

Hepatitis B and C in a Brazilian deaf community

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ABSTRACT

Introduction: Although deaf people are exposed to hepatitis B and C risk factors, epidemiological studies regarding these diseases in deaf people are lacking. **Methods:** After watching an explanatory digital versatile disc (DVD) in Brazilian Sign Language, 88 deaf people were interviewed and tested for hepatitis B surface antigen (HBsAg), hepatitis B surface antibody (anti-HBs), hepatitis B core antibody (anti-HBc), and hepatitis C virus antibody (anti-HCV). **Results:** The prevalence of hepatitis B markers was 8%; they were associated with incarceration and being born outside the State of São Paulo. No cases of hepatitis C were identified. **Conclusions:** Participants showed a substantial lack of knowledge regarding viral hepatitis, indicating a need for public policies that consider linguistic and cultural profiles.

Keywords: Epidemiology. Hepatitis B and C. Deafness.

The World Health Organization estimates that approximately 360 million people worldwide have hearing disorders⁽¹⁾. Because of barriers to communication, hearing impairment contributes to an individual's marginalization in daily life, by limiting socialization as well as access to good education, health information, and health services⁽²⁾.

This marginalization is also evident in the lack of scientific research involving deaf people. However, studies regarding acquired immunodeficiency syndrome (AIDS) and its risk factors among deaf individuals show serious deficiencies in their understanding of human immunodeficiency virus (HIV) transmission and preventive care. Considering the similar routes of transmission for HIV and hepatitis, it is likely that understanding of viral hepatitis is also lacking; however, there are surprisingly few studies regarding this topic in the major medical databases, in which deafness is usually considered as a disease complication or medication side effect^{(3) (4)}. Thus, there are no epidemiological studies addressing the distribution of and risk factors for hepatitis B and C among the deaf, which is a major obstacle to establishing preventive measures tailored to this group.

We conducted a cross-sectional study involving adult deaf attendees of the Deaf Association of Ribeirão Preto (DARP). Participants were shown a digital versatile disc (DVD) with

material about viral hepatitis B and C presented in Brazilian Sign Language [*Língua Brasileira de Sinais* (LIBRAS)]. The DVD was created specifically for this study and included two professionals acting simultaneously; one half of the screen showed a medical doctor orally explaining the two diseases, while the other half showed the LIBRAS teacher translating the material into sign language. The validity of the DVD was assessed by a member of the deaf community, who was also a certified teacher of LIBRAS.

Individuals who agreed to participate signed an informed consent form, after which they were asked to complete a questionnaire containing demographic and socioeconomic information as well as risk factors for hepatitis B and C. A 10-mL blood sample was collected from each participant and tested for the serological markers hepatitis B surface antigen (HBsAg), hepatitis B core antibody (anti-HBc), hepatitis B surface antibody (anti-HBs), and hepatitis C virus antibodies (anti-HCV) using immunoenzymatic techniques [enzyme-linked immunosorbent assay (ELISA)], manufactured by Abbot Laboratories) at the Laboratory of the Clinical Hospital of Ribeirão Preto Medical School (CHRPMS). Positive results for HBsAg were confirmed using molecular biology tests.

When it became clear that we would not be able to access the vaccination records of several participants, we conducted a search in the Hygia System (used by the Ribeirão Preto municipal health network) during the final phase of the research to identify any information regarding prior immunization against hepatitis B in participants with only the anti-HBs marker.

Data were coded and entered into a database using the Epi-Data package (EpiData Association, Odense Denmark 2002. v3.0). Social stratification of participants was conducted using the

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Brazilian Economic Classification Criterion⁽⁶⁾. Risk factors were investigated using a logistic regression model in which the odds ratios (ORs) of the different variables were adjusted for age and sex only, because the small sample prevented the convergence of the model when the other variables were included. Significance was set at $p \leq 0.05$.

This project was approved by the CHRPMS Ethics and Research Committee (case no. 9492/2011). Additional approval was obtained for the search in the Hygia system.

A total of 88 people were studied. The median age of the participants was 35 years (range, 19-78 years). A maximum of up to 4 years of education was reported by 34 (38.6%) participants, and only 9.1% had some college education. Only four (4.5%) individuals were classified in the high social stratum, while 34 (38.6%) were classified in the lowest social stratum.

Serological markers for current or past hepatitis B infection were present in seven participants (8%, 95% CI: 2.3-13.7). In two of these participants, both HBsAg and anti-HBc were present, indicating a likely current infection (2.3%, 95% CI: 0.0-5.4). There was only one suspected case of hepatitis C infection on the ELISA test, which was subsequently eliminated by the hepatitis C virus-polymerase chain reaction (HCV-PCR) test.

Of the typical risk factors for hepatitis B and C (**Table 1**), the most commonly reported were presence of tattoos and ≥ 2 sexual partners over the previous 6 months, followed by current or past intravenous drug use and incarceration. Previous blood transfusions were reported by two (2.3%) participants. The univariate analyses revealed an association between hepatitis B infection and a previous blood transfusion, incarceration, and being born outside the State of São Paulo. The variables

TABLE 1 - Logistic regression analysis of the association between hepatitis B and risk factors in the DARP, São Paulo, Brazil, 2013.

Variable	Total	Number	Percentage	Total OR (95% CI)	p	Adjusted OR (95% CI)*	p
Sex							
M	50	4	8.0	Ref.			
F	38	3	7.9	1.1 (0.2-5.2)	0.99		
Age (years)							
19-34	41	2	4.9	Ref.			
≥ 35	47	5	10.6	2.3 (0.4-25.5)	0.32		
Transfusion							
no	86	6	7.0	Ref.			
yes	2	1	50.0	13.3 (0.1-1059)	0.02	16.7 (0.7-370)	0.075
Tattoos							
no	79	5	6.3	Ref.			
yes	9	2	22.2	4.2 (0.3-31.9)	0.09	4.3 (0.7-27.6)	0.122
Intravenous drug use							
no	84	6	7.1	Ref.			
yes	4	1	25.0	4.3 (0.7-63.3)	0.23	3.3 (0.3-40.4)	0.354
Incarceration							
no	84	5	5.9	Ref.			
yes	4	2	50.0	15.8 (1.8-242)	0.01	18.6 (1.5-240)	0.025
Economic strata							
A, B, and C1	54	2	3.7	Ref.			
C2 and D	34	5	14.7	4.5 (0.7-48.9)	0.06	4.1 (0.7-22.7)	0.111
Birthplace							
State of São Paulo	63	2	3.2	Ref.			
other states	25	5	20.0	7.6 (1.1-83.6)	0.01	7.2 (1.3-40.7)	0.026
Sexual partners (≥ 2)							
no	79	5	6.3	Ref.			
yes	9	2	22.2	4.2 (0.3-31.9)	0.09	4.3 (0.7-27.6)	0.122

DARP: Deaf Association of Ribeirão Preto; **OR:** odds ratio; **CI:** confidence interval; **M:** male; **F:** female; *The adjusted ORs were adjusted for age and sex.

having tattoos, belonging to a lower economic stratum, and having two or more sexual partners in the previous six months were not statistically significant. In the logistic regression analysis controlled for age and sex, the variables associated with the presence of hepatitis B markers were a history of incarceration ($p = 0.025$) and being born outside the State of São Paulo ($p = 0.026$). A previous blood transfusion was borderline significant ($p = 0.075$).

The DARP is a public service entity that has been the only source of public support for the local deaf community since 1972. The deaf community meets there on Saturday afternoons for educational and leisure activities. Based on the available records from the DARP, we initially planned to include approximately 200 participants, which is the estimated number of members. However, the total number of participants was 88, or 44% of our original estimate, which comprises a margin of error of 8% in the prevalence estimates, with a 95% confidence level. Some explanations for this low response include incomplete death records, outdated addresses, and low attendance by some members during the six days of data collection. In an attempt to partially circumvent this limitation, we conducted a seventh blood collection in a health unit located next to the Ribeirão Preto bus station, where part of the deaf community meets on a daily basis. Approximately 30 potential participants who were Jehovah's Witnesses refused to participate.

Communication is a major barrier to information for the deaf, in Brazil^{(6) (7)} and elsewhere⁽⁸⁾. In the present study, we observed a significant lack of knowledge in the deaf community regarding the forms of viral hepatitis, associated risk factors, forms of prevention, and availability of an effective vaccine in the public health system.

The prevalence of all hepatitis B markers was 8% [95% CI (confidence interval): 2.3-13.7], and the prevalence was 6.8% (95% CI: 4.1-9.5) for anti-HBc specifically, similar to that reported in a recent study of the population of all Brazilian capitals (7.4%, 95% CI: 6.8-8.0)⁽⁹⁾. Therefore, even with the difficulties in achieving high levels of information about health issues and the presence of risk factors, the levels of hepatitis B infection in the deaf community were no different to those in the general population of the Brazilian capitals.

Some well-known risk factors for both hepatitis B and C, such as past blood transfusions, tattoos, intravenous drug use, poverty, and multiple sexual partners^{(10) (11) (12)} were reported more frequently by participants with positive markers. However, there were no significant associations with hepatitis B, which is likely due to the small sample.

Two variables remained associated with the risk of hepatitis B in the adjusted logistic regression analysis: history of incarceration and being born outside the State of São Paulo. The role of imprisonment has been extensively studied in different locations^{(13) (14)} and is attributed to a range of associated behaviors, habits, and practices that might precede and result in imprisonment. Prisoners are usually exposed to all types of violence, illicit drugs, tattoos, and risky sexual practices⁽¹⁵⁾, making them vulnerable to hepatitis B infection.

Due to the proximity, most participants from outside São Paulo originated from the State of Minas Gerais, where the prevalence was 18.2%. These are likely individuals with lower economic means who come to the Clinical Hospital for treatment and migrate to richer regions for survival. Although these values did not reach significance after adjusting for sex and gender, we observed higher rates of hepatitis B among individuals from lower economic strata.

Only one serum sample tested positive for hepatitis C, but the molecular biology test (PCR) then yielded a negative result. This was unexpected because the studied population reported risky behaviors throughout the interviews. In particular, the use of illicit intravenous drugs, which are strongly associated with hepatitis C, was reported by four (4.5%) participants and almost certainly withheld by others, based on the opinion of the professional who conducted the interviews and has had extensive contact with this population over several years. This may be due to the low rate of needle or syringe sharing, as reported by the participants.

One important limitation of our research was the difficulty with reliably communicating with a deaf population on matters about which most individuals lacked basic knowledge, even though our interviews were conducted exclusively by a professional who was highly trained in LIBRAS. Furthermore, we used an informative DVD on hepatitis B and C, which was carefully designed for deaf individuals who lip-read as well as use LIBRAS for communication.

The difficulty in communicating with the deaf could explain the lack of epidemiological studies regarding viral hepatitis in deaf populations. We found no studies when we conducted a search in Medline and Scientific Electronic Library Online (SciELO) using the following terms: *viral hepatitis, hepatitis B, hepatitis C, epidemiology and deaf/deafness, hard of hearing*. In the few studies that were found, deafness was treated as a side effect of drugs used in treatment, and the epidemiological profile, prevalence, or risk factors associated with hepatitis were not explored. However, the hypothesis that communication difficulties with the deaf population could explain the lack of hepatitis research is difficult to support given the reasonable number of epidemiological studies investigating AIDS in the deaf population. Some of these studies were useful for the current work because of the similar risk factors for the diseases, particularly for the hepatitis B virus. Considering that the epidemiology of hepatitis B and C has been extensively studied in different population groups in many different countries, the reason for the complete absence of these studies among the global deaf population remains unknown. Therefore, to the best of our knowledge, this is the first epidemiological study of hepatitis B and C in the deaf community. Despite its limitations, this research contributes to the understanding of the epidemiology of these diseases in a population that is socially marginalized and has limited access to health information and services.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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