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Original article

Knowledge, Attitude and Practice of Dental Students, Interns and Practitioners Towards the Phase-Down of Dental Amalgam in A Dental Institution of Libya

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ABSTRACT

Amalgam has historically been a widely used restorative material for posterior teeth, valued for its longevity. However, concerns about mercury-related health risks and aesthetic drawbacks have led to a decline in its usage. This study aimed to assess the knowledge, attitudes, and practices of dental students, interns, and practicing dentists regarding dental amalgam in dental institutions in western Libya. A cross-sectional survey was conducted with 409 participants, including dental students, interns, dental officers, and faculty members. The questionnaire consisted of 18 questions related to the knowledge, utilization, and safety of dental amalgam. Data analysis using SPSS version 27 revealed that most participants rarely used amalgam, influenced by aesthetic concerns and patient preferences. There was a clear preference for composite resin as an alternative restorative material, indicating a trend towards discontinuing amalgam due to safety and environmental issues. The study concluded that most respondents rarely use dental amalgam, primarily due to aesthetic considerations, patient preferences for tooth-colored materials, and increased awareness of mercury toxicity.

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INTRODUCTION

The scientific revolution in the field of dentistry has trended towards more cosmetic restorative options, and amalgam is often perceived as lacking in aesthetic appeal. Despite this shift, the use of amalgam as a restorative material persists due to its low cost, ease of application, and proven strength and durability [1]. It was previously indicated for many years as a direct restorative material for posterior teeth [2]. The development of amalgam has paralleled the advancements in other dental materials. Modern amalgam formulations are available in capsule form, which consists of approximately 45% mercury. This capsule-based presentation is intended to enhance ease of use, reduce dosage, and potentially mitigate concerns regarding mercury exposure during the mixing process [3].

Haikel and colleagues conducted a study in 1990 at Pasteur University that utilized atomic absorption spectrometry to measure the mercury exposure of patients. Their findings indicated that mercury vapor was released during the insertion, condensation, carving, and removal of amalgam restorations4. In the same year, Clarkson reported that mercury poisoning in young children was not caused by chewing on amalgam fillings [5]. Conversely, in December 2003, Dr.

Frederick Eichmiller, the director of the ADA Foundation's Paffenbarger Research Centre, testified that "the amalgam is a safe, affordable, and durable material." [6]. Despite the ongoing concerns regarding the potential toxicity of mercury, most dental institutions continue to maintain amalgam as the material of choice for undergraduate dental students [7]. However, some countries have taken a different approach. Dental schools in Netherlands stopped teaching restorative techniques with amalgam between 1995 and 2005, while schools in Denmark actively encourage the placement of composite restorations. In Japan, 93% of dental schools emphasized the teaching of mercury-free restorations. Furthermore, Sweden, Germany, and Norway have completely restricted the use of dental amalgam due to environmental considerations [8].

A study conducted in the United Kingdom and Ireland examined the teaching of restorative materials in dental schools, revealing that the instruction of posterior composite restorations has substantially increased over the years. Consequently, dental students often gain more experience in the placement of posterior composite restorations compared to amalgam fillings [9]. In contrast, a study from Brazil indicated that despite the significant reduction in the use of amalgam restorations in private practice and dental schools, dental educators still recommended that Brazilian dental schools should continue to teach amalgam techniques, as the demand for amalgam restorations remains high in the public sector [10]. The aim of the present study was to assess the awareness and perception of dental students, interns, and practicing dentists towards the use and safety of dental amalgam as a restorative material.

METHODS

Study design

The present study was a cross-sectional survey conducted online through the platform forms.office.com. The target group for this study comprised dental students, interns, dental officers, and dental faculty members from various locations in western Libya.

Sampling process

The study population was selected using a cluster random sampling technique. The study employed an 18-item structured questionnaire that was adapted from a previously published work by Dixit et al. in 2020. This questionnaire had been validated by the original authors prior to its use in the current research. The questionnaire comprised a combination of closed-ended questions, a demographic profile section, and questions related to the participants' knowledge, attitudes, and practices towards the use and safety of dental amalgam [11].

The questionnaire was uploaded to Microsoft Forms, and the study was completed over a period of two months. The web link was distributed through various social media platforms, including https://forms.office.com/r/wVHkVpySJT.

A total of 418 individuals were approached, and 409 of them responded to the survey. The responses were collected and tabulated in a Microsoft Excel spreadsheet.

Data analysis

The data was then analyzed according to the different professional levels using the Statistical Package for Social Sciences (SPSS) version 27. Frequency and percentage calculations were performed for each response.

RESULTS

A descriptive cross-sectional study was conducted among 409 participants, including dental students, interns, dental officers, and dental faculty members (Table 1). The distribution of participants among the dental students revealed that 65 (21.5%) were 1st-year students, 85 (20.7%) were 2nd-year students, 39 (9.5%) were 3rd-year students, and 40 (9.8%) were 4th-year students, totaling 177 students.

Table 1. Distribution of the subjects based on designation.

Designation	Frequency (n)	% Percentage
Undergarduate Students	**177**	**43.3**
1st year students	13	3.2
2ed year students	85	20.8
3rd year students	39	9.5
4th year students	40	9.8
Interns	**86**	**21.0**
Dental officers	**129**	**31.5**
Dental faculty members	**17**	**4.2**

The demographic profile of the participants, as shown in Table 2, indicated that the majority were females (261, 63.81%), with students comprising the majority (177, 43.3%) and faculty members the minority (17, 4.2%).
The participants' responses regarding the use of amalgam and its alternatives are detailed in Table 3. A significant proportion of participants (219, 53.55%) reported infrequent use of amalgam for restorations, while 85 (20.78%) used amalgam occasionally for simple restorations. Interestingly, 206 participants (50.37%) never used amalgam at all, and all dental faculty members refrained from using amalgam as a build-up material. Concerns related to poor aesthetics and patient preference for tooth-colored restorations were cited as major reasons for restricting amalgam use (221, 54.03%). Moreover, a majority of participants (269, 65.77%) agreed to replace a good amalgam restoration with composite, particularly students (115, 64.97%). Additionally, 292 participants (71.39%) expressed a preference for changing defective amalgam restorations to composite.
Regarding the discontinuation of amalgam use, the majority of respondents (323, 78.97%) supported its cessation. They indicated a preference for composite resin as an alternative restorative material (182, 44.50%), followed by other options such as cast gold or ceramic restorations (142, 34.72%).

Table 2. Demographic profile of study participants.

Variables	Students	Interns	Dental officers	Dental faculty members	Total according to gender
	n (%)	n (%)	n (%)	n (%)	n (%)
Male	46 (31.1)	40 (27)	56 (37.8)	6 (4.1)	**148 (36.19)**
Female	131 (50.2)	46 (17.6)	73 (28.0)	11 (4.2)	**261 (63.81)**
Total according to qualifications n (%)	**177 (43.3)**	**86 (21)**	**129 (31.5)**	**17 (4.2)**	**409 (100)**

Table 3. Responses to questions related to use of amalgam and its alternatives n (%.).

Question	Students n (%)	Interns n (%)	Dental officers n (%)	Dental faculty members n (%)	Total n (%)
Do you use dental amalgam for restorations in your clinical practice frequently?					
Yes	67 (37.85)	49 (56.98)	63 (48.84)	4 (23.53)	183 (44.74)
No	108 (61.02)	34 (39.53)	65 (50.39)	12 (70.59)	219 (53.55)
Have you used dental amalgam for the following?					
Simple restorations	44 (24.86)	29 (33.72)	30 (23.26)	2 (11.76)	85 (20.78)
Large restorations	52 (29.38)	7 (8.14)	14 (10.85)	7 (41.18)	80 (19.56)
Core material	5 (2.82)	1 (1.16)	1 (0.78)	1 (5.88)	8 (1.96)
Build up material	3 (1.69)	2 (2.33)	2 (1.55)	0 (0)	7 (1.71)
Don’t use at all	71 (40.11)	47 (54.65)	81 (62.79)	7 (41.18)	206 (50.37)
What are the reasons that restrict you from using dental amalgam?					
Aesthetics	21 (11.86)	17 (19.77)	14 (10.85)	4 (23.53)	56 (13.69)
Mercury Toxicity	25 (14.12)	10 (11.63)	17 (13.18)	2 (11.76)	54 (13.20)
Patient’s Desire	12 (6.78)	14 (16.28)	11(8.53)	1 (5.88)	38 (9.29)
Aesthetics and patient’s desire/mercury toxicity	86 (48.59)	42 (48.84)	84 (65.12)	9 (52.94)	221 (54.03)
Other reasons	30 (16.95)	2 (2.33)	1 (0.78)	1 (5.88)	34 (8.31)
Do you agree on replacing good amalgam restoration with composite resin?					
Agree	115 (64.97)	57 (66.28)	89 (68.99)	8 (47.06)	269 (65.77)
Disagree	59 (33.33)	22 (25.58)	35 (27.13)	7 (41.18)	123 (30.07)
If a patient had defective amalgam restoration, what would you prefer changing it to?					
Amalgam	19 (10.73)	17 (19.77)	14 (10.85)	2 (11.76)	52 (12.71)
Composite	122 (68.93)	57 (66.28)	104 (80.62)	9 (52.94)	292 (71.39)
Any of the above	34 (19.21)	10 (11.63)	10 (7.75)	6 (35.29)	60 (14.67)
Do you agree on stopping the use of amalgam as a final restoration?					
Agree	135 (76.27)	69 (80.23)	108 (83.72)	11 (64.71)	323 (78.97)
Disagree	39 (22.03)	14 (16.28)	16 (12.40)	6 (35.29)	75 (18.33)

Would you recommend an alternative to amalgam?					
Yes	106 (59.89)	72 (83.72)	102 (79.07)	14 (82.35)	294 (71.88)
No	22 (12.43)	8 (9.30)	10 (7.75)	1 (5.88)	41 (10.02)
Uncertain	48 (27.12)	4 (4.65)	9 (6.98)	2 (11.76)	63 (15.40)
Which of the following amalgam alternatives are you comfortable working with?					
Resin composite	103 (58.19)	34 (39.53)	37 (28.68)	8 (47.06)	182 (44.50)
Glass Ionomer Cement	37 (20.90)	19 (22.09)	21 (16.28)	3 (17.65)	80 (19.56)
Others (Cast gold restoration/ ceramic restoration)	36 (20.34)	32 (37.21)	68 (52.71)	6 (35.29)	142 (34.72)

Responses related to the amalgam controversy, as presented in table 4, revealed that most participants (272, 66.50%) were aware of the controversy, while some were uncertain (69, 16.87%). Concerns about the safety of amalgam were prevalent, with 246 participants (60.15%) considering it unsafe, and a portion remained uncertain (55, 13.45%). Environmental issues related to mercury in dental settings were a significant concern for 269 participants (65.77%).

Table 4. Responses regarding amalgam war n (%).

Question	Students n (%)	Interns n (%)	Dental officers n (%)	Dental faculty members n (%)	Total n (%)
Are you aware of amalgam controversy?					
Yes	80 (45.20)	70 (81.4)	110 (85.27)	12 (70.59)	272 (66.50)
No	41 (23.16)	7 (8.14)	9 (6.98)	2 (11.76)	59 (14.43)
Uncertain	53 (29.94)	7 (8.14)	7 (5.43)	2 (11.76)	69 (16.87)
What was your source of awareness?					
Patient enquiries	21 (11.86)	9 (10.47)	7 (5.43)	2 (11.76)	39 (9.54)
Undergraduate education	55 (31.07)	2 (2.33)	2 (1.55)	3 (17.65)	62 (15.16)
Conferences	20 (11.30)	27 (31.40)	44 (34.11)	5 (29.41)	96 (23.47)
Colleagues	37 (20.90)	35 (40.70)	55 (42.64)	1 (5.88)	128 (31.30)
Continuing dental education	39 (22.03)	12 (13.95)	18 (13.95)	6 (35.29)	75 (18.34)
What is your opinion about amalgam safety?					
Safe	47 (26.55)	21 (24.42)	20 (15.50)	6 (35.29)	94 (22.98)
Unsafe	84 (47.46)	59 (68.60)	95 (73.64)	8 (47.06)	246 (60.15)
Uncertain	42 (23.73)	4 (4.65)	6 (4.65)	3 (17.65)	55 (13.45)
What is your patient's opinion about amalgam safety?					
Safe	65 (36.72)	19 (22.09)	19 (14.73)	2 (11.76)	105 (25.67)
Unsafe	45 (25.42)	59 (68.60)	99 (76.74)	7 (41.18)	210 (51.34)
Uncertain	63 (35.59)	5 (5.81)	9 (6.98)	8 (47.06)	85 (20.78)
How do you respond to a patient's request to have his/her amalgam removed based on amalgam war?					
Agree	100 (56.50)	78 (90.70)	109 (84.50)	11(64.71)	298 (72.86)
Disagree and explain	71 (40.11)	5 (5.81)	11 (8.53)	6 (35.29)	93 (22.74)
What is your opinion about the controversy on amalgam ban?					
Ban	71 (40.11)	53 (61.63)	101 (78.29)	4 (23.53)	229 (55.99)
Don't ban	53 (29.94)	18 (20.93)	17 (13.18)	7 (41.18)	95 (23.23)
Uncertain	70 (39.55)	12 (13.95)	6 (4.65)	6 (35.29)	94 (22.98)
Is dental amalgam an occupational risk factor at your workplace?					
Yes	93 (52.54)	74 (86.05)	103 (79.84)	5 (29.41)	275 (67.24)
No	74 (41.81)	11 (12.79)	19 (14.73)	12 (70.59)	116 (28.36)
Are you bothered about the environmental issues of mercury in the dental office?					
Yes	92 (51.98)	66 (76.74)	100 (77.52)	11 (64.71)	269 (65.77)
No	22 (12.43)	6 (6.98)	9 (6.98)	2 (11.76)	39 (9.54)
Not sure	55 (31.07)	12 (13.95)	15 (11.63)	4 (23.53)	86 (21.03)

DISCUSSION

Dental amalgam is one of the most commonly used restorative materials in dentistry. It is often the preferred choice in various clinical situations when compared to other direct restorative materials, such as composites and glass ionomers, due to its favorable physical and mechanical properties, stability, ease of use, and relatively low cost [1,12]. However, the use of dental amalgam has been the subject of continuous debate for years, with concerns raised about the degree of mercury release and its potential health effects. Numerous scientific studies have consistently affirmed the safety and efficacy of dental amalgam as a restorative material [13-15]. Despite the wealth of evidence supporting its safety and effectiveness, prevailing perceptions among patients, dental students, and dentists in Libya persist in expressing concerns regarding the safety of dental amalgam material. So, the current study aimed to evaluate the knowledge, attitude, and behavior of students, interns, and dental practitioners concerning the utilization of dental amalgam within some dental facilities and dental clinics situated in western Libya.

The present study examined the restorative material preferences and utilization patterns among participants in western Libya. Regarding material preferences, the majority of respondents reported a preference for composite resin over amalgam for the replacement of defective amalgam restorations. However, a substantial proportion of participants, comprising more than 50% (219, 53.55%), indicated infrequent use of amalgam for restorative purposes. Furthermore, a majority of the participants (206, 50.37%) reported a complete absence of amalgam usage in their clinical practice. Interestingly, the analysis of utilization patterns across different participant groups revealed that students exhibited the highest rate of amalgam usage, with 67 individuals (37.85%) reporting its application. This finding aligns with the observations made by Dixit et al. in their 2020 study, which attributed the heightened amalgam usage among students to the presence of a specified quota for amalgam restorations within the Bachelor of Dental Surgery (BDS) curriculum at Kathmandu University [11].

Several studies have delved into the perceptions and behaviors of dental students, interns, and practitioners concerning the reduction of dental amalgam usage [11,14,16-18]. In Nepal, due to concerns regarding mercury toxicity, there has been a decline in the indication of amalgam, with a shift towards composite resin as a substitute. While dental professionals in Nepal traditionally favored amalgam for restorations, there is a rising apprehension regarding the health hazards linked to mercury. The research evaluated the preferences and behaviors concerning dental amalgam across various segments of the dental community. A significant proportion of respondents, including all dental officers, infrequently used amalgam for restorations (141, 73.44%). Furthermore, a majority (135, 70.31%) expressed agreement with discontinuing the use of amalgam. Findings revealed diverse attitudes towards amalgam, with a considerable number of participants favoring composite materials over amalgam due to aesthetic considerations (185, 96.35%). The majority (123, 64.06%) perceived amalgam as an unsafe material and expressed concerns about the environmental implications of mercury in dental settings (152, 79.16%).

According to our findings, the reluctance of dentists and students to continuously employ dental amalgam is largely attributed to three primary factors: poor aesthetics, patient desire, and mercury concerns (221, 54.03%). This sentiment is corroborated by the findings of Espelid et al., who noted that patients across all genders prioritize aesthetics over the longevity of restorative materials [18]. In Saudi Arabia, Alkhudhairy found the most common reasons for limiting amalgam use among participants were aesthetic considerations (77.1%), followed by patient desires (58.6%), with mercury toxicity cited by approximately 27% of respondents. The relatively low percentage of mercury toxicity concerns can be attributed to the differing perspectives on amalgam safety among practitioners, with a majority (85%) believing it to be safe for patients, while 88% consider it hazardous for dentists if not handled appropriately [14].

According to Alkhudhairy's study, the results indicated that a significant majority of the participants (80.7%) did not frequently use dental amalgam for restorations in their clinical practice. Notably, a substantial proportion of participants in the private sector expressed reluctance to replace sound amalgam restorations with composite resin and persisted in using amalgam as a final restoration. Furthermore, a higher percentage of interns exhibited infrequent use of amalgam in their clinical practice, refrained from replacing sound amalgam restorations with composite resin, and opposed the discontinuation of amalgam as a final restoration compared to practicing dentists. A larger proportion of interns opted not to replace intact amalgam restorations with composite resin [14], which contrasts with the results of our study.

Insights from a study conducted by Khairuldean and Sadig provided valuable perspectives on dental professionals' approaches to amalgam removal. The research revealed that a majority of participants (63%) engaged in discussions with patients prior to the removal of amalgam restorations. Additionally, 21% of respondents proceeded with removal based on patient requests, while 14% did not adhere to patient preferences. Furthermore, a smaller proportion (6%) advocated for the replacement of amalgam restorations with alternative restorative materials. These findings highlight the diverse approaches adopted by dental professionals when addressing amalgam restorations, with a significant emphasis on patient communication and shared decision-making [19].

Our results found that approximately 56% of respondents agreed on the need to discontinue the use of amalgam as a final restoration. This finding aligns with the conclusions drawn by Menakaya et al., in their review, which highlighted those composite restorations enable more conservative tooth preparation and localized repair, thereby eliminating the implications associated with the complete replacement of amalgam restorations. This approach can prevent the repeated enlargement of the cavity depth and width that often occurs when removing old amalgam fillings [20]. The World Health Organization (WHO) has also stated that resin-based composites surpass amalgam and are simpler to repair than amalgam restorations [21].

Dental amalgam and its impact on patients and the environment have been the subject of ongoing debate and research within the field of dentistry. Two parallel studies conducted in Portugal and the United States examined the health impacts on children who had their teeth restored with dental amalgam. The findings from both investigations revealed that children with dental amalgam had higher urinary mercury levels compared to those with composite resin restorations [22,23]. Furthermore, the research by Drasch et al. highlighted the presence of mercury concentrations up to 20 ng Hg/g in German infant brain tissues, primarily resulting from maternal dental amalgam fillings [24].

Additionally, the level of mercury in the urine can be influenced by the use of dental amalgam fillings. A study showed that exposure to dental amalgams can lead to increased urine mercury concentrations, indicating a direct impact on the body's mercury levels. Research conducted among 99 young women in Korea revealed that individuals with dental amalgam fillings had significantly higher urine mercury concentrations compared to those without such fillings. The study demonstrated a correlation between the number of teeth filled with amalgam, the surfaces involved, and the presence of defective amalgam fillings with elevated urine mercury levels. This suggests that the presence of dental amalgam can contribute to higher mercury excretion through urine, highlighting a potential link between dental amalgam exposure and urine mercury concentrations25. The study by Björkman et al. indicates that the removal of all amalgam restorations leads to a decrease in the concentration of inorganic mercury (I-Hg) and silver (Ag) in serum. The results suggest that exposure to amalgam fillings results in an increase in the daily dose of both I-Hg and Ag26.

Several other studies, including those by Barregard et al., Dunn et al., Dye et al., and others investigated urinary mercury (Hg) concentrations in relation to the presence of dental amalgam fillings. These studies demonstrated higher average urine Hg levels in individuals with amalgam fillings compared to those without, with urine Hg content increasing as the number of amalgam fillings rises [27,28,29]. In another study led by Berge et al., encompassing a cohort of more than 90,000 pregnant women, the researchers observed that there were no discernible adverse birth outcomes among women who underwent composite restorations compared to those who did not seek dental treatment during their pregnancy [30].

Previous research and our own investigations revealed a significant decline in the use of dental amalgam among dental students and practitioners, attributed to their heightened awareness of its environmental impact. Spaveras et al., in Greece highlighted a substantial shift away from dental amalgam use, acknowledging its moderate environmental implications. Interestingly, the study identified a lack of environmental awareness among dentists with 6–25 years of experience and fourth-year dental students. Moreover, a majority of Greek dental professionals and students expressed concerns about the hazardous effects of dental amalgam on patient health, with dentists reporting a moderate impact on staff health. Notably, perceptions of the impact on patient and staff health varied by geographical region [18].

Despite the American Dental Association's stance that dental amalgam has undergone thorough study and evaluation and has a proven track record of safety and efficacy, the United States has joined other countries in advancing the legally binding Minamata Convention on Mercury. The Minamata Convention on Mercury advocates for a strategic approach to diminishing mercury consumption by promoting education and training within dental schools. The convention recommends that dental institutions educate and train dental professionals and students on the indication of mercury-free dental restoration alternatives, along with fostering best management practices [31].

The studies highlighted a significant gap in awareness and training regarding alternatives to dental amalgam, with findings indicating limited knowledge of the Minamata Convention and alternative materials, as well as suboptimal adherence to phase-down practices among dental professionals in Nigeria17. The study in Nigeria revealed that a substantial proportion of participants exhibited limited knowledge of the Minamata Convention (87.7%) and lacked training in alternative materials to amalgam (72.0%). Despite efforts to phase down amalgam, it remains prevalent, with 39.1% of dental students and 31.3% of dentists continuing to use it. Merely 4.7% of respondents acknowledged adhering to recommended amalgam phase-down practices. Significantly, dentists demonstrated higher levels of awareness and adherence to phase-down practices compared to dental students. This underscores the urgent need for enhanced education and training initiatives to facilitate the transition towards alternative restorative materials in Nigeria's dental practice landscape [17].

A study conducted at a private dental school in 2020 by Natarajan et al. revealed that dental interns exhibited the highest level of knowledge regarding amalgam restorations compared to second-year, third-year, and final-year dental students

[32]. In Australia, dental educators have highlighted the necessity of emphasizing alternatives to dental amalgam and the importance of formal guidelines for its utilization. The study involving fifteen participants from seven out of the nine dental schools in Australia revealed key themes, including the (in)consistency in teaching restorative dentistry, the perceived disconnect between academic learning and practical application, the demand for teaching alternatives to dental amalgam (with 80% strongly supporting this notion), the complexity of the evidence base, and the call for increased postgraduate education on adhesive restorative materials (with 86% strongly advocating for this). Furthermore, there is a unanimous agreement among participants (100%) on the topicality and significance of these issues. This consensus among dental educators in Australian dental schools regarding the teaching of dental amalgam and the identified key themes underscores the importance of addressing these concerns in the field [33].

In another investigation, the primary obstacles to the complete elimination of dental amalgam in Ireland were pinpointed as training and remuneration. The study, which achieved an 11.8% response rate (285), revealed a notable level of awareness among participants regarding the recommended guidelines associated with the Minamata Convention on Mercury, with 96% acknowledging these recommendations. Moreover, a substantial portion of the respondents (61%) expressed support for the phase-down initiative. This research sheds light on dentists' perspectives concerning the gradual reduction of dental amalgam, their familiarity with the endorsed guidelines linked to this reduction, and the recognition of training and remuneration as significant barriers to a complete cessation of dental amalgam usage in Ireland [34].

The consideration of dental professionals' preferences and attitudes towards dental materials is crucial for dental institutions in Libya to effectively phase down the use of dental amalgam and promote sustainable dental practices in the region. This approach is particularly important given the prevailing concerns among dental professionals regarding the safety and environmental implications of dental amalgam. The Minamata Convention on Mercury, a legally binding international agreement, advocates for a strategic approach to diminishing mercury consumption, including in the dental sector. The convention specifically recommends that dental institutions educate and train dental professionals and students on the indication of mercury-free dental restoration alternatives, along with fostering best management practices for the use of dental amalgam. By emphasizing the safety, aesthetics, and patient-centered benefits of composite resin and other modern restorative materials, dental institutions in Libya can facilitate a shift towards more environmentally friendly and patient-centric practices. This shift can be achieved through targeted education and training initiatives that highlight the advantages of composite resin and other alternatives to dental amalgam. Additionally, dental institutions can promote the adoption of these alternatives by incorporating them into their curricula and providing ongoing support for dental professionals in their transition to these new materials.

CONCLUSION

The findings of the present study indicate that more than 53% of the respondents reported infrequent use of dental amalgam in their clinical practice. The primary reasons cited by the participants for restricting the use of amalgam were concerns related to poor aesthetics and patient preference for tooth-colored restorative materials, as well as perceived issues regarding mercury toxicity. Furthermore, the study findings suggest heightened awareness and concern among the respondents regarding the potential safety issues associated with dental amalgam, particularly in relation to mercury exposure.

Limitations

Responses obtained cannot be generalized to the opinions of all Dental faculty members, dental officers, interns, and students in Libya.

Comparative assessment could not be computed for statistical analysis and interpreted due to the uneven distribution of study participants in different groups.

Recommendations

To enhance the robustness and depth of future research on dental amalgam, the study recommends: expanding the geographical scope to include diverse institutions and regions, integrating qualitative methods alongside quantitative approaches, adopting a longitudinal design to track changes over time, and exploring potential confounding factors like educational background and personal beliefs. These recommendations aim to improve the generalizability, depth of understanding, and ability to discern evolving trends regarding the use and perceptions of dental amalgam.

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Conflicts of Interest
None declared.

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معرفة وسلوك وممارسة طلاب الأسنان والمتدربين والممارسين اتجاه تقليل استخدام مادة الأملغم في مؤسسة تعليمية لطب الأسنان في ليبيا

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المستلخص

كان الأملغم مادة ترميمية شائعة لسنوات طويلة للأسنان الخلفية بسبب طول عمرها. ومع ذلك، أدت المخاوف بشأن المخاطر الصحية المرتبطة بالزئبق والقيود الجمالية إلى تقليل استخدامها. هدف هذه الدراسة إلى تقييم المعرفة والمواقف والممارسات لدى طلاب الأسنان والمتدربين وأطباء الأسنان الممارسين فيما يتعلق بمادة الأملغم في المؤسسات التعليمية لطب الأسنان في غرب ليبيا. تم إجراء مسح مقطعي شمل 409 مشارك، بما في ذلك طلاب الأسنان والمتدربين وأطباء الأسنان وأعضاء هيئة التدريس. تضمن الاستبيان 18 سؤالًا يتعلق بالمعرفة والاستخدام والسلامة لمادة الأملغم. أظهرت تحليل البيانات باستخدام النسخة 27 من برنامج SPSS أن معظم المشاركين استخدموا الأملغم بشكل نادر، متأثرين بالمخاوف الجمالية وتفضيلات المرضى. كان هناك تفضيل واضح لمادة الكمبوسيت كمادة ترميمية بديلة، مما يشير إلى اتجاه نحو التوقف عن استخدام الأملغم بسبب القضايا المتعلقة بالسلامة والبيئة. خلصت الدراسة إلى أن المشاركين نادراً ما يستخدمون الأملغم، ويرجع ذلك أساسًا إلى الاعتبارات الجمالية وتفضيلات المرضى للمواد ذات اللون المشابه للأسنان، وزيادة الوعي بالتسمم الزئبقي وقضايا السلامة.

الكلمات الدالة: ترميم الملغم، أعضاء هيئة التدريس، طلاب طب الأسنان، التوعية، الزئبق.