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Saudi patients' knowledge and awareness about Mercury in Dental Amalgam

[*]Mazen Doumani[1],Adnan Habib[1],Ali Rafe Hatshan[2],Salman Raheem Alnofiai[2], Faisal Mohamed Alqahtani[2],Mohamad Alaa Sadeka[2],Hani Awad Alasmari[2]
[1](Department of Restorative Dental Sciences, Al-Farabi dental College, Riyadh, Saudi Arabia)
[2](Internship dentist, Al-Farabi dental College, Riyadh, Saudi Arabia)
Corresponding author: [*]Mazen Doumani

Abstract: *Amalgam has been used for 160 years as a restorative material. Millions of dentists around the world routinely use amalgam as a filling material in carious teeth. Mercury which is a component of amalgam known as neurotoxin that can harm the human health.*
Objective: *The aim of this study was to evaluate the knowledge of Saudi patients about mercury in general and mercury found in the composition of dental amalgam.*
Methods: *Anonymous survey forms were distributed to 363 Saudi patients who have at least one amalgam restoration. They were asked to fill it and forward it again to the author and co-authors.*
Results: *A total of 363 Saudi patients were included in this survey, including 209(58%)males and 154(42%)females. When the patients were asked about monthly income, 108(30%)patients reported monthly income of 0-2000SR and21(6%) patients reported more than 20000SR.The level of education was primary school in 1(0%)patients ,preparatory school in 9(2%) patients ,secondary school in 78(21%)patients ,and university in 275(76%).the type of dental filling material was known by 194(53%)patients .199(55%)patients did know that mercury is a part of dental amalgam,253(70%)knew that mercury in amalgam is harmful.*
Conclusion: *An Average knowledge was determined in this study participants about the harmful effect of mercury in amalgam fillings.*
Keywords : *Knowledge ; Amalgam ; mercury; harmful ; neurotoxin ; antagonism.*

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I. Introduction

American environmental protection agency stated that there are currently over one thousand tons of mercury in American mouths, which is more than half of all used mercury in America today (1). The American Society of Dental Surgeons, the predecessor to the American Dental Association (ADA), made its members not to use mercury because of its toxicity (2). Some countries have taken protective measures against amalgam. Norway banned dental amalgam in 2008 (3). Sweden banned the use of dental amalgam for almost all purposes in 2009(4). In spite of this international action, the American Food and Drug Administration considers dental amalgam fillings safe for adults and children ages 6 and above (5). studies has shown that amalgam restorations contribute to notable mercury levels in saliva, urine, and feces, and patients with dental amalgam excrete more than ten times more mercury in their feces than those without mercury fillings (6). Hylander et al 2006 concluded "Amalgam fillings not replaced before death will cause emissions to air, soil, and water upon cremation or burial" (7). (WHO) identified danger effects of mercury exposure, including areas of risk specifically linked to mercury in fetuses and children : insomnia, impaired vision and hearing, paralysis, tremors, emotional instability, developmental deficits during fetal development, and attention deficit and developmental delays during childhood (8). Regarding to fetal and infant dangers from dental amalgam, studies has provided significant information associating the number of maternal amalgam fillings with mercury levels in cord blood (9)., in the placenta (10). Another studies have found the mercury concentration in breast milk increases as the number of amalgam fillings in the mother increases (11). A Study published in 2014 revealed that there is a relation between the number of amalgam restorations in mouth and chronic fatigue, depression, anxiety, and suicide (12) .

II. Materials And Methods

The study was performed in the Restorative dental science department of Alfarabi Dental college in Saudi Arabia . The study included 363 patients with at least one amalgam restoration who attended the clinic for routine dental treatments. The study questionnaire was based on the validated questions assembled from

previous publications (13). Data were collected using a double-page questionnaire which had been developed in the standard manner. the study was conducted by authors of this research. Informed consent was obtained from the patients and the questionnaires were immediately completed in the clinic. Questions were also asked to ascertain the patient's level of knowledge in respect of mercury, amalgam fillings and human health.
Descriptive statistical methods were used to evaluate the data.

III. Results

The study included 363 patients: 209(58%) male and 154(42%) female .The age range of the patients was 18-30 years in 203 cases , 31- 40 years in 117 cases , 41-50 years in 37 cases ,51-60 years in 5 cases , and more than 60 years in one case . When the patients were asked about monthly income, 108(30%) patients reported monthly income of 0-2000 SR and 21(6%) patients reported more than 20000 SR . The level of education among patients group was reported as primary school in 1 case, preparatory school in 9 cases, secondary in 78 cases, and university in 275 cases. Of the total number of cases 169(47%) did not know the type of filling, and 199(55%) did not know that the dental amalgam contained mercury. 110(30%) of patients did not know whether or not mercury is harmful and 188(52%) did not know whether or not the mercury in dental amalgam is harmful(table 1). When the patients were asked about the source of their information about the mercury in dental amalgam the answers were as it is in (table 2), and the answers of the question if they replace dental amalgam fillings because of their fear of mercury they answered as it is in (table 3).

IV. Discussion

Amalgam has been the most common restorative material in the history of dentistry. It is relative cheap, and when handled in a correct way, the longevity of amalgam fillings exceeds that of alternative direct restorative materials (14). Free mercury can be found in the superficial layer of fresh amalgam fillings(15). The release of mercury vapor is increased during tooth brushing, the intake of hot beverages, and, particularly, gum chewing, whereas intake of other foodstuffs apparently has little effect on mercury release (16). Mercury uptake from amalgam fillings occurs primarily via the respiratory tract, specifically the lungs, where approximately 80% of the inhaled mercury vapor diffuses from the pulmonary alveoli to the alveolar capillaries. The kidney is the main depository of mercury after administration of elemental mercury vapor (17). Studies on human cadavers have given some indication of a positive correlation between the number of amalgam restorations and the mercury level in the brain and kidneys (18). In Nigerian study, it was stated that only 35% of the participant know that amalgam fillings contain mercury (19). In another study 76% Americans don't know mercury is the primary component of amalgam fillings (20). In our study, around 45% of participants reported that they knew amalgam fillings contained mercury which is close to Nigerian result (19). In Faraj BM et al study ,they found that awareness of mercury toxicity was found to be low (20).The current study revealed that high percentage (70%) of the participants have awareness of mercury toxicity which is clearly greater percentage than that of Emrullah Bahşi et al study in 2016 (13) , approximately half of participants (48%) have awareness of dental amalgam' mercury toxicity and it is also greater than that in Emrullah Bahşi et al study(13). The results in our study was greater than others and this may be related to the high percentage (76%) of highly educated participants. In spite of the awareness of mercury toxicity , only 6% replaced their amalgam restorations for this reason.

Tables

Table (1) The level of knowledge in respect to the type of filling, whether or not the filling contained mercury. Whether mercury is harmful to human health and whether mercury in dental amalgam is harmful to human health

	Do you know the type of fillings that you have?	Do you know that the amalgam fillings contain mercury?	Do you think mercury is harmful to human health?	Do you think mercury in amalgam fillings is harmful to human health?
Yes	194(53%)	164(45%)	253(70%)	175(48%)
No	169(47%)	199(55%)	110(30%)	188(52%)

Table (2) The source of patients information about mercury in dental amalgam.

What is the source of your information about mercury in dental amalgam?				
My dentist	Internet	My education	Tv	I don't have information
29(8%)	42(12%)	96(26%)	40(11%)	156(43%)

Table (3) Patients' reasons for amalgam fillings replacement .

Did you replace amalgam fillings before? if yes ,why?		
Yes		No
Fear of mercury	Other reasons	I did not replace amalgam fillings

23(6%)	69(19%)	271(75%)

V. Conclusion

The results of this study showed that the level of awareness of the toxicity of mercury was good in the study participants , and this is due to high level of education of the participant.

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