

# Assessment of Knowledge, Attitude and Practice among Dental Professionals in Central India regarding Amalgam Restoration and Composite Restoration as Posterior Restorative Material: A Questionnaire-based Study

ANJALI E MULE<sup>1</sup>, MANJUSHA M WARHADPANDE<sup>2</sup>, DARSHAN M DAKSHINDAS<sup>3</sup>

## ABSTRACT

**Introduction:** The restoration of teeth, which are most often damaged by trauma or dental caries, remains the majority of general dentists' main area of focus on a daily basis. A major cause of concern in dental practice is the failure of dental restorations. Dental practitioners tend to employ dental amalgam and composite restorations more commonly.

**Aim:** To evaluate the preference of amalgam or composite as a posterior restorative material among different groups of dental professionals in central India.

**Materials and Methods:** This questionnaire-based cross-sectional study was conducted in Central India (Nagpur region) by the Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Nagpur, Maharashtra, India. It was performed among 153 dental professionals including general dentists, Endodontists, other specialists and postgraduate students in central India between July 2021 to December 2021. Questionnaire containing 15 close-ended and two open-ended questions assessing different methods of restoring posterior teeth in different conditions of tooth, choice of patient, physical properties and future scope of restorative material. Following validation, the questionnaire given to targeted population. Data was collected and statistically analysed using

Statistical Package for Social Sciences (SPSS) software version 20.0. Comparison between different dental professional groups was performed using Chi-square test.

**Results:** A 76.9% Endodontists and 83.5% postgraduate students preferred composite in routine dental practice. A 76.9% Endodontists and 70.9% postgraduate students opted for restorative material depending on clinical indications. A 46.2% Endodontists choose amalgam restoration as posterior restorative material in patients with poor oral hygiene. A 52.6% general dentists preferred amalgam as restorative material in large cavities over composite restoration. Most of the Endodontists, general dentists and postgraduates choose composite as restorative material due to aesthetic, less enamel removal during cavity preparation and patient's request. Post-restoration sensitivity after amalgam restoration was stated by 64.9% general dentists.

**Conclusion:** Composite restoration was the most preferable posterior restorative material in routine dental practice among different groups of dental professionals. The ultimate decision on the best material for patients based on their clinical circumstances, teeth, and patient requests was a desirable approach to embrace.

**Keywords:** Aesthetic restorations, Dental restoration, Mercury hazards, Tooth fracture, Tooth-coloured restorations

## INTRODUCTION

The primary focus of most general dentists' daily work continues to be the restoration of teeth, which are most frequently damaged by dental caries or trauma [1]. To treat dental caries, dentists frequently employ traditional restorative procedures [2]. Since its widespread use as a dental restorative material more than 150 years ago, dental amalgam has given patients a useful and reasonably priced service [3]. In various dental procedures, amalgam has been found to be helpful. However, amalgam use has significantly decreased over the past ten years, primarily as a result of concerns about mercury [4]. There are certain limitations of amalgam also, such as aesthetics, the absence of adhesion to dental tissues, which is manifested in the need to remove sound tooth structure [5].

Since the 1840s, the safety of amalgam has been questioned and it continues to the present day [6]. The benefits and risks of using mercury-containing amalgam have generated a great deal of debate [7]. Today, posterior composites are replacing dental amalgam,

a time tested, widely used, and the gold standard for posterior restoration [8]. Resin-Based Composite (RBC) dental materials are being used more frequently due to the rising need for aesthetic, tooth-coloured, and mercury-free restorations [9]. In the field of composite dental restorations substantial and significant advancements are constantly proposed and made in resin formulation, filler loading and modification, and curing techniques and mechanisms [10].

It has been reported that failure of dental restorations is a significant source of concern in dental practice. Clinicians should be aware with both the longevity of direct posterior restorations and the most frequent reasons why they fail. Replacement of faulty restorations is thought to account for around 60% of all operational work [11]. In a review Alcaraz MG et al., stated that composite restorations had a significantly higher risk of failure than amalgam [10]. Opdam NJ et al., stated that survival for composite resin of 91.7% at 5 years and 82.2% at 10 years. For amalgam the survival is 89.6% at 5 years and 79.2% at 10 years [12]. Systematic review

by Moraschini V et al., calculated a 92.8% mean rate of survival for amalgams and 86.2% for the composite resins, with a mean of 55 months of follow-up [13]. Opdam NJ et al., studied survival of composite versus amalgam restoration and concluded that composite and amalgam restorations performed similarly in the high-risk group, with amalgam performing better on smaller restorations [12]. Composite restorations demonstrated superior 12-year survival for the combined risk categories and the low-risk group [14].

A contemporary point of controversy is that due to mercury toxicity, amalgam restorations need to be prohibited. It's crucial to distinguish between true and hypothetical threats while addressing safety issues [15]. Recent developments in resin formulation, filler loading and modification, curing methodologies, and mechanisms have all been proposed and achieved in the field of composite dental restoratives [16]. The most recent option for restoring cavities in permanent molars and premolars is still dental amalgam and resin composite. Resin composite has gradually taken the role of amalgam as the preferred material for restoring back teeth. But the findings of surveys and retrospective studies conducted by teams of researchers with a practice-based focus on restorative dentistry are not at all consistent [17, 18].

Although there are numerous studies evaluating dentists and patients' choices [3,6,8], it would be helpful to compare postgraduates' and other specialists' choices with those of general dentists and Endodontists in order to identify the areas that each set of clinicians needs to focus on. Due to their knowledge and proficiency in handling the various clinical settings, the Endodontists' decisions were taken into consideration as a comparison tool. In light of this, the current study was conducted to ascertain the best dental restorative material treatments in terms of preferred method, materials, and aesthetics between amalgam restoration and composite restoration for posterior restorative material. The present study examines the significance of other variables such as patient preferences, Dental professional's attitude, and challenges encountered during placement of restoration in posterior regions.

So, the present study was aimed to ascertain dentists' perception, knowledge, and attitude concerning amalgam and composite restoration as posterior restoration materials.

## MATERIALS AND METHODS

This was a questionnaire-based cross-sectional study conducted in Central India (Nagpur region) by the Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Nagpur, Maharashtra, India, from July 2021 to December 2021. The study was reviewed and approved by the Institutional Ethics Committee (Reference No. IEC/04/02). A total of 153 general dentists and specialists from different regions of central India who are registered with the Dental Council of India (DCI) and work in both public and private dental clinics were chosen at random to participate in the study.

**Inclusion criteria:** Dental practitioners who were in dental clinical practice and willing to participate in the study were included in present study.

**Exclusion criteria:** Dental practitioners not willing to participate in study were excluded from present study.

**Sample size calculation:** With reference to the study by Udoye C and Aguwa E, depending upon toxicity awareness among general dentists (93.6%) sample size of 101 was calculated [4]. Thus, a total sample size of 153 was taken to compensate for the non-response rate.

Sample size was calculated using following formula:

$$n \geq \frac{Z^2_{1-\alpha/2} \times p(1-p)}{d^2}$$

Where n=sample size

$Z^2_{1-\alpha/2}$ =level of significance

p=Estimated proportion

$d^2$ =Estimation error

In present cross-sectional study, a total of 153 individuals who had provided their consent were taken into account. Before the study began, each participant provided a written informed permission. The study was carried out in accordance with the ethical guidelines outlined in the 2013 revision of the Declaration of Helsinki.

## Study Procedure

**Questionnaire:** The basic concept was referred from studies done by Faraj BM et al., Udoye C and Aguwa E [3,4]. In the present study, 15 close-ended and two open-ended questions [Table/Fig-1] were face validated by three experienced Endodontists who evaluated, discussed, and suggested changes based on treatment

S. No.	Questions	Options
1.	Which direct restorative material you use routinely in your dental practice?	<ul style="list-style-type: none"> <li>• Amalgam</li> <li>• Composite</li> </ul>
2.	Choice of restorative material depends on?	<ul style="list-style-type: none"> <li>• Physical properties</li> <li>• Patients aesthetic need</li> <li>• Strength</li> <li>• Clinical indications</li> </ul>
3.	Decreased usage of amalgam will reduce mercury release from amalgam waste generated by dental office.	<ul style="list-style-type: none"> <li>• Strongly agree</li> <li>• Agree</li> <li>• Neutral</li> <li>• Disagree</li> <li>• Strongly disagree</li> </ul>
4.	What are the clinical problems faced during placement of posterior restorative material?	<ul style="list-style-type: none"> <li>• Poor isolation</li> <li>• Reduced accessibility</li> <li>• Time consuming</li> <li>• Increased cost</li> <li>• All of the above</li> </ul>
5.	Which material is cost effective and affordable to patients?	<ul style="list-style-type: none"> <li>• Amalgam</li> <li>• Composite</li> </ul>
6.	In what cases do you choose amalgam as restorative material?	<ul style="list-style-type: none"> <li>• Large cavities</li> <li>• Patients with poor oral hygiene</li> <li>• Incipient caries</li> <li>• All of the above</li> </ul>
7.	Why do you choose composite as a restorative material?	<ul style="list-style-type: none"> <li>• Patients request</li> <li>• Aesthetic</li> <li>• Less enamel removal and tooth preparation</li> <li>• All of the above</li> </ul>
8.	Which restorative material you will prefer in case of pregnant patient complaining of pain of dental origin?	<ul style="list-style-type: none"> <li>• Amalgam</li> <li>• Composite</li> <li>• Temporary restoration</li> <li>• Other restoration</li> </ul>
9.	Longevity of silver amalgam is more than composite resin restoration.	<ul style="list-style-type: none"> <li>• Strongly agree</li> <li>• Agree</li> <li>• Neutral</li> <li>• Disagree</li> <li>• Strongly disagree</li> </ul>
10.	Composite resin restoration is technique sensitive.	<ul style="list-style-type: none"> <li>• Strongly agree</li> <li>• Agree</li> <li>• Neutral</li> <li>• Disagree</li> <li>• Strongly disagree</li> </ul>
11.	Do you think placing composite in posterior teeth is more time consuming than amalgam?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
12.	Post restoration sensitivity is associated with	<ul style="list-style-type: none"> <li>• Amalgam</li> <li>• Composite</li> </ul>
13.	Chances of fracture of restored tooth are higher after which restoration	<ul style="list-style-type: none"> <li>• Amalgam</li> <li>• Composite</li> </ul>
14.	Chances of secondary caries due to plaque accumulation are high with?	<ul style="list-style-type: none"> <li>• Amalgam</li> <li>• Composite</li> </ul>
15.	Future of posterior restorative material will be?	<ul style="list-style-type: none"> <li>• Amalgam</li> <li>• Composite</li> <li>• Other</li> </ul>
		• Dentists opinion
16.	What are occupational hazards in using dental amalgam restorations? ----- -----	
17.	Can amalgam be phased out of dentistry? Why? ----- -----	

[Table/Fig-1]: Detailed questionnaire.

protocols followed in studied population. Tests of the questionnaire's content validity were conducted using a content validity index. Five Endodontists were given it, and they were asked to rate the same. The purpose of the questionnaire was to gather data on topics such as: demographics, professional abilities, current use of amalgam and amalgam substitute materials, difficulties encountered during posterior restoration, attitudes toward amalgam restoration, and knowledge of composite resin restoration as posterior restorative materials.

Content validity was done using S-CVI/Ave (Scale-Level Content Validity Index based on the average method): 0.96; S-CVI/UA (Scale-Level Content Validity Index based on the universal agreement method): 0.862 and S-CVI/Ave (Scale-Level Content Validity Index based on proportion relevance): 0.96.

Test-retest reliability was tested using Kappa statistics. A total of 20 individuals were given the questionnaire twice, and the results were analysed. The kappa statistic, which measures agreement, between the two responses was 0.952, indicating almost perfect agreement. This validated questionnaire was then circulated among the included participants using electronic media. The 15 questions were divided into five categories based on the objectives of present survey- Dental professional's attitude towards posterior restoration, knowledge about posterior restorations, treatment options determined, patient preferences, and awareness of post-treatment challenges. Question 16, 17 were not included in the categorisation as the responses were subjective.

Based on the proportion of respondents whose responses corresponded with the currently available evidence, a grading was given as follows [19].

- <34 Very poor
- 34-51 Fair/below average
- 52-57 Good/average
- 58-75 Very good/above average
- 76+ Excellent

Responses were submitted centrally and electronically entered into a database.

S. No.	Questions	Options	Endodontists (n=13)	General dentist (n=57)	Other speciality MDS (n=4)	Postgraduates (n=79)	p-value
1.	Which direct restorative material you use routinely in your dental practice?	Amalgam	3 (23.1%)	22 (38.6%)	0	13 (16.5%)	0.018*
		Composite	10 (76.9%)	35 (61.4%)	4 (100.0%)	66 (83.5%)	
2.	Choice of restorative material depends on?	Physical properties	0	1 (1.8%)	0	10 (12.6%)	0.036*
		Patients aesthetic need	2 (15.4%)	22 (38.6%)	0	4 (5.1%)	
		Strength	1 (7.7%)	7 (12.3%)	0	9 (11.4%)	
		Clinical indications	10 (76.9%)	27 (47.4%)	4 (100%)	56 (70.9%)	
3.	Decreased usage of amalgam will reduce mercury release from amalgam waste generated by dental office.	Strongly agree	6 (46.2%)	22 (38.6%)	2 (50.0%)	36 (45.6%)	0.906
		Agree	6 (46.2%)	22 (38.6%)	2 (50.0%)	36 (45.6%)	
		Neutral	1 (7.6%)	7 (12.25%)	0	5 (8.2%)	
		Disagree	0	5 (8.75%)	0	2 (0.6%)	
		Strongly disagree	0	1 (1.8%)	0	0	
4.	What are the clinical problems faced during placement of posterior restorative material?	Poor isolation	3 (23.1%)	7 (12.3%)	2 (50.0%)	10 (12.7%)	0.711
		Reduced accessibility	1 (7.7%)	11 (19.3%)	0	11 (13.9%)	
		Time consuming	0	1 (1.8%)	0	2 (2.5%)	
		Increased cost	0	1 (1.8%)	0	0	
		All of the above	9 (69.2%)	37 (64.9%)	2 (50.0%)	56 (70.9%)	
5.	Which material is cost effective and affordable to patients?	Amalgam	9 (69.2%)	48 (84.2%)	3 (75.0%)	69 (87.3%)	0.384
		Composite	4 (30.8%)	9 (15.8%)	1 (25.0%)	10 (12.7%)	
6.	In what cases do you choose amalgam as restorative material?	Patients with poor oral hygiene	6 (46.2%)	4 (7.7%)	1 (25.0%)	17 (21.5%)	0.021*
		Incipient caries	2 (15.3%)	5 (8.8%)	0	2 (2.5%)	
		All of the above	2 (15.3%)	18 (31.6%)	1 (25.0%)	23 (29.1%)	
		Large cavities	3 (23.1%)	30 (52.6%)	2 (50.0%)	2 (50.0%)	

## STATISTICAL ANALYSIS

Statistical analysis of the data was performed using SPSS software, version 20.0. The 5% level of significance was maintained. Descriptive statistics were used to present demographic information and responses to each topic. The Chi-square test was used to compare several groups of dental professionals. The p-value  $\leq 0.05$  was considered to be significant.

## RESULTS

The study included 153 dentists who received the questionnaire. There were 48 male (31.4%) and 105 female (68.6%) among the 153 dentists. Total 46 (29.5%) were working as academicians, 55 (36.1%) as clinicians, and 52 (34.3%) as both [Table/Fig-2].

Demographic and professional data		Frequency
Gender	Female	105 (68.6%)
	Male	48 (31.4%)
State/Union territory	Central India (Nagpur regions)	153 (100%)
Qualification	BDS (General dentists)	57 (37.3%)
	Postgraduate in any speciality including endodontics	79 (51.6%)
	Endodontist	13 (8.5%)
	Other speciality MDS	4 (2.6%)
Experience	Academician	46 (29.5%)
	Clinician	55 (36.1%)
	Both	52 (34.3%)

[Table/Fig-2]: Demographic and professional data of the dental practitioners. BDS: Bachelor's of dental surgery; MDS: Masters of dental surgery

Questionnaire showing the preferences for posterior restorative material between composite and amalgam restoration among various groups of dental professionals has been explained in detail in [Table/Fig-1,3].

From the total number of responses, 115 dentists preferred composite as a restorative material, with Endodontists accounting for 10 (76.9%), general dentists accounting for 35 (61.4%), and postgraduates accounting for 66 (83.5%). The p-value was 0.018.

7.	Why do you choose composite as a restorative material?	Patients request	0	2 (3.5%)	0	2 (2.5%)	<b>0.002*</b>
		Aesthetic	0	4 (7.0%)	1 (25.0%)	4 (5.1%)	
		Less enamel removal and tooth preparation	5 (38.5%)	6 (10.5%)	2 (50.0%)	3 (3.8%)	
		All of the above	8 (61.5%)	45 (78.9%)	1 (25.0%)	70 (88.6%)	
8.	Which restorative material you will prefer in case of pregnant patient complaining of pain of dental origin?	Amalgam	0	2 (3.5%)	0	1 (1.3%)	0.587
		Composite	6 (46.2%)	23 (40.4%)	0	29 (36.7%)	
		Temporary restoration	7 (53.8%)	29 (50.9%)	4 (100.0%)	48 (60.8%)	
		Other restoration	0	3 (5.3%)	0	1 (1.3%)	
9.	Longevity of silver amalgam is more than composite resin restoration.	Strongly agree	5 (38.5%)	11 (19.3%)	1 (25.0%)	21 (26.6%)	0.215
		Agree	3 (23.1%)	32 (56.1%)	1 (25.0%)	40 (50.6%)	
		Neutral	4 (30.8%)	8 (14.0%)	2 (50.0%)	13 (16.5%)	
		Disagree	0	5 (8.8%)	0	5 (6.3%)	
		Strongly disagree	1 (7.7%)	1 (1.8%)	0	0	
10.	Do you think composite resin restoration is technique sensitive ?	Strongly agree	5 (38.5%)	17 (29.8%)	1 (25.0%)	39 (49.4%)	0.461
		Agree	7 (53.8%)	29 (50.9%)	3 (75.0%)	33 (41.8%)	
		Neutral	1 (7.7%)	9 (15.8%)	0	6 (7.6%)	
		Disagree	0	2 (3.5%)	0	0	
		Strongly disagree	0	0	0	1 (1.3%)	
11.	Do you think placing composite in posterior teeth is more time consuming than amalgam?	Yes	7 (53.8%)	36 (63.2%)	2 (50.0%)	42 (53.2%)	0.685
		No	6 (46.2%)	21 (36.8%)	2 (50.0%)	37 (46.8%)	
12.	Post restoration sensitivity is associated with?	Amalgam	3 (23.1%)	37 (64.9%)	2 (50.0%)	38 (48.1%)	<b>0.034*</b>
		Composite	10 (76.9%)	20 (35.1%)	2 (50.0%)	41 (51.9%)	
13.	Chances of fracture of restored tooth are higher after which restoration?	Amalgam	3 (23.1%)	37 (64.9%)	2 (50.0%)	38 (48.1%)	0.315
		Composite	10 (76.9%)	20 (35.1%)	2 (50.0%)	41 (51.9%)	
14.	Chances of secondary caries due to plaque accumulation are high with?	Amalgam	6 (46.2%)	41 (71.9%)	2 (50.0%)	49 (62.0%)	0.281
		Composite	7 (53.8%)	16 (28.1%)	2 (50.0%)	30 (38.0%)	
15.	Future of posterior restorative material will be?	Amalgam	0	4 (7.0%)	0	4 (5.1%)	0.875
		Composite	12 (92.3%)	46 (80.7%)	4 (100.0%)	68 (86.1%)	
		Other	1 (7.7%)	7 (12.3%)	0	7 (8.9%)	

**[Table/Fig-3]:** Questionnaire showing the preferences for posterior restorative material between composite and amalgam restoration among various groups of clinicians. Bold p-values are significant

The majority of dentists who chose restorative material based on clinical indications were Endodontists 10 (76.9%), general dentists 27 (47.4%), other speciality, Masters of Dental Surgery (MDS) 4 (100%), and postgraduates 56 (70.9%). The p-value was 0.036.

Because of poor oral hygiene, about 6 (46.2%) of Endodontists choose amalgam as a restorative material. Because of extensive cavities, 27 (52.6%) of general dentists, 2 (50%) of other speciality MDS, and 37 (46.8%) of postgraduates choose amalgam restoration. The p-value was 0.021. Composite restoration was preferred by Endodontists 8 (61.5%), general dentists 45 (78.9%), and postgraduates 70 (88.6%) due to aesthetics, less enamel removal and tooth preparation, and patient preference. A 2 (50%) other speciality MDS preferred composite because it necessitates less enamel removal and tooth preparation. The p-value was 0.002. A total of 37 (64.9%) of general dentists and 2 (50%) of other speciality MDS consider post-restoration sensitivity is caused by amalgam restoration, while 10 (76.9%) of Endodontists and 2 (50%) of other speciality MDS believe it was caused by composite restoration. The p-value was 0.034.

According to the majority of dental professionals, inhaling mercury vapours is the biggest occupational risk, followed by skin rashes, mercury poisoning, ornament fading, nausea and vomiting brought on by amalgam blues, and amalgam tattoos on patients. Regarding the use of amalgam and composite as posterior restorative materials, there are two different viewpoints. While more recent practitioners choose composite restoration because it is more conservative and aesthetically pleasing, long-established dental experts choose amalgam restoration due to its cost effectiveness, strength, longevity, and marginal seal. They claim that rather than

completely getting rid of amalgam, an effort should be made to modify it to improve its qualities and make it more convenient for both dentists and patients.

Thus, according to the grading of knowledge, Endodontists found to had very good knowledge of techniques used for restorations, treatment alternatives, good knowledge of the materials used, their advantages, disadvantages, patient preferences, and aesthetics demand of patients. This level of awareness was the best in comparison with other groups in the respective areas of interest. Postgraduates had excellent knowledge about the indications of composite and very good knowledge about the problems faced during posterior restoration. The general dentists had good knowledge about the indication and longevity of amalgam restoration.

## DISCUSSION

The purpose of present study was to assess the knowledge, attitude, and practise perceptions of participating dentists about the use of composites and amalgam as direct filling materials for posterior teeth. The majority of respondents cited longevity as the most important consideration when considering dental amalgam. This finding is in disagreement with results published by Alkhudhairy F who claimed that dental professionals' preference for dental amalgam was mostly driven by the significant risk of cavities [20]. However, the findings reported by Faraj BM et al., were in agreement with the current study [3]. Systematic review by Moraschini V et al., found that as compared to composite resin restorations, occlusal and occlusoproximal amalgam posterior

restorations have a longer clinical lifespan. Other elements, including as the operator's skill, the materials used, the operating method, field isolation, patient compliance, and oral circumstances, may also affect the effectiveness and duration of the restorations [13]. Another significant factor for the failure of tooth-coloured fillings is secondary caries at the margin of the composite restorations [21]. This has been attributable to polymerisation shrinkage and marginal leakage [22]. A study also found an increase in the number of colony forming units for *Streptococci mutans* along the borders of composite restorations [23].

Shafiqh E et al., concluded that composite restorations showed promising fracture resistance compared to the amalgam group [24]. In the current study, 76.9% of Endodontists and 51.9% of postgraduates claimed that composite has a higher likelihood of fracture, whereas 64.9% of general dentists stated that amalgam has a larger chance of fracture. Vanishree HS et al., compared to samples repaired with bonded amalgam and composite resin, it was observed that the fracture resistance in the samples restored with amalgam was more consistent [25].

Post-operation sensitivity was mostly associated with composite resin restoration, according to 76.9% of Endodontists and 51.9% of postgraduates, while amalgam restoration was answered by 64.9% of general dentists. In contrast to what was previously thought, post-operative sensitivity has been linked to the ability of dentine adhesives to seal up open dentinal tubules rather than to the effects of polymerisation shrinkage on cuspal deflections and marginal adaptation [26]. Dental amalgam is still used often since composites are frequently twice as expensive as amalgam. Some higher-income nations have outlawed the use of dental amalgam as a restorative material, citing the increasing accessibility and availability of additional coronal prosthesis and alternative tooth-coloured dental materials [3]. The majority of dentists in this survey chose amalgam because of its low cost and patient affordability.

Study by Al-Zubaidi ES and Rabee AM reports that some dental offices in Baghdad City have significant levels of mercury vapour indoor air that surpass occupational exposure guidelines [27]. Data revealed that dental employees' exposure to mercury vapour can cause free radicals, dangerously substantial changes in several enzyme activities, liver and kidney functions, as well as some biochemical markers. Additionally, findings from the variations in blood levels of urea and creatinine between exposed and unexposed persons imply that a prolonged occupational exposure to mercury may result in renal impairment [27]. In present study, dentists believe that mercury toxicity, allergic reactions, mercury inhalation, respiratory disorders, neurological difficulties, discolouration of tooth and gingiva, waste disposal are all potential occupational hazards caused by dental amalgam.

Although many dentists believe that dental amalgam will not be phased out because of its affordability, ease of insertion, longevity, cost-effectiveness, and good marginal seal, emerging restorative materials such as composite resins may modify this due to aesthetic requirements of patients above strength and durability.

### Limitation(s)

Despite serving as a comparison group, the Endodontists' replies varied widely, possibly reflecting the fact that they made up just 8.5% of the sample size. There is a need for larger sample sizes and more rigorous evidence-based studies in this field involving dentists from a wider geographic dispersion.

### CONCLUSION(S)

Composite restoration is the most preferable posterior restorative material in routine dental practice among different groups of

dental professionals. An 83.5% postgraduates followed by 76.9% endodontist preferred composite as posterior restorative material. Although amalgam is still a popular material for posterior restorations, dental practitioners were aware of the issues surrounding the safety of amalgam, but they still favour amalgam restoration in particular clinical situations when done properly and with all necessary safety measures. Also, they focus more on the demands and satisfaction of their patients.

### REFERENCES

- [1] Lynch CD, Farnell DJJ, Stanton H, Chestnutt IG, Brunton PA, Wilson NHF. No more amalgams: Use of amalgam and amalgam alternative materials in primary dental care. *Br Dent J.* 2018;225(2):171-76.
- [2] Gao SS. The longevity of posterior restorations in primary teeth: Question: What is the longevity of posterior restorations with different materials in primary teeth and what are the common reasons for failures? *Evid Based Dent.* 2018;19(2):44-44.
- [3] Faraj BM, Mohammad HM, Mohammad KM. The changes in dentists' perception and patient's acceptance on amalgam restoration in Kurdistan-Iraq: A questionnaire-based cross-sectional study. *J Clin Diagn Res.* 2015;9(4):ZC22-25.
- [4] Udoye C, Aguwa E. Amalgam safety and dentists' attitude: A survey among a subpopulation of nigerian dentists. *Operative Dentistry.* 2008;33(4):467-71.
- [5] Correa MB, Peres MA, Peres KG, Horta BL, Barros AD, Demarco FF. Amalgam or composite resin? Factors influencing the choice of restorative material. *Journal of Dentistry.* 2012;40(9):703-10.
- [6] Al-Nahedh HN, El-hejazi AA, Habib SR. Knowledge and attitude of dentists and patients toward use and health safety of dental amalgam in Saudi Arabia. *Eur J Dent.* 2020;14(02):233-38.
- [7] Jones DW. A Scandinavian tragedy. *Br Dent J.* 2008;204(5):233-34.
- [8] Hemani K, Dhanraj M, Mallikarjuna AV. Awareness of amalgam versus composite as a posterior restorative material-A knowledge, attitude, and practice survey analysis among patients. *Drug Invention Today.* 2019;11(3):706-11.
- [9] Chesterman J, Jowett A, Gallacher A, Nixon P. Bulk-fill resin-based composite restorative materials: A review. *Br Dent J.* 2017;222(5):337-44.
- [10] Alcaraz MG, Veitz-Keenan A, Sahrman P, Schmidlin PR, Davis D, Iheozor-Ejiofor Z. Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth. *Cochrane Database of Systematic Reviews.* 2014(3).
- [11] Bernardo M, Luis H, Martin MD, Leroux BG, Rue T, Leitão J, et al. Survival and reasons for failure of amalgam versus composite posterior restorations placed in a randomized clinical trial. *The Journal of the American Dental Association.* 2007;138(6):775-83.
- [12] Opdam NJ, Bronkhorst EM, Roeters JM, Loomans BA. Longevity and reasons for failure of sandwich and total-etch posterior composite resin restorations. *Journal of Adhesive Dentistry.* 2007;9(5):469-75.
- [13] Moraschini V, Fai CK, Alto RM, Dos Santos GO. Amalgam and resin composite longevity of posterior restorations: A systematic review and meta-analysis. *Journal of Dentistry.* 2015;43(9):1043-50.
- [14] Opdam NJ, Bronkhorst EM, Loomans BA, Huysmans MC. 12-year survival of composite vs. amalgam restorations. *Journal of Dental Research.* 2010;89(10):1063-67.
- [15] Rathore M, Singh A, Pant VA. The dental amalgam toxicity fear: A myth or actuality. *Toxicology International.* 2012;19(2):81.
- [16] Cramer NB, Stansbury JW, Bowman CN. Recent advances and developments in composite dental restorative materials. *Journal of Dental Research.* 2011;90(4):402-16.
- [17] Makhija SK, Gordan VV, Gilbert GH, Litaker MS, Rindal DB, Pihlstrom DJ, et al. Practitioner, patient and carious lesion characteristics associated with type of restorative material: Findings from the dental practice-based research network. *The Journal of the American Dental Association.* 2011;142(6):622-32.
- [18] Nascimento MM, Gordan VV, Qvist V, Litaker MS, Rinda DB, Williams OD, et al. Reasons for placement of restorations on previously unrestored tooth surfaces by dentists in the dental practice-based research network. *Journal of the American Dental Association.* 2010;141(4):441-48. (Central: PMCID: PMC2848821; Pubmed: PMID: 20354094).
- [19] Whati L, Senekal M, Steyn NP, Lombard C, Nel J. Development of a performance-rating scale for a nutrition knowledge test developed for adolescents. *Public Health Nutr.* 2009;12(10):1839-45.
- [20] Alkudhairy F. Attitudes of dentists and interns in Riyadh to the use of dental amalgam. *BMC Res Notes.* 2016;9(1):488.
- [21] Browne RM, Tobias RS. Microbial microleakage and pulpal inflammation: A review. *Dent Traumatol.* 1986;2(5):177-83.
- [22] Priyalakshmi S, Ranjan M. A review on marginal deterioration of composite restoration. *IOSR Journal of Dental and Medical Sciences.* 2014;13:06-09.
- [23] Svanberg M, Mjör IA, Ørstavik D. Mutans streptococci in plaque from margins of amalgam, composite, and glass-ionomer restorations. *J Dent Res.* 1990;69(3):861-64.
- [24] Shafiqh E, Fekrazad R, Beglou A. Impact of various pressures on fracture resistance and microleakage of amalgam and composite restorations. *Diving Hyperb Med.* 2018;48(3):168-72.
- [25] Vanishree HS, Shanthala BM, Bobby W. The comparative evaluation of fracture resistance and microleakage in bonded amalgam, amalgam, and composite resins in primary molars. *Indian Journal of Dental Research.* 2015;26(5):446.

[26] Agbaje LO, Shaba OP, Adegbulugbe IC. Evaluation of post-operative sensitivity and secondary caries in posterior composite restorations: A 12 month study. Nigerian Journal of Clinical Practice. 2010;13(4):441-44.

[27] Al-Zubaidi ES, Rabee AM. The risk of occupational exposure to mercury vapor in some public dental clinics of Baghdad city, Iraq. Inhalation Toxicology. 2017;29(9):397-403.

**PARTICULARS OF CONTRIBUTORS:**

1. Postgraduate Student, Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Nagpur, Maharashtra, India.
2. Professor and Head, Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Nagpur, Maharashtra, India.
3. Associate Professor, Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Nagpur, Maharashtra, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Anjali E Mule,  
Plot No-128, Pritisudhaji Nagar, Mantha Road, Jalna-431504, Maharashtra, India.  
E-mail: anjalimule8@gmail.com

**PLAGIARISM CHECKING METHODS:** [Jain H et al.]

- Plagiarism X-checker: Jan 13, 2023
- Manual Googling: Apr 18, 2023
- iThenticate Software: May 02, 2023 (10%)

**ETYMOLOGY:** Author Origin**EMENDATIONS:** 8**AUTHOR DECLARATION:**

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Jan 12, 2023**Date of Peer Review: **Jan 24, 2023**Date of Acceptance: **May 04, 2023**Date of Publishing: **Jul 01, 2023**