



ISSN Print: 2394-7489  
ISSN Online: 2394-7497  
IJADS 2022; 8(2): 254-258  
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[www.oraljournal.com](http://www.oraljournal.com)  
Received: 18-02-2021  
Accepted: 28-03-2021

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## Evaluation of knowledge, approach & perception of the rural population regarding amalgam and tooth-colored composite material: A questionnaire based study

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DOI: <https://doi.org/10.22271/oral.2022.v8.i2d.1518>

### Abstract

**Introduction:** Dental caries is most common disease. Removal of the carious part and restoring it with biocompatible material is very important. The aim of the study was to evaluate the knowledge of the rural population about amalgam and tooth colored composite also their approach and perception in choosing the material.

**Material and Methods:** This study was conducted by random sampling form people visiting the department. After verifying the questionnaire, 12 close ended questionnaires were circulated among them to mark the option of their preference. Data was collected, complied and analyzed in MS Excel sheet (v.2007).

**Result:** A total 436 people from sample of 450 were included in the study. The results indicated that 53% of people had knowledge about amalgam, 42% people had knowledge about tooth colored restorative material. Majority (58%) thought that the amalgam was expensive than other material. People preferred tooth colored restoration rather than amalgam (60%). Maximum of them (88%) would allow the dentist to choose appropriate material for them. Major concern te the people was found out to be no postoperative pain (47%).

**Conclusion:** People still do not have enough knowledge regarding restorative material and there is need to create it. There is more demand for aesthetic restoration. People do not want any type of postoperative pain.

**Keywords:** Dental caries, amalgam, composite, questionnaire, mercury toxicity, postoperative pain

### Introduction

Despite significant improvements in the prevention of dental caries, it remains the most common chronic disease worldwide. If ignored at early stage, caries can develop into a deep cavity that requires significant tooth preparation and filling<sup>[1]</sup>. Cavity restoration can be done with a variety of materials. Dental amalgam, which contains 50% mercury, has been used for almost 150 years and is one of these materials. Since its inception, dentistry has progressed in several areas, such as restorative materials, which are being compared to the gold standard amalgam. Due to its high compressive strength, minimal marginal leakage (self-sealing ability), low creep, extended life, cost-effectiveness, ease of administration, and bacteriostatic action, amalgam can sustain occlusal masticatory stresses. However, despite rising knowledge and aesthetic concerns, it isn't being utilized as often as it formerly was<sup>[1, 2]</sup>. Its popularity is dwindling as a result of worries about negative health impacts, pollution, and metallic colors that do not match with natural tooth structure. Furthermore, literature have acknowledged that mercury from amalgam restoration can leach into the mouth, although there is no evidence that this has a negative impact on overall health<sup>[3]</sup>.

Composite restorations, on the other hand, were first introduced in the 1940s. They are made up of a polymerizable resin, a filler, and a resin filler interface that polymerizes by itself (self-cured), by light activation (light-cured), or by both. Composites are becoming increasingly popular these days because they are aesthetically beautiful, have excellent mechanical properties, have low thermal conductivity and with the use of adhesives and bonding agents,

they aid in proper tooth adherence, reducing tooth preparation. Its drawbacks include technique sensitivity, material cost, and tooth conditioning [4, 5]. Composite resin materials have recently improved, making it a viable option for posterior restorations as well.

People are obtaining partial knowledge about dental procedures and materials to be used as a result of increased awareness through various media. Tooth-colored restorations are becoming more popular. However, it is the practitioner's job to inform the patient about the benefits and drawbacks of various filling materials and to select the material while keeping the patient, his clinical state, and his requirements in mind.

A survey is a simple, straightforward, and cost-effective research approach. It is effective for a specific cohort and covers a large geographic area in a short amount of time. A question-based survey can be used to measure patient perceptions of the material and their knowledge of it.

The urban population is more aware than the rural population. Rural people, due to a lack of information and understanding, tend to stick to existing trends rather than adopting new ones. The practitioners can assess the need for additional awareness and the process of selecting newer restorative materials by evaluating their knowledge and perceptions about newer materials. There are few patient-based survey studies in the literature. As a result, the purpose of this questionnaire-based survey was to assess the rural population's understanding of amalgam and tooth-colored restorations, as well as their approach and perspective in selecting the material.

**Materials and Methods**

After conducting a short valid and pilot study, a questionnaire was created, were charted and completed by experienced specialists from the Department of Conservative Dentistry and Endodontics. From the institutional ethical committee approval was obtained. A total of 450 people were screened at outpatient department. A total of 436 participants aged 18 to 70 years old who visited the hospital were chosen as a sample. Each participant signed a consent form before receiving the questionnaire. Closed-ended questions were included in the survey, which was written in both English and the local regional language for better understanding.

Name, age, sex, address, occupation, and education were among the demographic data. There was no use of the patient's name without their approval, as stated in the consent form.

The questionnaire had a total of 12 closed-ended questions, six of which were knowledge-based, four of which were based on their approach to choosing different restorative materials, and two of which were based on their perception of decision-making for carious tooth treatment (amalgam or

tooth-colored restoration)

Knowledge and approach questions had a yes, no, or not sure option, as well as a choice of restorative materials, whereas perception questions featured multiple choice possibilities.

Patients were handed the questionnaire and consent document, to mark their preferred option, when they arrived at the outpatient department. The questionnaire papers were then gathered and put together for descriptive statistical analysis.

**Results**

According to the demographics, 44% or rural population were between the age of 18 and 30 years, 40% people were between the age of 30 to 50 years, and 16% were between the age of 50 and 70 years. Males (64%) outnumbered female (36%).

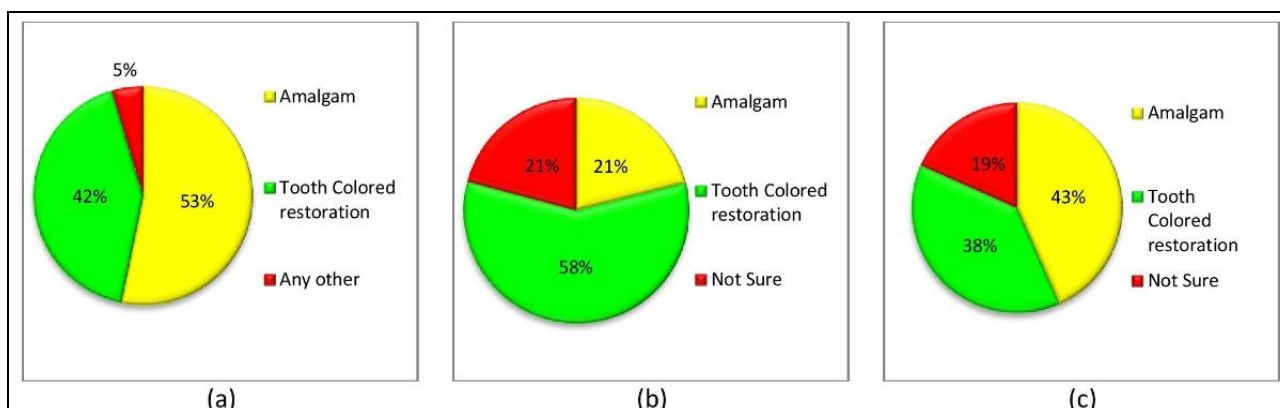
Figure 1a demonstrates people's understanding of restorative materials. Around 53% of people had knowledge about amalgam, 42% people had knowledge about tooth colored restorative material.

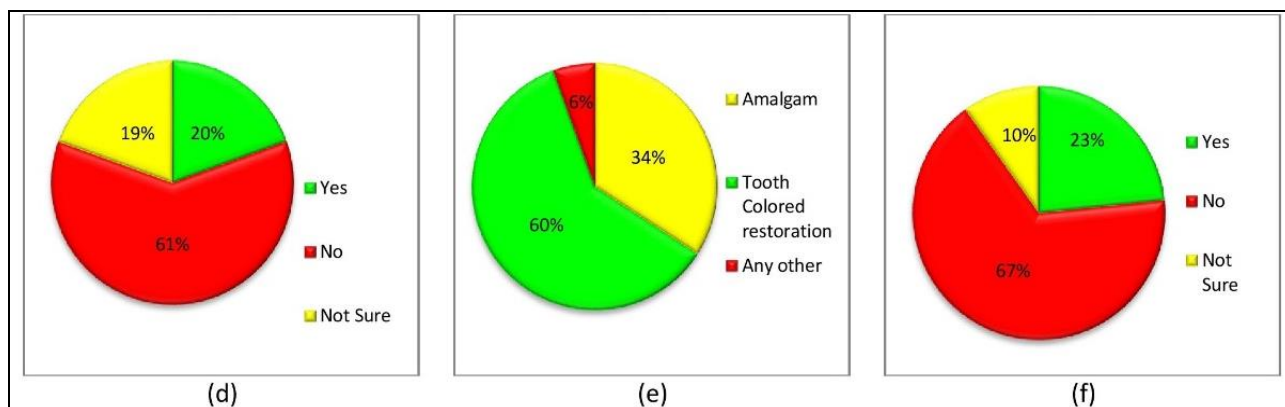
People's perceptions of the cost of restorative materials are depicted in fig 1b, with 58% believing tooth-colored restorative material is less expensive than amalgam, 21% believing amalgam is less expensive than tooth-colored restorative material, and 21% unsure. When questioned about the material's strength, 43% population answered amalgam, 48% answered tooth-colored restorative material and 19% people were not sure about their opinion (Fig 1c). According to fig 1d, 61% of people were unaware of mercury toxicity, 20% were aware of it, and 19% were unsure.

People's preferences for tooth filling materials are seen in fig 1e, with 60% preferring tooth-colored restorative materials, 34% preferring amalgam, and 6% preferring other materials. Only 23% of people had learned about tooth-colored restorative materials over the internet, 67% haven't done so and 10% were not sure (fig 1f). When asked about their choices for an anterior tooth filling, 52% chose tooth-colored restorative material, 23% chose amalgam, and 25% were unsure; and their choices for a posterior filling, 40% chose tooth-colored restorative material, 37% chose amalgam, and 23% were unsure. (Fig 2a and 2b)

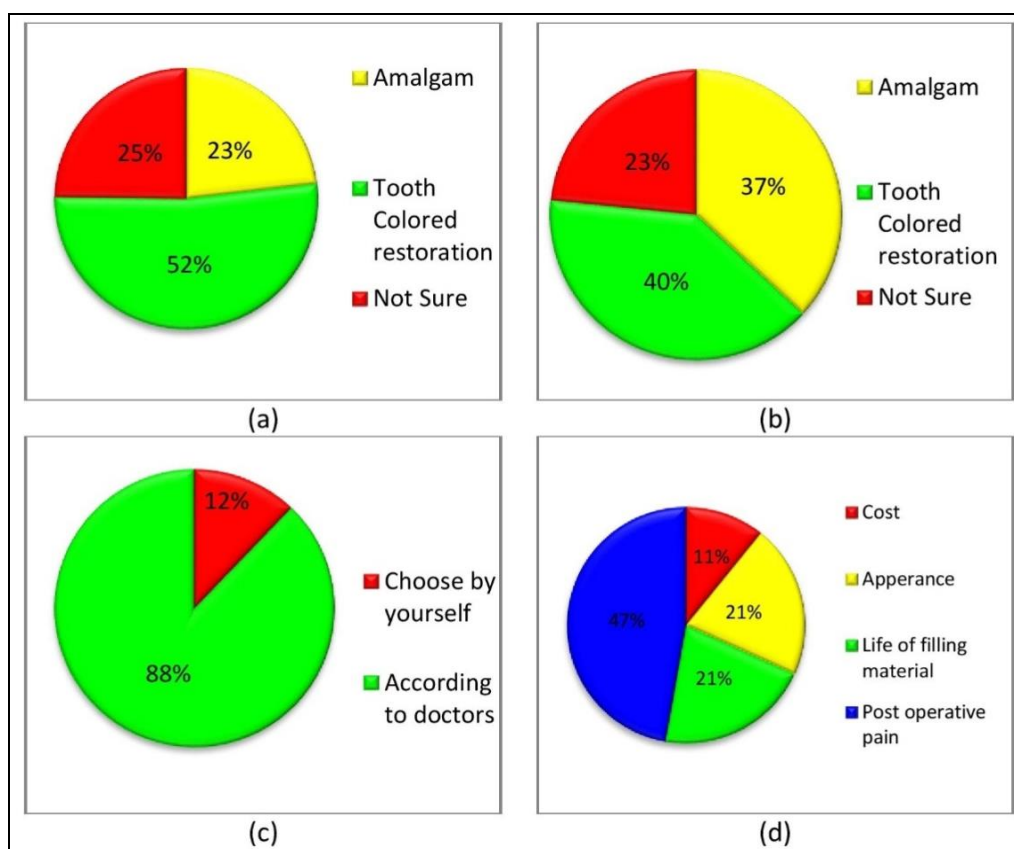
The following is the outcome of perception-based questions. Around 88% of people will let their dentist choose their restorative material, while only 12% will do so themselves (fig 2c). When asked what their choice is, 47% believe that there should be no post-operative pain, 21% value the superior appearance of the tooth filling material, 21% value the material's long life, and just 11% believe that the cost of the material matters (fig 2d).

**Figure format**





**Fig 1:** Pie charts are depicting a) Responses for which material do they know. b) Responses for which material was cheaper. c) Responses given to which material has more strength. d) Responses to weather they heard about mercury toxicity due to amalgam restoration. e) Responses for preference of tooth filling material. f) Responses for knowledge taken regarding restorative material from internet.



**Fig 2:** Pie charts are depicting a) Responses for choosing restorative material for anterior tooth filling. b) Responses for choosing restorative material for posterior teeth. c) Responses for giving choice for selection of restorative material for tooth filling. d) Responses for preference of restoration based on.

**Discussion**

Untreated dental caries causes structural loss, which worsens over time until the tooth is destroyed to the point that it can no longer be saved and must be removed. Early restoration helps to stop cavities and restore tooth morphology, as they say, prevention is better than cure. The most often utilized materials for tooth repair are composite and amalgam [6, 7]. Amalgam is a tried-and-tested material that has been used for centuries due to its high clinical effectiveness and affordable cost. Aesthetic materials, such as composite, are becoming more important and favored as dental materials progress [8]. Because the rural population knows little about these materials, the survey study's goal was to assess the rural population's knowledge, approach, and perceptions of the materials utilized for tooth restoration.

According to the study's demographic data, the majority of the participants were under the age of 30 (young adults). This is due to their willingness to have their teeth fixed as soon as possible. Males outnumbered females among them.

The majority of the population was aware of amalgam as a restorative substance. This indicates that amalgam has been used to fix teeth for many years. Its knowledge is widely disseminated among rural residents. There was a lack of knowledge about tooth-colored restorative materials. These findings were shown to be consistent in a study of South Indians who were aware of amalgam as a restorative substance [2].

When asked about the cost of tooth-colored restorative materials, the majority of participants said that they are less expensive than amalgam. This indicates a lack of

understanding of the material's cost, as well as the fact that amalgam contains silver. As a result, individuals may believe that amalgam is more expensive than tooth-colored restorative material because of the presence of high cost silver in the material. As stated in the literature, amalgam is less expensive than other tooth-colored restorative materials, and the cost of the material is rising as composites advance [9, 10]. Many individuals claim that amalgam is stronger than tooth-colored restorative material, which is supported by scientific evidence [4].

Another intriguing conclusion was that approximately 61% of participants had little knowledge of mercury toxicity or its detrimental effects on the body, which was consistent with prior studies [2].

According to the research, if amalgam restoration is done correctly, there is no evidence of mercury release from restorations that are left in the mouth for a prolonged period of time, causing little to no harmful health effects. Only a few patients may experience allergic reactions [3].

Question were asked to examine how they approached or made decisions while choosing restorative materials. Around 60% of people preferred tooth-colored restorative material to the over amalgam. People are paying more attention to aesthetics as a result of modernity. The telecommunications department's services and devices continue to evolve with time. Internet services were indeed a breakthrough. It was formerly only available in major cities, but with developments, it is now available in rural regions and is useful to everyone. It is a tool for learning, but according to research, only 23% of people have used the Internet to learn about restorative materials. This is due to a lack of education among the general public, as well as a lack of understanding of how to use this equipment and services. Newspapers and televisions are the most common platforms or sources of information for rural people.

Most people are familiar with amalgam, which is used to fill surface caries on posterior teeth. When asked to choose a material for a posterior tooth filling, the majority (40%) chose amalgam, while the majority (52%) chose tooth-colored restorative material for an anterior tooth filling. People are likely to want an aesthetic restoration for filling their anterior teeth [11].

The clinical condition of the tooth to be restored is critical in material selection, particularly in places where more force is applied and isolation is not possible. In such circumstances, amalgam may be the best option [12, 13]. The majority of patients will allow the dentist to choose the appropriate restorative material based on the clinical situation as per this study. The results of this studies are comparable to those stated in previous research [9].

Pain is a primary issue that prompts a patient to seek treatment from a dentist; they simply want to be free of the discomfort. The majority (47%) of them wanted no pain and only 11% of the people valued the cost of the material that is being used for restoration.

### Conclusion

Within the limitation of the study it can be concluded that rural people are still in old school of thoughts having more knowledge about amalgam and lacking the same about composite. There is more demand for esthetic restoration among the rural people. They believe doctors are knowledgeable and will choose whatever is right for them. The major concern of the rural people was post restorative pain while the cost was the least.

### Conflicts of Interest

There is no conflicts of interest.

### Questionnaire

#### 1) Which restoration material do you know?

- Amalgam
- Tooth Colored restoration
- Any other

#### 2) Do you think amalgam can be used to restore the carious tooth?

- Yes
- No
- Not sure

#### 3) Do you think tooth colored material can be used to restore the carious tooth?

- Yes
- No
- Not sure

#### 4) Which material will you prefer for tooth filling?

- Amalgam
- Tooth colored restoration
- Any other

#### 5) Have you taken any knowledge regarding the restorative materials for tooth filling from the internet?

- Yes
- No
- Not sure

#### 6) To whom will u give the choice of selection of restorative material for tooth filling?

- Choose by Yourself
- According to doctor

#### 7) According to you which material is cheaper?

- Amalgam
- Tooth colored restoration
- Not sure

#### 8) According to you which material has more strength?

- Amalgam
- Tooth colored restoration
- Not sure

#### 9) According to you which material will you choose for restoring anterior teeth?

- Amalgam
- Tooth colored restoration
- Not sure

#### 10) According to you which material will you choose for restoring posterior teeth?

- Amalgam
- Tooth colored restoration
- Not sure

#### 11) Have you ever heard about mercury toxicity due to amalgam restoration?

- Yes
- No
- Not sure

**12) What do you think your preference should be based on?**

- a) Cost
- b) Appearance
- c) Life of filling material
- d) Post-operative pain

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