

CROSS INFECTION CONTROL METHODS ADOPTED BY MEDICAL AND DENTAL PRACTITIONERS IN BENIN CITY, NIGERIA

B.D.O. Saheeb¹, E. Offor² and O.H. Okojie³

¹Departments of Maxillofacial and Oral Surgery, ² Medical Microbiology and ³Community Medicine, College of Medical Sciences, University of Benin, Benin City, Nigeria

Reprint requests to: Dr. B.D.O. Saheeb, P.O. Box 2799, Benin City, 300-001, Nigeria

E-mail: dauda2000@yahoo.com

Abstract

Background: Cross infection control is an essential aspect of medical and dental practice. The purpose of this study was to assess the various methods of cross infection control adopted by medical and dental practitioners in Benin City.

Method: A structured self-administered questionnaire was administered to a randomly selected group of medical and dental practitioners in order to assess their cross infection control methods, attitude to sterilization of equipment and immunization against hepatitis B virus.

Result: Of the 113 practitioners surveyed, 98.1% of them sterilised their equipments. The various methods used were autoclaving 46%, a combination of autoclaving and cold sterilisation 25.7% and other methods 25%. Practitioners who wash their hands before and after examining patients constituted 72.6% and 94.7% respectively. Those who screened blood before transfusing were 79.5% while 4.5% and 19.5% reused needles and syringes respectively. Although 77.9% of respondents suffered needle stick injury, only 10.6% were immunised against hepatitis B virus. Respondents who did not regularly wear face masks and eye goggles during operative procedure constituted 77.9% and 64.6% respectively. Similarly 40.7% of practitioners did not wear gloves when examining patients.

Conclusion: Our finding shows that although most the practitioners studied recognised the importance of cross infection control in practice, strict compliance still posed a problem.

Key words: Cross infection, control methods, medical and dental practitioners

Introduction

Cross infection control has occupied the attention of health care workers (HCW) since the discovery of the human immunodeficiency virus (HIV). Consequently, some health care authorities, including the British Dental Association¹ the British Medical Association² and the World Health Organization,³ recommended stringent guidelines for the management of HIV infected and AIDS patients. Although we are not aware of such guidelines in Nigeria, the attention of the Nigerian Medical Association (NMA) and the Nigerian Dental Association (NDA) has been drawn to the urgent need to formulate guidelines for the management of these patients and for the prevention of nosocomial infection.⁴

From the available evidence, most dental practitioners in the United Kingdom (U.K.) and New Zealand have either reviewed or modified their cross infection control procedures.^{5, 6, 7} Also patients are now aware of the methods of cross infection prevention adopted by the dentist or doctor in practice even when they are pre-occupied with pain.^{8, 4} The transfer of infection from a health care worker to a patient and vice versa cannot be trivialized. The risks for surgeons are also high^{9, 10, 11} although these can be reduced by good surgical techniques and careful handling of instruments.

Even before the sudden awareness of the potential infectivity of HIV and hepatitis B virus (HBV), dental practitioners have a culture of washing their hands before and after examining patients, as an aspect of infection control. However, a U.K. study¹² showed

that this practice was no longer strictly observed. Furthermore, an observation of compliance with hand washing by physicians and nurses in a medical intensive care unit was disappointing as only 28% of physicians and 43% of nurses washed their hands following contact with patients.¹³

Medical and dental practitioners in Nigeria adopt guidelines from other countries for the treatment of patients infected with blood borne diseases and the prevention of nosocomial infection. We are not aware of any study in Benin City, Nigeria to determine medical and dental practitioner's methods of preventing cross infection in practice. The purpose of this study was to assess the methods of cross infection control adopted by this group of practitioners in Benin City and whether such methods are adequately followed during patients' treatment.

Patients and Methods

A total of 180 randomly selected medical and dental practitioners in both private and public hospitals and clinics in Benin City, Nigeria were studied in order to assess the cross infection control measures they adopt in their practice.

A structured self-administered questionnaire utilizing both open and close ended questions was used to assess practitioners' methods of cross infection control, attitude to sterilization of instruments and immunization against hepatitis B virus. The age, sex and year of graduation were also determined. Completed questionnaires were collected and prospectively analysed. All responses were entered into a computer database and analysed using a statistical package (SPSS). Simple frequencies were calculated for all variables. All the frequency variables had percentages, cumulative percentages and corresponding related statistics. Only valid responses were used.

Results

One hundred and thirteen completed questionnaires were collected, representing a response rate of 62.8%. The sample comprised 62 (54.9%) and 51 (45.1%) dental practitioners who graduated between 1960 and 1995. They were 72 (63.7%) males and 41 (36.3%) females. Two (1.8%) practitioners graduated between 1960 and 1969, 11 (9.7%) graduated between 1970 and 1979, 49(43.4%) graduated between 1980 and 1989 while 48 (42.5%) graduated between 1990 and 1995. Their ages ranged between 20 and 55 years.

Three (2.6%) respondents did not indicate their years of graduation. All the practitioners surveyed (100%) agreed that both HIV and HBV can be transmitted through medical and dental treatment. Most of the respondents, 111 (98.1%) sterilized their equipment while 1(0.9%) respondent did not. Whereas 52(46.0%) respondents used autoclave for sterilization, 29 (25.7%) used a combination of cold sterilization and autoclave. The various methods of sterilization adopted by the respondents are shown in Table 1. Ten (8.9%) respondents routinely left them for one or two hours. These are shown in Table 2. Twelve (10.6%) respondents who frequently used cold sterilization preferred hibitane in spirit as shown in Table 3.

Respondents who had suffered needle stick injury were 88 (77.9%) while 25 (22.1%) had not. Similarly, only 12 (10.6%) respondents were immunized against hepatitis B virus while a total of 110 (88.9%) were not immunized. Female respondents who had suffered needle stick injury constituted 31 (27.4%) of the sample while 10 (8.9%) had not. Similarly, 59 (52.2%) males had suffered needle stick injury while 13 (11.5%) had not. In the same way, more males, 11 (9.7%) than females, 1(0.9%) were immunized against HBV. During surgery on patients, 82 (72.6%) practitioners washed hands before gloving while 54 (47.8%) of them wore them at all times before operating. These are shown in table 4. Furthermore, it could be observed from the table that 49 (43.4%) practitioners scrubbed their hands with a disinfectant before gloving while 79 (67.3%) did so with soap alone. Eighty-three (73.5%) of the respondents carried out one form of invasive procedure or the other on patients while 30 (26.5%) did not. Those who screened blood before transfusion constituted 90 (79.7%) of the sample, while 11 (9.7%) did not.

Respondents who sometimes reused needles constituted 5 (4.4%) of the sample while 98 (86.7%) did not. Only 10 (8.9%) respondents indicated "not applicable". Similarly, 22 (19.5%) respondents reused syringes while 91(80.5%) did not. Twelve (10.6%) respondents reused local anaesthetic agent while 95(84.1%) did not. Only 6(5.3%) respondents indicated "not applicable."

Table 5 shows the precautions taken by respondents during patients' examination. Examination of this table shows that 82 (72.6%) respondents regularly washed their hands before patients examination while 107 (94.7%) of them did so after patients examination. It appears that compliance with hand washing decreased in between patients' examination as 56 (49.6%) practitioners bothered to wash their hands.

Table 1: Respondents' methods of sterilization

Methods	No.	%
Autoclave	52	46.0
Boiling water	6	5.3
Cold sterilization and autoclave	29	25.7
Cold sterilization, boiling water and autoclave	9	8.0
Cold sterilization and boiling water	2	1.8
Autoclave and boiling water	11	9.7
Autoclave and disposable instruments	1	0.9
Not applicable	3	2.7

Table 2: Length of time instruments are left in disinfectants

Length of time	No.	%
5 – 14 minutes	5	4.4
15 – 19 minutes	3	2.7
20 – 24 minutes	-	-
25 – 30 minutes	10	8.9
31 – 35 minutes	-	-
36 – 45 minutes	2	1.8
> 45 minutes	2	1.8
1 – 2 hours	8	7.1
> 2 hours	2	1.8
1 – 2 days	1	0.9

Table 3: Disinfectants used frequently by respondents

Disinfectant	No.	%
Hibitane in spirit	12	10.6
Savlon	1	0.9
Lysol	1	0.9
Paraldehyde	1	0.9
Glutaraldehyde	1	0.9
Marigad antiseptic	1	0.9
No indication of antiseptic	12	10.6

Table 4: Precautions taken during surgery on patients

Precaution	Yes n (%)	No n (%)
HBG	82 (72.6)	7 (6.7)
SHG	76 (67.3)	13 (11.5)
SHD	49 (43.4)	40 (25.4)
WGO	54 (47.8)	35 (34.5)
RWG	9 (8.0)	79 (69.9)
RGO	3 (2.1)	86 (76.1)
WPE	16 (14.2)	73 (64.6)

Table 5: Precautions taken during patients' examination

Precaution	Yes n (%)	No n (%)
WHB	82 (72.6)	31 (27.4)
WHAE	107 (94.7)	6 (5.3)
WHIP	56 (49.5)	54 (47.8)
WFM	22 (19.5)	88 (77.9)
WG	67 (59.3)	46 (40.7)
WSG	3 (2.1)	86 (76.1)

Abbreviations

WHBE: wash hands before patients examination
 WHAE: wash hands after patients examination
 WHIP: wash hands in between patients examination
 WFM: wear face mask during patient examination
 WG: wear gloves during patient examination
 WSG: wear sterile garments during patient examination
 HBG: wash hands before gloving
 SHG: scrub hands with soap before gloving
 SHD: scrub hands with disinfectant before gloving
 WGO: wear gloves at all times before operation
 RWG: reuse wash gloves during operation
 RGO: reuse unwashed gloves during operation
 WPE: wear protective eye goggles

Discussion

With the increasing spread of HIV in Nigeria and the high prevalence rate of hepatitis B virus¹⁴ the need to institute stringent cross infection control measures ought to engage the attention of HCWS. Although in other parts of the world where cross infection control guidelines are available, compliance has been variable.⁶ There is evidence however, that this is now increasing^{15,7} even though the universal precaution adopted by some practitioners are still not applied equally to all patients.¹⁶

Hand washing is an essential part of infection control in medical and dental practice. Thus, even before the advent of AIDS, dentists world wide have a culture of washing their hands before and after examining patients. A close study of compliance with this aspect of infection control was undertaken by Scully et al¹² and found that in only 38% of patients contact, were the hands of HCWS washed before gloving, while 50% of them washed their hands only after patients' examination. In a medical intensive care unit in a teaching hospital where a similar study was carried out, only 26% of physicians and 43% of nurses washed their hands after patients' examination.¹³ The results of this study demonstrate

that 72.6% and 94.7% of medical and dental practitioners respectively washed their hands before and after examining patients. However, it appears that compliance tended to decrease in-between patients examination, as only about half (49.6%) of both practitioners would pay attention to hand washing.

Previously, the wearing of gloves before examining patients was hardly practised regularly as an essential part of cross infection control. Interestingly however, 59.3% of medical and dental practitioners in this study routinely wore gloves before patients' examination, probably out of increased awareness of HIV/AIDS. Whether routine wearing of gloves would prevent cross infection of blood borne viruses has not been firmly established¹⁷ nevertheless, it would protect minor cuts, and abrasions from contamination and so reduce the transmission of HBV from carrier to practitioners.

Although the majority of practitioners in this study frequently scrubbed their hands with soap before gloving, there is evidence^{18, 19, 20} of a reduction in skin flora when hands are scrubbed with soap and this should be encouraged in practice.

Despite the fact that dental practitioners undertook procedures which generated aerosol and some of the medical practitioners carried out procedures which caused blood splashes on the face, it was disturbing to find that, about 77.9% and 64.6% of them did not regularly wear face masks and eye goggles respectively when carrying out invasive procedures on patients. Studies have demonstrated that cutaneous, percutaneous and mucous membrane exposures to patients blood are common even during general surgical practice.¹¹ However, the efficacy of facemasks and goggles in reducing cross infection in practice is questionable as regards the transmission of HBV.^{21, 22} Nevertheless, the wearing of normal spectacles has been shown to reduce the risk of conjunctiva contamination by 95%²³ while the use of facemasks prevents the inhalation of infective aerosol.

Although autoclaving of instruments is the most frequently adopted method of sterilization (46%) in this study, it was a disturbing finding when 25.7% of respondents reported the use of a combination of autoclaving and cold sterilization. Cold sterilizing solutions are not suitable for routine use and it has been recommended that their use should only be limited to instruments, which cannot be exposed to heat.²⁴

The danger of transmitting blood borne viruses to patients by the reuse of needles, syringes and local anaesthetic agents cannot be over-emphasized. Thus, even though a small percentage of respondents reused needles (4.4%), syringes (19.5%) and local anaesthetic agents (10.6%), the practice gives cause

for concern. It is a fact that many hospitals and health centres in developing countries do not have adequate facilities for screening blood before transfusion.²⁵ It was therefore encouraging to find that out of 73% of respondents who transfused their patients, 79.8% used screened blood.

Various data on HBV suggest that 15% to 60% of the normal populations in many African countries may be positive to one or more of the serological markers of HBV infections.¹⁴ Anecdotal evidence has suggested that it is easier to transmit HBV in a patient infected with both viruses.²⁶ Although 77.9% of respondents have suffered needle stick injury, only 10.6% of them were immunized against HBV. Furthermore, a breakdown of this figure shows that more males (9.7%) than females (0.9%) were immunized against HBV, although fewer females (27.4%) than males (52.2%) had suffered needle stick injury. In a similar study elsewhere,²⁷ there was a high rate of immunization against HBV among medical practitioners (68.9%) even though 47% of them indicated they had needle stick or similar injury during patient treatment. It is on record that most practitioners take adequate precaution when they are treating patients perceived as high risks but still expose themselves to some risks when the infective status of the patient is not known,²⁷ Immunization is still the surest way of reducing the risk of infection with HBV, but perhaps the unavailability of the hepatitis B vaccine coupled with its high cost (approximately 100 US\$ for a course) is a limiting factor in developing countries.¹⁴

This study did not discriminate between practitioners in private clinics and those from general or teaching hospitals with regard to their methods of cross infection control. However, the results of the survey show the attempts being made by medical and dental practitioners to control cross infection in practice. Generally, the various methods adopted by them have not been adequate even though they recognized the importance of cross infection control; therefore the formulation and availability of cross infection guidelines for all HCWS in Nigeria might be worthwhile, considering the peculiarity of our environment and the spread of HIV in the society.

References

1. Guide to blood borne viruses and the control of cross infection in dentistry. British Dental Association, London. 1990.
2. Statement to fellows on HIV infection and AIDS. Royal College of Surgeons of Edinburgh, Edinburgh. 1990.

3. Guidelines on AIDS and first aid in the work place. WHO AIDS series 1990; No. 7.
 4. Saheeb B. D, Ufomata D. P, Igbinador G. P. Perception of AIDS among dental patients in Nigeria. *African J Med Pract* 1995; 2: 198-208.
 5. Samaranyake L. P, Lewis H, Lewis M. A. C, Lamey P. J. Sterilization in general dental practice. *Br Dent J* 1987; 162: 365-370.
 6. Pitts N. B, Nuttall N. M. Blood borne viruses. Precautions against cross infection in routine dental practice in Scotland. *Br Dent J* 1988; 165: 183-184.
 7. Gibson G. B, Nobel M. A, MacFadyen E. E. A pilot survey on compliance with recommended infection control procedures in ninety dental practices in New Zealand. *Int Dent J* 1995; 45: 275-281.
 8. Humphris G. M, Morrison T, Horne I. Perception of risk of HIV infection from regular attenders to an industrial dental service. *Br Dent J* 1993; 174: 371-378.
 9. Tanner W. A. The risks of HIV infection for surgeons. *J Irish Coll Phys Surgs* 1993; 22:258-259.
 10. Fisher - Hoch S. P, Tomori O, Nasidi A et al. Review of cases of nosocomial fever in Nigeria: the high price of poor medical practice. *Br Med J* 1995; 311: 857-859.
 11. Adesanya A. A, Atoyebi O.A, Panchalingam L, Atimomo C. E, da Rocha-Afodu, J. T. Accidental injuries and blood contamination during general surgical operation. *Nigerian Journal of Surgery* 1997; 4: 42-49.
 12. Scully C, Porter S. R, Epstein J. Compliance with infection control procedures in a dental hospital clinic. *Br Dent J* 1992; 173: 20-23.
 13. Albert R. K, Condie F. O. Handwashing patterns in medical intensive care units. *N Engl J Med* 1990; 304: 1465-1466.
 14. Bojuwoye B. J. The burden of viral hepatitis in Africa. *West Afr J Med* 1997; 16: 198-203.
 15. Burke F. J. T, Wilson V. H. F, Cheung S. W. Trends in glove use by dentists in England and Wales: 1989-1992. *Int Dent J* 1994; 44: 195-201.
 16. Pigada N, Avery C. M. E. Precautions against cross-infection during operations for maxillofacial trauma. *Br J Oral Maxillofac Surg* 2000; 38: 110-113.
 17. Reingold A. L, Kame M. A, Hightower A. W. Features of gloves and other protective devices to prevent transmission of Hepatitis B. virus to oral surgeons. *J Am Med Assoc* 1988; 259: 2558 – 2560.
 18. Lowbury E. J. L, Lilly B. A, Ayliffe G. A. J. Preoperative disinfection of surgeons' hands: use of alcoholic solutions and effects of gloves on skin flora. *Br Med J* 1974; 4: 369-372.
 19. Ugbam G. A. Comparative study of different scrubbing agents in surgical practice. *West Afr J Med* 1988; 5: 13-19.
 20. Field E. A, Martin M. V. Hand washing: soap or disinfectant? *Br Dent J* 1986; 160: 278-280.
 21. Peterson N. V, Bond W. W, Favero M. S. Air sampling for Hepatitis B. surface antigen in a dental operator. *J Am Dent Assoc* 1977; 99: 465.
 22. Scully C. Surgeons fear threat of AIDS in the Air. *Br Dent J* 1990; 169: 148-150
 23. Bell K. M, Clement D. A. Eye protection for the surgeon. *J R Coll Surg Edinb* 1991; 36: 178-179.
 24. BDA. Dental health and science committee workshop. The problem of cross infection in dentistry. *Br Dent J* 1986; 160: 131-134.
 25. Editorial. Focus on AIDS: Nigerian Bulletin of Epidemiology 1992; 2: 1-24.
 26. Morgan D. R. HIV and needle stick injuries. *Lancet* 1988; 1: 35-1280.
 27. LefProteous M. J. Operating practices of and precautions taken by orthopaedic surgeons to avoid infection with HIV and hepatitis B virus during surgery. *Br Med J* 1990; 301: 167-169.
-