



Prevalence of blood-borne viruses among Iranian dentists; results of a national survey

Azimi, Shohreh^{1*}; Akhoondi, Ahmad²; Ghalichi, Leila²; Momeni, Nafiseh²; Jazayeri, Seyed Mohammad¹.

1. Dep. of Virology-School of public Health-Tehran University of Medical Sciences, Tehran, Iran. 2. Dental Research Center, Tehran University of Medical Sciences, Tehran, Iran.



Introduction

Health care workers (HCWs) are at the front line for acquiring blood-borne viruses (BBV: HBV, HCV and HIV) infections. Among the HCWs, dentists are the most highly exposed group and most dentists experience a needle stick or puncture of finger skin every often. Due to the fact that dental health activities involves frequently use aerosol-forming equipment and sharp devices there has long been a great concern about transmission of blood-borne pathogens in dentistry.

The aims of the present study were to investigate the seroprevalence and occupational factors and other associates of blood-borne viruses (BBV) seropositivity among Iranian dentists.

Methods

A total of 1628 participants were recruited. Viral markers of HBV, HCV and HIV were measured by (ELISA) including HBsAg, anti-HBs, anti-HBc, Anti HCV and Anti-HIV and subsequently were rechecked by another ELISA kits from different companies. When the serum was positive for either HBsAg or anti-HBc, HBV DNA levels using real time PCR and subsequently surface standard PCR and sequencing for surface gene were carried out.

Results

The mean age of participant was 40.4±11.1 years (from 19 to 75). 1070 (65.7%) and 558 (34.3%) were of male and female, respectively. Overall, among 1628 dental care workers, 7 (0.42%) were positive for HBsAg (all were positive also for anti-HBc) and 81 (5.0%) were anti-HBc positive. 12 cases were isolated anti-HBc. Only one person (0.061%) was positive for anti-HCV. No case was positive for anti-HIV (Table 1). 70 of 81 (85.2%) anti-HBc-positive and all HBsAg positive (100%) cases were general practitioners. 7/119 (5.8%) specialists, 1/37 (2.7%) dental assistants and 3/155 dental students (1.9%) were anti-HBc positive, respectively. 1084/1592 (68.1%) were reported to have at least one history of needle stick and other sharp injuries. This prevalence was higher, however, not statistically significant, than for those who were negative for any BBV infection (76.2% vs. 67.6%, $P = 0.11$). Real time PCR was applied for 52 serodiscordant cases. One case was diagnosed as being occult HBV infection (HBsAg negative, HBV DNA positive with titer of 1950 copy/mL). He was HBeAg negative, anti-HBe positive. In mutational analysis, no mutation was found over the entire surface protein. 6 HBsAg positive cases had HBV DNA levels (Median 1.8×10^5 copy/mL). The mean age of anti-HBc positive group was higher than anti-HBc negative group ($P < 0.001$).

Variables	No (%)
Age	40.40±11.07
Gender	Male 1070(65.72%) Female 558(34.27%)
HBV vaccination	No 60(3.68%) Yes 1535(94.28%) Unknown 33(2.02%)
Marriage status	Single 396 (24.3%) Married 1207 (74%)
Anti-HBs status	(<10 IU/mL) 176(11.46%) (≥10IU/mL) 1359(88.53%)
HBcAb titer	Negative 1547(95.02%) Positive 81(4.97%)
HBsAg	Negative 1621(99.57%) Positive 7(0.42%)
Anti HCV Ab	Negative 1627(99.94%) Positive 1(0.06%)
Anti HIV Ab	Negative 1628(100%) Positive 0
Anti-HBc/HBsAg state	Anti HBc- / HBsAg- 1547(95.03%) Anti HBc- / HBsAg+ 0 Anti HBc+ / HBsAg- 74(4.54%) Anti HBc+ / HBsAg+ 7(0.43%)

Table 1. Basic Characteristics of dental participants as well related as risk factor.

A majority of anti-HBc positive individuals were of male gender ($P=0.04\%$). A significant proportion of anti-HBc positive individuals were married ($P=0.07$). Also, the duration of dental practice was longer in anti-HBc positive group than anti-HBc negative group ($P < 0.001$). 66 (83.5%) of anti-HBc individuals were vaccinated. Vaccination history between these two groups showed that anti-HBs levels below 10 IU/mL were more prevalent among anti-HBc positive case ($P < 0.06$, Table 2).

Regarding using routine protective tools as a whole, 1542 out of 1575 (97.9%) were reported to use new disposables for every new patients. The frequencies of using such tools were lower for those who were positive for anti-HBc, however these association was not significant ($P=0.70$) (Table 2).

Discussion

Virus transmission via saliva may be possible, probably due to the contamination of saliva with blood. Although the probability of infections due to contaminated needle sticks are lower for HCV and HIV compare to HBV, the rate of carrying HBV infection through HBV-contaminated needles is as high as 12% to 60% (in unvaccinated individuals). Before the availability of vaccine against HBV in the 1980s, the seroprevalence of HBV was higher among dentists than in the general population. However, after the implementation of Expanded Program on Immunization (EPI) on HBV endorsed by WHO together with HBV vaccination national programs among dentists,

recent data shown that this prevalence is equal or even lower in dentists than that of general population. In Iran, it is estimated that over 35% of the general population have been exposed to HBV and approximately 2.5% are chronic carriers., In the present study only 0.36 % and 4.5% of individuals were positive for HBs Ag and anti- HBc , respectively. On the other hand, previous studies on Iranian dental health care workers showed a prevalence of 1.1% and 7 to 14.7% for HBs Ag and anti-HBc positivity, respectively. The present study confirms the issue that application of HBV vaccine together with protective tools has decreased the overall HBV infection in this high-risk group.

In conclusion, despite the prevalence HBV among dental HCWs found in this study was lower than other reports from Iran and also lower than that of Iranian general population, due to the invasive nature of dental practice, permanent vigilance and educational programs addressing BBV infection among dentists are necessary. Guidelines need to be developed to ensure that the entire dental team is vaccinated against HBV. To reduce risk of HCV and HIV infections (as no vaccine available yet for both), educational interventions are required to improve compliance with universal precautions, the use of barriers, puncture-proof containers for sharps disposal, and post exposure protocols.

Variables	Anti-HBc positive n=81	Anti-HBc negative n=1547	p-value
Age (mean±SD)	46.8±12.2	40.1±10.9	<0.001
Duration of dental practice (mean±SD)	20.1±11.5	15.2±9.1	0.001
Gender (male)	62 (76.5%)	1006 (34.8%)	0.04
Marital status (being married)	67 (83.7%)	1136 (74.8%)	0.07
Vaccination	66 (81.4%)	1468 (96.9%)	<0.001
Incomplete Anti HBV immunity	18 (22.2%)	190 (12.3%)	0.009
History of needle stick	60 (75.9%)	1020 (67.5%)	0.12
History of liver diseases	11 (13.6%)	105 (6.8%)	0.02
History of blood transfusion	10 (12.5%)	80 (5.2%)	0.01
Using gloves for each patient	78 (97.5%)	1469 (95.0%)	0.70
Using mask for each patient	78 (96.3%)	1444 (96%)	1.00
Using glasses for each patient	54 (68.3%)	1128 (95.4%)	0.09
Using shield for each patient	19 (25%)	547 (37.9%)	0.02

Table 2. Demographic, vaccination status and risk factors between anti-HBc positive participants versus those were negative for anti-HBc.

References

- Alavian, S.M., et al., *Occult Hepatitis B (OBH) in Clinical Settings*. Hepat Mon, 2012. **12**(8): p. e6126.
- Alavian SM, et al., *Hepatitis B Virus infection in Iran: A systematic review*. Hepat Mon, 2008. **8**(4): p. 14.
- Akhoondi A, et al., *HBV vaccination status and response to hepatitis B vaccine among Iranian dentists*. Hep Mon, 2015.