

## PREVALENCE OF HEPATITIS A, B AND C AND USE OF INFECTION CONTROL PROCEDURES BY DENTAL HEALTH CARE WORKERS IN SALVADOR, BAHIA, BRAZIL

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**Aims:** Investigate the prevalence of hepatitis A, B and C and use of infection control procedures by dental health care workers. **Methods:** 284 dentists were submitted to hepatitis prevalence serologic analysis and answered a questionnaire about infection control practices. **Results:** three dentists were anti-HAV IgM positive. Anti-HBc was positive in 19 dentists, and one was positive for HBsAg and anti-HBs. Three were Hepatitis C positive without co-infection with hepatitis B. Seventy-three (25.7%) had anti-HBs lower than 10UI/L. **Infection control procedures:** 144 dentists (50.7%) used eyes wear protection. Most frequent sterilization method was dry heat (77.1%), followed by autoclaves (62.7%). Only 11.2% had sufficient number of hand pieces to allow sterilization between patients. **Conclusions:** This study indicates a need for interventions in order to improve safe work in dental practices, hepatitis A and B vaccination programs, HBV post-immunization serology tests and use of protection equipment.

**Key words:** Hepatitis A, Hepatitis B, Hepatitis C, blood-born viruses, control infection practices.

*Objetivo: Investigar a prevalência de hepatite A, B e C e uso de procedimentos de controle de infecção por dentistas. Método: 284 dentistas submeteram-se à análise da prevalência de hepatite e responderam questionário sobre controle de infecção. Resultados: três dentistas foram anti-HAV IgM positivos. Anti-HBc foi positivo em 19 dentistas, e um positivo para HBsAg (0,4%) e anti-HBs. Três foram positivos para Hepatite C, sem co-infecção com hepatite B. Setenta e três (25,7%) tiveram anti-HBs menor que 10UI/L. Procedimentos de controle de infecção: 144 dentistas (50,7%) usam protetores oculares. O método mais freqüente de esterilização foi estufa (77,1%), seguida por autoclaves (62,7%). Apenas 11,2% têm número suficiente de instrumentos que permitam esterilização no intervalo entre pacientes. Conclusões: Este estudo indica a necessidade de intervenções para aumentar a biosegurança na prática odontológica, programas de vacinação para hepatite A e B, a prática de controle sorológico pós-imunização para HBV e uso de equipamentos de proteção individual. Palavras-chave: Hepatite A, Hepatite B, Hepatite C, Vírus sanguíneos, Controle de infecção.*

Dental Care workers may be exposed to blood, oral fluids and tissues. Percutaneous injury is the most frequent via for diseases transmission such as hepatitis C (HCV), hepatitis B (HBV) and human immunodeficiency virus (HIV)<sup>(13)</sup>. Considerable interest has arisen in improving infection control in dentistry over the last decades and the increase of universal precautions adherence by dental staff has reduced the possibility of infections from dental care workers to patients, which is considered very small in some countries<sup>(12)</sup>.

However, the adherence to precautions by dental care workers in poor or developing nations is still very controversial. In Rio de Janeiro, Brazil, practices and attitudes of senior dental students about infection control procedures in 6 universities were analyzed and the authors observed a need for intervention to improve safe work practices and Hepatitis B post-immunization serology evaluation. Although 90.8% of students had been vaccinated for hepatitis B, only

25.0% have been assessed for anti-HBs. Among their instructors, it was observed that 60.2% of them did not use gloves for all procedures and 43.4% of those didn't change gloves between patients<sup>(14)</sup>. All around the world, the use of control infection practices among dentists is still very deficient and some dentists are not familiar with the universal-standard precautions, need for educational efforts and hepatitis B immunization. The use of protection equipments, including gloves, is very low. In some cases, gloves were washed and used again and contaminated surfaces were not disinfected<sup>(4, 11)</sup>.

A survey was conducted among 299 dentists in southeast Brazil, using a self-administered questionnaire to evaluate the hepatitis B vaccination prevalence. Of the participants, 74.9% received three doses of HBV vaccine, 14% two doses, 2% a single doses and 10% were not vaccinated. The main reason reported for not being vaccinated or incomplete vaccination was the need of more information about vaccination. Besides, incomplete vaccination was positively associated with non-use of gloves which emphasizes the urgency of vaccination programs against HBV in Brazilian dentists<sup>(8)</sup>.

Since, in dental health care procedures, both workers and patients are exposed to various infectious agents, it is essential that all dental staff have a good knowledge of infection diseases and about disinfection system to reduce the risk of cross infection during their practice. In the United States, a recent survey has shown that although there has been an improvement in compliance with recommended infection

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control guidelines, the majority of dental hygienists surveyed reported altering infection control practices and treatment techniques when treating patients infected with HIV or hepatitis virus<sup>(6)</sup>.

Considering few data about prevalence of hepatitis A, B and C infection in Brazilian dentists and the use of practice guideline to minimize cross-infection during their practice, the objectives of this study were to investigate the prevalence of hepatitis A, B and C and the use of infection control procedures by dental health care workers in Salvador, Bahia, Brazil.

### Material and Methods

A total of 284 dentists have participated of this study during Hepatitis Prevention Program by Regional Council of Dentistry, Federal University of Bahia and the Health Ministry of the City Hall of Salvador in 2002. All of the 284 dentists have answered an anonymous questionnaire about control infection practices and have donated blood sample for hepatitis prevalence analysis. The study was submitted and approved by the Ethical Committee of Research with Humans from Bahia Foundation to Science Development (FBDC) n° 62/2005, following the procedures determined by the 196 Resolution and the Helsinki Declaration.

The epidemiologic results of serology tests and the control infection practice questionnaire data were analyzed by Epi Info™ Version 3.4.3 (CDC, 2007). Probabilities were assessed for 95% significance, corresponding P-values <0.05 as significant. Differences in proportions were compared using chi square ( $\chi^2$ ) analysis. Blooding samples were tested at the laboratory of Immunology in The Science and Health Institute of Federal University of Bahia, using commercially available assays for the following markers to evaluate Hepatitis infection.

#### Hepatitis A Screening

Competitive Enzyme immunoassays for determination of antibodies to hepatitis A virus (EIAgen Anti-HAV Kit/Adaltis) and for determination of IgM class antibodies to HAV (EIAgen Anti-HAV IgM kit/Adaltis) in serum were used.

#### Hepatitis B Screening

IMMUNOLITE 2000 Anti-HBc kit was used for qualitative detection of total antibodies against hepatitis B core antigen, anti-HBc, in serum. A third generation assay (HBs Micro EIA) for the semi quantitative determination of hepatitis B surface Antigen (HBsAg) was used, and for detection of anti-HBs, the quantitative test, Anti-HBs DIASORIN.

#### Hepatitis C Screening

To evaluate HVC prevalence in serum, Competitive Enzyme immunoassays for determination of antibodies to hepatitis C virus (Detect ® 3.0), were used in this study and all positive samples were retested.

All participants were notified of the results and the ones that course with chronic infection will be followed by the

Gastroenterology Service of Edgar Santos University Hospital (HUPES) in Salvador, Bahia.

### Results

Of 248 dentists who participated in the study, 71 (25%) were males and 213 (75%) were female. The average age of the dentists was 37 years (range from 22 – 62 years) with standard deviation of 10.6 years. All serology results are summarized in Table 1.

**Table 1.** Frequency of hepatitis serology (%).

Serology	N (+/total)	%
Anti-VHA (+)	234/284	82.4
Anti-VHA IgM (+)	3/284	1.1
Anti-HBc (+)	19/284	6.7
AgHBs (+)/ Anti-HBs (+)	1/284	0.4
Anti-VHC (+)	3/284	1.1

Considering serology analyses, 234 (82.4%) individuals were positive for anti-HVA, and 50 (17.6%) were negative. Interestingly, three individuals (1.1%) were anti-HVA IgM positive and of these, one had an isolated positive result for IgM. Antibody to hepatitis B core antigen or anti-HBc was positive in 19 dentists (6.7%). One participant was both positive for HBsAg (0.4%) and anti-HBs. Of the 284 dentists, 73 (25.7%) had anti-HBs lower than 10UI/L, which represents no immune response to HBV. Only 3 dentists (1.1%) were Hepatitis C positive and there was no co-infection with hepatitis B in those individuals.

The frequency of use of personal protective equipment, sterilization method and Hand-pieces numbers are described in Table 2. Only 144 dentists (50.7%) wear eyes protection and 215 (75.7%) use hair coverings during dental practice. The most frequent sterilization method was dry heat (77.1%), followed by autoclaves (62.7%). Only one dentist (0.4%) disinfected impressions before sending it to dental laboratories. Considering those who had autoclaves, only 11.2% of them had a sufficient number of hand pieces to allow sterilization between patients.

### Discussion

Usually, the clinical course of hepatitis A is self-limited with no chronic liver disease, and life-long immunity for those that have been infected. Considering Salvador as an endemic area for HAV and the fecal-oral transmission route, the prevalence of anti-HAV positive individuals (82.4%) denotes past and resolved infection. However, effective vaccine to prevent HAV infection is now available and strongly recommended for health workers. Although anti HAV vaccination is not universally available yet in the Brazilian public health system, it is expected that health care workers at high risk for oral-fecal transmitted diseases must be concerned about it. Despite health education programs on viral hepatitis prevention, 17.6% of the individuals tested were negative for anti HAV IgG. Moreover, three of them tested positive for anti

**Table 2.** Frequency of the use of Personal protective equipment, sterilization method and hand-pieces number (%).

Variable	N (+/total)	%
<b>Frequency of the use of Personal protective equipment</b>		
Gloves	282/284	9.3
Mask	266/284	93.7
Eye wear	144/284	50.7
Gown	284	100
Hair coverings	215/284	75.7
<b>Sterilization method</b>		
Dry heat	219/284	77.1
Autoclave	178/284	62.7
Chemical sterilization	172/284	60.6
<b>Hand-pieces number</b>		
1  —  31	59/284	88.8
4  —  5	14/284	7.8
6  —  9	6/284	3.4

HAV IgM, what strongly suggest that they have asymptomatic acute hepatitis A or had a recent infection<sup>(16)</sup>. In both situations, these care workers could transmit the disease to their patients. This finding deserves discussion about implementation of anti HAV vaccination for health care workers in Brazil and others high endemic countries.

Among dentists anti-HBc IgG positive, all of them were also anti-HBs positive, which indicates that those individuals had a past and resolved infection. Unfortunately, this study could not establish if the HBV infection was related to the profession<sup>(1)</sup>.

One dentist was both positive for HBsAg (0.4%) and anti-HBs. That serological profile is described in some HBV carriers and could be explained by a false positive result or a HBV mutation, mainly a escape variant to the HBV vaccine.

Vaccination coverage against HBV was not completely effective in all dentists analyzed. At least 25.7% had low titers of anti HBs, despite of having taken the three vaccine doses. However, they had no evidence of chronic HBV infection (HBsAg and anti-HBc positivity). This finding reinforces the necessity to check anti HBs titers in health care workers after vaccination against Hepatitis B. In Brazil, HBV vaccine is easily available to this population, but there is no institutional mechanism to check the efficacy of vaccination.

Hepatitis C serum prevalence among dentists was higher than the prevalence in southeast of Brazil which was 0.4% and lower than reported in Amazonian health care workers<sup>(9, 15)</sup>.

In dentistry, blood-borne infections are likely to be transmitted via many types of equipment, such as air-driven hand-pieces. Regarding various methods for sterilizing dental instrumentals, pre-vacuum steam autoclaving is the most indicated because it is effective and can be applied to dental hand-pieces. Despite autoclaves were the second most frequent sterilization method in the present study, only 11.2% of those dentists who had autoclaves had a sufficient number of hand pieces to allow sterilization between patients. Since

hepatitis A, B and C could be detected in oral fluids and tissues, proper sterilization or disinfection is mandatory in those invasive equipments that may be an important route by which viruses are transmitted in dental practice<sup>(2, 5, 7, 10, 17)</sup>. Although all dental impressions should be disinfected before send it to dental laboratories, only one dentist (0.4%) was used to that practice. This information may represent a risk to dental technicians. Even though eye wear should be used, since hepatitis B transmission via eye inoculation in chimpanzee has been demonstrated<sup>(3)</sup>, in the present study, only 50.7% of the dentist use eye protection during their practice.

This study indicates a need for interventions to improve safe work in dental practices in Brazil, hepatitis A and B vaccination programs, HBV post-immunization serology and use of individual protection equipment.

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