunity status with anti-HBs. Immune due to HBV vaccination ranked first among 25 (61%), followed by immune due to natural infection among 4 (9.8%) of our sample. Two dentists reported that they were susceptible to infection with HBV. Despite 34 (82.9%) were vaccinated, we found only 61% of the total were immune due to HBV vaccination. Our findings could be because, first "not everybody actually responds to HBV vaccine;" secondly could be due to "not all completed the three doses of HBV vaccine."^[3-6,9] Third, "the level of anti-HBs titers declined with the passage of time after vaccination."^[11] For those who are susceptible they should be protected and should receive three doses of HBV vaccine.^[3-6,11]

Knowledge of seromarkers of the highly infectious or contagious patients is of a great value for dentists.^[5,6] This is because wounds caused by needles that are contaminated with HBsAg and HBeAg positive blood are associated with a 22-31% risk of developing hepatitis B and 37-62% probability of establishing HBV infection.^[5] Unfortunately, it was found more than 1/3rd of the participants did not recognize the seromarkers of the highly infectious or contagious patients and only 5 (12.2%) were able to interpret HBV seromarkers.^[5,6] Attributable reasons could be inadequate training programs about HBV.

It is well established that dental clinic is an environment where the disease transmission occurs easily.^[1,4-6,9,11] Clearly,

our findings indicate that majority of the dentists lacked the important knowledge about the cross-infection control methods. It was found only minority 16 (39%) recognized that HBV is resistant to alcohol and some detergents, less than half 20 (48.8%) recognized that HBV could be infectious in the wet surfaces. Furthermore, <2/3rd recognized that HBV can survive for 7-10 days on unsterilized surfaces.^[6,12] Our study is in agreement with those internationally that have identified limitations in knowledge among all HCWs about HBV and inadequate practice toward the occupational risk of the disease.^[8-11,13] This may indicate the importance of training program (continuing medical education [CME]) in improving the health behaviors in our dentists.

Our findings revealed that most of the responses show adequate knowledge about modes of HBV transmission. For specific modes of transmission (for example; saliva, maternofetal, breast milk) there were a confusions and misconceptions among the survey dentists.^[2,3,6] This might be due to the controversy of these issues and the lack of the solid evidence. Of the participants, only 14 (34.1%) knew that drinking from the same cup used by an infected person could transmit HBV.^[12] As such, it has been suggested that blood borne infections may be transmitted through sharing a water container since may be bleeding in or around the mouth of an infected person.^[12]

Regarding attitudes towards HBV, it was found more than half of the dentists surveyed 23 (56.1%) were willing to achieve a continuity of care for HBsAg-positive patients. Also, 29 (70.7%) feel confident on dealing with HBV-infected patients. Our findings are not dissimilar to those reported in a recently conducted study in Jordan to evaluate the willingness of clinicians in Jordan to provide care to HBV-infected patient. The referred study revealed that only 45% of the dental practices were willing to provide care to a person infected with HBV.^[14] Fortunately, this study shows more suitable believes regarding HBV vaccine, and almost all dentists surveyed showed more enthusiasm towards "vaccination against HBV must be mandatory for all HCWs in Saudi Arabia." Also, nearly all suggested that more attention should be offered to HBV, and were willing to subscribe in regular training programs about occupational risk of HBV. Our findings are in agreement with those reported in a study conducted in Morocco to evaluate knowledge and perception of hepatitis B among Moroccan HCWs. The referred study revealed that almost all the participants believed that HBV could be a serious health problem, and regarded vaccination against HBV as essential for all HCWs.^[15]

Regarding use of the barrier techniques such as gloves, facemasks or protective eyeglasses provides additional barriers against HBV transmission.^[1,8,13] Among the dentists surveyed, use of personal protective measures during their surgical procedures was inadequate. Including use of double

gloves (only 34.1% reported of always using double gloves), protective eyeglasses (only 46.3% reported of always wearing eyeglasses) and face masks (85.4% reported of always uses masks). Our findings are in concordance with international reports about the strict adherence to standard precautions among the dentists; those reports demonstrate that a few dentists have adhered to these procedures in their clinical practice.^[4,13] This could be because the key factors associated with successful safety from the occupational hazards are the dentist's knowledge, interest level, and ability to provide a logistical state of skills during daily practices.^[1,4-6,8,9]

Strengths of the current study included is the first comprehensive PHC setting-based study carried out in Saudi Arabia (Al Jouf Province) to obtain data on knowledge, attitudes, and practice of dentists toward infectious, occupational risk of HBV. Also, it refers to a common health problem and targets a high-risk group, which can have a significant influence on a serious health concern. Also, it is the first local estimates of coverage the level of HBV vaccination among dentists practicing in this part of Saudi Arabia. In spite of the study findings, we acknowledge its limitations; actually, it was relatively small scale study. Moreover, all the information that we got are reported which not necessary reflect the actual clinical decision.

Conclusion

Inappropriate practices and lack of knowledge about infectious, occupational risk of HBV have appeared pervasive among the majority of dentists in Al Jouf Province of Saudi Arabia. This may be due to lack of structured training programs concerning HBV. Well-planned CME programs in the form of seminars and group discussion with virologists and hepatologists are recommended for dentists. Further studies are also required to identify other factors underlining the less than optimal awareness about HBV in dental care setting.

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References

1. Mahboobi N, Agha-Hosseini F, Mahboobi N, Safari S, Lavanchy D, Alavian SM. Hepatitis B virus infection in dentistry: A forgotten topic. *J Viral Hepat* 2010;17:307-16.
2. Abedi F, Madani H, Asadi A, Nejatizadeh A. Significance of blood-related high-risk behaviors and horizontal transmission of hepatitis B virus in Iran. *Arch Virol* 2011;156:629-35.
3. Wilkins T, Zimmerman D, Schade RR. Hepatitis B: Diagnosis and treatment. *Am Fam Physician* 2010;81:965-72.
4. Resende VL, Abreu MH, Paiva SM, Teixeira R, Pordeus IA. Concerns regarding hepatitis B vaccination and post-vaccination test among Brazilian dentists. *Virology* 2010;7:154.

5. Nagao Y, Matsuoka H, Kawaguchi T, Ide T, Sata M. HBV and HCV infection in Japanese dental care workers. *Int J Mol Med* 2008;21:791-9.
6. Singhal V, Bora D, Singh S. Hepatitis B in health care workers: Indian scenario. *J Lab Physicians* 2009;1:41-8.
7. Alrowaily MA, Abolfotouh MA, Ferwanah MS. Hepatitis B virus sero-prevalence among pregnant females in Saudi Arabia. *Saudi J Gastroenterol* 2008;14:70-2.
8. Kabir A, Tabatabaei SV, Khaleghi S, Agah S, Faghihi Kashani AH, Moghimi M, et al. Knowledge, attitudes and practice of Iranian medical specialists regarding hepatitis B and C. *Hepat Mon* 2010;10:176-82.
9. Di Giuseppe G, Nobile CG, Marinelli P, Angelillo IF. A survey of knowledge, attitudes, and behavior of Italian dentists toward immunization. *Vaccine* 2007;25:1669-75.
10. Kesieme EB, Uwakwe K, Irekpita E, Dongo A, Bwala KJ, Alegbeleye BJ. Knowledge of hepatitis B vaccine among operating room personnel in Nigeria and their vaccination status. *Hepat Res Treat* 2011;2011:157089.
11. Sukriti, Pati NT, Sethi A, Agrawal K, Agrawal K, Kumar GT, et al. Low levels of awareness, vaccine coverage, and the need for boosters among health care workers in tertiary care hospitals in India. *J Gastroenterol Hepatol* 2008;23:1710-5.
12. Kordi R, Wallace WA. Blood borne infections in sport: Risks of transmission, methods of prevention, and recommendations for hepatitis B vaccination. *Br J Sports Med* 2004;38:678-84.
13. Alavian SM, Akbari H, Ahmadzad-Asl M, Kazem M, Davoudi A, Tavangar H. Concerns regarding dentists' compliance in hepatitis B vaccination and infection control. *Am J Infect Control* 2005;33:428-9.
14. El-Maaytah MA, Jerjes W, Upile T, Patel BJ, Hammad OA, Odeh ND, et al. Willingness of Jordanian clinicians to treat a hepatitis B-infected patient. *Quintessence Int* 2008;39:e147-51.
15. Djeriri K, Laurichesse H, Merle JL, Charof R, Abouyoub A, Fontana L, et al. Hepatitis B in Moroccan health care workers. *Occup Med (Lond)* 2008;58:419-24.

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