

ARTICLE

Assessment of Hepatitis B and Hepatitis C Knowledge and Attitudes in a Sample of Health Care Workers from Southeast Brazil

Livia M. Villar^{1*}, *Glaucia S. Silva*², *Vanessa S. de Paula*³

¹Viral Hepatitis Laboratory, Oswaldo Cruz Institute, FIOCRUZ, Rio de Janeiro, Brazil

²Redentor Faculty, Pos Graduation Course of Clinical Analysis, Itaperuna, Rio de Janeiro, Brazil

³ Molecular Virology Laboratory, Oswaldo Cruz Institute, FIOCRUZ, Rio de Janeiro, Brazil

This study aims to assess the knowledge and attitudes about hepatitis B and C viruses (HBV and HCV) in health care workers (HCW). A total of 266 HCW from Rio de Janeiro State (Southeast Brazil) answered an instrument containing 17 questions to study viral hepatitis knowledge and 12 statements regarding attitude and behavior about HBV and HCV. Mean HCWs' knowledge level was considered satisfactory (mean knowledge score was 12.21 ± 3.36), but almost half of HCW presented low knowledge level (score lower than 12.21). High knowledge level was observed in individuals with previous HBV vaccination. Mean attitude score was 39.06 ± 10.47 showing high level of positive attitudes, particularly among dentists and professionals who had previous needle stick injury. In conclusion, almost half of HCW had low level of knowledge about HBV and HCV and some gaps were identified showing the importance of continuous viral hepatitis education to HCW in this setting.

Key words: Hepatitis C virus; Hepatitis B virus; Knowledge; Attitudes; Health care workers

INTRODUCTION

Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are public health issues, both responsible for acute and chronic hepatitis, and transmitted percutaneous exposure to contaminated material and sexual intercourse, although much less common for HCV. Worldwide 257 million of individuals are living with hepatitis B virus and 71 million of individuals are chronically infected with HCV (WHO 2017a, 2017b).

Studies conducted in various countries, including Iran, Mexico, Saudi Arabia, demonstrated unsatisfactory level of knowledge regarding HBV and HCV infection in health care workers (HCW) (Islam et al., 2014; Homoud 2014; Joukar et al., 2017). Differences of knowledge regarding viral hepatitis can

be influenced by age, gender, occupational history, contact with viral hepatitis patients, high education level (Joukar et al. 2012, Frazer et al. 2011a, Delvaux et al. 2013). In Brazil, few studies have examined the knowledge about HBV and HCV in HCW, so it is important to determine the knowledge about HBV and HCV in this group.

HCWs are exposed to several infectious agents during their activities and can play an important role to disseminate information regarding viral hepatitis. Health professionals are at risk of accidental exposure to infectious agents. Recently, it was documented the transmission of a multidrug resistant HIV to a female health care worker from a finger needle stick injury in Sao Paulo, Brazil demonstrating the risk of accidental exposure in this setting (López-Lopes et al., 2015). In Brazil, Souza-Borges et al. (2014) related high frequencies of exposures among health students, inadequate practices in prevention and post-exposure, and, consequently, the need for training in "standard precautions" to prevent such exposures. De Melo e Gontijo Filho (2000) also observed lower proportion of dentists who reported

*Corresponding author: *Livia Melo Villar*
E-mail: lvillar@ioc.fiocruz.br

that they were aware of HBV vaccination in comparison to dental students.

This study aims to assess viral hepatitis knowledge, attitudes and practices associated with providing care for patients with HBV and HCV infection in a setting of HCW from Southeast Brazil.

METHODS

A convenience sampling was used in this study, since all participants were included during courses of the health area. A total of 266 HCWs were recruited from three cities located in North and Central area of Rio de Janeiro state (Southeast region of Brazil) while attending post-graduation courses for clinical analysis or update courses on healthcare between January 2008 to May 2008. Inclusion criteria were: health professional of both genders, from any ethnicity, and aging from 18 to 70 years. Exclusion criteria was absence to consent to participate. Ethical approval was obtained by Ethic Committee of Unigranrio, Rio de Janeiro, Brazil (n.º 0079.0.317.000-08).

Data collection was conducted by direct interviews using an instrument (Richmond et al. 2007) adapted to be applied in this study (Tables 2 and 3). This instrument was pre-standardized on a convenience sample of 20 health professionals that presented similar characteristics of the population studied (data not shown). A minimum sample of 264 HCWs was required, based on the positive attitude proportion among the random subgroup (22%) and considering the precision of 0.06 and a type one error of 0.05 (Jones et al., 2004; Martínez-Mesa et al., 2014). Mean of the total score from a possible score of 17 was used as the discriminant level and scores higher than the mean indicated a good knowledge level (Joukar et al. 2012).

Concerning attitude and behavior statements, participants were asked to what extent they agreed or disagreed using a scale (1-5) ranging from "totally agree" to "totally disagree". For the 12 statements, (1- 6 items were considered as positive statements and 7-12 were negative statements in table 3). A total score could range from 12 to 60 and evaluated according the statement and response given from "totally agree" to "totally disagree". Scores higher than 35 were considered as indicative of a positive attitude since individuals should demonstrated positive attitudes for at least 7 issues (5 points for each issue) (Joukar et al. 2012).

The following data were also obtained: age, gender, working history (years that HCW had worked for health care service), occupation (doctor, nurse, biologist and other healthcare profession), needle stick injury (NSI) history, attending at actualization course, and previous history of HBV vaccination.

Descriptive statistics (mean \pm standard deviation [SD], and frequencies) and comparison means (one-way ANOVA) were obtained. A *P* value $<$ 0.05 was considered statistically significant. All analyses were performed with the Statistical Package for the Social Sciences (SPSS for Windows, release 20.0; SPSS, Inc.,

Chicago, IL, USA).

RESULTS AND DISCUSSION

In this study, 138 (51.9%) were female, with a mean age of 31.83 ± 9.7 years and mean working history of 7.0 ± 7.9 years. Most of participants (87.2%) presented graduate course with median of conclusion of course of 4 years (1 month to 40 years). Majority of them were physicians (56.8%) and more than 90% of individuals reported previous HBV vaccination (246/92.5%). Previous studies have found 75.5% and 87.5% of HBV immunity among dentists from Midwest region of Brazil and HCW from Northeast region of country, respectively (Batista et al., 2006; Carvalho et al., 2012). In addition, 59 (22.2%) individuals had a history of needle stick injury while 29.5% of medical students from Serbia also related needle stick and sharp objects injuries (Marusic et al., 2017). In Brazil, more than 80% of occupational accidents in HCW were due to percutaneous exposure showing the importance of continuous education in biosafety (Silva et al., 2009; Khalil et al., 2015) (Table 1).

HCWs play an important role in propagating information about viral hepatitis for population. Mean knowledge score was 12.21 ± 3.36 and almost half of HCW (133/49.6%) individuals had low knowledge level (score lower than 12.21). Fair level of knowledge was also observed among HCWs from Mallawi (Mtengezo et al. 2016), and Democratic Republic of Congo (Shindano et al. 2017). In Brazil, studies conducted among nursing and dental students (Maniero et al. 2012; Souza et al. 2016) demonstrated good level of knowledge what could be the reflect of few number of nurses and dentists included in the present study.

Most of participants (90.2%) knew that hepatitis B is caused by a virus, transmitted through blood contact (91.3%), blood transfusion (81.9%), sexual route (82.3%), and can be spread through sharing injection equipment, such as needles (88.7%) (Table 2). More than 55% of physicians from Manaus City (North Brazil) also recognized the mechanisms of HBV transmission while only 2.1% (7/337) of professionals of rescue and emergency care of road traffic crash victims from Nigeria correctly identified contact with infected blood and blood contaminated body fluid as routes of transmission of HBV (Gonçalves et al., 2013; Ochu et al., 2017). These differences could be attribute to health education campaigns developed to these professionals according geographical regions.

Regarding HCV, most of them knew that it is not bacteria (77.4%), cannot be spread by personal contact (60.9%), mosquitoes (85.7%) or through the air in an enclosed environment (79.3%), can lead to cirrhosis (79.3%), could be infected through unsterile tattooing (61.7%), and could not have any symptoms of the disease (68.8%) (Table 2). Joukar et al. (2017) have also found good level of knowledge in nurses from Iran about HCV transmission by unsterile tattooing and recognized that infection can lead to cirrhosis. However, few number of individuals rec-

Table 1. Knowledge and attitude of healthcare workers in relation to the demographic characteristics (n=266).

Description	Mean (SD) knowledge score toward viral hepatitis	P Value	Mean (SD) attitude score toward viral hepatitis	P Value
Age		0.595		0.174
≤30 (n=156)	12.07 (3.55)		40.11 (9.50)	
31-40 (n=59)	12.27 (3.45)		38.13 (10.33)	
≥41 (n=51)	12.67 (2.30)		36.65 (13.67)	
Gender		0.132		0.510
Male (n=128)	11.89 (3.37)		38.63 (10.62)	
Female (n=138)	12.51 (3.33)		39.48 (10.37)	
Profession		0.375		0.066
Biologist (n=30)	12.58 (3.20)		40.37 (8.93)	
Dentist (n=31)	12.35 (2.73)		43.65 (4.67)	
Nurse (n=20)	12.25 (2.95)		41.45 (12.01)	
Laboratory Technicians (n=34)	11.00 (3.62)		37.15 (14.42)	
Physicians (n=151)	12.36 (3.53)		37.97 (10.29)	
Working History		0.489		0.900
≤5 (n=156)	12.09 (3.40)		39.85 (9.85)	
6-10 (n=50)	12.53 (3.84)		39.63 (11.04)	
≥11 (n=60)	12.65 (2.36)		38.51 (8.08)	
Needle Stick Injury		0.635		0.289
Yes (n=59)	12.49 (3.10)		40.31 (8.14)	
No (n=207)	12.27 (3.24)		38.93 (10.79)	
Actualization course		0.146		0.438
Yes (n=174)	11.80 (3.31)		38.38 (10.72)	
No (n=92)	12.43 (3.37)		39.43 (10.36)	
Previous History of HBV vaccine		0.056		0.131
Yes (n=246)	12.43 (3.11)		35.71 (12.48)	
No (n=20)	10.59 (3.97)		39.44 (10.07)	

ognized that HCV is not bacterial disease and cannot be spread by mosquitoes or through air. A good level of knowledge about HCV transmission was also observed among dental students from Brazil (Souza et al. 2016).

Some deficits about hepatitis B and C knowledge were observed in the present study. Almost half of HCW (44%) did not recognize that hepatitis B is associated with an increased risk of liver cancer, 47.8% did not know that there is a treatment available for hepatitis C, 17.3% affirm that HCV is a mutation of HBV, and 24.8% thought that there is a vaccine for hepatitis C. A high proportion of nurses from Iran did not know about HCV treatment (55%) and affirm that there is a vaccine for HCV (64.9%) (Joukar et al., 2017). These data demonstrated the necessity of education campaigns regarding hepatitis C treatment and prevention.

Few number of individuals recognized the relationship between HBV and cancer. Hepatocellular carcinoma (HCC) is the 5th most common tumor in the world and the 2nd leading cause of cancer mortality (Croaq et al., 2014; Torre et al., 2015). More than 50% of liver cancers were attributable to HBV (Franco et al. 2012). The lack of knowledge of HCW about the risk of HCC in

those infected by HBV is an important issue, since HCW could increase the access of information to general population.

Mean knowledge levels were similar according age group, gender, working history and previous needle stick injury, but higher mean knowledge level was observed among those individuals with previous HBV vaccination (Table 1). This demonstrates that the access to HBV vaccination could increase the knowledge about this theme. History of HBV vaccination was related to mean knowledge score toward hepatitis B in Iranian nurses (Joukar et al., 2017).

Mean attitude score was 39.06 ± 10.47 showing high level of positive attitudes and most of them (72.6%) demonstrated positive attitudes (score = 37-60) (Table 3). High level of positive attitudes about hepatitis C were demonstrated among dental students from Brazil (Souza et al. 2016) and nurses from Ireland (Frazer et al. 2011b) while more negative attitudes were observed among HCW from Malawi (Mtengezo et al., 2016). Recently, Ishimaru et al. (2016) have found that nurses are willingness to accept contact with HBV/HCV-infected colleagues even after risk assessment has been performed. These data demonstrated that comprehensive education is important to reduce stigma and

Table 2. Health care workers' hepatitis B and C knowledge (n=266)

Statement	True n (%)	False n (%)	Don't know n (%)
Hepatitis B is caused by virus	240 (90.2)	12 (4.5)	14 (5.3)
Hepatitis B can be spread by equipment, like needle, tourniquets, spoons, filters and swabs	236 (88.7)	16 (6.0)	14 (5.3)
Hepatitis B can be spread by blood contact	243 (91.3)	13 (4.9)	10 (3.8)
Sexual transmission is a common way hepatitis B is spread	219 (82.3)	23 (8.6)	24 (9.1)
Some people with hepatitis B were infected through blood transfusions	218 (81.9)	09 (3.4)	39 (14.7)
Hepatitis B is associated with an increased risk of liver cancer	149 (56.0)	54 (20.3)	63 (23.7)
HBV is easier to catch than hepatitis C	145 (54.5)	56 (21.1)	65 (24.4)
Hepatitis C is caused by bacteria	38 (14.3)	206 (77.4)	22 (8.3)
Hepatitis C can be spread by personal contact such as kissing	65 (24.4)	162 (60.9)	39 (14.7)
Hepatitis C can be spread by mosquitoes	10 (3.8)	228 (85.7)	28 (10.5)
Hepatitis C can be spread through the air in an enclosed environment (e.g., crowded buses and elevators)	32 (12.0)	211 (79.3)	23 (8.7)
Some people with hepatitis C were infected through unsterile tattooing	164 (61.7)	27 (10.1)	75 (28.2)
Hepatitis C can lead to cirrhosis	211 (79.3)	18 (6.8)	37 (13.9)
Hepatitis C is a mutation of hepatitis B	46 (17.3)	125 (47.0)	95 (35.7)
A person can be infected with hepatitis C and not have any symptoms of the disease	183 (68.8)	27 (10.2)	56 (21.0)
There is not a pharmaceutical treatment available for hepatitis C	71 (26.7)	139 (52.3)	56 (21.0)
There is a vaccine for hepatitis C	66 (24.8)	162 (60.9)	38 (14.3)

Table 3. Health Care workers' attitude toward Hepatitis B and C

Number	Statement	Totally Agree	Agree	Don't have any idea	Disagree	Totally Disagree
1	When receiving health care, patients with viral hepatitis should be identified for safety reasons	105 (39.5)	95 (35.7)	20 (7.5)	36 (13.5)	10 (3.8)
2	All patients should be tested for viral hepatitis before they receive health care	46 (17.3)	97 (36.5)	40 (15.0)	63 (23.7)	20 (7.5)
3	I deliver the same standard of care to patients with viral hepatitis as I do for other patients	87 (32.7)	106 (39.9)	30 (11.3)	36 (13.5)	7 (2.6)
4	Following infection control guidelines will protect me from being infected with viral hepatitis at work	123 (46.3)	113 (42.5)	24 (9.0)	3 (1.1)	3 (1.1)
5	I often use additional infection control precautions when treating patients with viral hepatitis	60 (22.5)	139 (52.3)	26 (9.8)	33 (12.4)	8 (3.0)
6	I would prefer to wear two pairs of gloves when treating a bleeding person with viral hepatitis	36 (13.5)	57 (21.4)	33 (12.5)	94 (35.3)	46 (17.3)
7	I feel that I do not have the skills needed to effectively and safely treat patients with viral hepatitis	19 (7.1)	56 (21.1)	50 (18.8)	99 (37.2)	42 (15.8)
8	Health professionals who are HCV or HBV positive should be discouraged from having contact with patients	11 (4.2)	25 (9.4)	38 (14.3)	127 (47.7)	65 (24.4)
9	Patients with viral hepatitis should be given the last appointment for the day (ICG)	13 (4.9)	43 (16.2)	28 (10.5)	106 (39.8)	76 (28.6)
10	I do not like treating people with viral hepatitis	3 (1.1)	33 (12.4)	20 (7.5)	138 (51.9)	72 (27.1)
11	I am willing to treat people with viral hepatitis	2 (0.7)	53 (19.9)	23 (8.7)	135 (50.8)	53 (19.9)
12	I am willing to be infected with viral hepatitis	73 (27.4)	132 (49.6)	20 (7.5)	29 (11.0)	12 (4.5)

improve understanding about the management of HCW infected by HBV or HCV.

Subjects aging less than 30 years, females, dentists and professionals who had previous NSI demonstrated high mean of positive attitudes, although it was not statistical significant (Table 1). Dental students also demonstrated high level of positive attitudes regarding viral hepatitis (Souza et al., 2016) demonstrating that some occupation could influence the attitudes of HCW. Richmond et al. (2007) have demonstrated

that health education had a significant influence on developing positive attitudes in HCW.

In this study, a convenience sampling was used. This type of sampling is simple, economical, fast and important to give information about a population when there is no information regarding the total number of individuals in a setting. Although some kind of selection bias could happen, the present work gave valuable information to conduct other studies using random sampling.

In conclusion, almost half of HCW had low level of knowledge about HBV and HCV and some gaps were identified showing the importance of continuous viral hepatitis education to HCW in this setting.

REFERENCES

Batista SM, Andreasi MS, Borges AM, Lindenberg AS, Silva AL, Fernandes TD, Pereira EF, Basmage EA, Cardoso DD. Seropositivity for hepatitis B virus, vaccination coverage, and vaccine response in dentists from Campo Grande, Mato Grosso do Sul, Brazil. *Mem Inst Oswaldo Cruz*. 2006 May;101(3):263-7.

Carvalho P, Schinoni MI, Andrade J, Vasconcelos Rêgo MA, Marques P, Meyer R, Araújo A, Menezes T, Oliveira C, Macêdo RS, Macêdo LS, Leal JC, Matos B, Schaer R, Simões JM, Freire SM, Paraná R. Hepatitis B virus prevalence and vaccination response in health care workers and students at the Federal University of Bahia, Brazil. *Ann Hepatol*. 2012 May-Jun;11(3):330-7.

Croagh CM, Lubel JS. Natural history of chronic hepatitis B: phases in a complex relationship. *World J Gastroenterol*. 2014;20(30):10395-10404.

Delvaux N, Paula VS, Espírito-Santo MP, Silva EF, Miguel JC, Oliveira JC, Silva AS, Vieira YR, Lampe E, Villar LM 2013. Knowledge about viral hepatitis among participants of Gay Pride Event in Brazil. *Braz J Infect Dis* 17:377-8.

de Melo GB, Gontijo Filho PP. Survey of the knowledge and practice of infection control among dental practitioners. *Braz J Infect Dis*. 2000 Dec;4(6):291-5.

Franco E, Bagnato B, Marino MG, Meleleo C, Serino L, Zaratti L 2012. Hepatitis B: Epidemiology and prevention in developing countries. *World J Hepatol* 4:74-80.

Frazer K, Glacken M, Coughlan B, Staines A, Daly L 2011a. Hepatitis C virus in primary care: survey of nurses' attitudes to caring. *J Adv Nurs* 67:598-608.

Frazer K, Glacken M, Coughlan B, Staines A, Daly L 2011b. Hepatitis C virus infection in primary care: survey of registered nurses' knowledge and access to information. *J Adv Nurs* 67:327-39.

Gonçalves IC, Gonçalves MJ. Knowledge, attitudes and practices of nurses and doctors about the vertical transmission of hepatitis B. *Rev Lat Am Enfermagem*. 2013 Sep-Oct;21(5):1030-8.

Homoud AH 2014. Knowledge, attitudes and practice of primary healthcare physicians concerning the occupational risks of hepatitis B virus in Al Jouf Province, Saudi Arabia. *J Infect Public Health* 7:257-70.

Islam N, Flores YN, Ramirez P, Bastani R, Salmerón J. Hepatitis and liver disease knowledge and preventive practices among health workers in Mexico: a cross-sectional study. *Int J Public Health*. 2014 Apr;59(2):381-94.

Ishimaru T, Wada K, Arphorn S, Smith DR. Barriers to the acceptance of work colleagues infected with Hepatitis B and Hepatitis C in Japan. *J Occup Health*. 2016 Jun 16;58(3):269-75.

Jones SR, Carley S, Harrison M. An introduction to power and sample size estimation. *Emerg Med J*. 2003;20:453-8.

Joukar F, Mansour-Ghanaei F, Soati F, Meskinkhoda P 2012. Knowledge levels and attitudes of health care professionals toward patients with hepatitis C infection. *World J Gastroenterol* 18:2238-44.

Joukar F, Mansour-Ghanaei F, Naghipour MR, Hasandokht T. Nurses' Knowledge toward Hepatitis B and Hepatitis C in Guilan, Iran. *Open Nurs J*. 2017 Apr 17;11:34-42.

ACKNOWLEDGMENTS

Authors would thank to professionals that agree to participate in the study.

Khalil Sda S, Khalil OA, Lopes-Júnior LC, Cabral DB, Bomfim Ede O, Landucci LF, Santos Mde L. Occupational exposure to bloodborne pathogens in a specialized care service in Brazil. *Am J Infect Control*. 2015 Aug;43(8):e39-41.

López-Lopes GI, Coelho LP, Hornke L, Volpato AP, Lopércio AP, Cabral GB, Ferreira JL, Domingues CS, Brígido LF. Transmission of a multidrug-resistant HIV-1 from an occupational exposure, in São Paulo, Brazil. *AIDS*. 2015 Jul 31;29(12):1580-3.

Maniero VC, Goldbach T, Marques APC, Cavaretto LSP, Santos AMO, Villar LM 2012. Evaluation of the knowledge of nursing students about viral hepatitis. *J Nurs UFPE on line* 6:831-8.

Martínez-Mesa J. et al. Sample size: how many participants do I need in my research?. *An. Bras. Dermatol.*, Rio de Janeiro, v. 89, n. 4, p. 609-615, Aug. 2014.

Marusic V, Markovic-Denic L, Djuric O, Protic D, Dubljanin-Raspopovic E. Knowledge about Blood-borne Pathogens and the Prevalence of Needle Stick Injuries among Medical Students in Serbia. *Zdr Varst*. 2017 May 26;56(3):179-184.

Mtengezo J, Lee H, Ngoma J, Kim S, Aronowitz T, DeMarco R, Shi L 2016. Knowledge and Attitudes toward HIV, Hepatitis B Virus, and Hepatitis C Virus Infection among Health-care Workers in Malawi. *Asia Pac J Oncol Nurs* 3:344-351.

Ochu CL, Beynon CM. Hepatitis B vaccination coverage, knowledge and sociodemographic determinants of uptake in high risk public safety workers in Kaduna State, Nigeria: a cross sectional survey. *BMJ Open*. 2017 Jun 2;7(5):e015845.

Richmond JA, Dunning TL, Desmond PV 2007. Health professionals' attitudes toward caring for people with hepatitis C. *J Viral Hepat* 14: 624-632.

Shindano TA, Bahizire E, Fiasse R, Horsmans Y 2017. Knowledge, Attitudes, and Practices of Health-Care Workers about Viral Hepatitis B and C in South Kivu. *Am J Trop Med Hyg* 96: 400-404.

Silva JÁ, De Paula VS, Almeida AJ, Villar LM. Investigação De Acidentes Biológicos Entre Profissionais De Saúde. *Esc Anna Nery Rev Enferm* 2009 jul-set; 13 (3): 508-16.

Souza-Borges FR, Ribeiro LA, Oliveira LC. Occupational exposures to body fluids and behaviors regarding their prevention and post-exposure among medical and nursing students at a Brazilian public university. *Rev Inst Med Trop Sao Paulo*. 2014 Mar-Apr;56(2):157-63.

Souza NP, Villar LM, Moimaz SA, Garbin AJ, Garbin CA 2016. Knowledge, attitude and behaviour regarding hepatitis C virus infection amongst Brazilian dental students. *Eur J Dent Educ* Jul 21.

Torre LA, Bray F, Siegel RL, et al. Global cancer statistics, 2012. *CA Cancer J Clin*. 2015;65(2):87-108

World Health Organization. Hepatitis C, <http://www.who.int/mediacentre/factsheets/fs164/en/>; 2016 [accessed 13.08.17].

World Health Organization. Hepatitis B, <http://www.who.int/mediacentre/factsheets/fs204/en/>; 2016 [accessed 13.08.17]

Financial Disclosure

Authors have no financial interests related to the material in the manuscript.

Financial Support

This work was supported by the Foundation for Supporting the Research of Rio de Janeiro State (FAPERJ) and Brazilian National Counsel of Technological and Scientific Development (CNPq).