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RESEARCH

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Prevalência de imunidade à hepatite B entre profissionais de enfermagem atuantes em hemodiálise

Prevalence of immunity to hepatitis B among nursing professionals active in hemodialysis

Prevalencia de inmunidad a la hepatitis B entre enfermería profesional activa en la hemodiálisis

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ABSTRACT

Objective: To evaluate the prevalence of immunity to hepatitis B among nurses active on hemodialysis. **Methods:** Cross-sectional study was conducted with 63 professionals from a hemodialysis private service and 29 public service ones that answered a questionnaire containing information on demographics, labor, adoption of biosecurity measures in hemodialysis and related to vaccination, immunity and occupational exposure and non-occupational at Hepatitis B virus**. Results:** Among the professionals from the private service, the prevalence of immunity to hepatitis B was 93.7% and among the professionals in the public service, the prevalence was 86.2%; in both services were not found statistically significant differences when characteristics related to demographics, laboral and occupational and non-occupational exposure to hepatitis B were considered. **Conclusion:** Possibly these high prevalences were due to complete immunization schedule against hepatitis B found in over 80% of study participants**.**

Descriptors: Immunity active, Hepatitis B, Nursing team, Hemodialysis units hospital, Cross-sectional studies.

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RESUMO

Objetivo: Avaliar a prevalência de imunidade à hepatite B entre profissionais de enfermagem atuantes em hemodiálise. **Métodos:** Estudo seccional desenvolvido com 63 profissionais de um serviço privado de hemodiálise e 29 de um serviço público que responderam um questionário contendo informações demográficas, trabalhistas, sobre adoção de medidas de biossegurança em hemodiálise e relativas à vacinação, imunidade e exposição ocupacional e não ocupacional ao vírus da hepatite B. **Resultados:** Entre os profissionais do serviço privado, a prevalência de imunidade à hepatite B foi de 93,7% e, entre os profissionais do serviço público, a prevalência foi de 86,2%; em ambos serviços diferenças estatisticamente significativas não foram encontradas quando características demográficas, trabalhistas e de exposição ocupacional e não ocupacional ao vírus da hepatite B foram consideradas. **Conclusão:** Possivelmente essas elevadas prevalências se deviam ao esquema vacinal completo contra a hepatite B encontrado em mais de 80% dos profissionais de enfermagem participantes do estudo.

Descritores: Imunidade ativa, Hepatite B, Equipe de enfermagem, Unidades hospitalares de hemodiálise, Estudos transversais.

RESUMEN

Objetivo: Evaluar la prevalencia de inmunidad a la hepatitis B entre los profesionales de enfermería que trabajan en hemodiálisis. **Métodos:** Estudio transversal con 63 profesionales de servicio privado y 29 de servicio público que respondieron un cuestionario que contiene información demográfica, laboral, sobre la adopción de medidas de bioseguridad en hemodiálises, relacionados con la vacunación, la inmunidad, la exposición ocupacional y no ocupacional al virus de la hepatitis B. **Resultados:** Entre los profesionales del servicio privado, la prevalencia de la inmunidad a la hepatitis B fue 93,7% y entre los profesionales del público, la prevalencia fue de 86,2%; en ambos no se encontraron diferencias estadísticamente significativas cuando se consideraron los datos demográficos, laboral, exposición ocupacional y no ocupacional a la hepatitis B. **Conclusión:** Posiblemente estas elevadas prevalencias se debieron a el completo esquema de vacunación contra la hepatitis B que se encontró en más del 80% de los participantes del estudio.

Descriptores: Inmunidad activa. Hepatitis B, Grupo de enfermería, Unidades de hemodiálisis en hospital, Estudios transversales.

INTRODUCTION

Hepatitis B is an infection caused by a virus (HBV) highly infective and easily transmitted through sexual contact, mother-to-child, blood transfusion, accidents with sharp objects, sharing of syringes and tattoo and piercing equipment, medical and dental procedures and hemodialysis (HD) without the proper norms of biosafety[1]. It is estimated that hepatitis B is responsible for 1 million deaths a year worldwide, and in Brazil, at least 15% of the population have been in contact with HBV and 1% carries a chronic disease caused by it. It is worth mentioning health professionals and people undergoing HD have hepatitis B prevalence rates larger than the general population.[1-2]

The most important infectious occupational disease for health professionals is hepatitis B.[3] Percutaneous exposure or exposure of mucosa to infected individual's blood represent the main source of occupational transmission since small amounts of blood are enough to transmit the virus.[4] In addition, the high environmental resistance of the HBV associated with the fact that many health professionals infected by it do not remember being exposed to contaminated blood leads to the belief that many occupational infections result from inoculation of HBV in skin lesions or mucosa.[5]

Among health workers, nursing professionals make the category most subject to frequent exposure to HBV. This is because these professionals, in addition to composing the largest group in health services, have more straight contact with patients and engage routinely in procedures with a potential risk of exposure to blood and other corporal fluids.[6] In HD services, nursing professionals frequently engage in procedures with a potential risk of exposure to the blood of HBV-infected individuals, from direct procedures with the patient, as arteriovenous fistula puncture and catheter manipulation, to the reprocessing of HD systems.[7-8]

Considering that some studies indicate HD services as a possible source of occupational transmission of HBV,[9-10] the objective of this study was to evaluate the prevalence of immunity to hepatitis B among nursing professionals working in HD.

METHODS

A sectional study conducted among nursing professionals working in two HD services located in the city of Rio de Janeiro (Brazil): a private ambulatory, in which 70 professionals worked, and a public hospital, in which 40 worked. The eligibility criteria to participate in this study were: not to be on vacation or licensed from work and have had serologic tests documented by the HD service at most 12 months old at the time of the data collection, which took place between the months of December 2010 and January 2011. After exclusions for vacations or licenses (n = 16) and serological tests over 12 months (n = 02), the study population consisted of 92 nursing professionals.

The self-report data collection instrument used by the study was enhanced through pre-testing, in relation to the order of questions and clarity in understanding, among nursing professionals in other HD public service. In order to test its logistics, it was conducted a pilot study with 12 nursing professionals in the same HD service where pre-testing occurred. The study participants were given the data collection instrument, which contained the variables demographic characteristics (gender, age), labor (professional category, amount of time working in HD, employment bond), occupational exposure (arteriovenous fistula puncture, blood collection via HD circuit, HD catheter manipulation, HD systems reprocessing, accident involving biological material) and non-occupational exposure to the hepatitis B virus (receiving blood component, dental or surgical treatment) and for the adoption of biosecurity

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measures in HD (use of personal protective equipment - PPE), filling it at the nursing station of the service without interruption from third parties.

Besides the above information, the data collection instrument had a section devoted to information about vaccination (number of doses of vaccine against hepatitis B) and immunity (serologic titration of antibodies against the surface antigen of hepatitis B virus), which was filled by the main author of this study, based on a consultation of the vaccination schedule and the results of tests for hepatitis B of the participants who were documented in HD services where the study was conducted. Immunity to hepatitis B was classified as present when the serological titration of antibodies against this virus surface antigen (anti-HBs) was ≥ 10 IU/mL and absent when < 10 IU/ml[11].

In the analytical phase of the data, reviewing and codification of issues were held and then the information contained in the data collection instruments was typed in the Epi-Info software version 3.5.1, where univariate analyses with distribution of simple frequencies for the description of the population and also bivariate analyses were made, verifying the association between each selected independent variable of the study and the results of Anti-HBs (dependent variable), according to HD service type. Analysis of differences between proportions was based on Fisher's exact test, adopting a significance level of 0.05.

This study followed the ethical recommendations of the Resolution 466/12 of the National Health Council[12] and was approved by the Research Ethics Committee of the Anna Nery Nursing School /São Francisco de Assis Hospital School of the Federal University of Rio de Janeiro (091/2010).

RESULTS

Of the 92 nursing professionals participating in this study, 63 worked in HD private service and 29 in HD public service. In both services, about 80% of them were female and slightly more than half were between 20 and 35 years old. In the private service, 63.5% of professionals worked on hemodialysis for less than five years and only 11.1% of them were nurses. In the public service, 34.5% of professionals worked in HD for at least 10 years and 41.4% were nurses (Table 1).

Table 1 - Demographic and labor characteristics of nursing professionals working in private (n = 63) and public services (n = 29) of hemodialysis. Rio de Janeiro/RJ, 2010/2011

Variables	Private Service n (%)	Public Service n (%)
Gender		
Female	51 (81.0)	25 (86.2)
Male	12 (19.0)	04 (13.8)
Age		
20-35 years-old	36 (57.1)	16 (55.2)
36-46 years-old	18 (28.6)	06 (20.7)
> 46 year-old	09 (14.3)	07 (24.1)
Profissional category		
Nurse	07 (11.1)	08 (27.6)
Nursing technician	55 (87.3)	09 (31.0)
Nursing auxiliary	01 (1.6)	12 (41.4)
Time working in HD		
Less than 5 years	40 (63.5)	17 (58.6)
6-10 years	09 (14.3)	02 (6.9)
> 10 years	14 (22.2)	10 (34.5)

With regard to vaccination status, 14.3% of nursing professionals working in the private HD service had fewer than three doses of vaccine against hepatitis B and 10.3% of the professionals in the public service did not have this information documented. It is noteworthy that 100% of nursing professionals working in public service said they usually use personal protective equipment in HD. Further information about occupational and non-occupational exposures of participants are also in Table 2.

Table 2 - Vaccine doses against hepatitis B and occupational and non-occupational exposure to its virus in nursing professionals working in private (n = 63) and public services (n = 29) of hemodialysis. Rio de Janeiro/RJ, 2010/2011

Variables	Private Service n (%)	Public Service n (%)
Vaccine doses against hepatites B		
1-2	09 (14.3)	02 (6.9)
3	33 (52.4)	12 (41.4)
> 3	18 (28.6)	12 (41.4)
Non documented	03 (4.7)	03 (10.3)
Arteriovenous fistula puncture		
Yes	53 (84.1)	25 (86.2)
No	10 (15.9)	04 (13.8)
Blood collection via HD circuit		
Yes	54 (85.7)	28 (96.5)
No	09 (14.3)	01 (3.5)

(To be continued)

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(Continuation)

Variables	Private Service n (%)	Public Service n (%)
HD catheter manipulation		
Yes	53 (84.1)	26 (89.7)
No	10 (15.9)	03 (10.3)
HD systems reprocessing		
Yes	37 (58.7)	14 (48.3)
No	26 (41.3)	15 (51.7)
Habitual use of PPE* in HD		
Yes	61 (96.8)	29 (100)
No	02 (3.2)	-
Accident with biological material		
Yes	12 (19.1)	09 (31.1)
No	51 (80.9)	20 (68.9)
Dental/surgical treatment		
Yes	51 (80.9)	26 (89.7)
No	12 (19.1)	03 (10.3)
Receiving of blood components		
Yes	01 (1.6)	02 (6.9)
No	62 (98.4)	27 (93.1)

(To be continued)

(Continuation)

* PPE: mask, goggles, gloves and waterproof coats.

Among the nursing professionals of HD private service the prevalence of immunity to hepatitis B was 93.7%; by contrast, among the professionals in the public service, the prevalence was 86.2%. Considering both demographic and labor characteristics, there were no statistically significant differences in the prevalence of immunity to hepatitis B among the private and public services of HD (Table 3).

Table 3 - Prevalence of immunity to hepatitis B, according to demographic and labor characteristics of nursing professionals working in private (n = 63) and public services (n = 29) of hemodialysis. Rio de Janeiro/RJ, 2010/2011

Variables	Private Service		p value*	Public Service		p value*
	Anti-HBs ≥ 10 UI/ml n (%)	Anti-HBs < 10 UI/ml n (%)		Anti-HBs ≥ 10 UI/ml n (%)	Anti-HBs < 10 UI/ml n (%)	
Gender						
Female	49 (96.1)	02 (3.9)	0.160	21 (84.0)	04 (16.0)	0.532
Male	10 (83.3)	02 (16.7)		04 (100)	-	
Age						
20-35 years-old	35 (97.1)	01 (2.9)	0.206	13 (81.3)	03 (18.8)	0.383
≥ 36 years-old	24 (89.3)	03 (10.7)		12 (92.3)	01 (17.7)	
Profissional category						
Nurse	06 (85.7)	01 (14.3)	0.383	08 (100)	-	0.252
Nursing technician/ auxiliary	53 (93.8)	03 (7.4)		17 (81.0)	04 (19.0)	
Time working in HD						
Less than 10 years	45 (91.8)	04 (8.2)	0.356	16 (84.2)	03 (15.8)	0.571
> 10 years	14 (100)	-		09 (90.0)	01 (10.0)	

Fischer's Exact Test.

Concerning occupational and non-occupational exposure to the hepatitis B virus, no statistically significant differences were found in the prevalence of immunity to this virus among professionals from private and public services of HD (Table 4).

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Table 4 - Prevalence of immunity to hepatitis B, according to occupational and non-occupational exposure to its virus among nursing professionals working in private (n = 63) and public services (n = 29) of hemodialysis. Rio de Janeiro/RJ, 2010/2011

Variables	Private Service		p value*	Public Service		p value*
	Anti-HBs ≥ 10 UI/ml n(%)	Anti-HBs < 10 UI/ml n(%)		Anti-HBs ≥ 10 UI/ml n(%)	Anti-HBs ≥ 10 UI/ml n(%)	
Arteriovenous fistula puncture						
Yes	49 (96.1)	04 (3.9)	0.876	21 (84)	04 (15)	0.739
No	10 (100)	-		04 (100)	-	
Blood collection via HD circuit						
Yes	51 (94.4)	03 (5.6)	0.469	24 (85.7)	04 (14.3)	0.862
No	08 (88.9)	01 (11.1)		01 (100)	-	
HD catheter manipulation						
Yes	50 (94.3)	03 (5.7)	0.508	22 (84.6)	04 (15.4)	0.629
No	09 (90)	01 (10)		03 (100)	-	
HD systems reprocessing						
Yes	36 (97.3)	01 (2.7)	0.187	12 (85.7)	02 (14.3)	0.674
No	23 (88.5)	03 (11.5)		13 (86.7)	02 (13.3)	
Habitual use of PPE in HD						
Yes	57 (93.4)	04 (6.6)	0.876	25 (86.2)	04 (13.8)	-
No	02 (100)	-		-	-	
Accident with biological material						
Yes	11 (91.7)	01 (8.3)	0.594	09 (100)	-	0.237
No	48 (94.1)	03 (5.9)		16 (80)	04 (20)	
Dental/surgical treatment						
Yes	47 (92.2)	04 (7.8)	0.479	22 (84.6)	04 (15.6)	0.730
No	12 (100)	-		03 (100)	-	
Blood components reception						
Yes	01 (100)	-	0.934	02 (100)	-	0.730
No	58 (93.5)	04 (6.5)		23 (85.2)	04 (14.8)	

* Fischer's Exact Test

DISCUSSION

The prevalence of immunity to hepatitis B found in this study was very high: 93.7% among nursing professionals from the private service and 86.2% among HD public service professionals. A similar prevalence (80%) was described by a research conducted with 20 professionals working in the only HD service in the state of Tocantins (Brazil) in 2001. It should be noted that 90% of the professionals interviewed for this study were of the nursing team[10]. On the other hand, a study conducted with 152 professionals working in all existing HD services in the city of Goiania (Brazil) in 1998, 70.4% of them being nursing professionals, found a prevalence of immunity to hepatitis B smaller than the present study: 49.3%. However, this same study reported complete vaccination schedule against hepatitis B (3 doses) in only 59.2% of professionals.[9]

In the present study, just over 80% of both HD services nursing professionals had 3 or more doses of vaccine against hepatitis B, which helps to explain the high prevalence of immunity to HBV found. Vaccination is the safest measure for the prevention of hepatitis B and in Brazil, it is available in the National Health System for health professionals and patients with chronic kidney diseases undergoing HD, as well as for children, adolescents and adults up to 49 years.[1]

In national and international studies, the vaccination coverage against hepatitis B is highly variable among workers in the health area who work in hospital services. In a cross-sectional study developed with 369 workers of a university hospital in Sweden, only 40% had completed the vaccination schedule[13]. A survey conducted in Italy with more than 3000 public hospital workers found average vaccination coverage of 65%.[14] In Brazil, a cross-sectional study with 298 workers of a hospital in Rio de Janeiro described a prevalence of complete vaccination against hepatitis B of 56%.[15] In studies developed in HD services in Tocantins and Teresina (Piauí), the prevalence of complete vaccination schedule among health workers was 95% and 91.6%, respectively.[10,16]

Facing so diverse findings, there is an integrative review that aimed to identify the available evidence in the literature on the compliance rate to the immunization against hepatitis B by professionals and health students. This study found that the factor that contributes to better adherence to

immunization against hepatitis B is free vaccination provided by the service itself and that the factors contributing to poor adherence are discredit regarding its benefits and little investment in vaccination campaigns.[17]

Only 4.3% of nursing professionals of the HD private service and 10.7% of public service workers had no information on the vaccination schedule against hepatitis B documented. As HD services are considered occupational risk environments for the transmission of HBV it is likely that this low frequency of no documentation is due to the concern of such services to maintain a vaccination record system of its current employees to facilitate the control of immunity.

There were no significant statistical differences found by this study in the prevalence of hepatitis B immunity among professionals of both services when demographic and labor characteristics and occupational and non-occupational HBV exposure were considered. It is noteworthy, however, the high prevalence of occupational exposures to HBV at work in HD: just over 80% for arteriovenous fistula puncture, blood collection via HD circuitry and HD catheter manipulation; and about 50% for reprocessing of HD systems.

The risk of exposure to HBV during arteriovenous fistula puncture occurs due to the ease of sticking one's finger while puncturing it, as well as during the disposal of the used needle. Furthermore, there is a risk of spilling blood on the professional, due to the high pressure of the fistula. Accidents with blood can also occur during HD catheter manipulation and the reprocessing of its systems, which are washed for removal of blood clots.[8]

For occupational exposures to HBV to be prevented the use of PPE is required (goggles, mask, gloves and waterproof coats). This study found prevalence of regular use of this equipment of 96.8% among HD private service nursing professionals and 100% among professionals in the public service. It is possible that the adoption of the PPE has not been 100% in both services because nursing professionals who work in HD services often explain non-adherence to the equipment reporting a lack of practice and discomfort, and complain of overwork and lack of time to wear it.[18-19]

It should be noted that although this study has limitations, such as the possibility of the occurrence of recall bias, as well as having been carried out in only two HD services in the city of Rio de Janeiro, as the study design was appropriate for its purpose and as the losses were small (n = 18; 16.4%), it is considered that the investigated sample was adequate to estimate the prevalence of immunity to hepatitis B among nursing professionals working in HD services where it was developed.

CONCLUSION

The prevalence of immunity to hepatitis B in this study was high: 93.7% of the HD private service nursing professionals and 86.2% among professionals in the public service. It is possible that these prevalence rates are due to the full vaccination schedule for hepatitis B found in more than 80% of participant nursing professionals.

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