

Awareness Of Hot Tooth And Its Management: A Questionnaire Survey

Research Article

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Abstract

Aim: The successful use of local anesthesia has changed the patient's experience from being painful and dreadful to being much less painful and pleasant. Optimum pain management helps in building up trust and facilitates the entire procedure. However, failure of local anesthesia in case of irreversible pulpitis diminishes these benefits. The term hot pulp generally refers to a pulp that has been diagnosed with irreversible pulpitis; with spontaneous moderate to severe pain. The primary aim of a practitioner is to provide proper diagnosis and treatment and make the patient free from illness. Therefore it is necessary for a dentist to have knowledge about hot tooth and management strategies for it. The main aim of this study was to assess the knowledge, attitude and practices of clinicians in management of Hot tooth.

Materials and Methods: The sample population of this study includes clinicians and postgraduate students. A generalized questionnaire based on hot pulp and its management was prepared and uploaded in an online platform (survey planet) which was circulated among the sample population using various social media platforms. Data collected was assessed and tabulated using Microsoft excel. The collected data was then subjected to statistical analysis using Statistical Package for Social Science (SPSS).

Results: About 78.8% of the total population were aware of the term hot pulp. 71.7% of the total population was aware that hot pulp is irreversible pulpitis which results in failure of anesthesia. 79.9% of the total population were aware about inflamed tissue bringing down the basic form of anesthesia due to a low pH. 68.7% of the total population were aware about Tetrodotoxin resistant (TTX-R) sodium channels and their resistance to Lidocaine. Change of lidocaine with 1.4% Articaine yields better anesthesia in case of Hot tooth. 74.7% of the total population were aware of this.

Conclusion: Within the limits of this study, we observe that the majority of dental practitioners are aware of hot pulp and its management.

Clinical significance: This survey aims in creating awareness among dental practitioners.

Keywords: Anesthesia; Articaine; Hot Tooth; Irreversible Pulpitis; Lidocaine.

Introduction

In this 20th century, the world is witnessing many revolutions in medical care and treatments [1-4]. Even though there is an increase in medications with high success rate; there are some conditions in which they fail. One such condition is "hot tooth" which is nothing but irreversible pulpitis.

Although local anesthetics are very effective in producing anesthesia in normal tissue [5], local anesthetics usually fail in patients with irreversible pulpitis or hot tooth [6, 7]. The inability to attain anesthesia in patients with irreversible pulpitis remains a major concern and a significant barrier to successfully treating patients [8]. The successful use of local anesthesia has changed the patient's experience from being painful and dreadful to being much less painful and pleasant [9, 10]. Optimum pain management

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Received: January 12, 2021

Accepted: January 22, 2021

Published: January 30, 2021

Citation: Azima Hanin S.M, Hemavathy Muralidoss. Awareness Of Hot Tooth And Its Management: A Questionnaire Survey. *Int J Dentistry Oral Sci.* 2021;08(01):1535-1541. doi: <http://dx.doi.org/10.19070/2377-8075-21000305>

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helps in building up trust and facilitates the entire procedure [8, 11]. However, failure of local anesthesia in case of irreversible pulpitis diminishes these benefits.

The term hot pulp generally refers to a pulp that has been diagnosed with irreversible pulpitis; with spontaneous moderate to severe pain. According to literature reports by Nusstein et al the most common sites of hot tooth are sites of recent or defective restorations, recent trauma and mandibular molars which are more difficult to anesthetize [12]. According to Ingle Ji and Bakland, the inferior alveolar nerve (IAN) block is associated with only a failure rate of 15% in patients with normal tissue [13], whereas IAN failure rate in patients with irreversible pulpitis is 44-81% [14]. Similarly, it has been reported that the failure rate of a maxillary infiltration injection is as high as 30% in teeth with irreversible pulpitis [13, 15]. According to McClanahan et al, the clinical signs and symptoms of hot pulp may include pain while biting or earlier presentation of intense pain in response to cold and a later presentation of pain in response to heat which is relieved by cold [16].

Despite the abundance of studies documenting reasons for pulpitis very little literature is available focussing on hot pulp and its management. In order to develop strategies to manage or prevent Hot tooth, it is important to understand factors which lead to such a condition [17]. The primary aim of a practitioner is to provide proper diagnosis and treatment and make the patient free from illness [18-20]. Recent researches provide various strategies to overcome anesthetic failure of hot tooth [21, 22]. Therefore it is necessary for a dentist to have knowledge about hot tooth and management strategies for it.

Hence the main aim of this study was to assess the knowledge, attitude and practices of clinicians in management of Hot tooth.

Materials And Methods

Study Setting

The sample population of this study includes clinicians and postgraduate students. A generalized questionnaire based on hot pulp and its management was prepared and uploaded in an online platform (survey planet) which was circulated among the sample population using various social media platforms.

Sampling

The total population of this study was 99 dental practitioners. In this research simple random sampling was done in order to minimize sampling bias. Internal validity was the pretested questionnaire. External validity was homogenisation and cross verification with existing studies.

Data Collection

The questionnaire contained 12 questions. The participants were asked to answer all questions to access them. Independent variables such as demographic details were recorded. Questions were based on the awareness of the term hot tooth, the possible causes, reasons for anesthetic failures in a hot tooth, the clinical signs and symptoms, the common sites for such a condition and lastly the management of hot tooth. The collected data was tabulated in Microsoft Excel 2010.

Data Analytics

The acquired data was subjected to statistical analysis. Microsoft Excel 2010 data spreadsheet was exposed to Statistical Package for Social Science (SPSS) for windows. Descriptive statistics was applied for the variables, chi-square tests were applied at a level of significance of 5% ($P < 0.05$).

Results

This survey was conducted amongst dental practitioners and postgraduate students. Most of the participants had 1-3 years of experience with 33.33% of total population (figure 1).

About 78.8% of the total population were aware of the term hot pulp (figure 2). 71.7% of the total population was aware that hot pulp is irreversible pulpitis which results in failure of anesthesia (figure 4). 79.9% of the total population were aware about inflamed tissue bringing down the basic form of anesthesia due to a low pH (figure 5). 68.7% of the total population were aware about Tetrodotoxin resistant (TTX-R) sodium channels and their resistance to Lidocaine (figure 6). Change of lidocaine with 1.4% Articaine yields better anesthesia in case of Hot tooth. 74.7% of the total population were aware of this (figure 11).

Discussion

From this study, about 78.8% of the total population were aware

Figure 1. This Bar Graph depicts the percentage distribution of clinical experience of dental practitioners and postgraduate students who participated in this survey. X-axis denotes the years of experience and Y-axis represents the percentage distribution. Most of the participants had 1-3 years of experience with 33.33% of the total population.

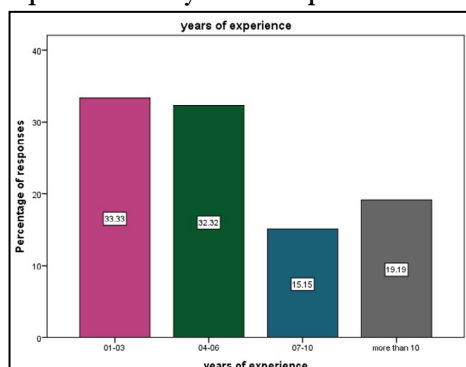


Figure 2. This Bar Graph depicts the awareness of the term hot pulp among dental practitioners and postgraduate students. X- axis denotes the response to question “Are you aware of the term hot pulp?”, Y-axis represents the percentage distribution. About 78.8% of the total population were aware of the term hot pulp.

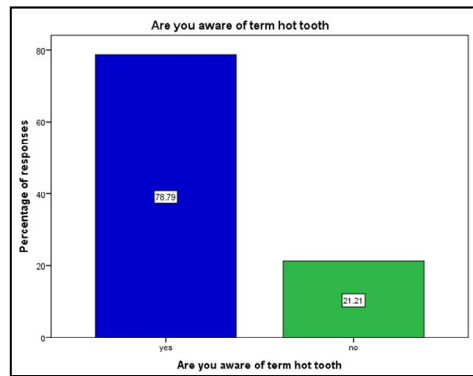


Figure 3. This bar graph depicts the comparison of years of experience dental practitioners and postgraduates and awareness of hot tooth. X- axis denotes the years of experience of participants and Y- axis denotes the frequency distribution of response to the question “Are you aware of the term hot tooth”. Blue colour depicts the participants who are aware of hot tooth and green colour depicts the no. of participants who disagree. It was observed that practitioners with 1-3 years of experience were more aware of the term than the others with 28.28% of the total population. This was found to be statistically significant when chi-square test was used with a p value of 0.045.

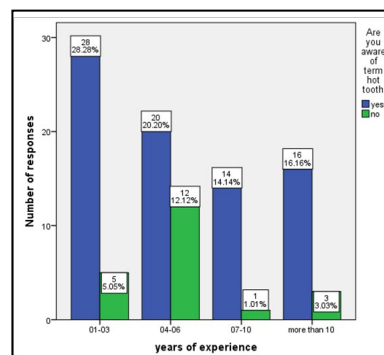


Figure 4. This bar graph depicts the awareness of dental practitioners and postgraduates about hot tooth. X- axis denotes the response to the question “What is hot pulp?”, Y-axis represents the percentage distribution. 71.7% of the total population were aware that hot pulp is irreversible pulpitis which results in failure of anesthesia.

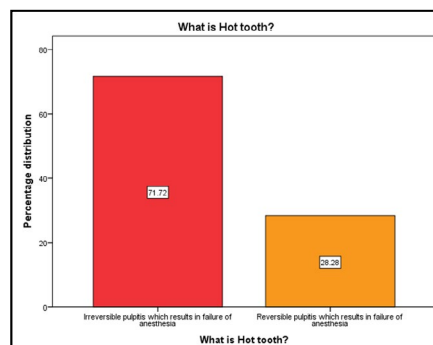
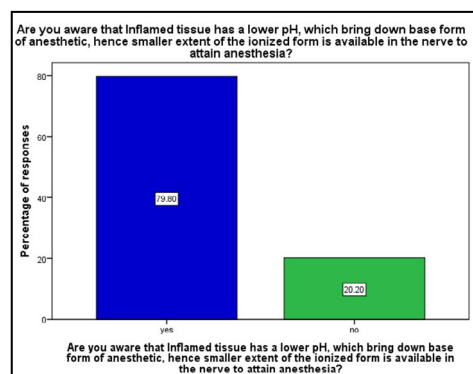


Figure 5. This bar graph depicts the awareness of dental practitioners and postgraduates about inflamed tissue bringing down the basic form of anesthesia due to a low pH. X- axis denotes the response to question “Are you aware that inflamed tissue has a lower pH, which brings down base form of anesthetic, hence a smaller extent of the ionized form is available in the nerve to attain anesthesia?”, Y-axis represents the percentage of responses. 79.9% of the total population were aware that inflamed tissue has a lower pH, which brings down the base form of anesthetic.



of the term hot pulp (figure 2) and that practitioners with 1-3 years of experience were more aware of the term than the others with 28.28% of the total population (figure 3). It was observed that 71.7% of the total population were aware that hot pulp is a term for irreversible pulpitis which results in the failure of anesthesia (figure 4). Similar findings from various literature reveal that hot pulp is irreversible pulpitis [23, 24].

Low pH of inflamed pulp is responsible for ion trapping of local anesthetics. 79.8% of the total population were aware (figure 5). Literature report by Rosenberg reveal that inflamed tissue brings down ionic form of anesthesia available. The reason for this is the fact that the base form of anesthetic gets trapped in the acid molecules present in inflamed tissue. Hence there is reduced ionic form of anesthesia available for anesthetising the nerve [12, 25].

68.7% agreed that Tetrodotoxin Resistant (TTXr) channels are 4 times resistant to Local Anesthesia (figure 6). This finding is in agreement with Wallace J et al. TTXr channels which are resistant to local anesthesia. Increased expressions of these channels in an inflamed pulp contribute to the failure of anesthesia [26-28].

Literature by McClanahan reveals that the clinical signs of the hot pulp may be pain on mastication or an earlier response to heat and a later response to cold (figure 7, 8). Majority of the population of this study agreed with this statement [16].

Various literature propose various management strategies. According to Jena and Shashirekha, NSAIDs given 1 hour prior to any procedure can reduce the incidence of hot tooth [29]. About 74.7% of the sample population agreed presumably because pre-treatment with NSAIDs help in reducing inflammation (figure 9) [30].

Additional anesthesia or supplemental injections are required for management of hot tooth. 77.8% agreed to this statement. According to John M. Nusstein et al supplemental injections helps in management of hot pulp [12]. Supplemental injections can be intraosseous, infiltration or intraseptal [12, 31]. About 55.6% of the study population agreed to this fact (figure 10). Intraosseus injections can deposit Local Anesthesia directly to surrounding bone providing a faster onset [32-34]. Intraseptal injections minimise pain and infiltration increases duration of anesthesia [22, 35-37].

According to a study by Hamad the anesthetic efficiency of 1.4% articaine shows higher anesthetic efficiency than 2% Lidocaine when used [38]. In the present study, about 74.7% agreed that articaine is better when it comes to management of hot tooth (figure 11) and was observed that practitioners with 4-6 years of experience were more aware of clinical management than the others with 25.25% of the total population (figure 12). This may be postulated by the fact that Articaine has a thiophene group which enhances lipid solubility and provides more anesthesia by penetrating into membranes [36]. About 69.7% of the total popula-

Figure 6. This bar graph depicts the awareness of dental practitioners and postgraduates about Tetrodotoxin resistant (TTX-R) sodium channels and their resistance to Lidocaine. X- axis denotes the response to question “Tetrodotoxin resistant (TTX-R) sodium channels which are present in inflamed pulp are”, Y-axis represents the percentage of responses. 68.7% of the total population were aware of Tetrodotoxin resistant (TTX-R) sodium channels and their resistance to Lidocaine.

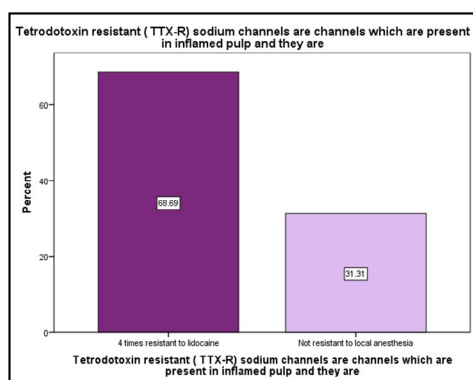


Figure 7. This bar graph depicts the awareness of dental practitioners and postgraduates about clinical signs and symptoms of hot tooth. X- axis denotes the response to question “Is pain when biting and reaction to percussion test an indicative for hot pulp”, Y-axis represents the percentage of responses. 78.8% of the total population were aware of pain when biting and reaction to percussion test an indicative for hot pulp.

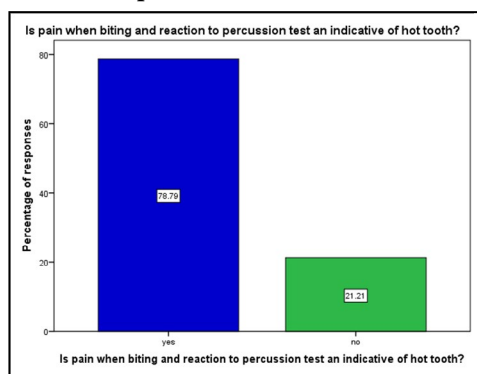


Figure 8. This bar graph depicts the awareness of dental practitioners and postgraduates about clinical signs and symptoms of hot tooth. X- axis denotes the response to question “Is earlier presentation of often intense, lingering pain in response to cold and Later intense pain in response to heat; relieved by cold an indicative for hot tooth?”, Y-axis represents the percentage of responses. 78.8% of the total population were aware that earlier presentation of often intense, lingering pain in response to cold and later intense pain in response to heat; relieved by cold is an indicative for hot tooth.

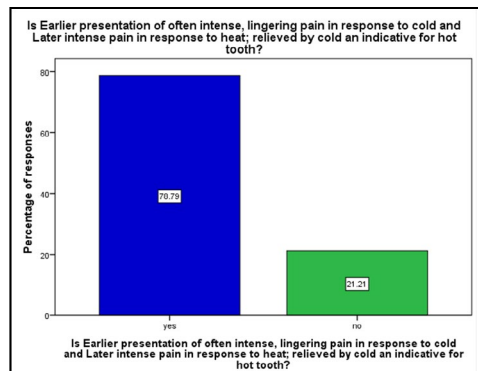


Figure 9. This bar graph depicts the awareness of dental practitioners and postgraduates about management of hot tooth. X- axis denotes the response to question “Pre-treatment with NSAIDS -1 hour before the surgery can help in management of hot pulp.”, Y-axis represents the percentage of responses.74.7% of the total population were aware that pre-treatment with NSAIDS -1 hour before the surgery can help in management of hot pulp.

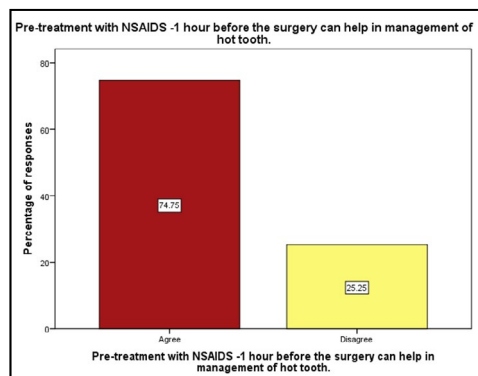


Figure 10. This bar graph depicts the awareness of dental practitioners and postgraduates about management of hot tooth. X- axis denotes the response to question “Supplemental injections can be”, Y-axis represents the percentage of responses. About 55.6% were aware that supplemental injections can be intraosseus, intraseptal or infiltration.

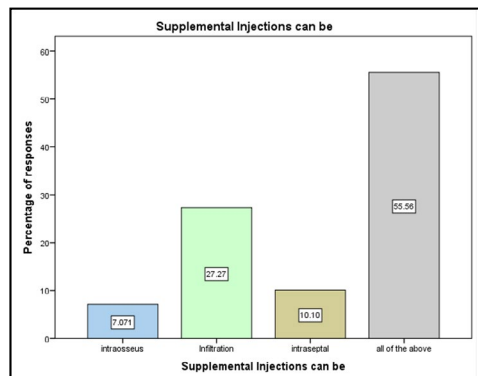


Figure 11. This bar graph depicts the awareness of dental practitioners and postgraduates about management of hot tooth. X- axis denotes the response to question “Change of lidocaine with 1.4%Articaine yields better anesthesia in case of Hot tooth.”, Y-axis represents the percentage of responses.74.7% of the total population were aware that change of lidocaine with 1.4%Articaine yields better anesthesia in case of Hot tooth

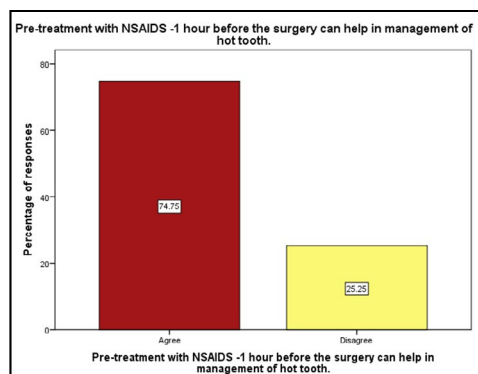


Figure 12. This bar graph depicts the comparison of years of experience dental practitioners and postgraduates and awareness of management of hot tooth by changing lidocaine with 1.4% articaine to yield better anesthesia. X- axis denotes the years of experience of participants and Y- axis denotes the frequency distribution of response to the question “Change of lidocaine with 1.4%Articaine yields better anesthesia in case of Hot tooth.”. Brown colour depicts the participants who agreed to the statement and yellow colour depicts the no. of participants who disagree. It was observed that practitioners with 4-6 years of experience were more aware of clinical management than the others with 25.25% of the total population. This was found to be statistically significant when the chi-square test was used with a p value of 0.033.

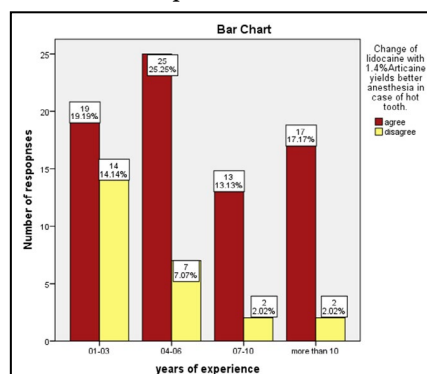
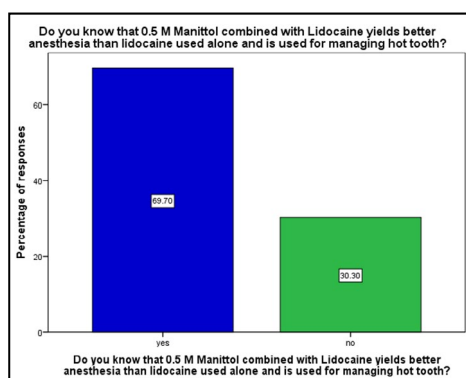


Figure 13. This bar graph depicts the awareness of dental practitioners and postgraduates about management of hot tooth. X- axis denotes the response to question “Do you know that 0.5 M Mannitol combined with Lidocaine yields better anesthesia than lidocaine used alone and is used for managing hot tooth.”, Y-axis represents the percentage of responses. 69.7% of the total population were aware that 0.5 M Mannitol combined with Lidocaine yields better anesthesia than lidocaine used alone.



tion were aware that 0.5 M Mannitol combined with Lidocaine yields better anesthesia than lidocaine used alone and is used for managing hot tooth (figure 13).

Conclusion

Within the limits of this study, we observe that the majority of dental practitioners are aware of hot pulp and its management.

Clinical Significance

This survey aims in creating awareness among dental practitioners.

Acknowledgement

We would like to acknowledge the Department of research of Saveetha Dental College and Hospitals for their support and expertise that greatly assisted this research.

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