

Knowledge, Attitude, and Practice of General Dental Practitioners and Endodontists Regarding the Use of Devitalizing Agents: A Questionnaire-Based Survey

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Abstract: ***Aim:** The present study aimed to evaluate the knowledge, attitude, and practice of general dental practitioners and endodontists regarding the use of devitalizing agents in routine clinical practice. **Materials and Methods:** A questionnaire-based cross-sectional survey was conducted among 150 dental practitioners, including general dental practitioners and endodontists. An open-ended questionnaire was designed to assess knowledge regarding devitalizing agents, awareness of associated complications, adherence to current recommendations, and patterns of clinical use. The responses obtained were subjected to descriptive statistical analysis. **Results:** Among the participants, 75% were general dental practitioners and 25% were endodontists. Only 34% reported using devitalizing agents. The most common indication for use was pulp extirpation (56%). Approximately 62.9% of participants were aware of current recommendations, whereas 65.7% had knowledge of complications associated with their use. **Conclusion:** Although the majority of practitioners were aware of potential complications associated with devitalizing agents, a considerable proportion lacked adequate knowledge regarding current recommendations. Continuing professional education and evidence-based endodontic practice are essential.*

Keywords: Devitalizing agents; Paraformaldehyde; Endodontics; Questionnaire survey; Knowledge; Attitude; Practice

1. Introduction

Pain management remains one of the most challenging aspects of endodontic treatment. Achieving profound local anesthesia is essential for successful pulp extirpation and root canal therapy. Historically, chemical devitalizing agents were introduced to induce pulpal necrosis before endodontic treatment in difficult anesthetic situations. These agents primarily consisted of paraformaldehyde, formocresol, arsenical compounds, and related formulations.¹⁻⁴

Paraformaldehyde-containing materials gained widespread popularity because of their ability to chemically devitalize inflamed pulp tissue. However, substantial evidence demonstrates significant cytotoxicity and severe complications including gingival necrosis, periodontal destruction, osteomyelitis, alveolar bone necrosis, and damage to adjacent teeth.^{2, 4-8}

Modern supplemental anesthetic techniques have substantially reduced the need for chemical devitalization. Professional organizations recommend these biologically acceptable techniques instead of paraformaldehyde-containing materials.^{1, 3, 9-12}

Previous surveys indicate that a considerable proportion of dental practitioners continue to use devitalizing agents. Walimbe et al. and Kaushik et al. reported continued clinical use despite awareness of complications.^{13, 14}

The present study aimed to evaluate the knowledge, attitude, and practice of general dental practitioners and endodontists regarding the use of devitalizing agents.

2. Materials and Methods

Study Design

A cross-sectional questionnaire-based survey was conducted among dental practitioners.

Study Population

A total of 150 dental practitioners participated in the survey, including general dental practitioners and endodontists.

Questionnaire Design

The questionnaire evaluated knowledge regarding devitalizing agents, awareness of complications, knowledge of current recommendations, frequency and indications of use, and clinical attitudes toward continued use.

Data Collection

Participation was voluntary and anonymous.

Statistical Analysis

Data were analyzed using descriptive statistics. Frequencies and percentages were calculated.

Table 1: Questionnaire Items

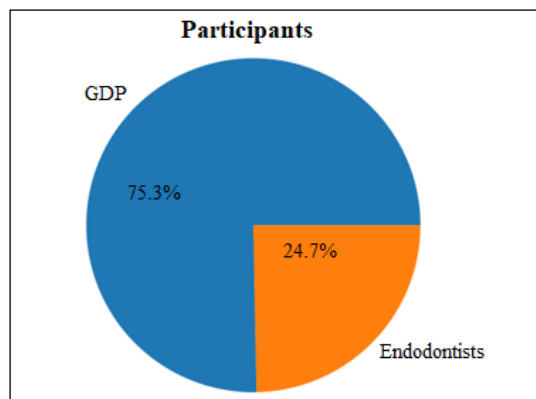
Question	Description Qualification	Response General practitioner / Endodontist
Q1	Years of clinical experience	0–5, 5–10, 10–15, >15 years
Q2	Type of clinical practice	Private Practice / Student
Q3	Use of devitalizing agents	Yes / No
Q4	Name of agent used	Open-ended
Q5	Composition of agent	Open-ended
Q6	Clinical indication	Vital/Non-vital/Pulp extirpation
Q7	Application method	Open-ended
Q8	Duration of use	Open-ended
Q9	Aware of recommendations	Yes / No
Q10	Aware of complications	Yes / No
Q11	Complication caused by it	Yes / No
Q12	If yes, please mention the type of complication	
Q13	Management of complication and what was the prognosis	
Q14	An alternative to devitalizing agent	

3. Results

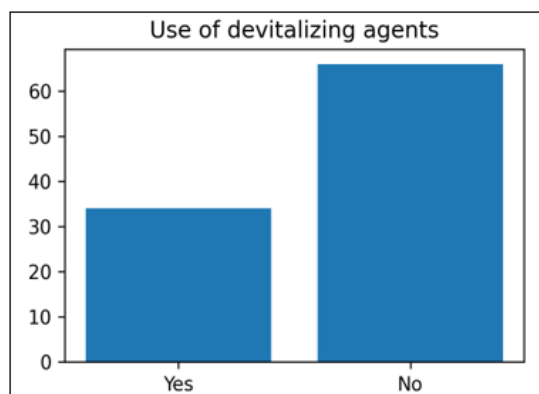
A total of 150 dental practitioners completed the survey. Among the respondents, 75% were general dental practitioners and 25% were endodontists. Only 34% of participants reported using devitalizing agents, whereas 66% did not.

Table 2: Distribution of Participants

Participant	Percentage
General Dental Practitioners	75%
Endodontists	25%

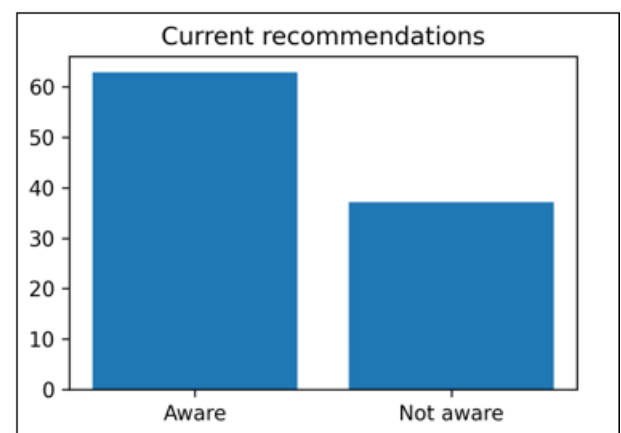
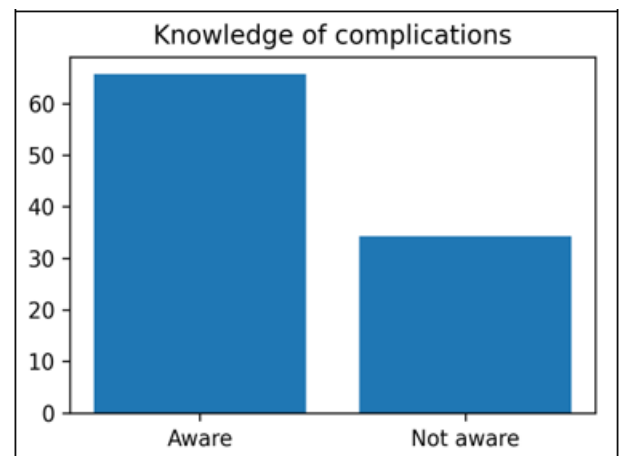
**Figure 1: Distribution of participants****Table 3: Use of Devitalizing Agents**

Response	Percentage
Yes	34%
No	66%

**Figure 2: Use of devitalizing agents**

Additional Findings

- Most common indication for use: Pulp extirpation (56%).
- Awareness of current recommendations: 62.9%.
- Awareness of complications: 65.7%.

**Figure 3: Awareness regarding current recommendations****Figure 4: Awareness regarding complications**

4. Discussion

A survey is a vital tool for collecting information from or about a given population to describe and compare their knowledge attitude and behavior¹⁵. A questionnaire based survey has the advantage of allowing respondents to answer questions in their time¹⁶. The present study demonstrated that although the use of devitalizing agents has declined, a

proportion of practitioners continue to use these materials despite modern recommendations.¹⁻⁴

The prevalence of use (34%) was lower than reported by Walimbe et al. and Kaushik et al., suggesting improved awareness and greater adoption of modern anesthetic techniques.^{13, 14}

The most common indication remained pulp extirpation; however, supplemental anesthetic techniques can effectively eliminate the need for chemical devitalization.⁹⁻¹²

Although 65.7% of participants were aware of complications, continued clinical use indicates a gap between knowledge and practice. Paraformaldehyde-containing materials remain associated with severe tissue destruction, and the American Association of Endodontists discourages their use^{2, 3, 5-7}

Verma et al. reported a case of soft tissue desquamation and gingival necrosis, developing within 24 hours following the use of formocresol during endodontic treatment of left maxillary first premolar¹⁷. Animal experiments have shown that formaldehyde gets systemically distributed after pulpotomy procedures using formocresol. Reports from animal studies suggest that formaldehyde has mutagenic and carcinogenic potential. It has also been demonstrated that formocresol leads to immune sensitivity due to the formation of antibodies. Due to the findings mentioned above, the International Agency for Research on Cancer of the World Health Organization reclassified formaldehyde as a known human carcinogen in 2004¹⁸. The American Association of Endodontists and the American Association of Pediatric Dentistry do not recommended formocresol for human use¹⁹.

The limitation of this study was that dentists who preferred alternatives over devitalizing agents had not been analysed and need for continuing professional education.

5. Conclusion

Within the limitations of this study:

- 1) Only a minority (34%) of practitioners continue to use devitalizing agents.
- 2) Most respondents are aware of associated complications.
- 3) Knowledge regarding current recommendations remains inadequate among a significant proportion.
- 4) Continuing education and modern anesthetic techniques should further reduce the use of devitalizing agents.

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