



Awareness of Mercury Toxicity among Dental Students- A Survey Based Study

Authors

S. Sameer Mohideen Gani*¹, Jayalakshmi. S²

¹Bachelor of Dental Surgery, Saveetha Dental College & Hospitals, Chennai, Tamil Nadu

²Dept of Conservative Dentistry and Endodontics, Saveetha Dental College & Hospitals, Chennai, Tamil Nadu

*Corresponding Author

S. Sameer Mohideen Gani

Bachelor of Dental Surgery

Saveetha Dental College & Hospitals, Chennai, Tamil Nadu

ABSTRACT

AIM: *The aim of this research is to analyse the knowledge of dental students regarding the harmful effects of mercury.*

MATERIALS AND METHODS: *A questionnaire was designed with various questions about the harmful effects of mercury and was distributed among 100 students in various dental colleges in Chennai. Out of 100 students who responded to the survey 36 were male and 64 were female (fig.1) and 27 were CRRIs, 26 were final year students and 47 were students from third year (fig.2).*

The students were questioned about the correct protocol for storage of mercury and disposal methods of scrap amalgam. They were also asked about the precautions to be taken while doing amalgam restorations and the correct ratio for mercury and alloy powder necessary to form amalgam. The results were tabulated and analysed.

INTRODUCTION

Dental amalgam with more than 150 years use in clinical dentistry, is a product of tin-silver alloy ^[1]. For a significant period of time, amalgam has been used in millions of patients ^[2] and has proved to be an ideal restorative material, except in extremely rare cases where a heavy metal allergy is reported ^[3]. Furthermore, amalgam has been found to be useful in many areas, including the restoration of posterior teeth, the sealing of the apical end of apicected roots, the restoration of access cavities and to serve as a core material in

post crowns. However, the use of amalgam has dramatically declined in the past 10 years ^[4-5] mainly due to the concern over mercury. Mercury is a toxic heavy metal which is widely dispersed in nature. Most human exposure results from seafood consumption or dental amalgam fillings. Mercury is capable of inducing a wide range of clinical presentations. Diagnosis of mercury toxicity can be challenging. Mercury vapour is rapidly absorbed in the respiratory tract and distributed by blood to a number of key target organs ^[8-9]. Mercury vapour is oxidised to

inorganic mercury and is eliminated as air or as inorganic mercury in urine from the kidneys, sweat and saliva. The key target organs are the central nervous system, which appears to be the most sensitive toxicological endpoint. It is reported that very high levels of mercury absorption, for instance urinary levels of mercury above 100µg/g creatinine are associated with adverse health effects, predominantly with the central nervous system and the kidneys [10-13]. Despite all the speculation regarding mercury toxicity, tooth fracture rate is less in older patients with amalgam restored teeth than in patients who have teeth restored with composite [7]. Hence amalgam is still the most cost-effective of all restorative materials [6]. This study aims at understanding the awareness among dental students about the harmful effects of mercury.

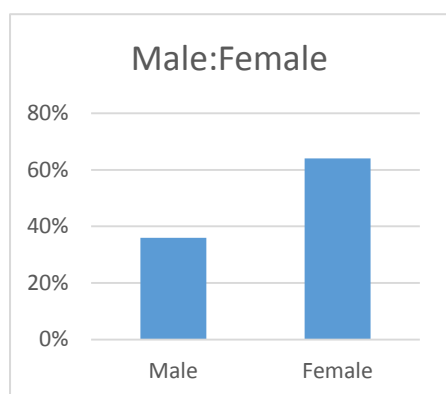
MATERIALS AND METHODS

A questionnaire was designed with various questions about the harmful effects of mercury and was distributed among 100 students in various dental colleges in Chennai. Out of 100 students who responded to the survey 36 were male and 64 were female (fig.1) and 27 were CRRI's , 26 were final year students and 47 were students from third year (fig.2).

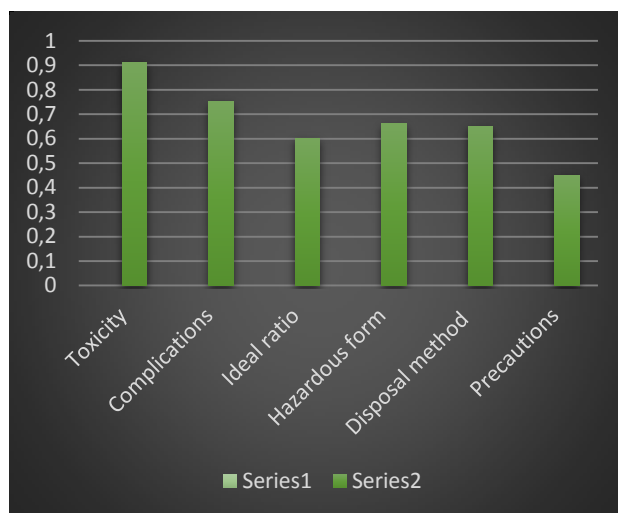
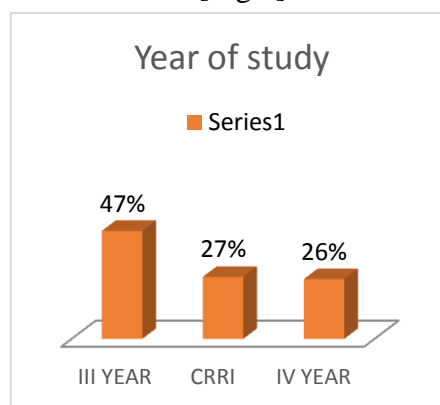
The students were questioned about the correct protocol for storage of mercury and disposal methods of scrap amalgam. They were also asked about the precautions to be taken while doing amalgam restorations and the correct ratio for mercury and alloy powder necessary to form amalgam. The results were tabulated and analysed.

RESULTS

[Fig.1]



[Fig.2]



Out of 100 students who filled the questionnaire more than 90% were aware that mercury can be toxic to the human body and that it can cause systemic complications. 60% of students were aware of the ideal powder and mercury ratio for amalgam and a few were doubtful about the same. When they were asked to point out the most hazardous form of mercury 70% of students said Mercury vapours were the most harmful form than liquid mercury. The students were asked about the correct protocol for disposal of scrap amalgam to which 70% of them said it should be stored under sodium thiosulphate which is a fixer solution. Majority of the students said use of rubber dam, evacuation hoses and minimal mercury use are the best precautions which have to be taken while doing an amalgam restoration.

DISCUSSION

The response rate in the present study was high. In the current study, the number of dentists who agreed on the safety of amalgam was slightly lower than that reported by Khairuldean and others^[14]. However, in the current study, higher numbers of dentists agreed that amalgam is unsafe. The reason for the disparity may be due to the types of population studies and/or the level of awareness of the dentists.

In the present study majority of students who filled the questionnaire were aware that mercury can be toxic to the human body and that it can cause systemic complications. Awareness of mercury causing systemic complications is highly essential as overdose of mercury can result in problems like renal failure, mental confusions, allergies, immune dysfunction and digestive problems. 60% of students were aware of the ideal powder and Mercury ratio for amalgam. This is important as higher amounts of mercury in the amalgam alloy mixture can cause release of mercury and result in the systemic complications as mentioned above.

70% of students said mercury vapours were the most harmful form than liquid mercury. The students were asked about the correct protocol for

disposal of scrap amalgam to which 70% of them said it should be stored under sodium thiosulphate which is a fixer solution. Majority of the students suggested the use of rubber dam, evacuation hoses and minimal mercury use are the best precautions which have to be taken while doing an amalgam restoration.

Compared to previous reports^[14] the current study reveals that fewer dentists would oblige patients' requests to have their amalgam removed. This factor may also be dentist-dependent. As part of a lack of information, patients have no knowledge that they have the right to a clinic for their treatment. On the other hand, dentist-dependent means that the dentist must allow patients to participate in an informed consent process before amalgam removal^[14].

CONCLUSION

Hence this study reveals that majority of the students who participated in this survey were aware about the harmful effects which can be caused due to the overuse of mercury. Many students even mentioned that all amalgam fillings do not cause mercury toxicity and that toxicity is caused only when mercury was used beyond its ideal level. This study has created a good awareness among few students who did not know about the harmful effects of mercury.

REFERENCES

1. Tveit AB & Espelid I (1992) Class II amalgam inter observer variations in replacement decisions and diagnosis of caries and crevices International Dental Journal 42(1) 12-18.
2. Diogo SJ (2003). Amalgam on trial. Retrieved May 30, 2005 from: www.agd.org/library/2003/jan/200301-diogo.asp.
3. Diogo SJ (2003). Amalgam on trial. Retrieved May 30, 2005 from: www.agd.org/library/2003/jan/200301-diogo.asp.

4. Forss H & Widstrom E (2004) Reasons for restorative therapy and the longevity of restorations in adults *Acta Odontologica Scandinavica* 62(2) 82-86.
5. Bogacki RE, Hunt RJ, del Aguila M & Smith WR (2002) Survival analysis of posterior restorations using an insurance claims database *Operative Dentistry* 27(5) 488-492.
6. Cook A (2006) Amalgam: Dead or alive? *Dental Update* 33(6) 94-98.
7. Wahl MJ, Schmitt MM, Overton DA & Gordon MK (2004) Prevalence of cusp fractures in teeth restored with amalgam and with resin based composite *Journal of the American Dental Association* 135(8) 1127-1132.
8. Berglund A (1990) Estimation by a 24-hour study of the daily dose of intra oral mercury vapor inhaled after release from dental amalgam *Journal of Dental Research* 69(10) 1646- 1651.
9. Molin M, Bergman B, Marklund SL, Schütz A & Skerfving S (1990) Mercury, selenium, and glutathione peroxidase before and after amalgam removal in man *Acta Odontologica Scandinavica* 48(3) 189-202.
10. Manhart J & Hickel R (1999) Esthetic compomer restorations in posterior teeth using a new all in one adhesive case presentation *Journal of Esthetic Dentistry* 11(5) 250-258.
11. Osborne JW & Albino JE (1999) Psychological and medical effects of mercury intake from dental amalgam. A status report for the American Journal of Dentistry *American Journal of Dentistry* 12(3) 151-156.
12. Mjör IA (1997) Selection of restorative materials in general dental practice in Sweden *Acta Odontologica Scandinavica* 55(1) 53-57.
13. Hickel R, Dasch W, Janda R, Tyas M & Anusavice K (1998) New direct restorative materials FDI Commission Project *International Dental Journal* 48(1) 3-16.
14. Khairuldean N & Sadig WM (1996) Amalgam safety and alternative restorative materials: A cross-sectional survey among dentists *The Saudi Dental Journal* 8(1) 27-33.