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# Hepatitis-B virus infection and the dental profession: a survey in the Witwatersrand area

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## SUMMARY

*An investigation of the prevalence of Hepatitis-B virus markers in a group of dentists and their auxiliary staff treating black and white patients in the Witwatersrand area was carried out. The prevalence of antibody against the hepatitis-B surface antigen (anti-HBs) was found to be significantly higher in the dentists studied than in blood donors on the Witwatersrand. Among those dentists who treated more black patients, the prevalence of anti-HBs was significantly higher.*

## OPSOMMING

*'n Ondersoek ingestel na die voorkomssyfer van Hepatitis-B virus merkers in 'n groep tandartse en hulle hulppersoneel, wat wit en/of swart pasiënte aan die Witwatersrand behandel, het getoon dat daar 'n groter opbouing van anti-HBs teenwoordig was in die tandartse as wat daar in bloedskenkers aan die Witwatersrand was. Tandartse wat meer swart pasiënte behandel, het 'n aansienlike hoër anti-HBs getoon.*

## INTRODUCTION

Hepatitis-B virus (HBV) infection is of concern to dental professionals for three reasons (Kew and MacNab, 1979). Firstly, the dentist runs an increased risk of contracting this infection from his patients. Secondly, the development of a chronic HBV carrier-state may follow an acute infection and the dentist may then infect future patients with the virus: and, thirdly, dental surgery equipment may be the vehicle for cross-infecting one patient to another with HBV.

The risk to the dentist of acquiring HBV infection from his patients could be demonstrated if a significantly higher prevalence of markers of HBV infection were to be found in dentists than in a control population. However, not all studies of prevalence of antibody against HBV surface antigen (anti-HBs), and of HBV surface antigen (HBs Ag) have shown this to be the case (Moseley *et al*, 1975; Smith *et al*, 1976; Aldershvile *et al*, 1978). These conflicting results may be explained by differences in the HBV carrier rates in dental patients in different parts of the world. This explanation can be tested in South Africa where the black population has a very high prevalence of chronic HBV infection, while the whites have a low prevalence (Bersohn *et al*, 1974).

The aims of the present study were to determine the prevalence of HBV markers in a group of dentists and their auxiliary staff dealing with black and/or white patients in the Witwatersrand area, and to relate this prevalence to the race of the patients treated. At the same time, other correlations could be analysed.

## SUBJECTS STUDIED AND METHODS

One hundred and thirty dentists, 15 dental surgery assistants, 2 dental technicians and 4 oral hygienists practising in the Witwatersrand area were included in the study. Each subject was allocated a code number and the following details were recorded on a history sheet:

1. Name and age.
2. Number of years qualified.
3. Whether in full-time hospital practice, full-time private practice or a combination of both.
4. Whether the practitioner is a general dentist, orthodontist, periodontist, maxillo-facial and oral surgeon, prosthodontist or other.
5. What percentage of each ethnic group, namely white, black, coloured, and asian were treated by the practitioner.
6. Whether the practitioner had ever suffered from viral hepatitis.
7. Whether the practitioner had ever treated a patient with known acute hepatitis.
8. Whether the practitioner had treated a patient from the renal dialysis and transplant unit of the Johannesburg General Hospital.
9. Whether the practitioner wears face masks all or part of the time during operative procedures.

10. Whether the practitioner himself had ever received a blood transfusion.

After completion of the questionnaire, 10 ml of venous blood was collected from each subject in a plain tube, and subjected to radioimmune assay for the presence of HBs Ag and anti-HBs. The results were subjected to statistical analysis using the Student's t-test for two independent samples. Probability levels of $p < 0,05$ were regarded as statistically significant.

## RESULTS

**(a) Dentists:**
Of the 130 white dentists studied, none (0 per cent) was HBs AG+ve, while 14 (10,8 per cent) were anti-HBs+ve. This latter prevalence is significantly greater ($p < 0,05$) than that in white blood donors on the Witwatersrand (5,3 per cent). (Kew *et al,* 1976).

Details of the dentists' ages, the number of years qualified and the percentages of black patients in the practices are listed in the Table. There was no statistically significant correlation between the presence or absence of anti-HBs and the age of the dentist or the number of years qualified. However, among dentists who treated more black patients, the prevalence of anti-HBs was significantly higher ($p < 0,05$).

Of the anti-HBs+ve dentists, three (21,5 per cent) had treated patients known to be chronic carriers of HBV and one dentist had treated a patient from the renal dialysis and transplant unit of the Johannesburg General Hospital. This prevalence was not greater than that found in the anti-HBs-ve dentists (22, 4 per cent).

### The use of face masks

Of the 14 anti-HBs+ve dentists, 2 (14 per cent) wore masks all the time compared with 22 per cent of the anti-HBs-ve dentists. This difference is not significant. Forty two per cent of the anti-HBs+ve dentists wore masks some of the time, compared with 21 per cent of the HBS-ve dentists, but this difference is not statistically significant.

### History of jaundice, hepatitis, or blood transfusions

In this study 1 out of 14 anti-HBs+ve dentists gave a history of being jaundiced at some time during his career, while 2 out of 116 HBs-ve dentists gave similar histories. Four out of the 116 HBs-ve dentists gave a history of having suffered from viral hepatitis without being jaundiced.

None of the dentists who were anti-HBs+ve had ever received blood transfusions, whilst two of the HBs-ve group had been transfused.

**(b) Dental surgery assistants and other dental auxiliary staff.**
Of the 15 chairside assistants studied, 12 were white and 3 were black. In the white group, three were anti-HBs+ve and nine were anti-HBs-ve. Of the 3 black chairside assistants, 1 was anti-HBs+ve and 2 were anti-HBs-ve.

Of the remaining dental auxiliary staff studied, namely radiographers, dental technicians and oral hygienists, the radiographer and both dental technicians were anti-HBs-ve. Of the 4 oral hygienists included in this study, 1 was anti-HBs+ve and the others negative. The sample of auxiliary staff, however, is too small to be of statistical significance.

## DISCUSSION

By demonstrating a significantly higher prevalence of anti-HBs among dentists than among blood donors, we have shown that dentists run a greater than normal risk of acquiring HBV infection. This study confirms the findings of Moseley *et al* (1975) and Smith *et al* (1976). By analysing the incidence of attacks of acute B-virus hepatitis suffered by practising dentists, Feldman and Schiff (1975) and Glenwright *et al* (1974) reached a similar conclusion. If dentists are infected by their patients, the risk would be expected to be greatest in those whose patients have a high prevalence of the HBV carrier state and this has been shown in the present study.

It is the blood of individuals infected with HBV which is particularly infectious, although the virus is also present in saliva. Blood and saliva from the patient come into contact with minor cuts and abrasions on the dentist's ungloved hands, or may be splattered into his eyes or mouth. In addition, potentially infectious aerosols

*Table I.* Differences between anti-HBs+ve and anti-HBs-ve dentists in age, number of years qualified and percentage of practice comprised of Black patients.

| Group | Age | | Years qualified | | Percentage Black patients in the practice | |
|---|---|---|---|---|---|---|
| Anti HBs+ve | number | = 14 | number | = 14 | number | = 13 |
| | range | = 26-70 yrs | range | = 3-47 yrs | range | = 0 - 100% |
| | mean | = 40.9 yrs | mean | = 17 yrs | mean | = 29.0% |
| | standard deviation | = 11.6 yrs | standard deviation | = 12.6 yrs | standard deviation | = 42.5% |
| Anti HBs-ve | number | = 116 | number | = 116 | number | = 113 |
| | range | = 24-62 yrs | range | = 1-40 yrs | range | = 0 - 100% |
| | mean | = 36.6 yrs | mean | = 12.4 yrs | mean | = 14.0% |
| | standard deviation | = 9.4 yrs | standard deviation | = 9.3 yrs | standard deviation | = 23.8% |
| | | N.S. | | N.S. | | $p < 0,05$ |

N.S. = Not significant

are created by the use of ultrasonic and rotary instruments and by air and water sprays.

Recommendations with regard to the precautions that a dentist should take to prevent himself becoming infected with HBV are discussed by Kew and MacNab (1979).

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