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Prevalence and risk factors for hepatitis B and C viruses in patients with leprosy

J.E.F. Costa[a], V.M.S. Morais[b], J.P. Gonçales[b], D.M. Silva[b], M.R.C.D. Coêlho[b,c,*]

[a] Health Sciences Center, Federal University of Pernambuco, Av. Prof. Moraes Rego, 1235, Cidade Universitária, 50670-901, Recife, Pernambuco, Brazil
[b] Virology Sector, Keizo Asami Immunopathology Laboratory, Federal University of Pernambuco, Av. Prof. Moraes Rego, 1235, Cidade Universitária, 50670-901, Recife, Pernambuco, Brazil
[c] Department of Physiology and Pharmacology, Center for Biosciences, Federal University of Pernambuco, Av. Prof. Moraes Rego, 1235, Cidade Universitária, 50670-901, Recife, Pernambuco, Brazil

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ABSTRACT

It has been reported a higher seroprevalence of HBV and HCV in leprosy patients than in the general population, but the reasons for these findings are not yet clear. On the other hand, there is evidence that these viruses may influence the onset of leprosy reactional episodes, an important cause of neurological sequelae. This study aimed to determine seroprevalence and risk factors for HBV and HCV in leprosy patients and to investigate its association with leprosy reactions. Patients attended from 2015 to 2016 at a Reference Center in Leprosy in Northeastern region of Brazil, were interviewed, had their records reviewed to investigate biological, clinical, behavioral and socioeconomic factors, and underwent blood sample collection. Biological samples were tested for HBV (HBsAg, anti-HBs and anti-HBs) and HCV (anti-HCV) serological markers by ELISA and, in anti-HCV positive samples, HCV RNA was screened by real time PCR. SPSS program was used to analyze the data. A total of 403 leprosy patients were included. Although anti-HBc was positive in 14.1%, there was no detection of HBsAg, which contradicts the hypothesis that leprosy patients have immune deficit that make them more prone to chronic HBV infection. Multibacillary leprosy (0.057), health-related work (0.011) and lower educational level (0.035) were associated with anti-HBc positivity. Anti-HCV was positive in 0.5%, with no detection of HCV RNA. No association was identified between anti-HCV and the epidemiological analyzed factors. There was also no association of anti-HBc or anti-HCV with type 1 or type 2 leprosy reactions. Thus, the seroprevalence of HBV and HCV in leprosy patients was similar to that of the general population of Northeastern region of Brazil, and no association of HBV or HCV with leprosy reactions was observed.

1. Introduction

Studies have reported higher seroprevalence of hepatitis B virus (HBV) and hepatitis C virus (HCV) in leprosy patients compared to the general population (Rosa et al., 1992; Banerjee et al., 1994; De Moraes Braga et al., 2006; Ramos et al., 2011; Leitão et al., 2014). The causes of these findings are not yet clear. Some authors suggest that cellular immune deficiency of leprosy, especially of disseminated clinical forms, would make patients more vulnerable to these viruses (Blumberg et al., 1967; Banerjee et al., 1994; De Moraes Braga et al., 2006; Leitão et al., 2014). However, other authors suggest that the higher seroprevalence of HBV and HCV reported in leprosy patients may be related to greater exposure to risk factors for virus aquisition, and not to immunological characteristics (Ramos et al., 2011).

As for these risk factors, there is evidence that institutionalization in leprosariums is associated with HBV and HCV markers positivity (Rosa et al., 1992; De Moraes Braga et al., 2006; Machado et al., 2012; Leitão et al., 2014). Socioeconomic or behavioral factors, related to social segregation and to the negative impact of leprosy and its sequelae on the patient's life, although not sufficient investigated previously, may also be associated with the increased risk of acquisition of these viruses by leprosy patients, similarly to what occurs in the general population (Pereira et al., 2009; Pereira et al., 2013; WHO, 2015).

In addition, it was reported an association between HBV or HCV markers and type 1 leprosy reaction, neuritis and neural function deficit, suggesting that immune alterations induced by the presence of HBV or HCV could negatively influence the course of leprosy (Rego et al., 2007; Machado et al., 2012; Machado et al., 2015).

* Corresponding author at: Rua Manoel Lubambo, 118, Afogados, 50 850-040, Recife, Pernambuco, Brazil.
E-mail addresses: joanne_ferraz@yahoo.com.br (J.E.F. Costa), vivi.martha@hotmail.com (V.M.S. Morais), julianapgoncales@gmail.com (J.P. Gonçales), dmufpe@outlook.com (D.M. Silva), rcoelholika@gmail.com (M.R.C.D. Coêlho).

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Table 1
Frequency of biological and clinical factors, according to anti-HBc positivity, in patients with leprosy of a Reference Center in Brazil, period 2015–2016.

	Anti-HBc						*p* value
	No		Yes		Total		
	N	%	N	%	N	%	
Age (years)							
7–25	42	12.1	9	15.8	51	12.7	
26–45	134	38.7	13	22.8	147	36.5	
46–65	138	39.9	24	42.1	162	40.2	
66–86	32	9.2	11	19.3	43	10.7	0.035*
Biological sex							
Male	211	61.0	38	66.7	249	61.8	
Female	135	39.0	19	33.3	154	38.2	0.413*
Operational classification							
Multibacillary	274	79.2	52	91.2	326	80.9	
Paucibacillary	72	20.8	5	8.8	77	19.1	0.032*
History of leprosy reaction[a]							
Only type 1	83	41.1	19	45.2	102	41.8	
Only type 2	39	19.3	12	28.6	51	20.9	
Type 1 and type 2	42	20.8	5	11.9	47	19.3	
Never have	38	18.8	6	14.3	44	18.0	0.335*
History of surgery							
No	157	45.4	26	45.6	183	45.4	
Yes	189	54.6	31	54.4	220	54.6	0.973*
History of hospitalization							
No	178	51.4	30	52.6	208	51.6	
Yes	168	48.6	27	47.4	195	48.4	0.868*
History of blood transfusion							
No	308	89.0	54	94.7	362	89.8	
Yes	38	11.0	3	5.3	41	10.2	0.186**
History of institutionalization[b]							
No	338	97.7	56	98.2	394	97.8	
Yes	8	2.3	1	1.8	9	2.2	1.000**

[a] In patients who have already completed polychemotherapy.
[b] In leprosariums, sanatoria or penitentiaries.
* Chi-square test was used.
** Fisher's exact test was used.

Considering the disagreements on the existence or not of a greater vulnerability of leprosy patients to HBV and HCV, this cross-sectional study aimed to determine the HBV and HCV seroprevalence in patients with leprosy in Northeast of Brazil, country with the second highest prevalence of this disease in the world. It also aimed to identify risk factors for these coinfections and investigate if there is an association between HBV or HCV and leprosy reactions.

2. Materials and methods

Between February 2015 and January 2016, leprosy patients attending the dermatology outpatient clinic of a Reference Center in Paraíba, Northeastern of Brazil, were invited to participate in the study, by signing an informed consent form, being interviewed for research on risk factors for HBV and HCV, including behavioral and socioeconomic factors. In addition, clinical data were obtained from medical records. History of leprosy reaction was analyzed only in patients who concluded polychemotherapy. Samples of 8 mL of blood were collected from patients and transported to the Virology Sector of Keizo Asami Immunopathology Laboratory (LIKA), Federal University of Pernambuco (UFPE), to investigate HBV and HCV markers by enzyme-linked immunosorbent assay (ELISA), using commercial kits HBsAg ELISA (Wiener, Argentina), Bioelisa anti-HBc and anti-HBs (Biokit, Spain) and anti-HCV Murex (Diasorin, Italy). The sample size was calculated based on seroprevalence and risk factors studies (Ramos et al., 2011; Leitão et al., 2014), using Epi Info 7 program (CDC, USA).

Table 2
Frequency of behavioral and socioeconomic factors, according to anti-HBc positivity, in patients with leprosy of a Reference Center in Brazil, period 2015–2016.

	Anti-HBc						*p* value
	No		Yes		Total		
	N	%	N	%	N	%	
History of acupuncture, tattooing or piercing							
No	303	87.6	51	89.5	354	87.8	
Yes	43	12.4	6	10.5	49	12.2	0.684*
History of drug use[a,b]							
No	321	94.1	56	98.2	382	94.8	
Yes	20	5.9	1	1.8	21	5.2	0.335**
Have iniciated sexual life[b]							
No	13	3.8	4	7.0	17	4.2	
Yes	328	96.2	53	93.0	381	95.7	0.283**
History of sexually transmitted infection[b]							
No	312	91.5	54	94.7	366	92.0	
Yes	29	8.5	3	5.3	32	8.0	0.598**
Number of sexual partners in the last year[b]							
0	93	27.3	18	31.6	111	27.9	
1	239	70.1	36	63.2	275	69.1	
2 or more	9	2.6	3	5.3	12	3.0	0.411*
Health-related job							
No	341	98.6	54	94.7	395	98.0	
Yes	5	1.4	3	5.3	8	2.0	0.089**
Years of study concluded							
0–9	260	75.1	50	87.7	310	76.9	
10 or more	86	24.9	7	12.3	93	23.1	0.037*

[a] Inhaled, injectables or in the form of a cigarette (marijuana).
[b] For patients aged 13 years and over.
* Chi-square test was used.
** Fisher's exact test was used.

Table 3
Multivariate analysis of the association of epidemiological factors with anti-HBc positivity in leprosy patients at a Reference Center in Brazil, period 2015–2016.

	Anti-HBc					
	Total	Yes				
		N	%			
Operational classification						
Multibacillary	326	52	16.0	1.00	–	
Paucibacillary	77	5	6.5	0.38	0.14–1.03	0.057
Health-related job						
No	395	54	13.7	1.00	–	
Yes	8	3	37.5	8.28	1.62–42.18	0.011
Years of study concluded						
0–9	310	50	16.1	1.00	–	
10 or more	93	7	7.5	0.37	0.15–0.93	0.035

OR: odds ratio.
CI: confidence intervals.

The sample number (203 patients) obtained in the calculation was almost doubled to increase the statistical power of analysis of associated factors. SPSS program, version 13.0 (SPSS Inc., USA) was employed to data analysis. Univariate analysis was performed using Chi-square test or Fisher's exact test and the associated factors ($p < 0.2$) were included in initial model of multivariate analysis, from which, by backward method, the final model was obtained. The study was approved by the Research Ethics Committee of the Health Sciences Center of UFPE, under the number CAAE 31249014.0.0000.5208.