



Knowledge and Awareness about Ketamine as Anaesthetic among Dental Students - A Survey

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Authors' contributions

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

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ABSTRACT

Ketamine has been used as a safe and effective sedative to treat adults and children exhibiting high levels of anxiety or fear during dental treatment. Pediatric dentistry often involves patients with high levels of anxiety and fear and possibly a few positive dental experiences. Patient management can involve behavioral approaches, as well as the use of sedation or general anesthesia with a variety of agents, including ketamine. The aim of this study was to assess the knowledge and awareness of ketamine as an anesthetic among dental students. A questionnaire survey was carried out online containing 10 questions that were sent to 100 dental students through survey planet software and the data was collected and statistically analysed. 74% of the students were aware about the uses and adverse effects of ketamine. Within the limits of this study, it may be concluded that most of the students were aware of ketamine as an anesthetic.

Keywords: Anesthesia; drug; ketamine; dental.

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1. INTRODUCTION

Ketamine has been used widely since 1970. Ketamine was launched commercially in 1970, with the manufacturer's definition as a "fast-acting, non-barbiturate general anesthetic" and a suggestion that it would be useful for short-term procedures. Through the aid of its old special pharmacological properties and newly discovered beneficial therapeutic properties, ketamine has overcome strong winds of time and actually has a wide range of clinical applications. New neuroprotective, anti-inflammatory and anti-tumor effects have been reported, and the discovery of the effectiveness of low-dose ketamine regimens has helped to extend the clinical application profile of ketamine [1].

Uncooperative children may need to seek dental care under sedation, which is demonstrated when non-pharmacological advice is ineffective. There are randomized controlled trials (RCTs) comparing various sedative protocols for dental procedures; however, the proof of superiority of one type over another is poor. [2] Ketamine Pediatric dental treatment sedation poses special challenges. While total immobility is not necessary, the patient must be co-operative and relatively still, must retain protective airway reflexes and must allow the operator to operate intraorally. While the procedures may be painful, discomfort is attenuated by using local anesthesia prior to the dental operation. The sedative must not have such a prolonged action that an unresponsive child is sent home from the clinic area. Despite several known drawbacks, oral administration is usually favored for sedation of difficult pediatric patients over parenteral agents [3].

Ketamine HCL, a white crystalline compound that forms a smooth, colorless solution in water, is a fast-acting non-narcotic, non-barbiturate medication with a broad safety margin. It is best known as a dissociative anesthetic with a strong analgesic effect [3,4]. Ketamine varies chemically and pharmacologically from other anesthetic agents and produces a specific anesthetic impact. The adaptability of ketamine for use in outpatient anesthesia for oral surgery has been documented since 1965. "While its use was initially limited to the operating room, this appears to be changing. Ketamine may be used as an anesthetic or, in lower doses, as a sedative agent. [5] The aim of this study was to assess the knowledge and awareness of

ketamine as an anesthetic among dental students.

Previously our department has published extensive research on various aspects of prosthetic dentistry [6–16], this vast research experience has inspired us to research about Knowledge and awareness about ketamine as an anesthetic among dental students.

2. MATERIALS AND METHODS

It was a questionnaire-based study evaluating the Knowledge and awareness about ketamine as an anesthetic among dental students. A total of six questions were asked to a batch of 100 participants to elicit awareness about ketamine as an anesthetic among dental students. The study was done under a University setting. Two reviewers are involved in the study. The data collection was done, the obtained data were tabulated and entered in the MS Excel sheet. Data collection were imported to SPSS, variable definition process was done using tables and graphical illustration.

By using the statistical software IBM SPSS version 20 statistical tests like description statistical test and inferential statistics were done keeping demographical, such as age, gender as the independent variable, and ketamine anesthesia as dependent variable. The data was reviewed by one external reviewer and the data was imported to SPSS and variables defined. Chi-square was done on the data obtained. The type of analysis that was done was correlation and association.

3. RESULTS AND DISCUSSION

The data collected from the google form were tabulated in SPSS and descriptive statistics were obtained. Out of the 100 dental students. 60% of the dental students were postgraduates and 40% were undergraduates (Fig. 1). 70% were male and 30% were female (Fig. 2). 55% of the dental students had knowledge of ketamine as an anesthetic and 45% of them were not aware (Fig. 3). 24% of the dental students knew the difference between ketamine and local anesthesia 76% were not aware (Fig. 4). 13% of dental students who had undergone treatment under ketamine 87% had not undergone treatment under ketamine anesthesia (Fig. 5). 74% of dental students were aware of ketamine anesthetic complications and side effects and 26% were not aware (Fig. 6).

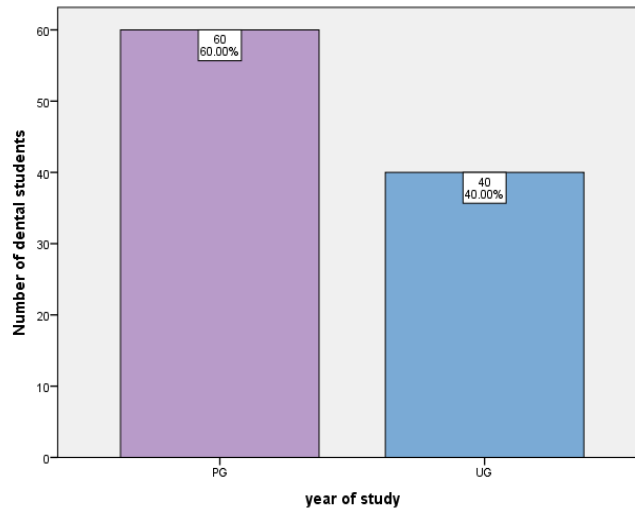


Fig. 1. The graph shows the age distribution of students who were aware of ketamine as anesthetic use among dental students. X axis shows the age groups and Y-axis shows the number of students who were aware. 60% were postgraduates (purple),40% were undergraduates (blue)

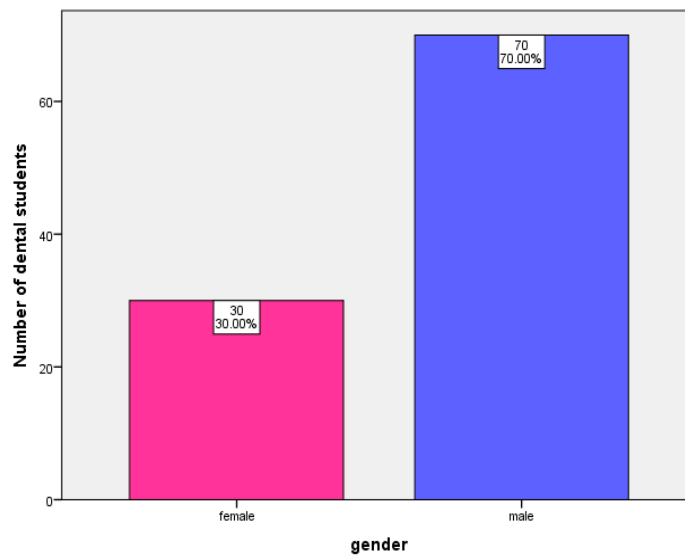


Fig. 2. The graph shows the gender distribution of students who were aware of ketamine as anesthetic use among dental students. X axis shows the gender distribution and Y-axis shows the number of students who were aware. 70% were male (blue), 30% were female (pink)

Pharmacologically, ketamine's main action is on glutamate, the major excitatory neurotransmitter in the brain. It is a non-competitive antagonist at one of the three glutamate receptors: the N-methyl d-aspartate (NMDA) receptor. Because of its role in synaptic plasticity, the NMDA-receptor

is central to learning and memory. Ketamine also has less prominent actions at other receptor sites. It blocks muscarinic acetylcholine receptors and may potentiate the effects of gamma-aminobutyric acid (GABA) synaptic inhibition. Ketamine also induces activation of dopamine

release and acts as a weak agonist at μ opioid receptors.[17,1]

Ketamine was shown as a very effective anaesthetic in all oral surgical procedures for children in outpatient departments. [18]. The

research concerning intranasal procedural sedation has been highlighted due to its faster onset of action and recovery time and less discomfort and cost compared to other routes of sedative administration and used Ketamine with effective results.[18,19]

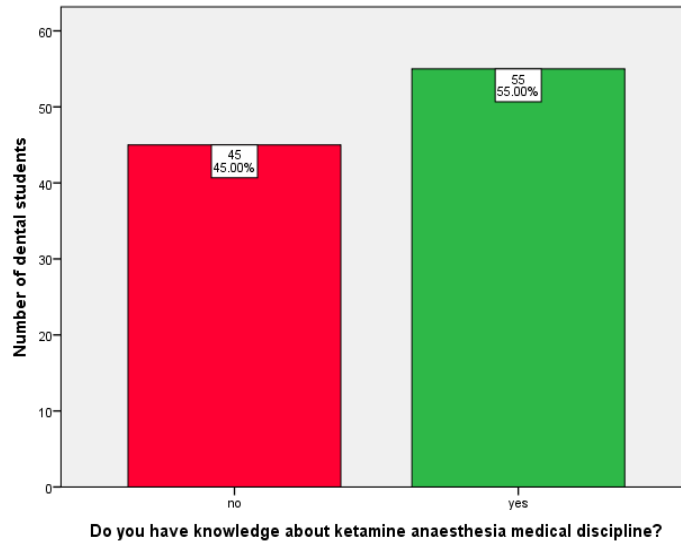


Fig. 3. The graph shows the distribution of dental students who were aware about ketamine anesthetic. The X-axis shows those who were aware and Y-axis shows the number of students who were aware. 45% were not aware (red), 55% were aware (green)

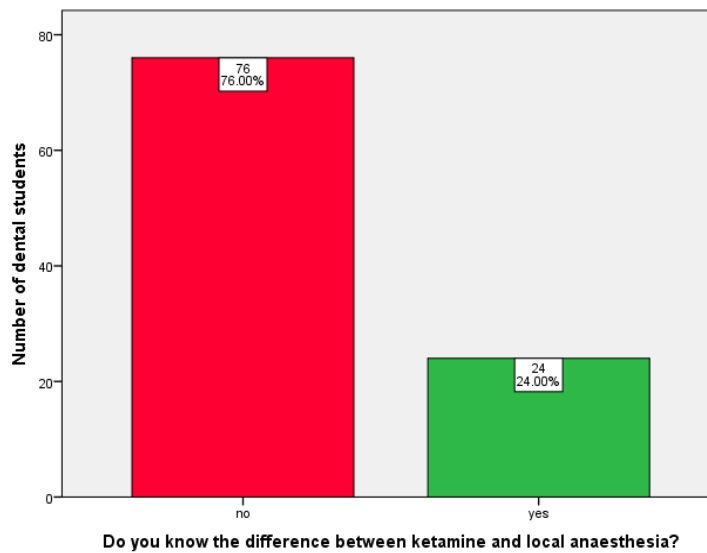


Fig. 4. The graph shows the distribution of dental students who knew the difference between ketamine and local anaesthesia. The X-axis shows those who were aware and Y-axis shows the number of students who were aware. 76% were not aware (red), 24% were aware (green)

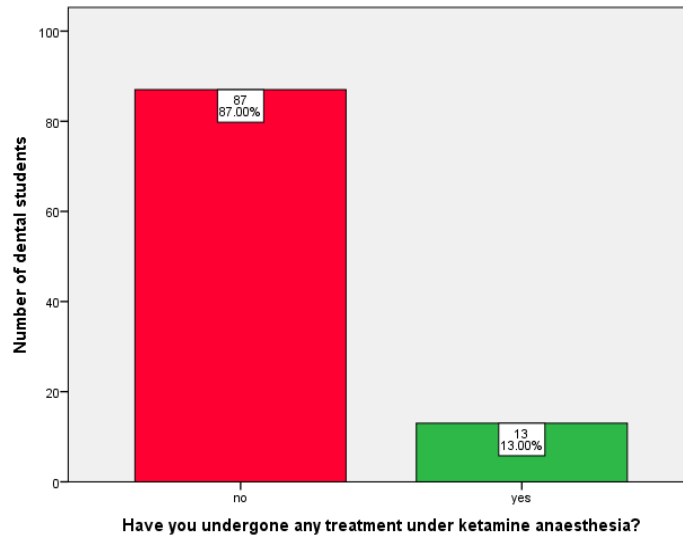


Fig. 5. The graph shows the distribution of dental students who had undergone treatment under ketamine. The X-axis shows those who were aware and Y-axis shows the number of students who were aware. 87% were not aware (red), 13% were aware (green)

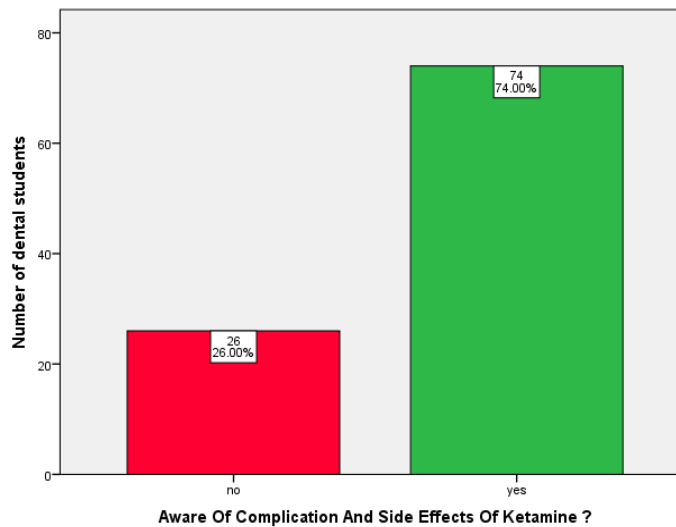


Fig. 6. The graph shows the distribution of dental students who were aware of ketamine anesthetic complications and side effects. X axis shows those who were aware and Y-axis shows the number of students who were aware. 26% were not aware (red), 74% were aware (green)

Shevde et al . in their study on attitudes and concerns regarding anaesthesia reported most patients preferred general to regional anaesthesia and not to select their own anaesthesiologist. Most significant preoperative concerns regarding the anaesthesiologist focused on experience,

qualifications, and presence or absence during the anaesthesia. Patient concerns also included the possibility of not waking up postoperatively, experiencing pain, and becoming paralyzed. Intensity of concern was inversely related to age and unrelated to educational level or occupation.

Variables related to type of concern included patient's sex, type of anesthesia, and proposed surgical procedure. Issues of least concern included disclosure of personal matters during anesthesia, experiencing impaired judgment

postoperatively, and being asleep or bedridden for a prolonged period of time. They suggested that anesthesiologists address significant patient concerns during the preoperative visit to enhance their effectiveness in patient care [20].

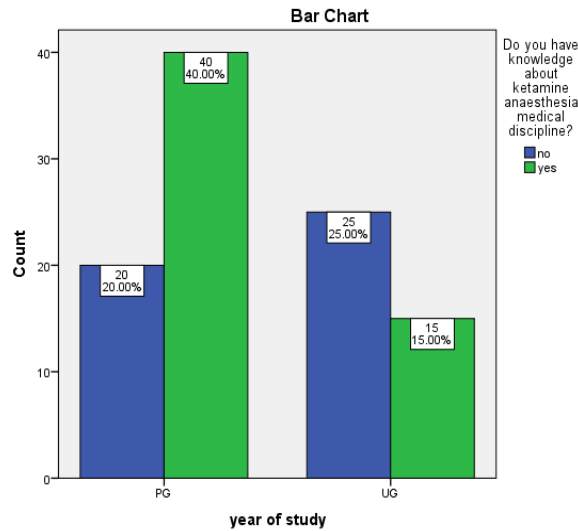


Fig. 7. Bar graph showing the association between year of study and responses about knowledge on ketamine anesthesia .X axis represents the year of study and the Y-axis the knowledge about ketamine anesthesia
The knowledge was more among the postgraduates about ketamine anesthesia compared to undergraduate students with a statistically significant difference. (Pearson Chi-square Test;P=0.01, P<0.05)

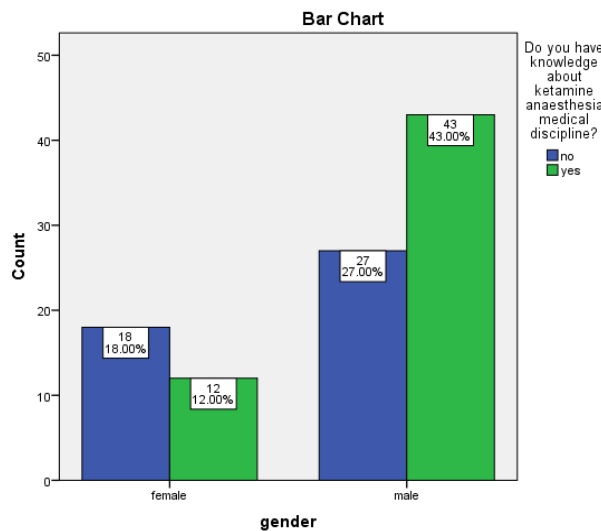


Fig. 8. Bar graph showing the association between gender and responses knowledge on ketamine anesthesia .X axis represents gender and Y-axis the knowledge about ketamine, anesthesia
The knowledge was more among the males about ketamine anesthesia compared to females students with a statistically significant difference. (Pearson Chi-square Test;P=0.01, P<0.05)

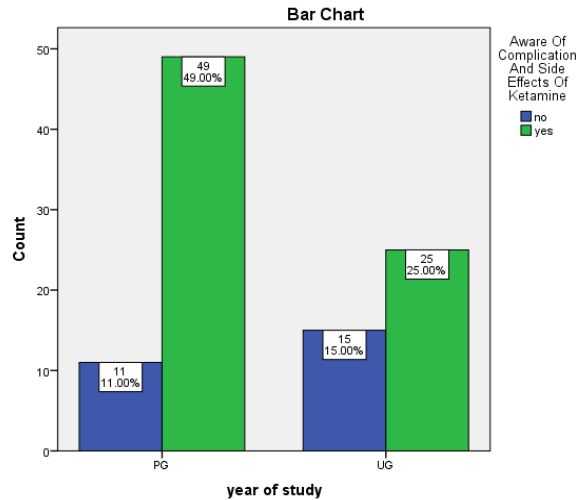


Fig. 9. Bar graph showing the association between year of study and awareness of complication and side effects of ketamine anesthesia. The X-axis represents the year of study and the Y-axis the awareness of complication and side effects of ketamine anesthesia
The knowledge was more among the postgraduates about ketamine anesthesia compared to undergraduate students with a statistically significant difference. (Pearson Chi-square Test; P=0.01, P<0.05)

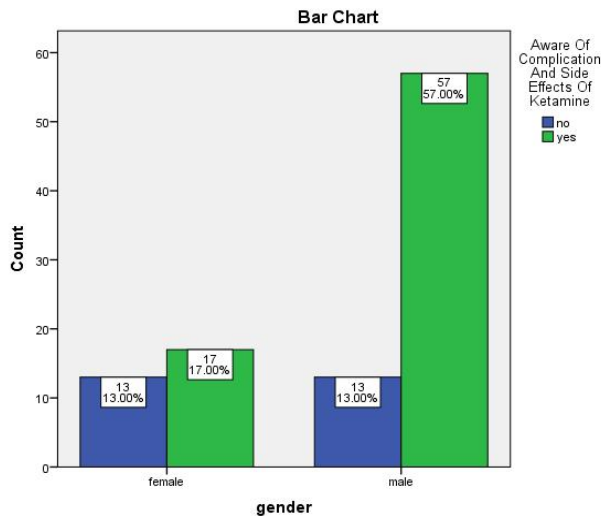


Fig. 10. Bar graph showing the association between gender and awareness of complication and side effects of ketamine anesthesia .X axis represents gender and Y-axis awareness of complication and side effects of ketamine anesthesia
The knowledge was more among the males about ketamine anesthesia compared to females students with a statistically significant difference. (Pearson Chi-square Test; P=0.01, P<0.05)

Ketamine is a very safe, low-cost drug and plays an important role in the developing world. In regions where access and support for a broader variety of drugs is challenging, its limited range of clinical applications is perfect. The good safety profile and ease of storage make it suitable for use in areas where

refrigerators, complicated control, electricity and oxygen can all be in short supply or unreliable. Ketamine is still commonly used in both acute and chronic pain conditions, and work is still underway into the possible neuroprotective role of ketamine in brain injury [21].

4. CONCLUSION

Within the limits of this study, it may be concluded that most of the students were aware of ketamine as an anesthetic. Organizing seminars and additional awareness programs would help them acquire more knowledge about ketamine Anaesthesia.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s). The study was approved by the Institutional Ethics Board.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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