ISSN : 2949 - 9100

International Journal of Health and Dentistry Care (IJHDC)

IJHDC : Health and Dental Publication
Available Online at: www.ijhdc.com
Volume – 2, Issue – 1, January – February - 2023, Page No. : 22 - 26

Knowledge attitude and practice regarding mercury waste disposal among health care

[1]Lieice J N, Dental College and Research Center, Iasi

[2]Walker E M, Dental College and Research Center, Iasi

[3]Zublekar K G, Dental College and Research Center, Iasi

Corresponding Author: Lieice J N, Dental College and Research Center, Iasi

Citation This Article: Lieice J N, Walker E M, Zublekar K G, "Knowledge attitude and practice regarding mercury waste disposal among health care", IJHDC – January – February - 2023, Volume – 2, Issue - 1, P. No. 22 – 26.

Open Access Article: This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0) and the Budapest Open Access Initiative (http://www.budapestopenaccessinitiative.org/read), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Regulation of waste generated in any health care system is a crucial issue as it poses a direct risk to human health as well as to the environment. In dental field, the bio medical waste generated includes sharps like needles, infectious waste like blood-soaked gauze, hazardous waste like amalgam and chemical waste such as disinfectants. The most prevalent issue in the field of dentistry is the management and disposal of mercury**.**

Aim: The present study investigated the knowledge, attitude and practice of undergraduate students about mercury waste disposal.

Materials and Methods: The present cross-sectional study includes health care personnel in Dental College. A structured, self-administered questionnaire consisting of 15 closed-ended questions was employed to 60 staff (nurses, lab technicians, and class IV employees). Among all, 70 responded and willingly participated in the survey and filled the questionnaire.

Results: Most of the students lacked knowledge about the waste management of mercury as well as didn't follow appropriate disposal measures for the same.

Conclusion: There is need for awareness regarding hazards caused due to inappropriate waste disposal amongst students. It is of vital importance that waste should be separated and discarded in a safe manner to preserve the environment and human health.

Keywords: Dental Amalgam, Biomedical Waste, Knowledge

Introduction

Amalgam is an alloy of mercury (Hg), which is an excellent and versatile dental restorative material. Amalgam has been used in dentistry for about 100 years and is still being used due to its low cost, strength, durability, ease of application, and bacteriostatic effects. Now a days due to concerns about aesthetics,

environmental pollution, and detrimental health effects, the popularity of amalgam as a restorative material is decreasing.

It has also been shown that mercury results in oxidative stress and mitochondrial dysfunction that can increase lipid peroxidation and can also result in calcium homeostasis alteration. Mercury poisoning may also lead to angina or chest pain, especially in an individual under the age of 24.

Human toxicity varies with the form of mercury, the doses, and the rate of exposure. Mercury can be inhaled in vapor form, and the brain is primarily the target organ for inhaled mercury. The gut lining and the kidney are chiefly damaged by mercurous and mercuric salts, while methyl mercury is widely distributed throughout the body. Toxicity varies with the dosage: severe pneumonitis is induced by exposure to large acute elemental mercury vapor and exposure in extreme cases can be fatal.[7] Low-grade chronic exposure to elemental or other forms of mercury induces subtler symptoms and clinical findings.

Any solid, liquid, or fluid waste, including its container and any intermediate product, produced during diagnosis, treatment, and immunization of human or animal research pertaining thereto or in the testing of bio logical and animal waste from slaughterhouses or any other health camps, is known as the Bio-Medical waste. Hazardous Biomedical waste causes physical, chemical, and microbiological risks to the general population and healthcare workers handling the treatment and disposal of waste. The hazardous biomedical waste is only about 15%-30%. The remaining 80-90% is non-hazardous. Dental waste is a subdivision of hazardous biomedical waste. It includes materials that are usually contaminated with body fluids like blood and saliva, these are materials such as soaked cotton, extracted teeth, sharp needles, human tissue parts, and so on.[7] A few other types of wastes are also produced in dental practices such as mercury, silver amalgam, and various chemical solvents. It could be responsible for environmental pollution as well as occupational exposure if the manipulation of amalgam and proper disposal of its waste products are not properly regulated. The aim of the study is to obtain information about the knowledge, attitude, and practices of dental undergraduates in the disposal of silver amalgam and associated health hazards and to create awareness about the proper disposal of mercury amalgam among dental students and paradental staff.

Methodology

Materials and Methods: The present cross-sectional study includes health care personnel in Dental College. A structured, self-administered questionnaire consisting of 15 closed-ended questions was employed to 60 staff (nurses, lab technicians, and class IV employees). Among all, 70 responded and willingly participated in the survey and filled the questionnaire.

Results

A survey was conducted in Dental College. In which 2nd, 3rd, 4th years along with interns participated but 1st year was excluded because of their lack of clinical information and exposure.

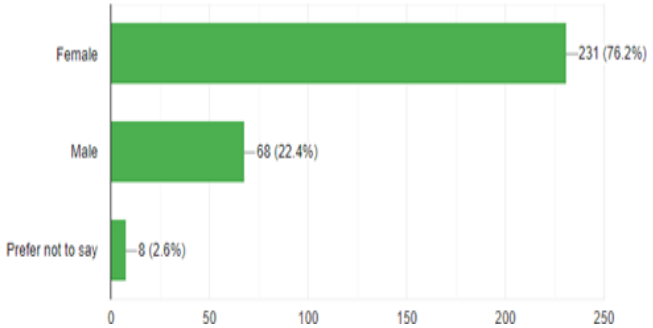

Figure 1: This descriptive analysis depicts that 76.2% females and 22.4% males took part in the survey.

© 2023 - IJHDC

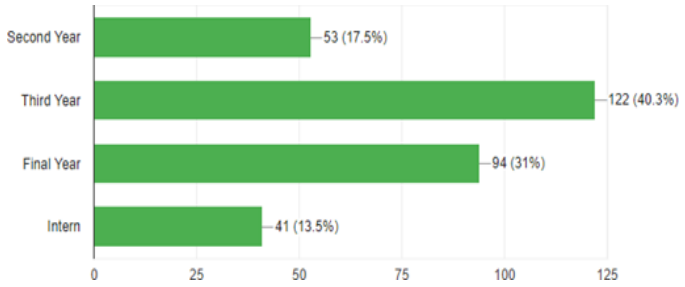

Figure 2: This graph shows that 17.5% second year, 40.3% third year, 31% final year and 13.5% Interns participated in this survey.

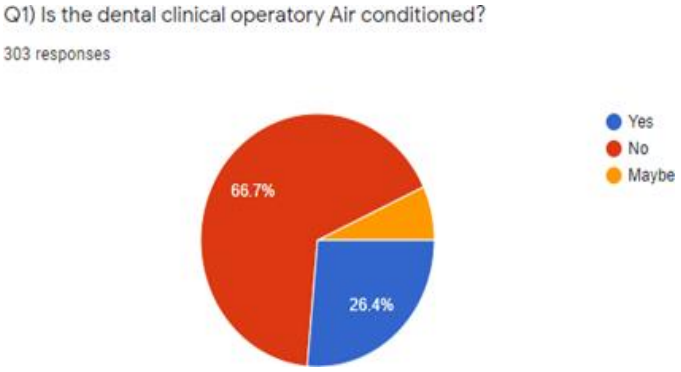

Figure 3: As per the survey, we recorded that 66.7% of the participants said that the clinical operatory is not air-conditioned whereas 26.4% said that it is air conditioned and 6.9% were not sure.

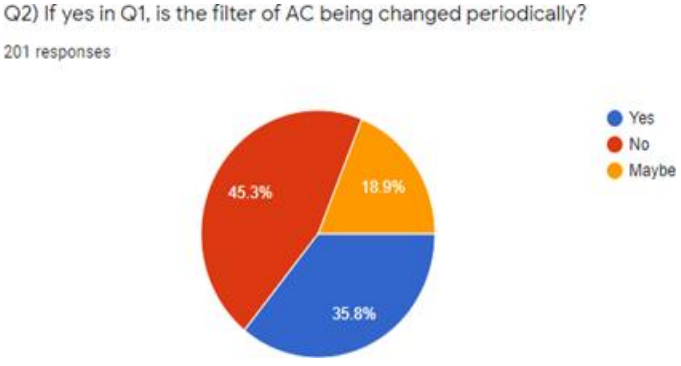

Figure 4: But the clinical operatory is not well maintained as according to 45.3%, the filters are not changed periodically whereas according to 35.8% they are changed periodically and 18.9% are not sure about the answer.

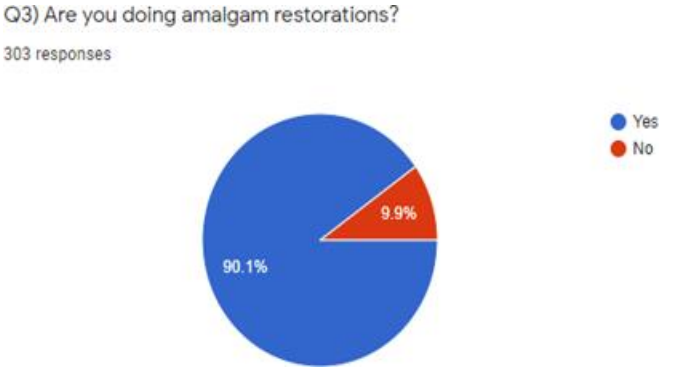

Figure 5: The majority of the participants are doing amalgam restorations 90.1% whereas only 9.9% are not doing it.

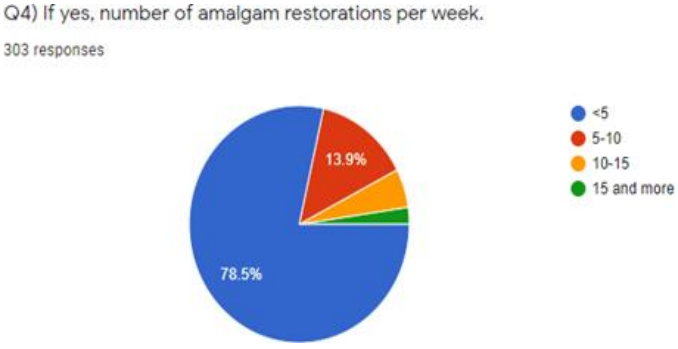

Figure 6: The number of amalgam restorations per week varies to <5 for 78.5%, 5-10 for 13.9%, 10-15 and 15< comprises the rest.

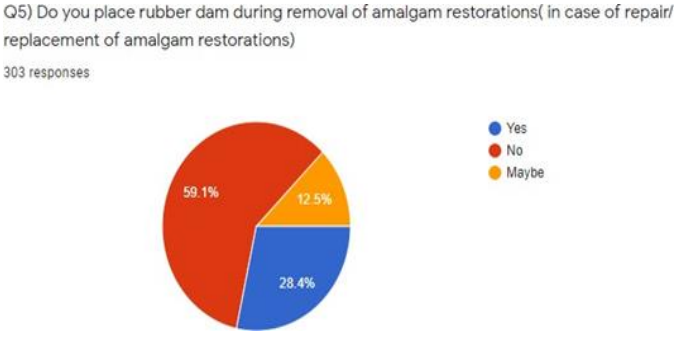

Figure 7: During the removal of amalgam restorations, only 28.4% are using rubber dams, 59.1% are not using them and the remaining 12.5% are not sure about it.

Discussion

Healthcare establishments have a responsibility to make sure that people and the environment are safe and so have particular duties concerning the waste they produce.

© 2023 - IJHDC

The subject of biomedical waste management and handling is gaining prominence for the past few years. Biomedical waste is defined as any waste which is generated during the diagnosis, treatment, or immunization of human beings or animals.

Dental practices involve many restorative materials amongst which silver amalgam is hazardous and this call for proper segregation and disposal of it. According to the World Health Organization, most human mercury exposure is caused by mercury vapours from dental amalgam, ingestion of contaminated fish, or occupational exposure.

With the advancement of technology, dental procedures are highly developed along with the invention of new synthetic non-metallic materials. However, silver amalgam is still widely used for economical dental treatments.

Mercury-containing waste can be in form of elemental mercury or scrap amalgam. The scrap amalgam can be further classified as contact and non-contact amalgam. Contact amalgam is an amalgam that has been in contact with the patient e.g. extracted teeth with amalgam restorations. Non-contact amalgam is an amalgam that has not been in contact with the patient e.g. excess unused set amalgam. Both the scrap amalgams should be stored separately in different containers.

Toxicity from mercury could occur through exposure to organic, inorganic, and elemental forms of mercury. It also depends on the amount of mercury accumulated in the body of the patient.[16] The mercury concentration in whole blood is usually lower than 10µg/L but the value of 20µg/L or below is considered normal. The blood mercury concentration can rise to 35µg/L after long-term exposure to mercury vapors.

Conclusion

The present study have demonstrated that: There should be a necessary practical exercise in dental colleges to impart knowledge of proper amalgam disposal as there is a significant lack of knowledge regarding silver amalgam disposal among health care.

References

1. Li CS, Jenq FT. Physical and chemical composition of hospital waste. Infection Control & Hospital Epidemi ology 1993 Mar;14(3):145-50.
2. Berglund M, Lind B, Björn Berg KA, Palm B, Einar son Ö, Vahter M. Inter-individual variations of human mercury exposure biomarkers: a cross-sectional assess Ment. Environ mental Health 2005 Dec;4(1):20.
3. Brown well AM, Berent S, Brent RL, Bruckner JV, Doull J, Gershwin EM, Hood RD, Matano ski GM, Rubin R, Weiss B, Karol MH. The potential adverse health effects of dental amalgam. Toxicological reviews 2005 Mar 1;24(1):1-0.
4. Berry TG, Summitt JB, Chung AK, Osborne JW. Amalgam at the new millennium. The Journal of the American Dental Association 1998 Nov 1;129(11):1547-56.
5. Dunne SM, Gainsford ID, Wilson NH. Current materials and techniques for direct restorations in posterior teeth: Part 1: silver amalgam. International Dental Journal 1997 Jun;47(3):123-36.
6. Lund BO, Miller DM, Woods JS. Studies on Hg (II) -Induced H2O2 formation and oxidative stress in vivo and in vitro in rat kidney mitochondria. Biochemical pharmacology 1993 Apr 25;45(10):2017-24.
7. Peraza MA, Ayala-Fierro F, Barber DS, Casarez E, Rael LT. Effects of micronutrients on metal toxicity.

© 2023 - IJHDC

Environ mental Health Perspectives 1998 Feb; 106 (1): 203-16.

8. Frustaci A, Magna Vita N, Chimenti C, Caldarulo M, Sabbioni E, Pietra R, Cellini C, Possati GF, Maseri A. Marked elevation of myocardial trace elements in idio pathic dilated cardiomyopathy compared with secondary cardiac dysfunction. Journal of the American College of Cardiology 1999 May 1;33(6):1578-83.
9. Berlin M, Zalpus RK, Fowler BA. Mercury In: Nordberg M, Friberg LT, editors. Handbook on the toxicity of metals. 3rd edition. Chapter 33. New York, NY, USA: Elsevier; 2007.
10. Al-Khatib IA, Darwish RO. Assessment of waste amalgam management in dental clinics in Ramallah and al-Bireh cities in Palestine. Int J Environ Health Res.2004;14(3):179-183.
11. Fung YF, Molvar MP. Toxicity of mercury from dental environment and from amalgam restorations. J Toxicol Clin Toxicol. 1992;30(1):49-61.
12. Awodele O, Adewoye AA, Oparah AC. Assessment of medical waste management in seven hospitals in Lagos, Nigeria. BMC Public Health. 2016;16(1):269.
13. Horsted-Bindslev P. Amalgam toxicity - environmental and occupational hazards. J Dent. 2004;32(5):359-365.
14. Adedigba MA, Nwhator SO, Afon A, Abegunde AA, Bamise CT. Assessment of dental waste management in a Nigerian tertiary hospital. Waste Manage Res. 2010;28(9):769-777.
15. Horsted-Bindslev P. Amalgam toxicity - environmental and occupational hazards. J Dent. 2004;32(5):359-365

© 2023 - IJHDC