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Hepatitis B-related awareness among health care workers in Belgrade, Serbia

Znanje zdravstvenih radnika o hepatitisu B u Beogradu, Srbija

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Abstract

Background/Aim. Despite the availability of safe and effective vaccine since 1982, hepatitis B virus (HBV) infection still remains a major occupational disease among health care workers (HCWs) worldwide. The aim of this study was to estimate the level of knowledge regarding HBV among HCWs in Serbia. **Methods.** A random sample of 352 HCWs, stratified by occupation, was selected from the list of employees in the Clinical Centre of Serbia during December 2015. Anonymous questionnaire was used in data collection. Data were statistically assessed. **Results.** The mean HBV knowledge score was 22.9 ± 4.8 (out of maximum 30). Better knowledge score correlated with higher education attainment (ϱ = 0.377; p < 0.001), younger age (ϱ = -0.113; p = 0.034) and less working experience (ϱ=-0.127; p = 0.017). We observed that those HCWs who were previously vaccinated against hepatitis B demonstrated statistically significantly higher knowledge level (t = 5.656, p < 0.001) compared to HCWs who were not vaccinated (23.9 ± 3.7 vs. 20.9 ± 5.8, respectively). **Conclusion.** We found poor level of knowledge on some aspects of HBV infection among HCWs in Serbia. Tailoring of education campaigns in this high-risk exposure group is necessary. Education intervention should focus on change of attitudes and behaviour modification to ensure safe and responsible health care environment.

Key words:
hepatitis b; medical staff; education; infection control; serbia.

Apstrakt

Uvod/Cilj. Uprkos dostupnosti sigurne i efektivne vakcine još od 1982. godine, infekcija virusom hepatitisa B (HBV) i dalje predstavlja glavno profesionalno oboljenje među zdravstvenim radnicima širom sveta. Cilj ovog istraživanja je bio procena znanja o HBV-u u populaciji zdravstvenih radnika u Srbiji. **Metode.** Slučajni uzorak od 352 zdravstvena radnika, stratifikovan u odnosu na profesiju, je odabran sa spiska zaposlenih Kliničkog Centra Srbije tokom decembra 2015. godine. Za prikupljanje podataka je korišćen anonimni upitnik. Podaci su statistički obrađeni. **Rezultati.** Prosečan skor znanja o HBV-u je iznosio 22,9 ± 4,8 (od maksimalnih 30). Viši nivo znanja je korelirao sa višom stručnom spemom (ϱ = 0,377; p < 0,001), mlađim uzrastom (ϱ = -0,113; p = 0,034) i kraćim radnim stažom (ϱ = -0,127; p = 0,017). Zapaženo je da su zdravstveni radnici koji su prethodno vakcinisani protiv hepatitisa B imali statistički značajno viši nivo znanja (t = 5,656, p < 0,001) od onih koji nisu bili vakcinisani (23,9 ± 3,7 naspram 20,9 ± 5,8). **Zaključak.** Zapažen je nizak nivo znanja zdravstvenih radnika u Srbiji u vezi sa pojedinim aspektima HBV-a. Neophodno je kreiranje obrazovnih kampanja za ovu populacionu grupu izloženu visokom riziku od infekcije. Obrazovna intervencija bi trebalo da ima za cilj promenu stavova i ponašanja kako bi se obezbedila sigurna i odgovorna zdravstvena zaštita.

Ključne reči:
hepatitis b; kadar, medicinski; obrazovanje; infekcija, kontrola; srbija.

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Introduction

Although a safe and effective hepatitis B virus (HBV) vaccine has been available for the past 4 decades, hepatitis B infection remains a major occupational disease among health care workers (HCWs) globally [1–4]. A number of studies have previously reported that acceptance of vaccine against HBV among HCWs varies. Specifically, the lowest coverage was reported in African region (approximately 15%), while coverage of more than 75% has been reported in Australia, New Zealand and the USA [5–9]. These remarkable global variations most likely originate from discrepancy in awareness of exposure risk. Indeed, perception of HBV infection risk has been strongly associated with general preventive behaviours in this susceptible cohort [5, 10].

Regardless of well-recognized professional risk for HBV infection, it has been emphasized that poor level of preventive practices among HCWs appear difficult to determine and explain [10, 11]. Furthermore, studies conducted in both developed [12, 13] and developing [14] countries documented insufficient HBV knowledge among HCWs. Overall, lower HBV-related awareness has been associated with poorer preventive attitudes, including decrease in HBV vaccination coverage [15]. Lack of awareness regarding risk of exposure to HBV has been particularly prominent among HCWs in developing countries. Subsequently, lack of awareness promotes low HBV vaccination coverage. Moreover, estimates suggest that in developing countries 40–60% of HBV infection in HCWs has been attributed to professional hazard. On the other hand, in developed countries, the attributed fraction of HBV infection is less than 10%, as a result of higher vaccination coverage [1].

In the Republic of Serbia determinants of hepatitis B-related awareness in health care setting have not been sufficiently explored and understood. Therefore, we aimed at estimating the level of knowledge relative to HBV nature, transmission, complications and prevention among HCWs in a national health care centre in Serbia.

Methods

Participants and settings

This cross-sectional study was conducted at the Clinical Centre of Serbia in the capital city of Belgrade. The Centre is the largest hospital complex in the Republic of Serbia. It consists of 41 units of which 23 are clinics. There are a total of 3,500 beds available for in-patients. The Centre has been affiliated with the Faculty of Medicine, University of Belgrade, a state university with approximately 1,200 employees.

Since 1989 the HBV vaccine has been provided free of charge to the occupationally exposed workers at the Clinical Centre of Serbia. Also, the vaccine has been periodically provided (based on current socioeconomic circumstances and vaccine stocks) at first employment visit and at request. However, the HBV vaccine is compulsory after a high-risk occupational injury.

We selected a random sample of HCWs from the list of employees who were subsequently stratified by occupation. The selection of study participants was conducted during December 2015. The structure of the study sample was based on the proportion of occupational distribution in the Centre (physicians/nurses/technicians/ administrative staff, etc). The sample comprised 7.1% of the employees at the Clinical Centre of Serbia.

All participants provided signed informed consents. The study was approved by the Ethics Committee of the Faculty of Medicine, University of Belgrade.

Instruments

Relevant data in this study were collected by a questionnaire, derived and adapted from others surveys [11, 16]. After translation to Serbian language, its validity was assessed and previously published [17]. First set of questions explored demographic and occupational data (such as gender, age, marital status, type of occupation, work place and duration of work experience). Second set of questions comprised 30 statements (with binary yes/no options), assessing HCWs' knowledge on HBV infection. These items referred to the nature of HBV infection and its transmission, symptoms, complications, possibility for prevention and treatment. Each correct answer in this set of items was awarded 1 point. Thus, a possible range of knowledge score was from 0 to 30 points. To have a more detailed insight in knowledge level, the knowledge score was categorized based on median value (24 points). This means that median value was labelled as "good knowledge level". Therefore, observed values lower then median were labelled as "unsatisfactory", while values greater then median were additionally divided into two subcategories as follows: "very good knowledge level" (25–27 points) and "excellent knowledge level" (28–30). Third set of questions assessed hepatitis B vaccination status of the study participants, as well as the number of issues concerning potential contact with blood and blood products in the workplace.

Statistical analyses

All continuous variables were given as mean ± standard deviation. All categorical variables were presented as count and corresponding percentage. Differences between vaccinated and non-vaccinated groups of HCWs were assessed by *t*-test. The relationship between the HBV-related knowledge score and selected variables was assessed by Spearman's rank correlation coefficient. Probability level of $p < 0.05$ was considered statistically significant.

Results

We invited a total of 380 HCWs to participate in the study, and 367 (96.6%) agreed to participate. Nevertheless, 356 (93.7%) provided all relevant information necessary for the study. Among them, four potential participants reported a history of hepatitis B and, thus, were excluded from all subsequent analyses. Accordingly, the total study sample comprised 352 HCWs.

Basic socio-demographic and occupational characteristics of the study sample are presented in Table 1. Mean age of respondents was 39.1 ± 9.2 years. There were 86 males and 266 females with sex ratio (males:females) of about 1:3. More than one half of participants (59.9%) were married. Predominant occupation in our sample were nurses (51.4%) and physicians (26.1%), while most respondents worked in in-patient wards (31.8%) and operating rooms (29.8%). Mean work experience among study participants was 15.9 ± 10.1 years.

Table 1

Socio-demographic characteristics of the study sample (n = 352)

Variable	Value
Gender, n (%)	
male	86 (24.4)
female	266 (75.6)
Age (years)	
mean ± SD	39.1 ± 9.2
range	21–62
Marital status, n (%)	
single (never married)	111 (31.5)
married/cohabiting	211 (59.9)
separated/divorced	28 (8.0)
widowed	2 (0.6)
Occupation, n (%)	
physicians specialists	46 (13.1)
physicians undergoing specialization	39 (11.0)
physicians without specialization	7 (2.0)
nurses	181 (51.4)
medical technologists	6 (1.7)
laboratory technologists	34 (9.7)
administrative staff	7 (2.0)
sanitary workers	14 (4.0)
others	18 (5.1)
Work site, n (%)	
operating room	105 (29.8)
emergency room, hemodialysis	37 (10.5)
specialty ward/intensive care unit	35 (9.9)
laboratory	6 (1.7)
inpatient wards	112 (31.8)
others	57 (16.2)
Duration of work experience (years)	
mean ± SD	15.9 ± 10.1
range	0–36

SD – standard deviation.

Overall, 58.5% of HCWs in our study reported sharps injury, and 73.5% reported unprotected blood muco-cutaneous exposure in the past year. Furthermore, overall hepatitis B vaccination coverage was 66.2%. Potential reasons for HBV vaccine acceptance or refusal in this HCWs sample has been previously analyzed [17].

The item-specific proportions of incorrect answers related to hepatitis B knowledge are displayed in Table 2. Approximately, one in three HCWs in our sample incorrectly identified recommendations on special diet for patients with hepatitis B, possibility for family transmission of HBV and potential for reinfection. Specifically, 125 HCWs (35.5%) inaccurately answered that newborns should not receive HBV vaccine. Additionally, more than one half of participants incorrectly considered that pregnant women should not receive HBV vaccine, that people with hepatitis B should be restricted from working in the food industry, and that hepatitis B cannot lead to cirrhosis (Table 2).

Mean hepatitis B-related knowledge score was 22.9 ± 4.8 out of 30 points. Distribution of HCWs according to hepatitis B knowledge level was presented in Figure 1. Almost one half of respondents (n = 175) scored less than median, suggesting “unsatisfactory” level of knowledge. On the other hand, 32 (9.1%) responders achieved “excellent” knowledge score. Small proportion of HCWs (5.4%) answered correctly to all questions (knowledge score 30 out of 30). By contrast, 2 (0.6%) participants provided only one correct answer. Higher level of hepatitis B-related knowledge correlated with higher education attainment ($\rho = 0.377$; $p < 0.001$), being younger ($\rho = -0.113$; $p = 0.034$) and having less work experience ($\rho = -0.127$; $p = 0.017$).

Table 2

Proportions of incorrect hepatitis B-related knowledge answers

Statements	Incorrect answers, n (%)
Transmission	
HBV can spread from one person to another in the family.	162 (46.0)
Hepatitis B can be spread by sharing dishes with HBV positive patients.	96 (27.3)
HBV can be transferred through colonoscope or endoscope tools.	94 (26.7)
Hepatitis B can be spread by mosquitoes.	78 (22.2)
Hepatitis B is spread through the air in an enclosed environment.	61 (17.3)
Hepatitis B can be transferred from mother to fetus.	45 (12.8)
Hepatitis B can be spread through close personal contact such as talking and kissing.	45 (12.8)
HBV can be transferred through mother's milk to the infant.	41 (11.6)
Having a medical and/or dental procedure increases a person's chances of contracting hepatitis B	33 (9.4)
Some people with hepatitis B were infected through unsterile tattooing.	30 (8.5)
Some people with hepatitis B were infected through blood transfusions.	24 (6.8)
Hepatitis B is commonly spread by sexual transmission.	20 (5.7)
Hepatitis B is spread through blood-to-blood contact.	16 (4.5)
Hepatitis B can be spread through sharing injecting equipment, such as needles and operation tools.	15 (4.3)
Nature and complications	
Hepatitis B is caused by a virus.	18 (5.1)
Hepatitis B can lead to cirrhosis.	208 (59.1)
Hepatitis B is associated with an increased risk of liver cancer.	101 (28.7)
Symptoms of hepatitis B infection always appear.	89 (25.3)
A person can be infected with HBV and not have any symptoms of the disease.	84 (23.9)
After the entry of HBV to the body, symptoms appear after 1 to 3 days.	51 (14.5)
An individual can have hepatitis B antibodies without being currently infected with the virus.	44 (12.5)
Once you have had hepatitis B, you cannot catch it again because you are immune.	143 (40.6)
Prevention	
Pregnant women should not receive the vaccine against hepatitis B.	181 (51.4)
People with hepatitis B should be restricted from working in the food industry.	179 (50.9)
Newborn children should not receive the vaccine against hepatitis B.	125 (35.5)
Special diet is recommended for patients with hepatitis B.	120 (34.1)
Vaccination against hepatitis B is obligatory for all persons employed in health care institutions that come in direct contact with infectious materials.	41 (11.6)
There is a vaccine for hepatitis B.	11 (3.1)
Treatment	
The vaccine can be used for the treatment of hepatitis B.	102 (29.0)
There is a pharmaceutical treatment available for hepatitis B.	61 (17.3)

HBV – hepatitis B virus.

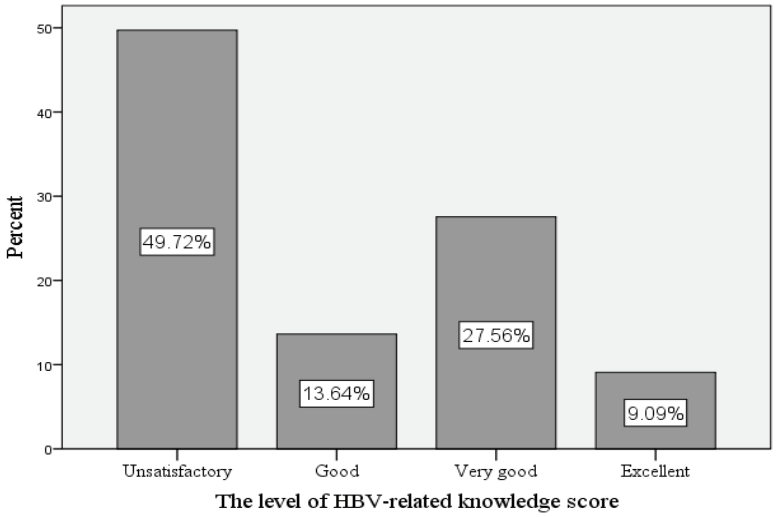

Fig. 1 – Distribution of hepatitis B-related knowledge level.

We observed that those HCWs who were previously vaccinated against hepatitis B, had significantly higher knowledge score (t = 5.656, p < 0.001) compared to HCWs who were not vaccinated (23.9 ± 3.7 vs. 20.9 ± 5.8, respectively) (Figure 2). Additionally, the average value of knowledge score was higher (t = 4.721, p < 0.001) in subcohort of participants who reported occupational exposures to blood and body fluids (23.3 ± 4.0), compared to subcohort of HCWs who did not report this professional risk (19.3 ± 5.4) (Figure 3).

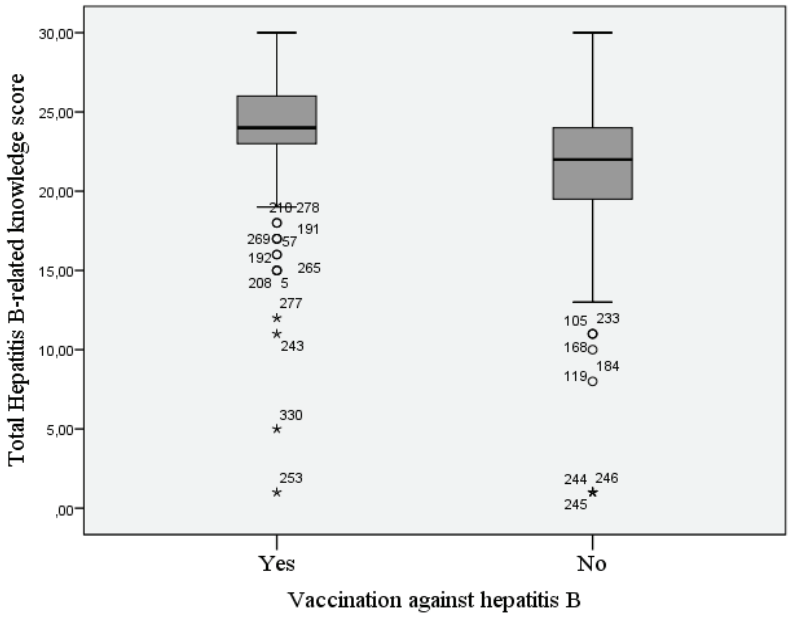

Fig. 2 – Total hepatitis B-related knowledge score according to the hepatitis B vaccination status.

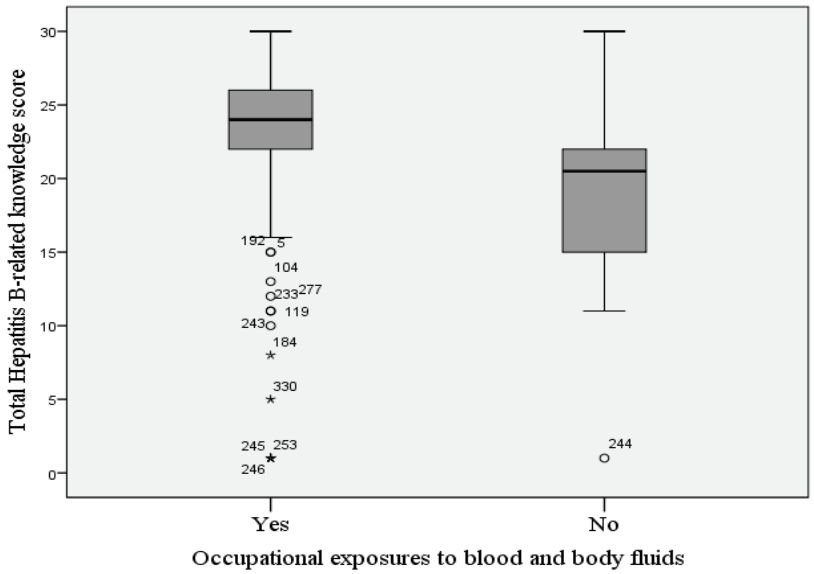

Fig. 3 – Total hepatitis B-related knowledge score according to the occupational exposures to blood and body fluids.

Discussion

Regardless of well-recognized high professional risk for HBV infection and ample possibilities for effective prevention, results from evidence-based studies suggest that a considerable knowledge gap about hepatitis B still exists among HCWs. It has been indicated that insufficient HBV awareness in this professional group could profoundly influence their behavioural patterns towards vaccination and other safety measures. Thus, testing the level of HCWs' hepatitis B awareness is of tremendous importance, considering the fact that knowledge is crucial factor for prevention-related behaviour modification. Keeping this public health problem in mind, over the past years increasing numbers of studies has been dealing with this particular issue [9, 13, 14, 16, 18–20]. Therefore, the present study conducted in Serbian health care setting aimed at addressing this challenge.

Slightly more than half of HCWs in our sample scored above median value of HBV knowledge score. Similar finding was obtained in the study of Abeje and Azage [14] where 52% of the responders achieved scores greater than mean value. This is certainly below the common expectation that all HCWs should demonstrate good hepatitis B knowledge. These results highlighted considerable misunderstanding among health care professionals. In our sample of HCWs, higher values of hepatitis B knowledge score statistically significantly correlated with higher education level, younger age and less working experience. Additionally, meaningfully higher score is observed among HCWs who were vaccinated against HBV compared to the unvaccinated group, as well as among subgroup working at the operating room. Factors favouring better hepatitis B-related knowledge in our study were similar to those observed among HCWs in Greece [15]. Namely, Karaivazoglou et al. [15] reported that higher education, occupation, and HBV vaccination were associated with hepatitis B knowledge score. Moreover, results from our study also introduced younger age and less working experience as factors that significantly contributed to higher HBV knowledge score. Previous studies reported conflicting results on age and HBV-related knowledge. Results of Adekanle et al. [18] supported our finding that younger age was associated with being more knowledgeable on HBV, while Afihene et al. [19] reported the opposite results suggesting that older age and more working experience were predictors of higher knowledge score. Higher HBV knowledge score in younger subgroup of our HCWs could be partially explained by more intensive hepatitis B-related education during the past decades in our medical schools.

Although most HCWs correctly identified that hepatitis B infection was caused by a virus, 18 (5.1%) participants misperceived this fact. Further analyses of characteristics of HCWs who answered incorrectly to this question showed that most (72.2%) belonged to non-medical subgroup of respondents, including administrative staff, sanitary workers and drivers. However, 2 medical technologists, 2 nurses, and even one physician were not knowledgeable regarding this basic question. In the study of Hassan et al. [20] was also shown that 7.3% of HCWs considered that the causing agent of hepatitis B was bacterium, while 6.5% considered that the agent was a parasite.

In our study, most HCWs showed good knowledge regarding various modes of HBV transmission, which is in agreement with the results from other authors [13, 14, 18, 19]. However, some authors suggested that significant proportion of HCWs were less knowledgeable regarding this matter, as they have indicated faecal-oral route and polluted water as possible modes of transmission [14, 19]. Furthermore, in our settings, poor knowledge concerning possible chronic complications of HBV infection has been observed. Specifically, large proportion of responders did not know that hepatitis B could lead to liver cirrhosis and liver cancer. It is clear that, in our group of HCWs, there is a knowledge gap surrounding comprehensive issues of hepatitis B. This was also supported by findings in other HCW cohorts [18].

Majority of HCWs in our sample were aware of the availability of HBV vaccine, as well as that it was mandatory for all HCWs. However, 11 (3.1%) responders wrongly reported that HBV vaccine did not exist. This is in line with previous surveys, where in almost all HCW cohorts some participants incorrectly identify the absence of HBV vaccine [13, 14, 18, 19]. This finding certainly represents a major concern worldwide. Additionally, one-third of the HCWs in our survey demonstrated a lack of awareness on vaccination of newborns against HBV. In the Republic of Serbia, hepatitis B vaccine has been a part of the mandatory childhood immunization schedule for more than 10 years. Bearing in mind the fact that the first dose of HBV vaccine should be administered within the first days after birth, it is worrisome that such a large proportion of HCWs misperceive this practice. These data confirmed the need for additional efforts to improve hepatitis B vaccine awareness, promotion and implementation in our health-care community.

Study limitations and strengths

Some limitations of the present study need to be kept in mind in interpretation of our results. Firstly, this investigation was performed at one national clinical centre, thus selection bias cannot be excluded. Secondly, the cross-sectional design of our study captured the associations between several variables, but does not inherently allow us to make definite causality conclusions. Thirdly, an information bias should be acknowledged, because this study relies on self-reported data, which may be subject to over- or under-estimation, potentially distorting results. Namely, data in our research were obtained through self-reported questionnaire. Although this approach has many advantages (low price, collecting data in a short period of time, etc.), it is dependent on sincerity of respondents which is generally linked to nature of questions. Finally, it is important to mention that comparison of results from different studies dealing with this issue is difficult due to heterogeneity in item structure questionnaire examining hepatitis B-related knowledge and different approaches to their scoring and interpretation. Apart from these limitations, this study has several strengths because it refers to a common public health problem and targets high risk cohort. Furthermore, it should be emphasized that such investigation was conducted for the first time in Serbia, and offer picture about hepatitis B-related awareness in our health care settings. We selected a representative sample of HCWs from a large referral health care facility. Thus, we hypothesize that the results of our study could be generalized to the total HCWs population of the country.

Conclusion

In summary, results of the present study suggest that the level of hepatitis B-related among HCWs is poor relative to some important aspects of HBV infection. Bearing in mind the fact that health care professionals are perceived as reliable source of information on hepatitis B, to both patients

and general public, it is essential that HCWs possess optimum knowledge on various aspects of this disease. Hence, well-planned educational campaigns and continuing medical education among this high-risk professional group should be intensified with primary focus on attitude change and behaviour modification to ensure hepatitis B-related safe and responsible health-care environment.

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