

Knowledge and Attitudes of Healthcare Professionals Employed in Tertiary Healthcare Institutions About Hepatitis B and Prevention Measures

Dragana D. Brnović¹, Damir N. Peličić^{1,2}, Tanja V. Boljević^{1,2}

¹ Clinical Center of Montenegro, Podgorica, Montenegro

² Faculty of Medicine, University of Montenegro, Podgorica, Montenegro

SUMMARY

Introduction: Hepatitis B infection is an occupational disease of professional healthcare professionals at the global level. It is estimated that 600,000 to 800,000 healthcare professionals in the world experience an accident at work. The results of evidence-based studies suggest that there is a gap in knowledge about HBV among healthcare professionals.

Aim: The aim of this research is to assess knowledge and attitudes about the hepatitis B virus and prevention measures in the population of healthcare professionals employed in tertiary healthcare institutions in Montenegro.

Material and Methods: A transversal prospective research („cross-sectional” study) was conducted, where the results were obtained using the original author’s questionnaire. The research was conducted in a tertiary level health institution (Clinical Center of Montenegro). The questionnaire was conducted on a voluntary and anonymous basis. Among the methods of inferential statistics, Pearson’s rank coefficient and ANOVA test were used. Among the statistical methods, the Chi square test (X²-test) was used. The results are shown in a table. The level of significance is $p < 0.05$.

Results: There were 272 health professionals who took part in the research, among whom the largest share in the research was nurses and technicians with a percentage of participation of 76.1%, then doctors 17.3%, laboratory technicians 5.5%. The majority of respondents were female gender 77%, while male respondents participated in the research with 23%. The average age of our respondents was 38.76 years. The results of our research showed a high level of knowledge of professional healthcare professionals about the ways of transmission of HBV infection, while a significantly lower level of knowledge of professional healthcare professionals about knowing the symptoms of HBV infection and the risk of developing certain diseases caused by this virus is recorded. Of the examined group of health professionals, 81.5% point out that they are often exposed to contact with the patient’s blood in their work, while 52.2% of respondents state that in their previous work they had an accident in which they came into contact with the patient’s blood one or more times.

Conclusion: Analyzing the data obtained from the research, one gets the impression of incomplete information, knowledge and interest about the HBV virus among health professionals, especially when it comes to the respondents’ knowledge of the symptoms of this

Corresponding author:

Associate Professor Tanja V. Boljević, MD, PhD

Specialist in Maxillofacial Surgery

Clinical Center of Montenegro, Ljubljanska bb, 20000 Podgorica, Montenegro

E-mail: boljevictanjamini@gmail

infection, its risk for the occurrence of other diseases and the importance of general and specific prevention. In this regard, as a proposal for measures to be planned and implemented in KCCG, it would primarily refer to the continuous education of employees at all levels of education.

Keywords: Hepatitis B Infection, Healthcare Professionals, Preventive Measures, Vaccination

INTRODUCTION

Although a safe and effective vaccine against hepatitis B virus (HBV) has been available for the last 4 decades, hepatitis B infection remains a major occupational disease of health professionals globally. Persons employed in healthcare institutions represent a high-risk cohort for the development of hepatitis B virus (HBV) infection. It is estimated that, on a global level, every year from 600,000 to 800,000 persons employed in health care institutions are cut or stabbed with a needle in the workplace. Also, according to these estimates, about 5.9% of healthcare professionals are exposed to hepatitis B virus infection, which results in about 66,000 newly infected [1]. In developing countries, occupational exposure is responsible for 40 to 60% of all hepatitis B infections among healthcare professionals. In developed countries, slightly less than 10% of hepatitis B cases in the group of professional healthcare professionals are related to contact with blood and blood derivatives at the workplace, which is associated with significantly higher vaccination coverage [2]. Although a safe and effective vaccine has been available since 1982, a large number of professional healthcare professionals globally are not vaccinated against this disease. Research at the level of the world population has shown that about 90% of professional healthcare professionals are aware of the fact that they need to be vaccinated, but that only slightly more than 50% do so. Therefore, today it is considered that behind the receptivity of the hepatitis B vaccine in the group of professional healthcare professional there is a whole series of psychological, professional and behavioral factors that potentially influence this complex picture. Indeed, the perception of risk of hepatitis B infection is strongly associated with general preventive behavior in this susceptible cohort [3]. Regardless of the well-recognized occupational risk for hepatitis B infection, there is an emphatically poor level of prevention, and it is very difficult to

determine the practice among healthcare professionals and explain it [4]. Studies conducted in developing countries have documented insufficient knowledge about the hepatitis B virus among healthcare professionals [5,6], and a lower level of knowledge and awareness of the risk of infection with the hepatitis B virus is associated with poorer preventive attitudes, including a decrease in hepatitis B vaccination coverage [7]. The lack of knowledge and awareness about the risk of exposure to the hepatitis B virus is particularly prominent among healthcare professionals in developing countries. Consequently, lack of awareness promotes low hepatitis B vaccination coverage. Despite the well-recognized high occupational risk for hepatitis B infection and wide opportunities for effective prevention, the results of evidence-based studies suggest that there is still a significant gap in hepatitis B knowledge among healthcare professionals. It has been indicated that insufficient awareness of hepatitis B infection in this professional group could have a profound impact on their behavioral patterns towards vaccination and other safety measures [8]. Therefore, testing the level of knowledge and attitudes of health professionals about hepatitis B infection is of great importance, given the fact that knowledge is a key factor for prevention and modification of behavior. Bearing in mind the maintenance of the level of this public health problem, in recent years an increasing number of studies have dealt with this specific issue [9,10]. No research has been conducted in Montenegro on the knowledge and attitudes of healthcare professionals about hepatitis B infection. The determinants themselves that influence awareness of hepatitis B virus infection and attitudes about professional exposure in the healthcare environment are not sufficiently researched and understood.

AIM

The aim of this research is to assess knowledge and attitudes about the hepatitis B virus and prevention measures in the population of healthcare professionals employed in tertiary healthcare institutions in Montenegro.

MATERIAL AND METHODS

This is an academic study (non-commercial). Health professionals employed at the Clinical Center of Montenegro in Podgorica participated in this research. The research was conducted from July 1, 2022 until September 1, 2022 with the consent of the KCCG Ethics Committee, Decision No. 03/01-7517/1 dated May 4, 2022 as well as the ethical approval of the Ethics Committee of the Faculty of Health Studies.

A transversal research („cross-sectional” study) was conducted, where we obtained results using the original author’s questionnaire.

The basic instrument for data collection is a structured questionnaire, which was compiled on the basis of literature data.

The survey questionnaire contained 25 questions that were didactically divided into five subgroups consisting of:

1. General data and information about the respondents.
2. Knowledge about the routes of transmission of HBV infection, symptoms and diseases.
3. Exposure at the workplace to contact with blood and attitude towards the accident.
4. Behavior of healthcare professionals in work (protection) with body fluids of patients.
5. Attitudes of professionalshealthcare professionalsabout prevention measures.

The questionnaire was conducted on the basis of anonymity and voluntariness, and the obtained results were exclusively used for the purpose of preparing the final paper. All international conventions, as well as international and domestic documents/legislation in research ethics and professional deontology, were respected.

The research was conducted as a cross-sectional study, where we obtained results with the help of an original author’s (non-standardized) research instrument, a survey questionnaire. The results of the research were processed in the software system SPSS, version 22. The data are presented through frequen-

cies and percentages of the results in a table. Among the methods of inferential statistics, Pearson’s rank correlation coefficient and ANOVA test were used. Among the statistical methods, the Chi square test (X²-test) was used. The results are presented in a table. The level of significance is $p < 0.05$.

RESULTS

272 professionalshealthcare professionalsem-
ployed at the Clinical Center of Montenegro in Podgorica participated in the research, with an average age of 38.7 years. The largest number of respondents who participated in this research were women, 77%, while 23% of the respondents were men. The largest number of respondents who participated in the research, 204 (77%), were women, while 61 (23%) were men. The average age of the youngest respondents was 38.76 years and ranged from 19 years for the respondents to 65 years for the oldest respondents. When it comes to our profession, the largest number of 207 (76.1%) are nurses and technicians, 47 (17.3%) respondents are doctors, 15 (5.5%) are laboratory technicians, while 3 (1.1 %) respondents state that they belong to the category other. The results of the research show that the largest number of respondents, 144 (53.3%) of them have a secondary education, 109 (40.4%) respondents have a university education, while 17 (6.3%) respondents have a higher education. The average length of service of the respondents was 15.96 years and ranged from a minimum of 1 to a maximum of 44 years of service. The research covered the departments/clinics of the Clinical Center of Montenegro: Central Intensive Care Unit, Operating Block, Angio Room, Surgical Clinic, Center for Cardiac Surgery, Center for Laboratory Diagnostics, Center for Neonatology, Internal Medicine, Center for Hemodialysis, Clinic for Infectious Diseases.

DISCUSSION

Considering the characteristics of HBV and the ways of its transmission, healthcare professionals represent a high-risk cohort for HBV infection compared to the general population. One of the goals of our work is to create, based on the obtained results, a proposal for measures aimed at preventing the occurrence of this disease among healthcare professionals. Safety at work is an essential need of every in-

Table 1. Overview of the respondents according to the answers to the questions

Have you had an accident in your past work in which you came into contact with a patient's blood?	Number	Percent
No	129	47.8
Yes, once	80	29.6
Yes, more than once	61	22.6
In total	270	100.0
Have you reported the accident to the authorities?	Number	Percent
Yes	91	57.2
No	68	42.8
In total	159	100.0
Where to dispose of used sharp objects?	Number	Percent
Medical waste	48	17.6
Municipal waste	7	2.6
Sturdy containers for sharp objects	217	79.8
In total	272	100.0
Is there specific protection against HBV infection?	Number	Percent
Yes	223	84.2
No	28	10.6
I do not know	14	5.2
In total	265	100.0
Vaccination against HBV infection for healthcare professionals in Montenegro is?	Number	Percent
Mandatory	73	27.0
Recommended	176	65.2
It is not enforced	21	7.8
In total	270	100.0
Have you been vaccinated?	Number	Percent
Yes	129	47.4
No	143	52.6
In total	272	100.0
If you were vaccinated, how many doses of vaccine did you receive?	Number	Percent
One dose	15	10.0
Two doses	47	31.3
Three doses	62	41.4
I do not know	26	17.3
In total	150	100.0
If you haven't been vaccinated the reason for not vaccinating is?	Number	Percent
Concerns about unwanted effects after vaccination	38	25.0
Distrust in the effectiveness of vaccines	15	9.9
I am not at risk of disease	25	16.4
Previously cured of hepatitis B	3	3.3
I didn't receive an invitation to be vaccinated	48	31.6
I don't have enough knowledge about significant HBV vaccination	21	13.8
In total	150	100.0
How often does your institution conduct education on blood-borne disease prevention measures?	Number	%
Never	90	34,0
Rare (1 in 5 years)	145	54,7

Regular (1 per year)	30	11.3
In total	265	100.0

dividual. Healthcare professionals are exposed to the risk of illness and injury in their daily work, and their safety during the treatment of patients is very important [11]. In this regard, it is necessary for each health care institution to look at current and potential problems that may endanger the employees of that institution, and to plan activities for the prevention of illnesses and injuries at work. When talking about blood-borne diseases, HBV, HCV, HIV infection, prevention of exposure is the best form of protection. Compliance with general, non-specific measures and vaccination against HBV will significantly reduce the risk of infection. In Montenegro, there are no available data on the degree of professional exposure of healthcare professionals to blood-borne infections, the coverage of healthcare professionals by active protection against HBV infection, the effectiveness of the implemented protection, the degree of use of specific personal protective equipment, as well as PEP measures. The aim of our research was to examine the level of professional exposure, coverage of professionalshealthcare professionalsby vaccination against HBV infection, the level of use of

protective equipment as well as the knowledge of professionalshealthcare professionalsabout HBV infections and the attitudes of professionalshealthcare professionalsabout the prevention of HBV infections in the Clinical Center of Montenegro. 272 health professionals participated in the research, among whom the largest share in the research was nurses and technicians with a percentage of participation of 76.1%, followed by doctors 17.3%, laboratory technicians 5.5% and 1.1% of health professionals classified under category second. The majority of respondents were female, 77%, while male respondents participated in the research with 23%. This data is certainly not surprising considering that the largest share in the health care system is occupied by women, especially when it comes to the field of health care covered by nurses, who in our research have the largest share. The age of our respondents was 38.76 years old, which indicates that they are young staff who are on average in their most productive age, with 59.6% in the majority having secondary and higher degrees. The average length of service was 15.96 years. The results of our research show a high level of

Claim	Intermediate level of vocational education		Higher degree of professional education		High degree of professional education		P	
	Number	%	Number	%	Number	%		
During work when there is a risk of contact with body fluids, use?	Never	1	0.7	0	0.0	1	0.9	0.45
	Sometimes	3	2.2	0	0.0	4	3.7	
	Often	16	11.6	1	2.6	21	19.4	
	Always	118	85.5	16	91.4	82	75.9	
Mask	Never	33	29.2	4	25.0	35	35.4	0.73
	Sometimes	54	47.8	10	62.5	43	43.4	
	Often	8	7.1	0	0.00	8	8.1	
	Always	18	15.9	2	0.9	13	13.1	
Glasses	Never	33	29.2	4	25.0	35	35.4	0.73
	Sometimes	54	47.8	10	62.5	43	43.4	
	Often	8	7.1	0	0.00	8	8.1	
	Always	18	7.9	2	12.5	1	13.1	
Protective coat	Never	15	11.8	0	0.00	12	11.7	0.29
	Sometimes	50	39.4	7	41.2	47	45.6	
	Often	29	22.8	7	41.2	17	16.5	
	Always	33	26.0	3	17.6	27	26.2	

Table 2. The influence of the level of professional education of the respondents on the behavior in working with body fluids

Table 3. Comparison of the investigated characteristics between the groups of subjects who were and were not vaccinated against hepatitis B

Variable	Vaccinated N (129)	Unvaccinated N (143)	P
Gander (number %)			
Men	27 (44,3%)	34 (55,7%)	0,51
Women	100 (49,0%)	104 (51,0%)	
Age			
Mean±standard deviation	37,99±1,14	37,39±1,09	0,90
Gander (number %)			
Doctor	36 (76,6%)	11 (23,4%)	0,00*
Nurse/Technician	83 (40,1%)	124 (59,9%)	
Laboratory technician	8 (53,3%)	7 (46,7%)	
Other occupation	2 (66,7%)	1 (33,3%)	
Vocational education degree (number %)			
Intermediate level of vocational education	62 (43,1%)	82 (56,9%)	0,41
Higher degree of professional education	7 (41,2%)	10 (58,8%)	
High degree of professional education	60 (55,0%)	49 (45,0%)	
Did you have an accident in your previous job? (number%)			
No	47 (36,7%)	82 (63,6%)	0,00*
Yes, once	50 (62,5%)	30 (37,5%)	
Yes, more than once	31 (50,8%)	30 (49,2%)	
Did you have an accident in your previous job? (number%)			
Never	5 (71,4%)	2 (28,6)	0,91
Sometimes	24 (55,8%)	19 (44,2%)	
Often	100 (45,2%)	121 (54,8%)	

knowledge of healthcare professionals about the routes of transmission of HBV infection. In almost all questions about the routes of transmission of HBV infection, the number of correct answers was on average more than 95%. It has been established that there is a statistically significant difference in the level of professional education and knowledge of the respondents about transmission routes. A higher percentage of correct answers were given by respondents with higher and higher education. Also, the results of our research showed that the factor that stands out as significant for a greater degree of knowledge about HBV infections is less work experience, or more precisely, shorter work experience of the respondents. Results from Adellante et al. in a study conducted in a tertiary care institution in Nigeria in 2015, they agree with our results that shorter work experience is associated with a higher level of knowledge about HBV infection [12]. Similar results were shown by a study conducted in Serbia, Knowledge of HBV among healthcare professionals [13], where higher values of knowledge about hepatitis B

correlate statistically significantly with a higher level of education, younger age and less work experience. Certainly, the shorter work experience and higher knowledge scores of these patients can be connected with the intensive education about HBV during the past decades at our medical faculties, higher and higher medical schools. As many as 145 (54.7%) respondents state that their institution rarely (1 to 5 years) conducts education on blood-borne disease prevention measures, 90 (34.0%) respondents point out that their institution never conducts this type of education, while 30 (11.3%) respondents state that their institution regularly conducts education on measures to prevent blood-borne diseases. The results of a study conducted in Poland in 2015 showed that as many as 82.1% of respondents had acquired knowledge about HBV infection during basic training (school / study), while 68.6% had participated in various refresher courses [14]. Such results may imply that decision-makers on medical education should consider the need to harmonize theory and practice, i.e. improving practical skills. The re-

sults of the conducted research record a significantly lower level of knowledge of healthcare professionals about the symptoms of HBV infection and the risk of developing certain diseases caused by this virus. The correct number of answers on average is slightly above 60%, however, this is certainly not a satisfactory level of knowledge for healthcare professionals since they should have a high level of knowledge about blood-borne infections. A large part of the respondents did not know that hepatitis B can lead to cirrhosis of the liver and cancer. of the liver, which indicates that the examined group of professionals healthcare professionals has insufficient knowledge about comprehensive issues about hepatitis B. Only 56.2% of professionals healthcare professionals know that the hepatitis B virus survives the longest in the external environment. Here, no statistically significant difference was shown regarding the length of work experience and the respondents' knowledge of symptoms and risks for the occurrence of other diseases caused by hepatitis B. This is also supported by the findings of other cohort studies [15]. In the Republic of Serbia, research was conducted on the territory of the Autonomous Province of Vojvodina regarding the importance of prevention of blood-borne infections and control to reduce occupational risks among health professionals. The results of the research showed that health professionals in Vojvodina have a high rate (more than 80%) of professional exposure to these infections [16]. Similar results were obtained in our research, where 81.5% of the examined group of healthcare professionals pointed out that they were often exposed to contact with the patient's blood in their work, while 52.2% of the respondents stated that in their previous work they had an accident that resulted in contact with the patient's blood one or more times. The results of a study conducted in Brazil in the state of Gojas with 73 professionals healthcare professionals show that 32.9% of respondents had a repeated accident that was reported to the competent service [17]. The largest number of our respondents, 91 (57.2%) stated that they reported the accident to the competent services, while 68 (42.8%) respondents stated that they did not report the accident. A retrospective study conducted in Turkey shows that a total of 100 accidents at work were reported for a five-year period [18]. In studies conducted in other countries, it was determined that

27% to 50% of accidents at work were not reported [19, 20]. The most common reason for not reporting such injuries is the perception that there is a low risk of infection (51%-87%) [21,22]. When it comes to the behavior of respondents when working with bodily fluids, 82.3% of respondents point out that they always use gloves, 71% of respondents always use a mask, while the percentage of using protective glasses (14.8%) and a protective coat (25.7%)) significantly lower. In the study Protection of healthcare professionals employed in tertiary healthcare institutions from hepatitis B virus infection [23], which was conducted in Vojvodina, similar results to ours are also shown when it comes to personal protection, 89% of respondents use protective measures when performing their professional duties, and these are the most common were gloves (88%), while safety glasses were used by at least 24%. A study conducted in Minas Gerais revealed that 35.7% of respondents who experienced an accident at work did not wear protective gloves during exposure to patients' bodily fluids. The same study showed that the use of personal protective equipment is related to professionals' perception of occupational exposure [24]. The use of personal protective equipment in clinical practice enables the reduction of exposure to blood and other body fluids and thus prevents occupational hazards and ensures productivity. Wearing personal protective equipment, i.e. the basic accessories necessary for the protection of healthcare professionals, is of the utmost importance [25]. Therefore, the use of personal protective equipment should be adopted by health professionals regardless of the risk of contamination [25]. WHO estimates that every year around 66,000 healthcare professionals become infected with HBV, and 600,000–800,000 healthcare professionals experience an incident at the workplace in the form of a cut or needle stick [1]. When working with sharp medical material, 76.6% of the respondents state that they put the protector back on the used needle, which is definitely wrong, since this is where the largest number of accidents occur. The largest number of respondents, 217 (79.8%) point out that they dispose of used sharp objects in solid containers for sharp objects, 48 (17.6%) dispose of them in medical waste, while 7 (2.6%) respondents state that they dispose of them in municipal waste. Similar results are shown by a retrospective de-

scriptive study conducted in Turkey with professional healthcare professionals employed in a children's hospital, which was related to the analysis of patterns of accidents at work caused by used needles. Among all employees, nurses and cleaning staff were the most exposed to occupational accidents. Accidents most often occurred during the removal of medical waste precisely because of incorrect disposal, i.e. throwing used needles into garbage bags. Precautions that are effective in preventing injury include disposing of used needles in sharps disposal containers without resealing the needles after use, and visual reminders about disposing of used sharp medical needles in containers intended for that purpose can certainly contribute to this [18]. One quarter of respondents state that they are not familiar with post-exposure prophylaxis. Some countries (Sudan) have recognized the need to educate healthcare professionals about exposure to HBV infection in the workplace when providing healthcare and treatment [26]. 84.2% of our respondents know that there is specific protection against HBV, while less than half 47.4% of respondents point out that they have been vaccinated, of which 41.4% with 3 doses. A study conducted with professional healthcare professionals at the University Teaching Hospital in Cameroon in 2013 showed that at the time the study was conducted, 36.67% of subjects had received all three doses of the vaccine, 19.33% had started vaccination but had not yet completed the series. vaccination, while 44% of respondents were not vaccinated [27]. In the Republic of Serbia, an epidemiological study of Serbia was carried out on the territory of the Nišava and Toplički districts (2000–2009), which determined that 31% of healthcare professionals were covered by vaccination against hepatitis B [28]. In December 2015, a cross-sectional study was conducted for predictors of vaccination status associated with hepatitis B immunization among persons working at the Clinical Center of Serbia (Belgrade). The prevalence of vaccination in the studied sample was 66% [29]. The retrospective study, which was conducted in China, included 1,420 healthcare professionals. It confirmed that complete vaccination was carried out in 40.42% of respondents [30]. In Southern Indiana, a study was conducted on the coverage of healthcare professionals with protection against hepatitis B, where it was proven that out of 778 professionals, only 454 were vacci-

nated with three doses of the vaccine [31]. As the reason for not vaccinating, the largest percentage of our respondents, 31.6%, stated that they did not receive an invitation to be vaccinated, 25% because they were worried about the unwanted effects of the vaccine, 16.4% because they believed that they were not at risk of getting sick, and 9.9% stated that they did not trust vaccine effectiveness. One of the questions arising from the results of our research is that if a healthcare worker has not received the vaccine, does this conflict with the ethical standards of the profession and should the vaccination of healthcare professionals be mandatory, or has the practice chosen explanation and education as a more efficient method? about the importance of vaccination? Our results show that it was education that proved to be the missing link, which has a direct impact on the knowledge and attitudes of healthcare professionals about vaccination against HBV infection. A very significant indicator of the insufficient activity of the public health system is the fact that as many as 31.6% of respondents state that they did not receive an invitation for vaccination as the reason for not vaccinating, which would otherwise be one of the effective public health interventions in terms of increasing the coverage of health professionals by vaccination. The analysis of the results of the comparison of the groups of respondents who were and were not vaccinated against hepatitis B showed that the respondents were statistically significantly more vaccinated in the category of doctors compared to the categories of nurses/technicians, laboratory technicians and those who defined their occupation under the category other. A study conducted at the University Teaching Hospital in Cameroon also shows a higher degree of vaccination among doctors (48.3%) compared to nurses (35.6%) [27]. In a meta-analysis conducted in Africa on professionals which included 331 classified articles, 35 studies met the criteria included in the review. Complete vaccination coverage against hepatitis B was 27.7%. In this study, similar to our results, it was also shown that doctors were more covered by vaccination compared to nurses and technicians, however, the unavailability of the vaccine stands out as the reason for non-vaccination, even in 50.5% of cases [32]. According to WHO estimates, vaccination coverage varies between 18% in Africa and 77% in Australia and New Zealand. Doctors are more likely

to be vaccinated among healthcare professionals [33]. Gender, age, and professional training of our respondents did not show a statistically significant effect on vaccination, but it was shown that respondents who have never had an accident at work are less vaccinated than respondents who have had multiple accidents. Also, between these two groups of respondents there was a statistically significant difference in relation to whether they had an accident in their previous work. The group of subjects who had one accident were vaccinated statistically significantly more times compared to the group that had several accidents, while subjects who never had an accident were statistically significantly less vaccinated compared to subjects who had one or more accidents in to his previous work. Considering that more than 50% of the respondents stated that they had an accident at work, and that in the survey the most respondents belonged to the category of nurses and technicians, 76.1%, and that 59.9% of them were not vaccinated, it indicates that despite the fact that they know that they are at an increased risk of infection, they do not get infected, possibly due to insufficient knowledge about hepatitis B itself, but also a lack of a greater degree of personal and professional responsibility, as well as insufficient awareness of the health system to make the problem current and undertake activities aimed at improving safety at work in health care professionals. Similar results were shown by a study conducted in Cameroon, where respondents who had an accident (20%), i.e. who are more exposed to occupational risk, are vaccinated in a smaller percentage than those who did not have an accident in the past work [27], which indicates the need to strengthen education aimed at healthcare professionals at high risk of occupational exposure. All research to a greater or lesser extent indicates the importance of prevention and the existence of regulations, which should be based on the principles that a healthy and safe working environment is the highest priority, as well as that the primary prevention of transmission of blood-borne agents must be continuously and systematically strengthened [34]. However, the results of our research, where more than one-third of the respondents (39.9%) point out that they are always aware of the „infectious status” of the patient before the intervention, continuously point to the lack of education and, therefore, the lack of knowledge of our respondents about the importance

of applying standard protection measures in daily work with all patients and their body fluids, regardless of their „infectious status”. This result may indicate a lack of awareness that absolutely every patient should be treated as a potential source of infection. The patient is not obliged to inform the healthcare worker about his „infectious status”, but the healthcare worker is certainly obliged to use protective equipment in his daily work. Therefore, when there is a possibility of contact with potentially infectious material at work, the same precautions must be used for all patients. The results of a study conducted in Poland in 2015, which examined the behavior and attitudes of professionalshealthcare professionals in the field of accidents, show that according to health professionals, professionalshealthcare professionals should be informed about the serological status of patients and that such information should be transmitted between of different healthcare institutions. The majority of healthcare professionals (69.4%) would like patients to be required to inform healthcare staff that they are infected with a blood-borne virus [14]. Prevention of transmission of HBV infection from professionalshealthcare professionals to patients as well as from patients to health care providers is a comprehensive approach that includes strong reinforcement of universal precautions with mandatory vaccination. Despite all recommendations and guidelines, this discrepancy remains a major problem everywhere. The most cost-effective method for controlling HBV infection is preventive vaccination with strict compliance with the infection control protocol. However, numerous studies report that a large number of healthcare professionals remain unvaccinated [35]. The lack of protocol, uniformity in the vaccination monitoring protocol and poor adherence to standard precautions are largely responsible for the low level of vaccination of healthcare professionals. Our research confirms the working hypothesis, that the knowledge and attitudes of health professionals employed in a tertiary health institution about hepatitis B, its nature, transmission routes and prevention measures, significantly influence their behavior in terms of prevention against infection with the hepatitis B virus. Although the goal of our work was not to validate and standardize the original author’s questionnaire, yet one of the key conclusions is that it is not reliable for further research, considering

the value of the Cronbach alpha coefficient of 0.159, which is below the threshold value of 0.7. The limitations of our research refer to the questionnaire as a research instrument, which has not been previously examined in terms of reliability and validity, and that it is only descriptive in nature.

CONCLUSION

A statistically significant difference was found in the knowledge about HBV infection and the level of professional education of the respondents, where the respondents with a secondary education show a lower level of knowledge compared to the respondents with a higher and higher education. It was also determined that there is a statistically significant difference in the knowledge about HBV infection and the length of work experience of the respondents, where a greater degree of knowledge is shown by respondents with a shorter length of work experience. The research did not establish a correlation between the length of service and the assessment of the risk of HBV infection among healthcare professionals. The analysis of the results of the comparison of the groups of respondents who were and were not vaccinated against hepatitis B showed that the respondents were statistically significantly more vaccinated in the category of doctors compared to the category of nurses and technicians. Also, the results showed that the group of subjects who had an accident once were statistically significantly more vaccinated compared to the group of subjects who had an accident more than once. According to the analysis of the obtained results, the information obtained is that subjects who are often exposed to contact with blood are significantly more unvaccinated than subjects who are sometimes or never exposed to contact with blood at the workplace. Better results related to the current problem could be achieved through a well-designed, integrated approach to this problem, with innovations in logistics (accident registers, coverage of healthcare professionals by vaccination). Our research confirms the working hypothesis, that the knowledge and attitudes of health professionals employed in a tertiary health institution about hepatitis B, its nature, transmission routes and prevention measures, significantly influence their behavior in terms of prevention against infection with the hepatitis B virus.

CONFLICT OF INTEREST

All authors declare no conflict of interest.

REFERENCES

1. Abiola AO, Omoyeni OE, Akodu BA. Knowledge, attitude and practice of hepatitis B vaccination among health workers at the Lagos State accident and emergency centre, Toll-Gate, Alausa, Lagos State. *West Afr J Med* 2013; 32(4): 257-62.
2. Maltezou HC, Poland GA. Immunization of healthcare providers: a critical step toward patient safety. *Vaccine* 2014; 32: 4813.
3. Morowatishaifabad MA, Zare Sakhvidi MJ, Gholianavval L, Masoudi Boroujeni D, Alavijeh MM. Predictors of Hepatitis B preventive behavioral intentions in healthcare workers. *Saf Health Work* 2015; 6(2): 139-42.
4. Da Costa FM, de Barros Lima Martins AM, Dos Santos Neto PE, de Pinho Veloso DN, Magalhães VS, Ferreira RC. Is vaccination against hepatitis B a reality among primary health care workers? *Rev Lat Am Enfermagem* 2013; 21(1): 316-24.
5. Tuckerman JL, Collins JE, Marshall HS. Factors affecting uptake of recommended immunizations among health care workers in South Australia. *Hum Vaccin Immunother* 2015; 11(3): 704-12.
6. Harrison N, Brand A, Forstner C, Tobudic S, Burgmann K, Burgmann H. Knowledge, risk perception and attitudes towards vaccination among Austrian health care workers: A cross-sectional study. *Hum Vaccin Immunother* 2016; 12(9): 2459-63.
7. Karaivazoglou K, Triantos C, Lagadinou M, Bikas C, Michailidou M, Kalafateli M, Thomopoulos K, Assimakopoulos K, Nikolopoulou V, Jelastopulu E, Labropoulou-Karatza C. Acceptance of hepatitis B vaccination among health care workers in Western Greece. *Arch Environ Occup Health*. 2014;69(2):107-11. doi: 10.1080/19338244.2012.750586. PMID: 24205962.
8. Galanakis E, D'Ancona F, Jansen A, Lopalco PL. VENICE (Vaccine European New Integrated Collaboration Effort) National Gatekeepers, Contact Points. The issue of mandatory vaccination for healthcare workers in Europe. *Expert Rev Vaccines* 2014; 13(2): 277-83.
9. Mansour-Ghanaei R, Joukar F, Souti F, Atrkar-Roushan Z. Knowledge and attitude of medical science students toward hepatitis B and C infections. *Int J Clin Exp Med* 2013; 6(3): 197-205.
10. Abeje G, Azage M. Hepatitis B vaccine knowledge and vaccination status among health care workers of Bahir Dar City Administration, Northwest Ethiopia: a cross sectional study. *BMC Infect Dis* 2015; 15, 30.
11. Zakon o zdravstvenoj zaštitit ("Sl. list CG", br. 3/2016, 39/2016, 2/2017, 44/2018, 24/2019 - dr.

- zakoni, 82/2020 i 8/2021) Dostupno na : <https://www.paragraf.me/propisi-crnegore/zakon-o-zdravstvenoj-zastiti.html>
12. Adekanle O, Ndububa DA, Olowookere SA, Ljartotimi O, Ijadunola KT. Knowledge of Hepatitis B Virus Infection, Immunization with Hepatitis B Vaccine, Risk Perception, and Challenges to Control Hepatitis among Hospital Workers in a Nigerian Tertiary Hospital. *Hepat Res Treat*. 2015;2015:439867
13. Kisić Tepavčević D, Kanazir M, Marić G i saradnici: Znanje zdravstvenih radnika o hepatitisu B u Beogradu, Srbija. *Vojnosanitetski pregled* 2020. vol. 77, br. 5, p. 463-469.
14. Garus-Pakowska A, Górajski M. Behaviors and Attitudes of Polish Health Care Workers with Respect to the Hazards from Blood-Borne Pathogens: A Questionnaire-Based Study. *Int J Environ Res Public Health*. 2019;16(5):891. Published 2019 Mar 12.
15. Coppeta L, Pompei A, Balbi O, Zordo LM, Mormone F, Policardo S, et al. Persistence of Immunity for Hepatitis B Virus among Healthcare Workers and Italian Medical Students 20 Years after Vaccination. *Int J Environ Res Public Health*. 2019;16(9):1515.
16. Đurić P. Uticaj programa unapređenja prevencije i kontrole krvoprenosivih infekcija na smanjenje profesionalnog rizika u zdravstvu [d disertacija]. Novi Sad: Medicinski fakultet Univerziteta u Novom Sadu; 2008. p. 230.
17. Guimaraes de Carvalho L, Grgo Maia L, Verve de Marquez dos Santos S, Alessandra Evangelista R, de Assis Bueno A, e Almeida da Silvia L. Predictors associated with recurrence of accidents with biological material among health workers. *Rev. Salud Pública*. 23(3): 1-9, 2021.
18. Toktas I, Cavus E. Causes of work Accidents Experienced by Healthcare Workers: A Retrospective Five-Year Study. *Gumushane University Journal of Health Sciences GUJHS* 2022: 11(2) 723-729.
19. Abdel Hamied A M. Determinants of behavior of health care workers at Mansoura National Hospital toward needlestick injuries and hepatitis B virus infection. *Benha Medical Journal* 34 (2017): 49 - 57.
20. Katsevman GA, Sedney CL, Braca Iii JA, Hatchett L. Interdisciplinary differences in needlestick injuries among healthcare professionals in training: Improving situational awareness to prevent high-risk injuries. *Work*. 2020;65(3):635-645.
21. Elmiyeh B, Whitaker IS, James MJ, Chahal CA, Galea A, Alshafi K. Needle-stick injuries in the National Health Service: a culture of silence [published correction appears in *J R Soc Med*. 2004 Sep;97(9):458]. *J R Soc Med*. 2004;97(7):326-327.
22. Voide C, Darling KE, Kenfak-Foguena A, Erard V, Cavassini M, Lazor-Blanchet C. Underreporting of needlestick and sharps injuries among healthcare workers in a Swiss University Hospital. *Swiss Med Wkly*. 2012;142:w13523. Published 2012 Feb 10
23. Bogdanović-Vasić S, Stojčević-Maletić J, Brestovački-Svitlica B, i saradnici: Zaštita zdravstvenih radnika zaposlenih u tercijarnim zdravstvenim ustanovama od infekcije virusom hepatitis B. *Srpski arhiv za celokupno lekarstvo* 2020 Volume 148, Issue 11-12, p. 695-700.
24. Julio RS, Filardi MB, Marziale MH. Acidentes de trabalho com material biologico ocorridos em municipios de Minas Gerais [Work accidents with biological material occurred in municipalities of Minas Gerais]. *Rev Bras Enferm*. 2014;67(1):119-126.
25. Soares RZ, Schoen AS, da Rocha Gomes Benelli K, Araújo MS, Neves M. Analysis of reported work accidents involving healthcare workers and exposure to biological materials. *Rev Bras Med Trab*. 2020;17(2):201-208. Published 2020 Feb 12.
26. Elmukashfi TA, Ibrahim OA, Elkhidir IM, Bashir AA, Elkarim MA. Hazards analysis, within departments and occupations, for hepatitis B virus among health care workers in Public Teaching Hospitals in Khartoum State; Sudan. *Glob J Health Sci*. 2012;4(6):51-59.
27. Nouetchognou JS, Ateudjieu J, Jemea B, Mbanaya D. Accidental exposures to blood and body fluids among health care workers in a Referral Hospital of Cameroon. *BMC Res Notes*. 2016 Feb 15;9:94. doi: 10.1186/s13104-016-1923-8.
28. Janićijević I, Perović M, Rančić N, Mitić S. Vakcinacija zdravstvenih radnika protiv virusnog hepatita B. *Timočki medicinski glasnik*. 2011, 36(4):188-91.
29. Kanazir M. Ispitivanje prediktora vakcinalnog statusa povezanog sa imunizacijom protiv hepatitisa B kod osoba zaposlenih u zdravstvenim ustanovama [d disertacija]. Beograd: Medicinski fakultet Univerziteta u Beogradu; 2016. p. 81.
30. Zheng YB, Gu YR, Zhang M, Wang K, Huang ZL, Lin CS, Gao ZL. Health care workers in Pearl River Delta Area of China are not vaccinated adequately against hepatitis B: a retrospective cohort study. *BMC Infect Dis*. 2015 Nov 22;15:542. doi: 10.1186/s12879-015-1278-0.
31. Thomas RJ, Fletcher GJ, Kirupakaran H, Chacko MP, Thenmozhi S, Eapen CE, Chandy G, Abraham P. Prevalence of non-responsiveness to an indigenous recombinant hepatitis B vaccine: a study among South Indian health care workers in a tertiary hospital. *Indian J Med Microbiol*. 2015 Feb;33 Suppl:32-6. doi: 10.4103/0255-0857.150877.
32. Auta A, Adewuyi EO, Kureh GT, Onoviran N, Adeloje D. Hepatitis B vaccination coverage among health-care workers in Africa: A systematic review and meta-analysis. *Vaccine*. 2018;36(32 Pt B):4851-4860.
33. Hutin Y, Hauri A, Chiarello L, Catlin M, Stilwell B, Ghebrehwet T, Garner J. Injection Safety Best Practices Development Group. Best infection control practices for intradermal, subcutaneous, and intramuscular needle injections. *Bull World Health Organ*. 2003;81(7):491-500. Epub 2003 Sep 3.

34. Ziraba AK, Bwogi J, Namale A, Wainaina CW, Mayanja-Kizza H. Sero-prevalence and risk factors for hepatitis B virus infection among health care workers in a tertiary hospital in Uganda. *BMC Infect Dis.* 2010 Jun 29;10:191

35. Kashyap B, Tiwari U, Prakash A. Hepatitis B virus transmission and health-care workers: Prevention, management, and awareness toward the disease. *Indian J Med Spec* 2019;10:6-11.

Znanje i stavovi zdravstvenih profesionalaca zaposlenih u tercijarnim zdravstvenim ustanovama o hepatitisu B i merama prevencije

Dragana D. Brnović¹, Damir N. Peličić^{1,2}, Tanja V. Boljević^{1,2}

¹ Klinički centar Crne Gore, Podgorica, Crna Gora

² Medicinski Fakultet, Univerzitet Crne Gore, Podgorica, Crna Gora

KRATAK SADRŽAJ

Uvod: Infekcija hepatitisom B predstavlja profesionalnu bolest zdravstvenih radnika na globalnom nivou. Procenjuje se da se u svetu kod od 600 000 do 800 000 osoba zaposlenih u zdravstvu dogodi akcident na radu. Rezultati studija zasnovanih na dokazima sugerišu da postoji jaz u znanju o HBV među zdravstvenim radnicima.

Cilj: Cilj ovog istraživanja je procena znanja i stavova o virusu hepatitisa B i merama prevencije u populaciji zdravstvenih radnika zaposlenih u tercijarnim zdravstvenim ustanovama u Crnoj Gori.

Materijal i metode: Sprovedeno je transversalno prospektivno istraživanje („cross-sectional” studija), gdje su se pomoću originalnog autorskog upitnika dobili rezultati. Istraživanje je sprovedeno u zdravstvenoj ustanovi tercijarnog nivoa (Klinički Centar Crne Gore). Upitnik je sproveden na bazi dobrovoljnosti i anonimnosti. Od metoda inferencijalne statistike korišten je Pearsonov koeficijent ranga i ANOVA test. Od statističkih metoda koristio se Hi kvadrat testa (X²-test). Rezultati su prikazani tabelarno. Nivo signifikantnosti je $p < 0.05$.

Rezultati: U istraživanju je učestvovalo 272 zdravstvena profesionalca među kojima su najveći udio u istraživanju imali medicinske sestre i tehničari sa procentom učešća 76,1%, zatim lekari 17,3%, laboranti 5,5%. U najvećem broju ispitanici su bili ženskog pola 77%, dok su ispitanici muškog pola imali učešće u istraživanju sa 23%. Prosječna starost naših ispitanika iznosila je 38,76 godina. Rezultati našeg istraživanja pokazali su visok stepen znanja zdravstvenih radnika o putevima prenosa HBV infekcije, dok se beleži značajno manji stepen znanja zdravstvenih radnika o poznavanju simptoma HBV infekcije i riziku za nastanak određenih bolesti prouzrokovanih ovim virusom. Od ispitivane grupe zdravstvenih radnika 81,5% ističe da je u radu često izloženo kontaktu sa krvlju pacijenta, dok 52,2% ispitanika navodi da je u svom dosadašnjem radu imalo akcident pri kojem je došlo do kontakta sa krvlju pacijenta jednom ili više puta.

Zaključak: Analizirajući podatke dobijene istraživanjem, stiče se utisak o nepotpunoj informisanosti, saznanju i interesovanju zdravstvenih radnika o virusu HBV, posebno kada je u pitanju saznanje ispitanika o simptomima ove infekcije, riziku od pojave drugih bolesti i važnosti opšte i specifične prevencije. S tim u vezi, kao predlog mera koje treba planirati i implementirati u KCCG, prvenstveno bi se odnosilo na kontinuiranu edukaciju zaposlenih na svim nivoima obrazovanja.

Ključne reči: hepatitis B infekcija, zdravstveni radnici, mere prevencije, vakcinacija

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