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AWARENESS ABOUT HOT TOOTH AND ITS MANAGEMENT AMONG DENTAL PRACTITIONERS- A QUESTIONNAIRE BASED SURVEY

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ABSTRACT

Objective: *To determine the awareness of hot tooth and its management among dental practitioners.*

Materials and Methods: *This descriptive cross-sectional study was conducted on 131 participants were recruited. Inclusion criteria included qualified dentists with a BDS qualification, trainees in operative dentistry, endodontists, dental professionals in Pakistan, and individuals aged 21 to 60 years. Exclusion criteria included trainees of other dental specialties not currently practicing, dental technicians, quacks, and undergraduate students. Data were collected using a structured online questionnaire shared via WhatsApp and email. Chi-square/Fisher exact test employed to compare awareness levels across different academic qualifications.*

Results: *The mean age was 35.85±6.12 years and 61 females (46.56%) and 70 males (53.44%). General dental practitioners made up the largest group (62, 47.33%), followed by trainees (52, 39.69%) and endodontists (17, 12.98%). Most participants had 1 to 4 years of experience (96, 73.28%). Awareness of the term "hot tooth" was high, with 112 (85.50%) participants familiar with it. In maxillary anesthesia, infiltration was the predominant technique (83.97%). For mandibular anesthesia, the inferior alveolar nerve block was most common (79.39%). Mandibular molars were identified as the most difficult teeth to anesthetize (81.68%). Non-steroidal anti-inflammatory drugs (NSAIDs) were the preferred medication for managing a hot tooth (90.84%). Significant differences in awareness and management practices were observed across different qualification levels.*

Conclusion: *Awareness of hot tooth and its management varies significantly among dental practitioners, with higher awareness and specific management techniques more prevalent among endodontists compared to general dental practitioners and trainees*

Keywords: *Hot tooth, dental practitioners, awareness, management, endodontists, general dental practitioners, trainees*

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INTRODUCTION

Pain control and effective local anesthesia are paramount in dental practice, directly influencing patient comfort, treatment efficacy, and overall clinical outcomes.[1] Inadequate pain management can lead to increased patient anxiety, avoidance of dental care, and prolonged treatment times, which may compromise the quality of dental procedures.[2] Effective local anesthesia not only facilitates painless dental interventions but also contributes to better patient compliance and satisfaction.[3,4]

The concept of a "hot tooth" refers to a dental condition where a tooth exhibits persistent pain and heightened sensitivity to thermal stimuli, often posing challenges in achieving effective local anesthesia.[5] This condition is commonly encountered in endodontic practice and can significantly impact the management and treatment

outcomes for patients.[6] Mandibular molars, recent trauma, and sites with faulty or recent restorations are identified as common locations of "hot teeth," where anesthesia failure rates can be as high as 44–81%.[5] Clinical manifestations of "hot pulp" include pain during biting, early severe pain in response to cold, and later pain in response to heat.[7,8]

Despite its clinical significance, there is limited data on the awareness and management practices related to hot teeth among dental practitioners.[9] Given the potential complications and the need for specialized knowledge to manage such cases effectively, it is crucial to assess the current level of awareness and the approaches employed by dental professionals. This survey aims to evaluate the awareness about hot tooth and its management among dental practitioners in Pakistan, providing insights into their understanding, diagnostic methods, and treatment preferences. The findings of this study could inform educational initiatives and guide clinical practices to improve patient outcomes in cases of hot tooth.

The objective of this study was to assess the awareness of hot tooth and its management among the dental practitioners.

METHODOLOGY

This study was a descriptive cross-sectional study conducted over six months. Ethical approval was not required as the study did not involve patients or the use of hospital resources. Informed consent was taken from all the participants. Non-probability convenience sampling was employed. A sample size of 131 participants was calculated using OpenEpi, based on a 7% margin of error and a 95% confidence level, with an estimated prevalence of 78.79% for hot tooth from a previous study10.

The inclusion criteria encompassed both genders, qualified dentists with at least a BDS qualification, trainees in operative dentistry, endodontists, dental professionals working in Pakistan, and individuals aged 21 to 60 years. The exclusion criteria ruled out trainees of other dental specialties not currently practicing, dental technicians, quacks, and undergraduate students.

The questionnaire was piloted on a sample of 10 participants to identify potential issues and ensure clarity of items. Its reliability was assessed using Cronbach's Alpha, which demonstrated a satisfactory level of internal consistency, indicating that the instrument is suitable for the intended study.

WhatsApp numbers were obtained through the personal networks of the authors and their colleagues, and emails were sourced from previously published papers. Questionnaires were shared in WhatsApp groups. A structured online questionnaire in Google Forms containing 12 questions was used to gather information. Participants were required to answer all questions, which covered topics such as understanding the term "hot tooth," potential causes, reasons for anesthesia failure in hot tooth cases, clinical signs and symptoms, common locations for this issue, and management strategies. Demographic information and other independent variables were recorded. The collected data were downloaded from Google Forms and organized and tabulated in Microsoft Excel 2010 for analysis.

Data were analyzed using R software version 4.1.2. Descriptive statistics were computed as frequencies and percentages for qualitative variables, and as mean with SD for continuous data. Awareness of hot tooth was compared among academic levels of dental practitioners using the chi-square/Fisher exact test. The significance level was set at $p<0.05$.

RESULTS

The study involved 131 participants (mean age 35.85 ± 6.12 years), with a fairly balanced gender distribution of 61 females (46.56%) and 70 males (53.44%). Most were general dental practitioners (47.33%), followed by trainees (39.69%) and endodontists (12.98%). A majority (73.28%) had 1–4 years of experience, while 26.72% had 5–7 years, highlighting a cohort of early-career professionals. (Table 1)

Most of the participants were employed in government setups (n=115, 87.79%), while 16 (12.21%) were in private practice. (Fig 1)

Table 2 represents dental practitioners' awareness and management of "hot tooth." Among 131 practitioners, 112 (85.50%) were familiar with the term, and 92 (70.23%) confirmed lower pulpal anesthesia using lip numbness. For maxillary anesthesia, infiltration was the preferred technique (110, 83.97%), while the inferior alveolar nerve block dominated for mandibular cases (104, 79.39%). Mandibular molars were identified as the most challenging teeth to anesthetize by 107 practitioners (81.68%). For managing hot teeth, 110 (83.97%) used intrapulpal injections, and 119 (90.84%) favored NSAIDs, with only 12 (9.16%) opting for opioids.

Table 3 compares awareness and management of "hot tooth" among dental practitioners by qualification level, showing significant variations. Awareness was highest among endodontists (94.12%), followed by GDPs (83.87%) and trainees (28.85%) ($p=0.001$). Infiltration was the preferred maxillary anesthesia method for all groups, with endodontists (88.24%) and trainees (88.46%) slightly ahead of GDPs (79.03%) ($p=0.007$). Supplemental injection use varied significantly ($p<0.001$): all trainees (100%) and most GDPs (83.87%) used intrapulpal injections, compared to only 35.29% of

endodontists. Notably, 52.94% of endodontists deemed supplemental injections unnecessary. Other factors, including anesthesia confirmation and medication choice, showed no significant differences.

Practitioners with 5-7 years of experience are significantly more likely to be aware of and correctly manage "hot tooth" compared to those with 1-4 years of experience (p = 0.004). They also use supplemental injections and confirm anesthesia more effectively (p = 0.019), but no significant differences were found in anesthesia techniques or medication preferences (p > 0.1). (Table 4).

TABLE 1: DISTRIBUTION OF DEMOGRAPHICS, QUALIFICATION AND EXPERIENCE

Characteristic	N = 131
Age(years)	35.85 ± 6.12
Gender	
Female	61 (46.56)
Male	70 (53.44)
Qualification	
Endodontist	17 (12.98)
General dental practitioner	62 (47.33)
Trainee	52 (39.69)
Experience (years)	
5 -7	35 (26.72)
1- 4	96 (73.28)

* Mean ± SD; n (%)

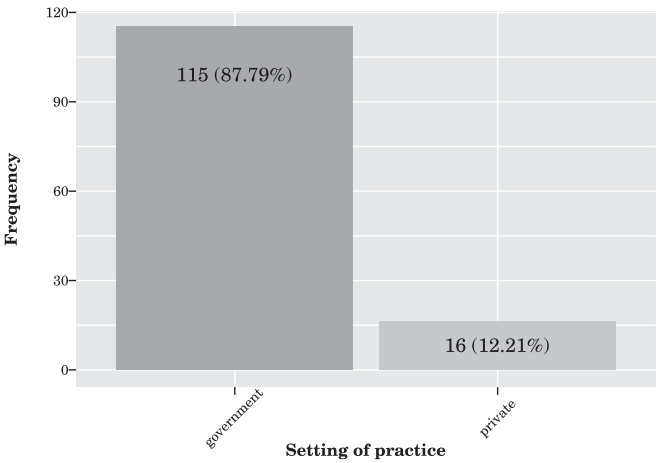

Fig 1: Location of practice of the participants

DISCUSSION

The findings of this study provide the information about the awareness and management practices of dental practitioners regarding hot tooth, an ailment synonymous with irreversible pulpitis. Despite advancements in dental care and the availability of effective medications, cases of hot tooth pose challenges in achieving pain control and anesthesia. In our study, a considerable proportion of dental practitioners were aware of the term "hot tooth," with 85.50% acknowledging its existence. However, a notable subset (14.50%) remained unaware, indicating potential gaps in knowledge dissemination or education regarding this condition. similar findings were reported by previous studies.[10,11]

TABLE 2: AWARENESS ABOUT HOT TOOTH AND ITS MANAGEMENT AMONG DENTAL PRACTITIONERS

Awareness of hot tooth	N = 131
Do you know hot tooth	
No	19 (14.50)
Yes	112 (85.50)
How you confirm lower pulpal anesthesia	
lip numbness	92 (70.23)
no on access	39 (29.77)
Anesthesia technique in maxilla	
infiltration	110 (83.97)
maxillary block	2 (1.53)
PDL injection	19 (14.50)
Anesthesia technique in mandible	
inferior block	104 (79.39)
infiltration	6 (4.58)
PDL injection	21 (16.03)
Difficult tooth anesthetize	
mandibular molar	107 (81.68)
mandibular premolar	12 (9.16)
maxillary molar	12 (9.16)
How u manage hot tooth	
mandibular premolar	1 (100.00)
Unknown	130
Supplemental injection for hot tooth	
Don't needed	14 (10.69)
Intrapulpal	110 (83.97)
PDL injection	7 (5.34)
Preferred medication for hot tooth	
NSAIDs	119 (90.84)
Opioid	12 (9.16)

Regarding anesthesia techniques, lip numbness was the preferred method for confirming lower pulpal anesthesia among 70.23% of practitioners, while 29.77% relied on

TABLE 2: AWARENESS ABOUT HOT TOOTH AND ITS MANAGEMENT AMONG DENTAL PRACTITIONERS

Awareness of hot tooth	Qualification level			p-value**
	GDP, N = 62*	endodontist, N = 17*	trainee, N = 52*	
Do you know hot tooth				0.001
No	10 (16.13)	1 (5.88)	37 (71.15)	
yes	52 (83.87)	16 (94.12)	15 (28.85)	
How you confirm lower pulpal anesthesia				0.2
lip numbness	42 (67.74)	15 (88.24)	35 (67.31)	
no on access	20 (32.26)	2 (11.76)	17 (32.69)	
Anesthesia technique in maxilla				0.007
infiltration	49 (79.03)	15 (88.24)	46 (88.46)	
maxillary block	0 (0.00)	2 (11.76)	0 (0.00)	
PDL injection	13 (20.97)	0 (0.00)	6 (11.54)	
Anesthesia technique in mandible				0.4
inferior block	47 (75.81)	16 (94.12)	41 (78.85)	
infiltration	2 (3.23)	0 (0.00)	4 (7.69)	
PDL injection	13 (20.97)	1 (5.88)	7 (13.46)	
Difficult tooth anesthetize				0.7
mandibular molar	51 (82.26)	15 (88.24)	41 (78.85)	
mandibular premolar	5 (8.06)	2 (11.76)	5 (9.62)	
maxillary molar	6 (9.68)	0 (0.00)	6 (11.54)	
How u manage hot tooth				
mandibular premolar	1 (100.00)	0 (NA)	0 (NA)	
Unknown	61	17	52	
Supplemental injection for hot tooth				<0.001
Don't needed	5 (8.06)	9 (52.94)	0 (0.00)	
Intrapulpal	52 (83.87)	6 (35.29)	52 (100.00)	
PDL injection	5 (8.06)	2 (11.76)	0 (0.00)	
Preferred medication for hot tooth				0.8
NSAIDs	56 (90.32)	15 (88.24)	48 (92.31)	
Opioid	6 (9.68)	2 (11.76)	4 (7.69)	

*n (%), **Fisher's exact test; Pearson's Chi-squared test

the absence of pain upon access. Notably, mandibular molars were identified as the most challenging teeth to anesthetize by 81.68% of participants, highlighting the specific difficulties encountered in managing this subset of teeth. These findings align with previous literature indicating higher failure rates in achieving anesthesia for mandibular molars compared to other tooth types.[5,12]

Interestingly, a significant difference in awareness levels of hot tooth was observed across different qualification levels, with specialized practitioners demonstrating a higher awareness compared to general dental practitioners and trainees. This could be attributed to the specialized training and exposure to complex cases that endodontists receive, contributing to their enhanced awareness of conditions like hot tooth. Previous studies also showed dental practitioners are more aware with higher qualification about dental problems and procedures.[13]

Furthermore, the choice of anesthesia techniques varied significantly among different qualification levels, with endodontists exhibiting a preference for techniques like

TABLE 4: AWARENESS ABOUT HOT TOOTH AND ITS MANAGEMENT AMONG DENTAL PRACTITIONERS BY EXPERIENCE LEVEL

Characteristic	Experience in years		p-value
	5 -7, N = 35	1- 4, N = 96	
Do you know hot tooth			0.004
No	0 (0.00)	19 (19.79)	
yes	35 (100.00)	77 (80.21)	
How you confirm lower pulpal anesthesia			0.019
lip numbness	30 (85.71)	62 (64.58)	
no on access	5 (14.29)	34 (35.42)	
Anesthesia technique in maxilla			0.1
infiltration	29 (82.86)	81 (84.38)	
maxillary block	2 (5.71)	0 (0.00)	
PDL injection	4 (11.43)	15 (15.63)	
Anesthesia technique in mandible			0.7
inferior block	27 (77.14)	77 (80.21)	
infiltration	1 (2.86)	5 (5.21)	
PDL injection	7 (20.00)	14 (14.58)	
Difficult tooth anesthetize			0.02
mandibular molar	27 (77.14)	80 (83.33)	
mandibular premolar	7 (20.00)	5 (5.21)	
maxillary molar	1 (2.86)	11 (11.46)	
How u manage hot tooth			
mandibular premolar	1 (100.00)	0 (NA)	
Unknown	34	96	
Supplemental injection for hot tooth			0.2
Don't needed	4 (11.43)	10 (10.42)	
Intrapulpal	27 (77.14)	83 (86.46)	
PDL injection	4 (11.43)	3 (3.13)	
Preferred medication for hot tooth			0.2
NSAIDs	34 (97.14)	85 (88.54)	
Opioid	1 (2.86)	11 (11.46)	

*n (%), **Fisher's exact test; Pearson's Chi-squared test

maxillary block, which were less commonly utilized by general dental practitioners and trainees. This divergence in practice patterns underscores the importance of tailored training and education programs to equip dental professionals with the necessary skills and knowledge to effectively manage hot tooth cases.[14]

The use of supplemental injections for managing hot tooth also differed markedly among qualification levels, with endodontists exhibiting a lower propensity to use such injections compared to general dental practitioners and trainees. This discrepancy in practice approaches may reflect varying levels of confidence and experience in managing complex endodontic cases among different practitioner groups.[12,15]

The no use of the intraosseous (IO) injection technique among dental professionals may be attributed to its procedural sensitivity and complexity. These challenges can be addressed with appropriate training and the use of guiding tips, which simplify needle insertion into the bone.[16] Additionally, while there is concern about a temporary increase in heart rate following the administration of vasopressor-containing anesthetics through IO injections, research shows that heart rates generally return to normal within four minutes. Thus,

despite these concerns, the IO technique remains a valuable option for overcoming cases of failed anesthesia.[17]

CONCLUSION

Variations in awareness regarding hot tooth management were observed among dental professionals, with endodontists demonstrating a notably higher level of awareness compared to general dental practitioners and trainees. This discrepancy suggests that specialized training and clinical experience may contribute to a deeper understanding of complex endodontic conditions such as hot tooth.

REFERENCES

1 Aghababaie ST, Monteiro J, Stratigaki E, Ashley PF. Techniques for effective local anaesthetic administration for the paediatric patient. Br Dent J. 2020;229(12):779-85.

2 Do□ramac□ EJ, Rossi□Fedele G. Patient□related outcomes and oral health□related quality of life in endodontics. Int Endod J. 2023;56:169-87.

3 Ferrazzano GF, Di Fabio G, Gatto R, Caruso S, Botticelli G, Caruso S. Effectiveness and tolerability of a new formulation of a topical anesthetic in reduction of pain and parents' satisfaction in pediatric dentistry. Child. 2023;10(3):444.

4 Kuswandani F, Balafif FF, Najmi N, Rafisa A. Efficacy of Local Anesthetic: A Narrative Literature Review and Clinical Update in Dentistry. J edu Health. 2023;14(02):675-82.

5 Bhalla VK, Taneja S, Chockattu SJ. Failure of molar anesthesia in endodontics: a systematic review. Saudi Endod J. 2021;11(3):283-91.

6 Aminsobhani M, Meraji N, Ghorbanzadeh A, Ajami M, Hoseini SAS, Kharazifard MJ. Effect of local and application of amitriptyline and imipramine on teeth with irreversible pulpitis failed pulpal anesthesia: a randomized, double-blind, controlled trial. Dent Hypoth. 2016;7(4):128-32.

7 Singh V, Gangwar A. Management of Hot Irreversible Pulpitis with Radix Entomolaris: An Uphill Battle for a Pediatric Dentist. A Case Report. Univ J Dent Sci. 2023;9(3):41-6.

8 Parirokh M, Abbott PV. Various strategies for pain-free root canal treatment. Iran Endod J. 2014;9(1):1-9.

9 Ramachandran A, Khan SI, Siddeeqh S, Gopinathan PA, Bijai LK, Iyer K. Management Protocols of the Hot Tooth—A KAP Survey among General Dentists and Endodontists. J Pharm Bioall Sci. 2023;15(Suppl 1):S383-S90.

10 Azima Hanin S, Muralidoss H. Awareness Of Hot Tooth And Its Management: A Questionnaire Survey. Int J Dentistry Oral Sci. 2021;8(01):1535-41.

11 Pereira R, Gillam D, Bapatla S, Satyamurthy P. Awareness of Dentine Hypersensitivity among General Dental Practitioners in Mumbai, India. J Odontol. 2018;12.

12 Shoba J, Koshy M, Anirudhan S, Kalaichelvan T. Effective Strategies to Manage the Clinically Challenging Hot Tooth: A Review. J Operat Dent Endod. 2024;8(1):17-22.

13 Tadin A, Aleric K, Jerkovic D, Gavic L. Knowledge, Practice and Self-Reported Confidence Level of Croatian Dentists in the Use of Local Anesthesia: A Cross-Sectional Study. Healthcare. 2023;11(14):21-9.

14 Shairaz Sadiq M, Ahmed S, Qazi SR. Dental practitioner's choice of local anesthesia technique for mandibular molar anesthesia. Pak Oral Dent J. 2017;37(2):227-31.

15 Ramachandran A, Khan SI, Siddeeqh S, Gopinathan PA, Bijai LK, Iyer K. Management Protocols of the Hot Tooth—A KAP Survey among General Dentists and Endodontists. J Pharma Bioall Sci. 2023;15(Suppl 1):S383-S90.

16 Kumar K, Bhattarai BP, Subedi S. Comparison of anesthetic efficacy of intraosseous injection with conventional inferior alveolar nerve block in mandibular third molar surgery: a systematic review and meta-analysis. Oral Surg Oral Medi Oral Pathol Oral Radiol. 2022;133(2):e33-e42.

17 Ho J-PT, van Riet TC, Afrian Y, Sem KTCJ, Spijker R, de Lange J, et al. Adverse effects following dental local anesthesia: a literature review. J Dent Anesth Pain Med. 2021;21(6):507.

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