



Knowledge and Awareness on the Usage of Preemptive Analgesics in Third Molar Extraction among Dental Students: A Survey

Keerthana Balaji¹ and M. Dinesh Prabu^{2*}

¹Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Science (SIMATS), Saveetha University, Chennai, India.

²Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Science (SIMATS), Saveetha University, Chennai, India.

Authors' contributions

This work was carried out in collaboration between both authors. Author KB designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors KB and MDP managed the analyses of the study. Author MDP managed the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Postoperative pain control after extraction of third molars is important for patients because of the effect of pain symptoms on the healing process and quality of life. The aim of this study was to assess the knowledge and awareness of dental students towards the use of preemptive analgesics in third molar extractions. A questionnaire based survey was conducted among 100 dental students. Questionnaire was distributed through a survey link. Results were collected and analysed using IBM SPSS Statistical Analyzer (23.0 version). Frequency distribution and descriptive analysis were carried out. The variables were analysed using Pearson Chi square test. P Value less than or equal to 0.05 was considered to be statistically significant. The results of the study showed that the knowledge and awareness of dental students about the usage of preemptive analgesics in day to day practice varied according to their year of study. Interns were observed to have more knowledge and awareness regarding preemptive analgesics in comparison to third years and final years.

Preemptive analgesics play a significant role in the elimination of postoperative pain in patients after removal of third molars. Therefore, it is of utmost importance for dental students to gain sufficient knowledge regarding the usage and importance of preemptive analgesics in dentistry.

Keywords: Postoperative pain; preemptive analgesics; third molar extraction; dental students.

1. INTRODUCTION

Extraction of impacted teeth is one of the most common operations in oral and maxillofacial surgery. Postoperative pain and swelling are the most common complications. Post operative pain and swelling are mainly due to inflammatory processes initiated by surgical trauma [1]. Damage to the capillary vessels and the release of inflammatory cytokines as a result of trauma lead to increased permeability of vessels which results in accumulation of sero-sanguinous fluid and exudate. Many individuals rate the pain of tooth extraction as very severe or intolerable [2]. The pain of tooth extraction varies among individuals depending upon their anxiety level and each extraction of an individual may be quite different. The removal of impacted mandibular third molars is usually a planned surgical procedure, after which a moderate to severe pain occurs within 1 to 3 hours after the operation, requiring the use of analgesics. The acute postoperative pain in the early postoperative period and the possibilities for minimising and controlling it are of scientific interest [3]. The postoperative pain is a complicated response to the tissue injury resulting from the operation that stimulates central nervous system hypersensitivity. It may occur after any surgical procedure, whether it is minor oral surgery or another type of surgery. After surgical interventions, prolonged pain stimuli cause suffering, harm to the body and post-operative complications that may have a negative effect on patient recovery. This makes it necessary to take into account pain characteristics and its intensity in order to assess the need for a particular type of analgesic intervention [4]. The concept of preemptive analgesia minimizes post-operative pain by preventing central sensitization. Crile, who introduced pre-emptive analgesia, advocated the use of regional blocks in addition to general anesthesia to prevent intraoperative nociception caused by changes in the central nervous system during surgery [5]. Management strategies for postoperative pain are aimed at reducing a patient's pain to a tolerable level. Complete abolition of pain should not be the objective and is certainly not desirable. Though the traditional approach has been to begin pain therapy when surgery is complete, the concept of

preemptive analgesia has become increasingly popular wherein antinociceptive treatment is started before the onset of pain. Such treatment prevents the establishment of altered central processing which normally amplifies postoperative pain by sensitising the central nervous system to sensory input. Effective treatment of postoperative pain is a major priority in clinical practice [6,7]. Preemptive analgesia improves the quality of life postoperatively, reducing morbidity and providing greater comfort, allowing for rapid recovery and early return of patients to daily activities. With a rich case bank established over 3 decades we have been able to publish extensively in our domain [8–18]. Based on this inspiration we aim to assess the knowledge and awareness of dental students towards the use of preemptive analgesics in third molar extractions.

2. MATERIALS AND METHODS

A questionnaire based study was conducted among 100 dental students of Private dental college in Chennai, Tamil Nadu. The questionnaire consisting of 10 questions (Table 1) was designed and addressed voluntarily to 100 students at a Private Dental College and hospitals through an online survey link. The study included only undergraduate students. Surveyed undergraduate students were 3rd, 4th and 5th year (interns) who were practicing in clinics under proficient staff. Data was collected using an online survey link (Survey planet) and tabulated in excel. The excel sheet was then imported to IBM SPSS Statistical Analyzer (23.0 version) for statistical analysis. Results were obtained in the form of graphs.

3. RESULTS AND DISCUSSION

This study was conducted among 100 dental students. Out of 100, 43% were third years, 22% were final years and 35% were interns (Fig. 1). Among the study population, only 38% of the dental students had knowledge on preemptive analgesics constituting 22% of interns, 9% of final years and 7% of third years (Figs. 2 & 3). Only 26% were aware of the usage of preemptive analgesics in third molar extractions and remaining 74% were not aware of this (Fig.

4). Only 17% of dental students had knowledge on the mechanism of action of preemptive analgesic (Fig. 5). In Terms of commonly used preemptive analgesics in third molar extractions, 47% of dental students answered diclofenac sodium, 27% answered ketamine and 26% answered tramadol to be commonly used drugs as preemptive analgesics in third molar extractions (Fig. 6). About 65% of the dental students were aware of the usage of preemptive analgesics in the surgical extractions of impacted third molars constituting 35% of interns, 19% of final years and 14% of third years (Figs. 7 & 8).

Majority of the study population that is 73% had knowledge on the usage of preemptive analgesics to eliminate postoperative pain after third molar extractions (Fig. 9). About 59% of the dental students had knowledge on various methods of administration of preemptive analgesics which constitutes 30% of interns, 22% of third years and 7% of final years (Figs. 10 & 11). Only 42% of the students had knowledge on

the influence of vasoconstrictors on the efficacy of preemptive analgesics constituting 27% of interns, 2% of final years and 13% of third years (Figs. 12 & 13). Only 37% of the dental students were aware of the influence of duration of surgery on the efficacy of preemptive analgesics (Fig. 14).

Several studies assessed the dental students and practitioners about the efficacy of the usage of preemptive analgesics in third molar extractions. In general, the results of this study showed that knowledge and awareness regarding preemptive analgesics were significantly low among the dental students and should be improved. Many research findings suggest that dentists should have sufficient information about preemptive analgesics prior to its usage. Preemptive analgesia is a controversial topic. Differences between experimental models, including different routes of administration, drug combinations, time of postoperative pain evaluation, types of surgery,

Table 1. Table representing the questionnaire distributed to the dental students

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1. Year of Study:
 2. Are you aware of preemptive analgesics?
 - Yes
 - No
 3. Are you aware that preemptive analgesics are used in third molar extractions?
 - Yes
 - No
 4. Do you know the mechanism of action of preemptive analgesics?
 - Yes
 - No
 5. What do you think is the most commonly used preemptive analgesic in third molar extraction?
 - Diclofenac sodium
 - Tramadol
 - Ketamine
 6. Do you think it is necessary to use preemptive analgesics in surgical removal of third molars?
 - Yes
 - No
 7. Do you know that preemptive analgesics are used to eliminate postoperative pain after third molar extractions?
 - Yes
 - No
 8. Are you aware of the various methods of administration of preemptive analgesics?
 - Yes
 - No
 9. Do you know vasoconstrictors in local anaesthesia influence the efficacy of preemptive analgesics?
 - Yes
 - No
 10. Are you aware of the influence of duration of the surgery on the efficacy and action of preemptive analgesics?
 - Yes
 - No
-

concomitant use of sedation and local anesthetics that are more potent hinder the comparison between procedures. The issues related to achieving good postoperative analgesia are many and various - insufficient competence, fear of complications, poor knowledge of analgesic drugs, poor assessment of pain, etc [19]. There are numerous techniques for analgesic treatment of postoperative pain, but the interest in recent years has been focused on the preemptive analgesia. This is due to the development of the fundamental sciences associated with the discovery of central sensitization by Woolf [20]. Neychev D et al stated that the use of preemptive analgesia with nimesulide results in significant reduction in the pain experience. Preemptive analgesia influences primarily the sensory component of pain, as well as the intensity of pain [21].

The results of the present study showed that the majority of the dental students that is 47% answered that diclofenac sodium was the most commonly used preemptive analgesics in extractions of third molars. Shah R et al stated in their that use of diclofenac sodium orally in 50 mg dose one hour preoperatively as preemptive

analgesic agent is economical, effective, easy and safe method of postoperative pain in mandibular impaction surgery cases [22]. Different administration routes used for preemptive analgesics include intramuscular, oral, intravenous and sub mucosal. Isirdia-Espinoza et al showed that the association of submucous tramadol (50 mg) applied at surgical site with ketorolac (10 mg) administered orally 30 minutes before surgery was more effective than the preemptive use of oral ketorolac (10 mg) alone [23].

In contrast, Zacharias et al. 10 evaluated preemptive analgesia by separating the patients into three groups: placebo, diclofenac 100 mg, and methadone 10 mg administered orally 60-90 minutes before surgery, and found no significant difference between groups [24]. Preemptive analgesia has been investigated with the possibility of a pharmacodynamic advantage. With the onset of surgical trauma and inflammatory cascade activation, there is the release of inflammatory mediators and its corresponding nociceptors sensitization. The hypothesis of the anti-inflammatory administered before trauma reduces the amount of release of

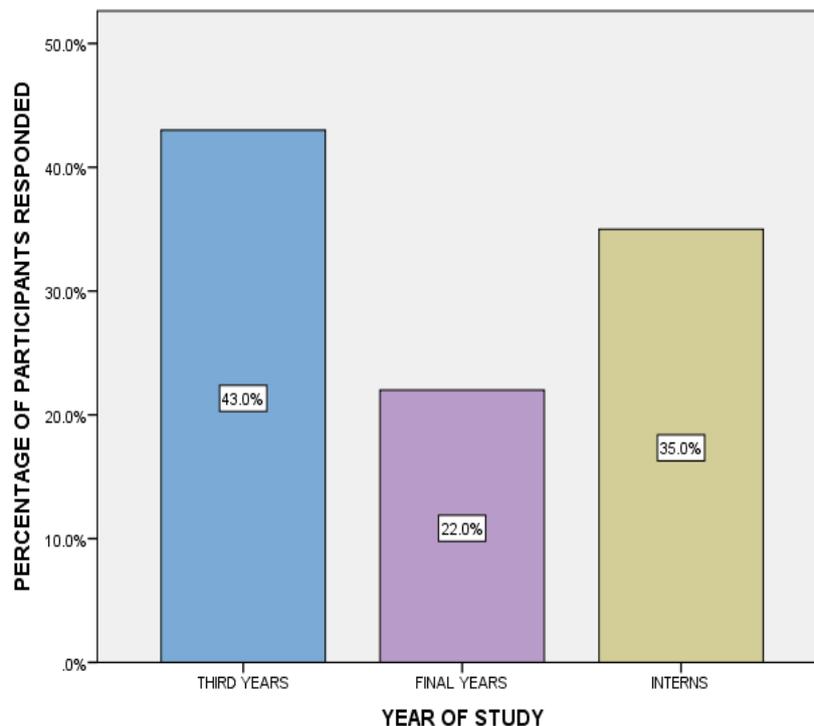


Fig. 1. This bar graph represents the distribution of study population according to their year of study. X-axis represents the year of study and Y-axis represents the percentage of participants responded. About 43% of the respondents were third years (blue), 35% were interns (beige) and 22% were final years (violet)

these mediators and the consequent peripheral and central sensitization is attractive. The limitations of this study include small study population and differences in the interpretation

among the respondents. Thus future studies with large sample size and more standardised study design are needed for further assessment.

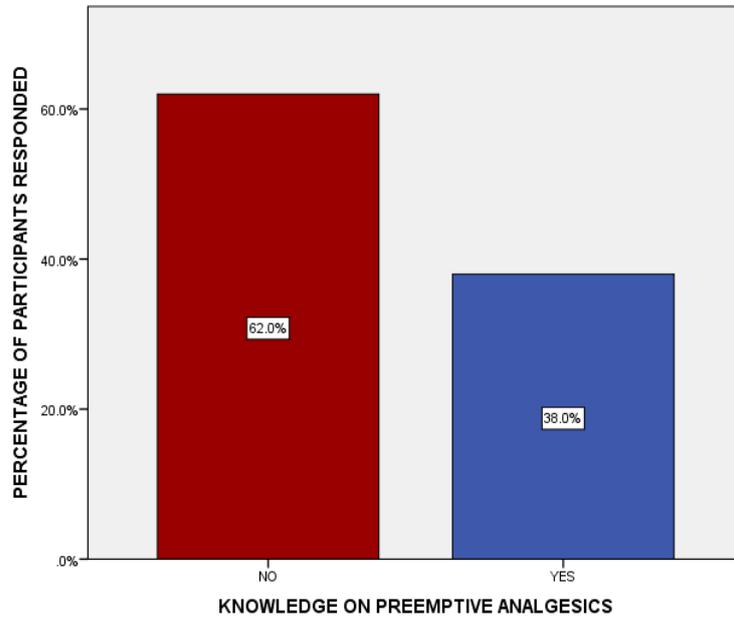


Fig. 2. This bar depicts the frequency distribution of knowledge of the study population on preemptive analgesics. X-axis represents the knowledge on preemptive analgesics and Y-axis represents the percentage of participants responded. Only 38% of the dental students had knowledge on preemptive analgesics

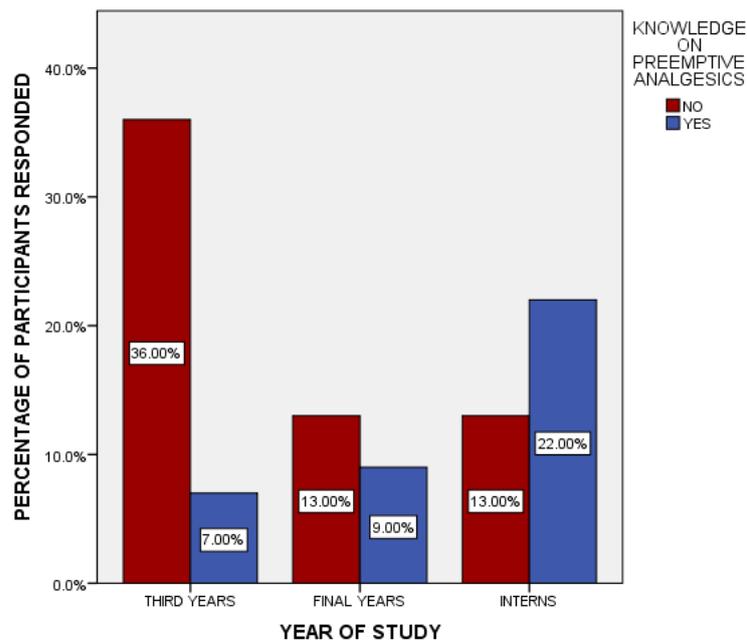


Fig. 3. This bar graph represents the association between the year of study and their responses to the given question. X-axis represents the year of study and Y-axis represents the percentage of participants responded. Interns had more knowledge on preemptive analgesics compared to others. Pearson Chi-square test, p value= 0.000<0.05, hence the association is statistically significant

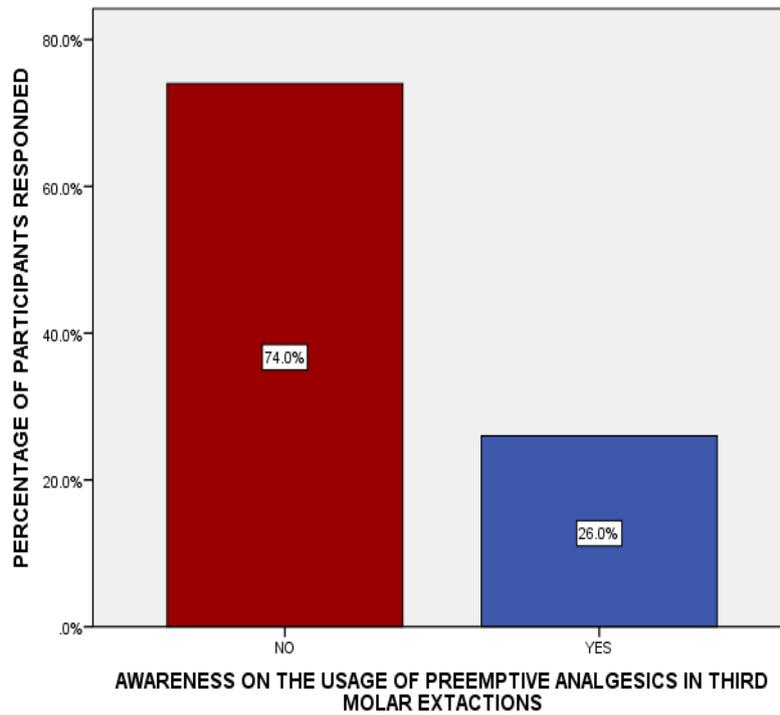


Fig. 4. This bar depicts the frequency distribution of awareness of the study population on the usage of preemptive analgesics in third molar extractions. X-axis represents the awareness on the usage of preemptive analgesics in third molar extraction and Y-axis represents the percentage of participants responded. Only 26% of the dental students were aware of the usage of preemptive analgesics in third molar extractions

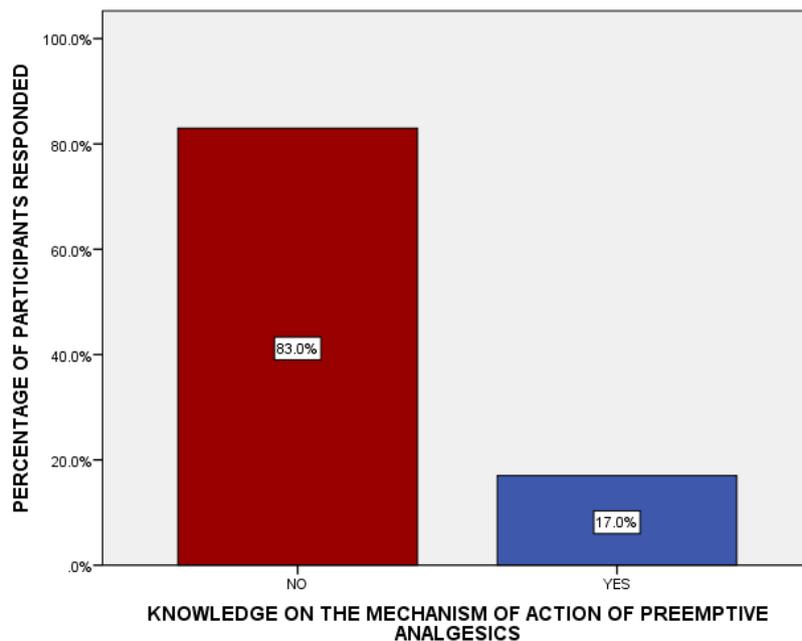


Fig. 5. This bar depicts the frequency distribution of knowledge of the study population on mechanism of action of preemptive analgesics. X-axis represents the knowledge on the mechanism of action of preemptive analgesics and Y-axis represents the percentage of participants responded. Only 17% of the dental students had knowledge on the mechanism of action of preemptive analgesics

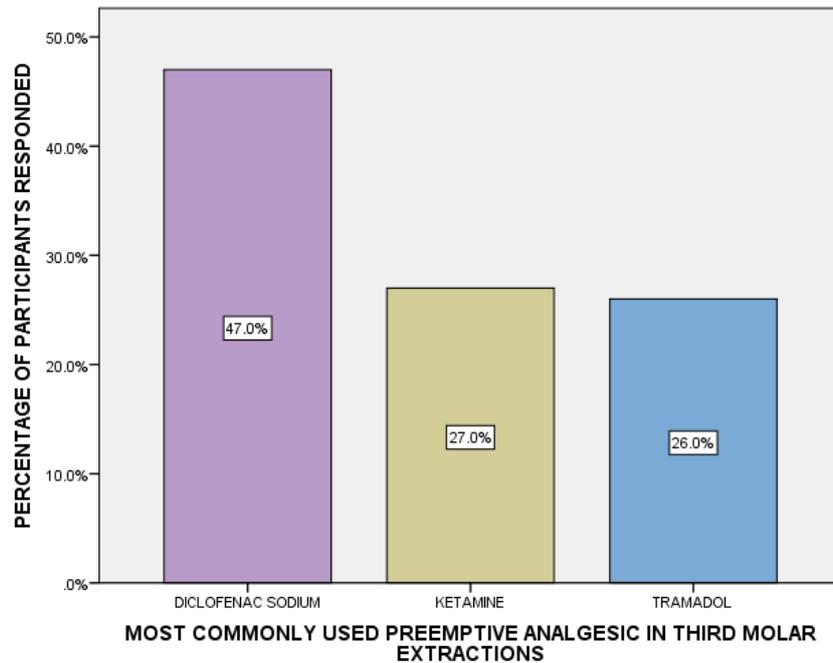


Fig. 6. This bar depicts the frequency distribution of most commonly used preemptive analgesics in third molar extractions. X-axis represents the most commonly used preemptive analgesics in third molar extractions and Y-axis represents the percentage of participants responded. Majority of the dental students (47%) answered diclofenac sodium (violet) as the most commonly used preemptive analgesic in third molar extractions compared to others

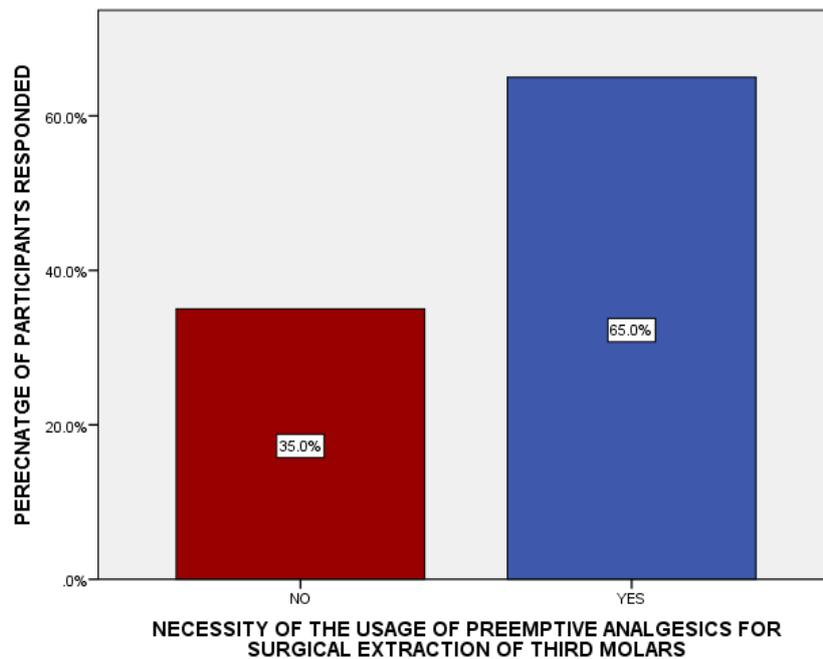


Fig. 7. This bar depicts the frequency distribution of awareness of the study population on the necessity of the usage of preemptive analgesics in surgical extractions of third molars. X-axis represents the necessity of the usage of preemptive analgesics in surgical extractions of third molars and Y-axis represents the percentage of participants responded. Majority of the dental students (65%) were aware of the usage of preemptive analgesics in surgical extractions of third molars

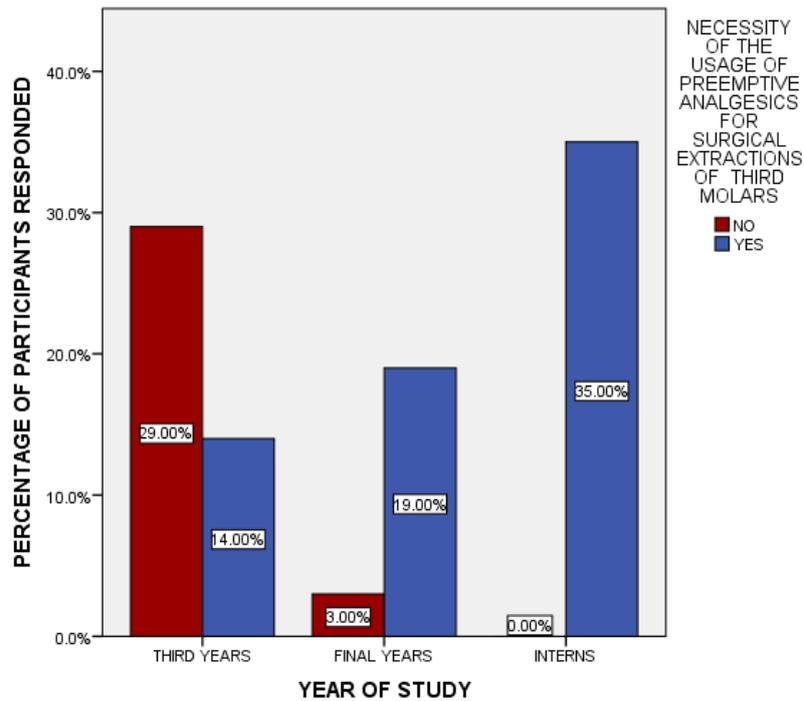


Fig. 8. This bar graph represents the association between the year of study and their responses to the given question. X-axis represents the year of study and Y-axis represents the percentage of participants responded. Interns were more aware of the necessity of the usage of preemptive analgesics in surgical extraction of third molars compared to others. Pearson Chi-square test, p value= 0.000<0.05, hence the association is statistically significant

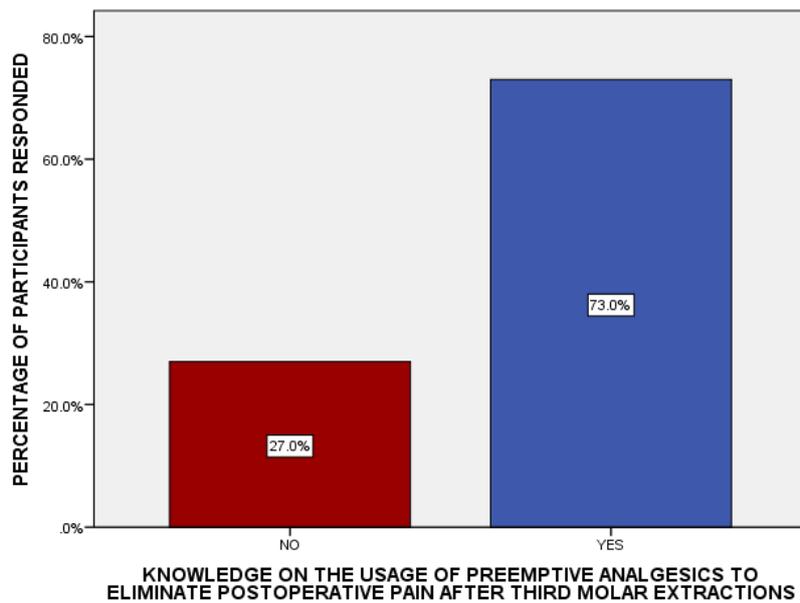


Fig. 9. This bar depicts the frequency distribution of knowledge of the study population on the usage of preemptive analgesics to eliminate postoperative pain after third molar extractions. X-axis represents the knowledge on the usage of preemptive analgesics to eliminate postoperative pain after third molar extractions and Y-axis represents the percentage of participants responded. Majority of the dental students (73%) had knowledge on the usage of preemptive analgesics to eliminate postoperative pain after third molar extractions

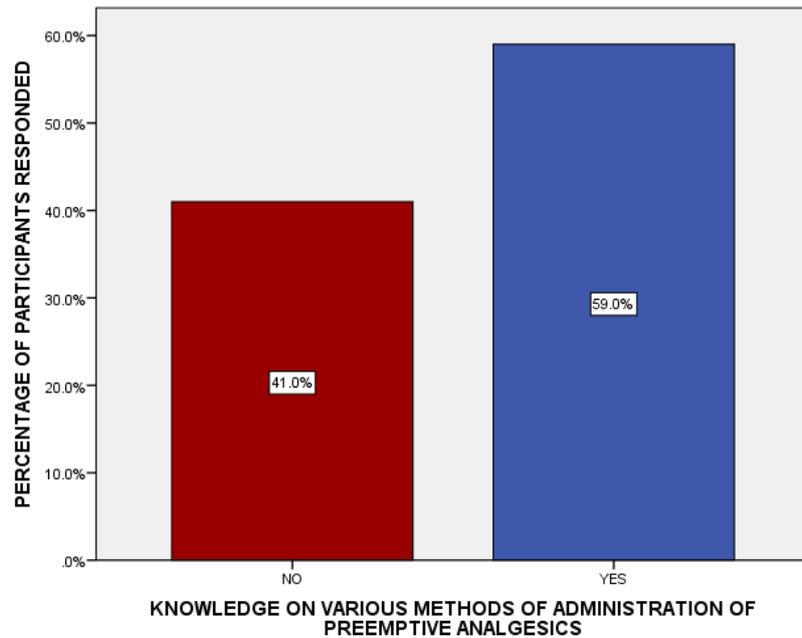


Fig. 10. This bar depicts the frequency distribution of knowledge of the study population on various methods of administration of preemptive analgesics. X-axis represents the knowledge on various methods of administration of preemptive analgesia and Y-axis represents the percentage of participants responded. Majority of the dental students (59%) had knowledge on various methods of administration of preemptive analgesics

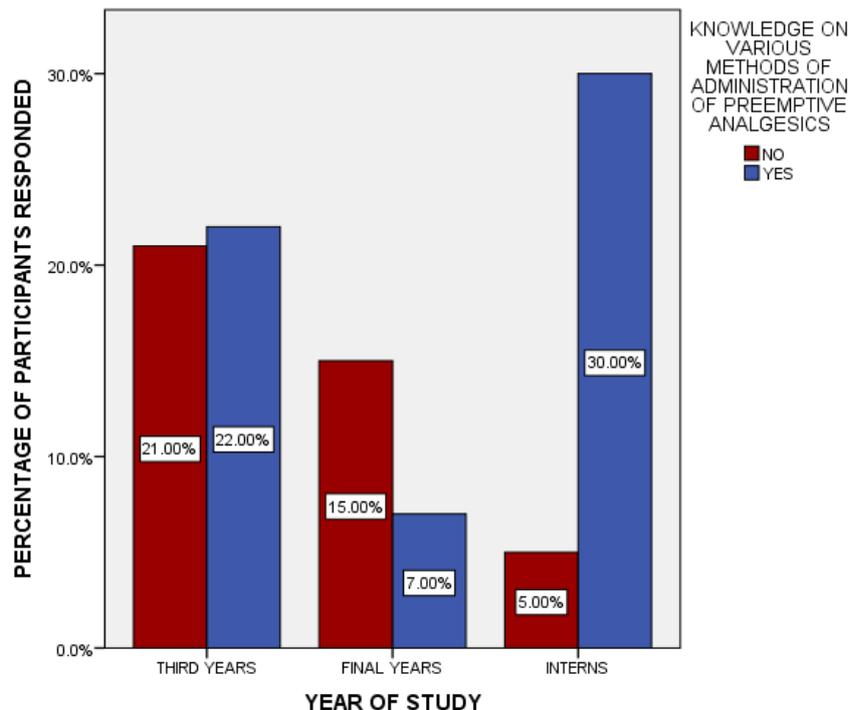


Fig. 11. This bar graph represents the association between the year of study and their responses to the given question. X-axis represents the year of study and Y-axis represents the percentage of participants responded. Interns had more knowledge on various methods of administration of preemptive analgesics compared to others. Pearson Chi-square test, p value= 0.002<0.05, hence the association is statistically significant

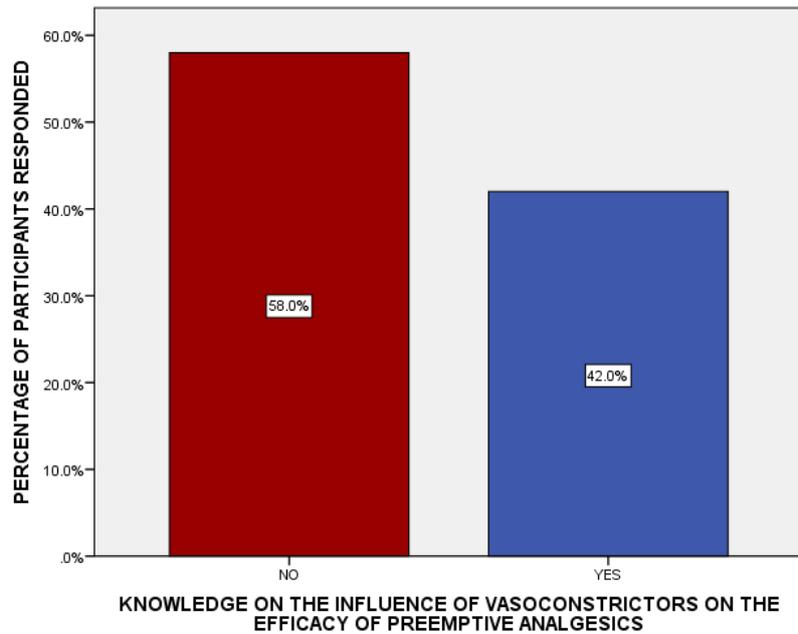


Fig. 12. This bar depicts the frequency distribution of knowledge of the study population on the influence of vasoconstrictors on the efficacy of preemptive analgesics. X-axis represents the knowledge on the influence of vasoconstrictors on the efficacy of preemptive analgesics and Y-axis represents the percentage of participants responded. Only 42% of the dental students had knowledge on the influence of vasoconstrictors on the efficacy of preemptive analgesics

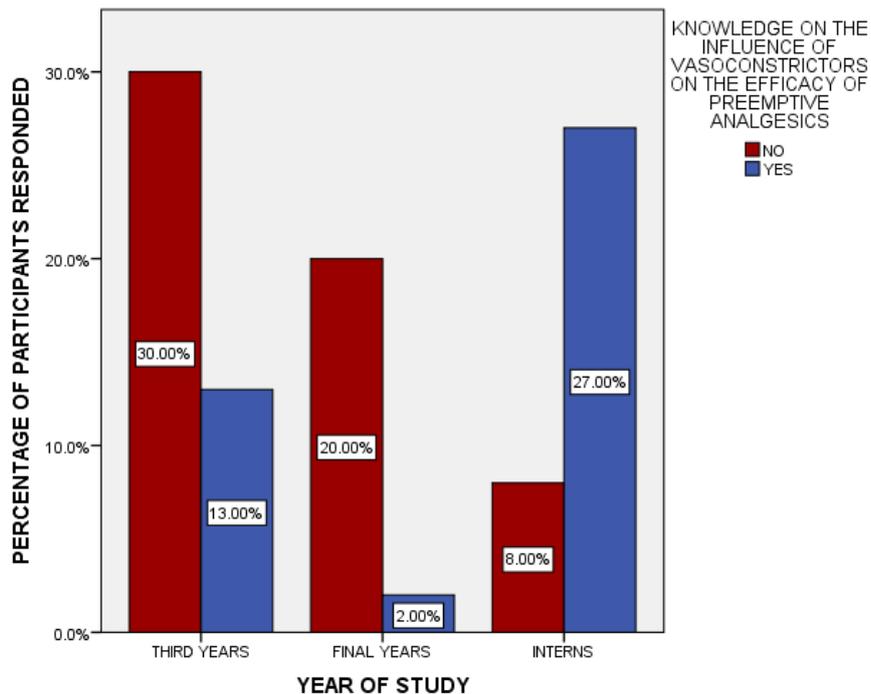


Fig. 13. This bar graph represents the association between the year of study and their responses to the given question. X-axis represents the year of study and Y-axis represents the percentage of participants responded. Interns were more aware of the influence of vasoconstrictors on preemptive analgesics compared to others. Pearson Chi-square test, p value= 0.000<0.05, hence the association is statistically significant

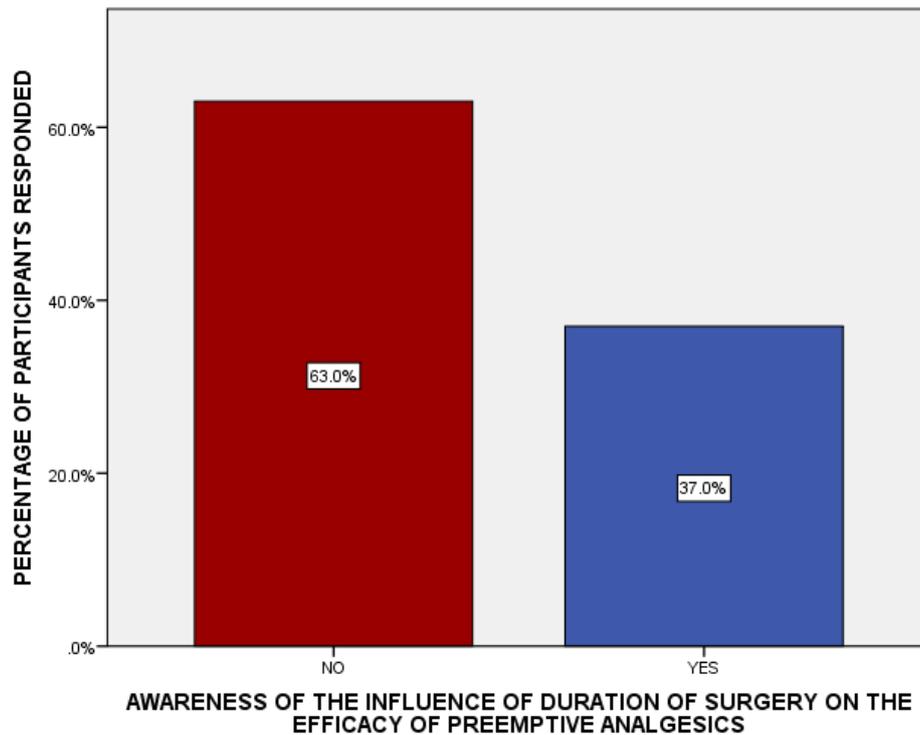


Fig. 14. This bar depicts the frequency distribution of awareness of the study population on the influence of duration of surgery on the efficacy of preemptive analgesics. X-axis represents the awareness of the influence of duration of surgery on the efficacy of preemptive analgesics and Y-axis represents the percentage of participants responded. Only 37% of the dental students were aware of the influence of duration of surgery on the efficacy of preemptive analgesics

4. CONCLUSION

In this study, knowledge and awareness of the dental students towards the use of preemptive analgesics in the extraction of third molars were assessed. The results of the study showed that the knowledge and awareness about the usage of preemptive analgesics among dental students varied according to their year of study. Interns were observed to have more knowledge and awareness in comparison to third years and final years. Hence, the primary focus should be improving the knowledge and awareness through symposiums and continuing medical education programs regarding the usage of preemptive analgesics and pain physiology which in turn will benefit patients in the management of postoperative pain.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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