

KNOWLEDGE, ATTITUDE AND PRACTICE ON CRYOTHERAPY IN ENDODONTICS AMONG DENTAL STUDENTS - A QUESTIONNAIRE SURVEY

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ABSTRACT:

Introduction: The term cryotherapy comes from the Greek word cryos, which means "cold." It means lowering or decreasing the temperature of tissues for therapeutic purposes in physiotherapy. In fact, cryotherapy does not mean the application of cold, but rather the removal of heat.

The aim of the present study was to investigate the knowledge, awareness and practice on cryotherapy in endodontics among dental students.

Materials and methods: A survey based questionnaire was done to study the knowledge about cryotherapy in endodontics among dental students. A total questionnaire of 14 questions were collected by google form app. SPSS statistical analysis was done. A total of 100 participants participated in this survey. The collected data was subjected to SPSS. Descriptive statistics was drawn with respective percentages to have a comparative overview.

Result: The results were collected and data were analysed. 68% of the participants were aware of the cryotherapy in endodontics.

Conclusion: This study concludes that the majority of the participants were aware of cryotherapy in endodontics.

KEYWORDS: knowledge, awareness, cryotherapy, endodontics, dental students

INTRODUCTION:

The term cryotherapy comes from the Greek word cryos, which means "cold." It means lowering or decreasing the temperature of tissues for therapeutic purposes in physiotherapy. In fact, cryotherapy does not mean the application of cold, but rather the removal of heat. Short-term applications of cryotherapy in orthopaedic, abdominal, gynecological, and hernia operations have been shown to reduce oedema, pain, inflammation, and recovery time. The types of cold application include an ice pack, gel pack, ice chips, melted ice water, ice massage, prepackaged chemical ice pack, and ice in a washcloth. Clinical and physiological evidence indicates that applying cold by different methods reduces the conduction velocity of nerve impulses, haemorrhage, edoema, and local inflammation, and is therefore efficient in the reduction of musculoskeletal discomfort, muscle spasm, and connective tissue distension.

Vera et al. were the first to bring cryotherapy to the attention of endodontists(1). To calculate the change in temperature of the exterior root surface of extracted teeth, they used a final rinse with 2.5C cold saline combined with Endovac for 5 minutes of application time(2). They discovered a more than 10-degree decrease in external root surface temperature that lasted for four minutes(3). They encouraged further clinical studies using the same methodologic structure, assuming that this drop in root surface temperature may have a local anti-inflammatory and analgesic effect on the periapical tissue(4). Cryotherapy has been used in endodontics to reduce postoperative pain, according to several studies. In a case study, cryotherapy was successfully used for the control of pulpal haemorrhage in direct pulp capping, indicating that its use in endodontics is expanding(5).

Our team has extensive knowledge and research experience that has translated into high quality publications(6–15),(16–19),(20–24)(25). The aim of the present study was to investigate the knowledge, awareness and practice on cryotherapy in endodontics among dental students.

MATERIALS AND METHODS:

A cross sectional study was conducted among undergraduate dental students in a dental institution. This was done in the form of a questionnaire that was circulated online. The dental students were of the age group 18 to 25 years. The study protocol was approved by the institutional review board and the questionnaire was validated. The sample size of this study was 100. The questionnaire consisted of 14 questions that mainly focused on knowledge, awareness and practice of cryotherapy in endodontics among undergraduate dental students. The questionnaire was distributed among the students through an online survey website called google forms. The data was collected, compiled and was arranged in a systematic manner and was analysed according to SPSS software. The Pearson Chi Square test was also done. The confidence

interval was found to be 95% and statistical significance of $p < 0.05$. The independent variable of the study was gender. The results were then represented in the form of pie charts and bar charts.

Inclusion criteria:

The participants should be dental students.

Exclusion criteria:

Students who were not available to take the survey.

Students who were not willing to participate.

Dentists who had completed the period of study.

Study Setting:

The study was conducted with the approval of the Institutional Ethics Committee. The study consisted of one assessor and one guide.

Study method:

Self administered questionnaire of 14 close-ended questions was prepared and was validated by the Institutional Review Board (IRB). The questionnaire was distributed among undergraduate dental college students of private dental college institutions through an online survey form "GOOGLE FORMS". Demographic details were also included in the questionnaire.

Sampling Technique:

The study was based on a non probability consecutive sampling method.

Ethical considerations:

Returning the filled questionnaire was considered as implicit consent with no need for signing for a return consent.

Ethical approval of study is obtained from the Institutional Review Board (IRB).

Statistical analysis:

Data was analysed with the SPSS version (22.0). Descriptive statistics as number and percent were calculated to summarize qualitative data. Chi square test was used to analyze and compare the education level of students and their knowledge, attitude and practise on cryotherapy in endodontics among undergraduate dental students. The confidence level was 95% and the statistical significance $p < 0.05$ was considered statistically significant. Finally the results were represented by using bar charts and frequency tables.

RESULT:

Table 1: Responses of the questionnaire.

S. No	QUESTIONS	CHOICES	RESPONSES
1	Gender?	Male Female	59% 41%
2	Are you aware of cryotherapy?	Yes No Maybe	68% 26% 6%
3	Basic physiological tissue effects of cryotherapy are?	Vascular Neurological Tissue metabolism All the above	9% 27% 4% 60%
4	The recommended protocol in postsurgical supportive therapy is?	Cold application Warm application Acupuncture	64% 32% 4%
5	Do you know that a final rinse with 2.5C cold saline for 5 minutes reduces the temperature of the external root surface?	Yes No	79% 21%
6	Cryotherapy was first used in endodontics	2001	0%

	in the year?	2010 2016 2020	10% 68% 22%
7	Cryotherapy was first used in endodontics by?	Keskin Vera Emad Hutter	63% 6% 26% 5%
8	Which is the best gauge used in cryotherapy?	19G 21G 23G 27G	5% 13% 25% 57%
9	What are the modes of cold application?	Ice pack Gel pack Melted ice water All the above	4% 7% 25% 64%
10	The reduction of pain is achieved by cold application due to?	Relaxation of muscles Contraction of muscles Blockade of nerve endings Release of nerve endings	5% 25% 66% 4%
11	What method of cryotherapy is used to control pulpal bleeding?	Spray freeze method Applicator method Vital pulp cryotherapy Cryoprobe method	4% 5% 87% 4%

DISCUSSION:

The results were collected and the data were analysed. A total of 100 students completed the survey questionnaire. Majority of the students who attended this survey were at the age 18- 20 (Table 1). There was a remarkable knowledge of cryotherapy in endodontics among the students. The percentage of participants who were aware of cryotherapy comprises 68% and 26% were not aware. 64% of the participants chose cold application as the recommended protocol in post surgical support. 79% of the participants were aware that the final rinse with 2.5°C cold saline for 5 minutes reduces the temperature of the external root surface. 68% of the respondents chose 2016 as the year at which cryotherapy was first used in endodontics. 63% of the respondents were aware that Keskin first used cryotherapy in endodontics. 53% of the participants chose 27G as the best gauge used in cryotherapy. 60% of the respondent chose -80°C as the temperature used in shallow cryogenic treatment. 76% of the participants chose -185°C as the temperature used in deep cryogenic treatment. 25% of the participants chose melted ice water as the mode of cold application, 7% participants chose gel pack, 4% participants chose ice pack and 64% participants chose all the above. 66% of the participants chose blockade of nerve endings as the cause of reduction of pain achieved by cold application. 87% of participants chose vital pulp cryotherapy as the method of cryotherapy used to control pulpal bleeding.

In previous study, CangulKeskin et al. investigated the effect of 2.5°C cold saline irrigation as the final irrigant on postoperative pain after single-visit root canal treatment of teeth with essential pulps(26), but they used a side-vented, positive-pressure 31-G NaviTip needle instead of negative apical pressure to negate its additional effect on reducing postoperative pain(26,27), It also found that cryotherapy decreased postoperative pain in teeth with essential pulps after single-visit root canal treatment(28), indicating that cryotherapy may be used for postoperative pain management in single-visit root canal treatment(29). After single-visit RCTs, Al- Nahlawi., et al. found that using intracanal cryotherapy combined with negative pressure irrigation reduces post endodontic pain(30). A. A. Alharthi et al., on the other hand, found that flushing the canal with saline at room temperature or cold was effective for post-endodontic pain relief(31). The effect of cryotherapy on reducing postoperative pain was compared in permanent pulpitis with and without apical periodontitis, according to Chumkam et al(32). Cold saline used as a final rinse with a 27-G side vented needle was found to help patients with irreversible pulpitis and apical periodontitis reduce their postoperative pain(33).

The present study has some limitations like the study population like small sample size as there were only 100 participants. We could create more awareness and let people understand cryotherapy in endodontics.

CONCLUSION:

Within the limitations of this study it is evident that most of the dental students were aware of cryotherapy in endodontics among dental students. This survey brings about epidemiological significance about the knowledge and awareness of cryotherapy in endodontics among dental students.

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CONFLICT OF INTEREST: None

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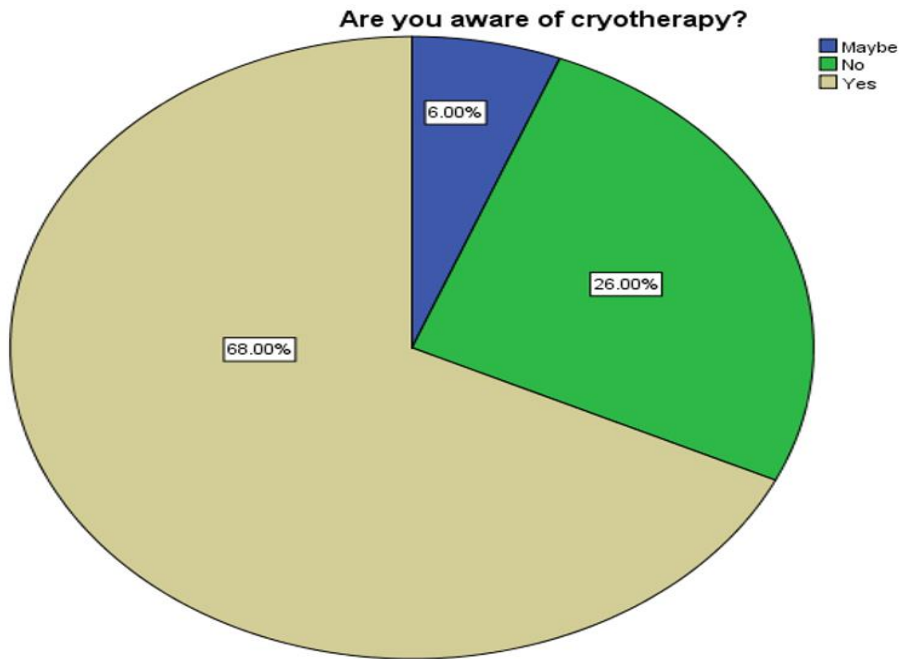


Figure 1: Shows the response of the awareness of cryotherapy of the participants. 68% participants chose yes, 26% participants chose no, 6% participants chose maybe. Beige indicates yes, green indicates no and blue indicates maybe.

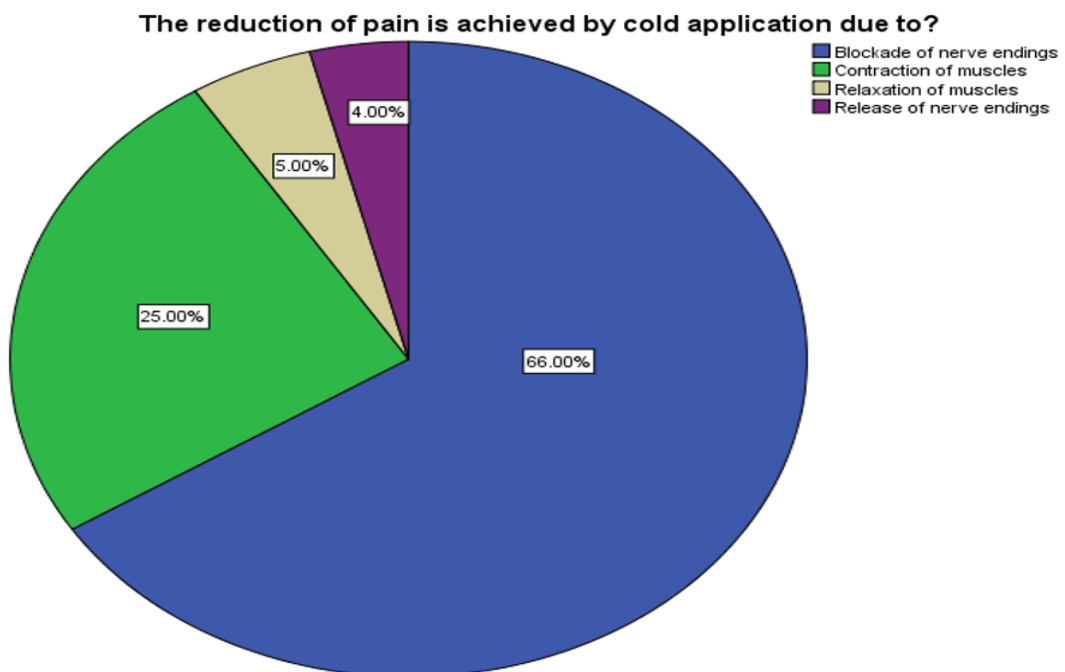


Figure 2: Shows the responses of the cause of reduction of pain achieved by cold application. 66% participants chose blockade of nerve endings, 25% participants chose contraction of muscles, 5% participants chose relaxation of muscles and purple indicates release of nerve endings. Blue indicates blockade of nerve endings, green indicates contraction of muscles, beige indicates relaxation of muscles and purple indicates release of nerve endings.

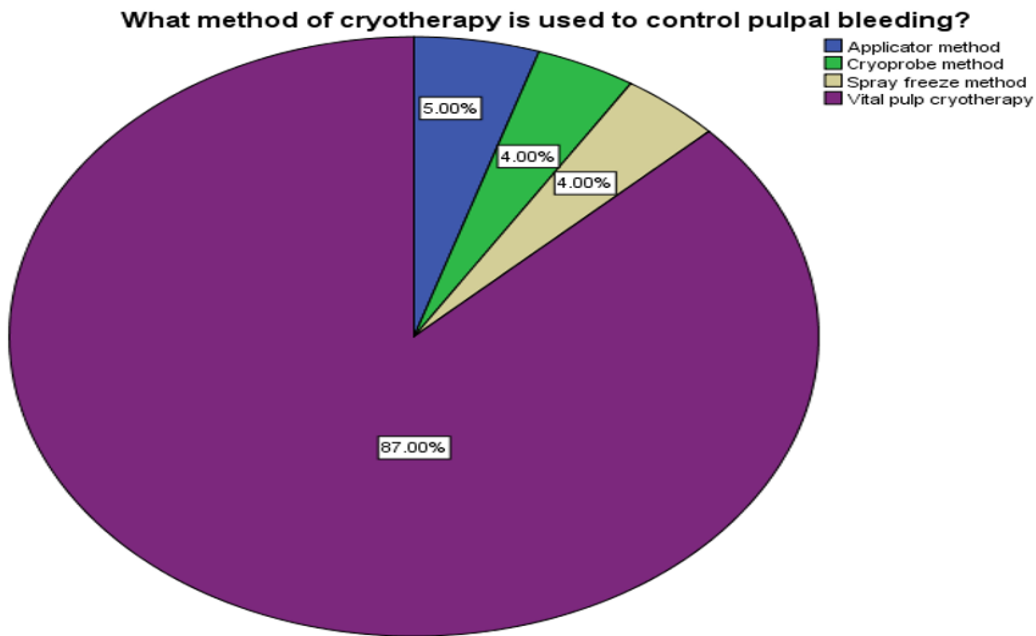


Figure 3: Shows the responses of the method of cryotherapy used to control pulpal bleeding. 87% participants chose vital pulp cryotherapy, 5% participants chose applicator method, 4% participants chose cryoprobe method and 4% participants chose spray freeze method. Blue indicates applicator method, green indicates cryoprobe method, beige indicates spray freeze method and purple indicates vital pulp cryotherapy.

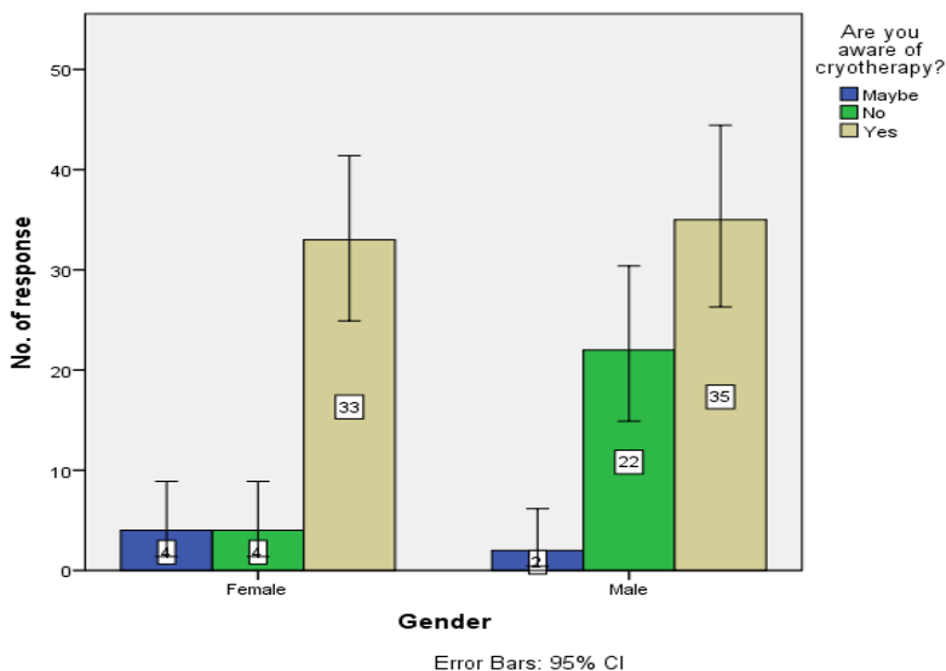


Figure 4: Bar graph showing the association between gender and the awareness of cryotherapy. X-axis represents the gender and Y-axis represents the number of participants of which beige colour indicates yes and green colour indicates no and blue colour indicates maybe. Majority of the males (35 participants) were more aware of cryotherapy than females. The association was statistically significant (Chi-square value-10.280 , p value-0.006 (<0.05)).

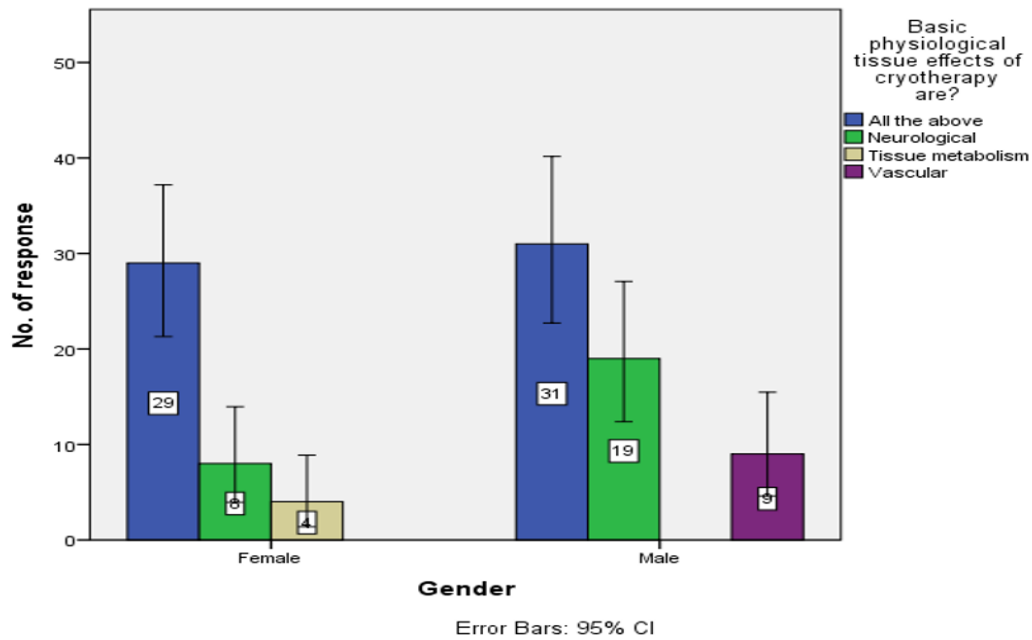


Figure 5: Bar graph showing the association between gender and the awareness of basic physiological tissue effects of cryotherapy. X-axis represents the gender and Y-axis represents the number of participants of which beige colour indicates tissue metabolism and green colour indicates neurological and purple indicates vascular and blue colour indicates all the above. Majority of the males (31 participants) were more aware of basic physiological tissue effects of cryotherapy than females. The association was statistically significant (Chi-square value-14.787 , p value-0.002 (<0.05)).

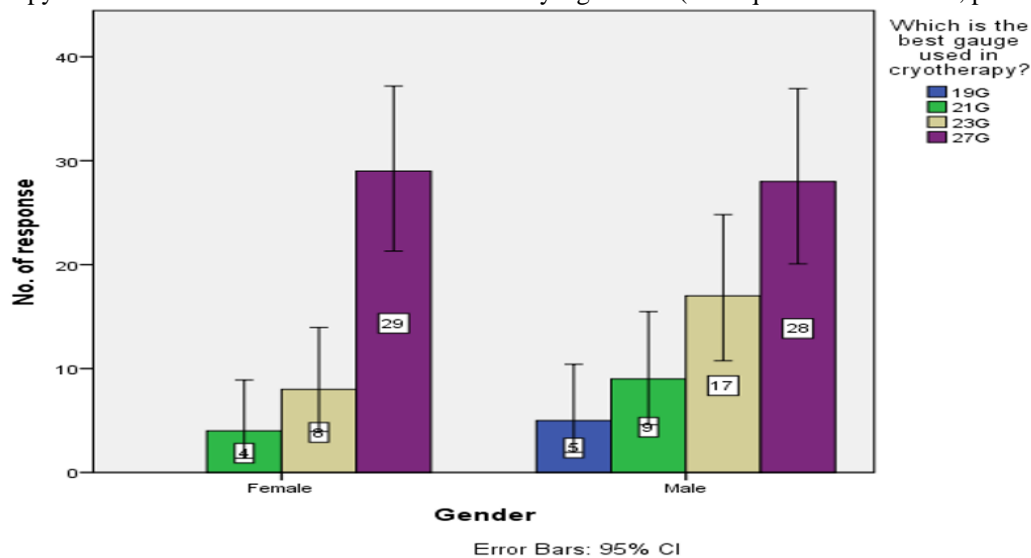


Figure 6: Bar graph showing the association between gender and the awareness of the best gauge used in cryotherapy. X-axis represents the gender and Y-axis represents the number of participants of which blue colour indicates 19G and green colour indicates 21G and beige colour indicates 23G and purple colour indicates 27G. Majority of the females (29 participants) were more aware of the best gauge used in cryotherapy than males. However the association was statistically not significant (Chi-square value-7.173 , p value-0.067 (>0.05)).