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Knowledge, Attitude, And Introspective Confidence In Managing Medical Emergencies Among Undergraduate Students And Postgraduate Students In Chengalpattu District - A Cross Sectional Study

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Abstract

Background: Medical emergencies in dental clinics, although infrequent, can pose serious risks and demand immediate and effective intervention. The level of preparedness among dental professionals is critical in ensuring patient safety.

Aim: To evaluate and compare the knowledge, attitude, and Introspective confidence in handling medical emergencies among final-year dental students, interns, and postgraduate students.

Materials and Methods: A cross-sectional survey was conducted among 200 participants comprising final-year students (n = 62), interns (n = 85), and postgraduates (n = 53). A structured questionnaire assessed participants' knowledge, attitude, and perceived confidence in medical emergency management. Data were analyzed using descriptive statistics and one-way ANOVA. Tukey's post-hoc test was applied for intergroup comparisons, with statistical significance set at $p < 0.05$.

Results: The mean overall knowledge score was 11.93 ± 2.44 . Postgraduates achieved the highest mean score (14.30 ± 0.89), followed by interns (12.39 ± 1.68), while final-year students had the lowest mean score (9.26 ± 1.54). ANOVA demonstrated a statistically significant difference among the three groups ($F(2,197) = 176.56, p < 0.001, \eta^2 = 0.64$). Post hoc analysis confirmed significant differences between each group. Postgraduates also reported greater confidence in managing medical emergencies compared to interns and final-year students.

Conclusion: Academic progression significantly influences knowledge and confidence in medical emergency management. Enhanced practical training and periodic emergency drills are recommended, particularly at the undergraduate level.

Keywords: Emergency, dental students, postgraduates, cardiopulmonary resuscitation, syncope, choking

Introduction

Anxiety, underlying systemic conditions, allergic reactions, or procedural complications can all lead to medical emergencies in dental practices⁽¹⁾. Syncope, hypoglycemia, bronchospasm, anaphylaxis, seizures, and cardiac arrest are among the common emergencies that people encounter^(3,4). Even though they are not common, poor management can have detrimental effects^(6,7).

Dentists need to have the necessary theoretical understanding and practical abilities to identify and handle such situations quickly⁽⁵⁾. Although emergency management is theoretically covered in undergraduate curricula, real-world clinical exposure and practical training may vary depending on the academic level⁽¹⁰⁾.

In a dental office, a patient's medical history can help prevent or minimize medical emergencies^(11,12). The information is useful when examining the patient and creating a thorough treatment plan with appropriate alternatives for the dental treatment plan⁽¹³⁾. However, an emergency situation on the dental chair could occur even with efforts to minimize any untoward incidence⁽⁹⁾.

More clinical responsibilities are usually taken on by postgraduate students, which could lead to increased competence and confidence^(7,8). Thus, the purpose of this study was to evaluate and compare dental students at various academic levels in terms of their knowledge, attitudes, and Introspective confidence in handling medical emergencies⁽⁴⁾.

Materials and Methods

Study Design

A cross-sectional, questionnaire-based study design was employed. The study was conducted during the 2026 in January among both male and female dental students, interns, postgraduates

Study Population : The study included 200 participants categorized as: Final-year dental students: 62(31.0), Interns: 85 (42.5%), Postgraduates: 53 (26.5%)

Data Collection Instrument: A validated structured questionnaire was used, the questionnaire was divided into two parts. The first part included demographic information such as age, gender, and educational attainment. Sixteen questions about dental students' knowledge, attitudes, and perceived confidence in managing emergency situations were included in the second section. The questionnaire generated are as follows,

1. Checking vitals confidently during an emergency situation?
2. Asking Medical history of patient everytime before starting the procedure?
3. Have you ever handled a medical emergency Scenario in dental chair?
4. Drug of choice in anaphylaxis management?

5. Management protocol of a patient suffering from epilepsy in a dental chair
 6. Drug of choice for managing an acute seizure episode in the dental chair?
 7. 1st step in managing a patient who has fainted in the dental chair?
 8. most appropriate position for a pregnant woman experiencing Syncope?
 9. Hypoglycaemia best immediate management of patient if conscious?
 10. Drug indicated in acute asthmatic attack at dental clinic?
 11. Universal sign of choking
 12. Management of choking in a conscious adult patient?
 13. A patient with slurred speech and facial drooping suspected diagnosis ?
 14. Emergency colour code for cardiac arrest?
 15. CPR cycle
 16. Immediate management for sudden cardiac arrest in dental chair
- Knowledge scores were computed based on the number of correct responses.

Statistical Analysis

Data were analyzed using appropriate descriptive and inferential statistics. Continuous variables were expressed as means with standard deviations (SD) and 95% confidence intervals (95% CI). Categorical variables, including academic level classifications (final year students, interns, and post-graduates), were presented as frequencies and percentages. Normality of data distribution was assessed prior to parametric testing. The homogeneity of variance assumption was evaluated to ensure the appropriateness of the statistical tests employed.

One-way analysis of variance (ANOVA) was conducted to compare knowledge scores across the three academic groups. The effect size was quantified using eta-squared (η^2) to determine the proportion of variance in knowledge scores explained by academic level. Post-hoc pairwise comparisons were performed using Tukey's Honestly Significant Difference (HSD) test to identify specific group differences while controlling for Type I error inflation due to multiple comparisons. Cohen's d was calculated to assess the magnitude of pairwise differences. Statistical significance was set at $p < 0.05$ for all analyses.

Results

Participant Characteristics

A total of 200 participants were included in this study, comprising 62 (31.0%) final year dental students, 85 (42.5%) interns, and 53 (26.5%) post-graduates. The overall mean knowledge score was 11.93 (SD = 2.44, 95% CI: 11.59–12.27).

Knowledge Scores by Academic Level

Table 1 presents the descriptive statistics of knowledge scores stratified by academic level. Post graduate participants demonstrated the highest mean knowledge score (14.30 ± 0.89), followed by interns (12.39 ± 1.68), and final year students (9.26 ± 1.54). Post-graduates also exhibited the lowest variability in scores (variance = 0.79), indicating more homogeneous knowledge levels within this group compared to interns (variance = 2.84) and final year students (variance = 2.36).

Group N (%) Mean (SD) 95% CI Variance

Final year students 62 (31.0) 9.26 (1.54) 8.87–9.65 2.36

Interns 85 (42.5) 12.39 (1.68) 12.03–12.75 2.84

Post-graduates 53 (26.5) 14.30 (0.89) 14.06–14.54 0.79

Overall 200 (100) 11.93 (2.44) 11.59–12.27**Table 1:** Descriptive Statistics of Knowledge Scores by Academic Level**Comparison of Knowledge Scores Across Groups**

One-way analysis of variance (ANOVA) revealed statistically significant differences in knowledge scores among the three academic groups ($F(2, 197) = 176.56, p < 0.001, \eta^2 = 0.64$) (Table 2). Academic level accounted for approximately 64% of the variance in knowledge scores, indicating a large effect size. The between-group variance ($MS = 379.32$) was substantially larger than the within-group variance ($MS = 2.15$), demonstrating that the differences between groups far exceeded the variability within groups.

Source of Variation Sum of Squares df Mean Square F-statistic p-value Effect Size (η^2)Between Groups 758.65 2 379.32 176.56 <0.001 0.64 Within Groups 423.23 197 2.15 - - - **Total****1181.88 199 - - - Table 2: One-way ANOVA for Knowledge Scores by Academic Level, $\eta^2 =$** **eta-squared Post-hoc Pairwise Comparisons**

Given the significant omnibus F-test, Tukey's Honestly Significant Difference (HSD) post-hoc test was conducted to examine specific pairwise differences (Table 3). All three pairwise comparisons were statistically significant (all $p < 0.001$), indicating that each academic level differed significantly from the others in terms of knowledge scores.

Post-graduates scored significantly higher than both interns (mean difference = 1.91, 95% CI: 1.31–2.51, $p < 0.001$) and final year students (mean difference = 5.04, 95% CI: 4.47–5.61, $p < 0.001$). The largest difference was observed between post-graduates and final year students. Interns also demonstrated significantly higher knowledge scores compared to final year students (mean difference = 3.13, 95% CI: 2.56–3.70, $p < 0.001$).

Comparison Mean Difference 95% CI p-value Cohen's d*

Post-graduates vs Final year 5.04 4.47–5.61 <0.001 3.44

Post-graduates vs Interns 1.91 1.31–2.51 <0.001 1.30

Interns vs Final year 3.13 2.56–3.70 <0.001 2.14

Table 3: Post-hoc Pairwise Comparisons Using Tukey's HSD Test *Cohen's d: small effect = 0.2, medium effect = 0.5, large effect = 0.8; all comparisons show very large effect sizes**Discussion**

Medical emergencies in dental practice are relatively uncommon; however, when they occur, they require immediate recognition and prompt management to prevent serious consequences⁽²⁾. Therefore, dental professionals must possess adequate theoretical knowledge and clinical preparedness to manage such situations effectively⁽⁴⁾. The present study aimed to assess and compare the knowledge related to medical

emergency management among final-year dental students, interns, and postgraduate students⁽⁶⁾. The results demonstrated a progressive improvement in knowledge with increasing academic level and clinical experience⁽⁸⁾.

The overall mean knowledge score obtained in the present study was 11.93 ± 2.44 , indicating a moderate level of awareness among the participants⁽¹¹⁾. Nevertheless, clear variations were observed among the three academic groups. Postgraduate students recorded the highest mean knowledge score (14.30 ± 0.89), followed by interns (12.39 ± 1.68) and final-year students (9.26 ± 1.54). Statistical analysis using one-way ANOVA revealed a highly significant difference between the groups ($p < 0.001$) with a large effect size ($\eta^2 = 0.64$). This finding suggests that academic level plays a major role in determining knowledge related to the management of medical emergencies in dental practice^(11,13).

Assessment of vital signs is one of the most critical steps when a medical emergency occurs in the dental setting. Immediate evaluation of parameters such as pulse rate, respiratory rate, and level of consciousness allows the clinician to rapidly determine the patient's physiological status⁽⁹⁾. Monitoring pulse helps identify circulatory abnormalities including bradycardia, tachycardia, or cardiac arrest, while observing breathing patterns assists in detecting respiratory compromise or airway obstruction. Obtaining a comprehensive medical history prior to initiating dental treatment is a fundamental component of patient assessment and risk prevention⁽⁷⁾. Many systemic conditions, including cardiovascular diseases, respiratory disorders, diabetes mellitus, epilepsy, and drug allergies, can significantly influence dental treatment planning and may predispose patients to medical emergencies during dental procedures. A detailed medical history enables the clinician to identify underlying conditions. This information helps in modifying treatment plans, selecting appropriate anesthetic agents, and implementing necessary preventive measures. Questions addressing fundamental clinical assessment, such as the ability to check a patient's pulse and breathing during an emergency (Q1) and the practice of taking a detailed medical history before initiating dental treatment (Q2), reflect essential components of patient safety^(3,4). A larger proportion of postgraduate students and interns reported confidence in performing these tasks compared to final-year students. This difference can be explained by the increased clinical exposure and patient interaction experienced during internship and postgraduate training. Accurate assessment of vital signs is critical for identifying early warning signs of emergencies such as syncope, respiratory distress, or cardiac complications⁽¹²⁾.

Anaphylaxis is a rapid and severe systemic allergic reaction that can occur after exposure to allergens such as medications, latex, or certain foods⁽¹¹⁾. It is characterized by symptoms including difficulty in breathing, hypotension, urticaria, and swelling of the airway⁽⁷⁾. Immediate recognition of these signs is essential to prevent life-threatening complications. The first-line treatment for anaphylaxis is the prompt administration of intramuscular adrenaline (epinephrine), along with positioning the patient appropriately and ensuring airway support. Additional management may include oxygen administration, antihistamines, corticosteroids, and immediate activation of emergency medical services. (Question 4) evaluated knowledge of the drug of choice in anaphylaxis, where adrenaline (epinephrine) is considered the primary life-saving medication. Postgraduate students showed the highest level of correct responses, followed by interns and final-year students. This observation highlights the role of advanced clinical education in reinforcing knowledge related to emergency drug use⁽⁵⁾.

A seizure is a sudden episode of abnormal electrical activity in the brain that may result in involuntary muscle movements, loss of consciousness, or altered awareness⁽¹⁰⁾. During a seizure in the dental clinic, the primary goal is to protect the patient from injury by removing nearby instruments and ensuring the

airway remains clear. The patient should not be restrained, and objects should not be placed in the mouth. If the seizure persists for several minutes or repeats, emergency medication such as a benzodiazepine may be administered and medical assistance should be sought. (Question 6) examined awareness of the medication used for controlling acute seizure episodes in the dental clinic, typically benzodiazepines such as diazepam or midazolam. Postgraduate participants demonstrated greater accuracy in answering this question, indicating a stronger understanding of emergency pharmacological protocols. Question 5 assessed the management approach for a patient experiencing epilepsy in the dental chair. Appropriate management includes protecting the patient from injury, maintaining airway patency, and administering medication if necessary. Postgraduate students demonstrated a better understanding of this protocol compared to interns and final-year students^(7,8).

Syncope is a temporary loss of consciousness caused by a sudden reduction in blood flow to the brain, commonly triggered by anxiety, pain, or prolonged standing. It is one of the most frequently encountered medical emergencies in dental practice⁽²⁾. Management involves placing the patient in a supine position with the legs elevated to improve cerebral circulation⁽³⁾. The airway should be maintained, vital signs monitored, and oxygen administered if necessary until the patient regains consciousness. In relation to syncope, Question 7 evaluated the first step in management. The recommended intervention involves placing the patient in a supine position with the legs elevated to facilitate cerebral blood flow. Interns and postgraduate students were more likely to identify this correct management approach compared to final-year students^(6,7).

Choking occurs when a foreign object blocks the airway and prevents normal breathing. Immediate management involves encouraging the patient to cough; if the obstruction persists in a conscious adult, abdominal thrusts (Heimlich maneuver) should be performed to clear the airway^(8,9). Questions 11 and 12, which included identification of the universal sign of choking and the appropriate intervention for a conscious adult patient. Correct management typically involves performing the Heimlich maneuver (abdominal thrusts). Postgraduate students again showed the highest proportion of correct responses, while final-year students displayed comparatively lower awareness⁽¹²⁾.

Cardiopulmonary resuscitation (CPR) is an emergency lifesaving procedure performed when a person experiences cardiac arrest or stops breathing. It involves rhythmic chest compressions combined with rescue breaths to maintain blood circulation and oxygen supply to vital organs⁽⁶⁾. In a dental clinic, CPR should be initiated immediately after confirming unresponsiveness and absence of normal breathing. Emergency medical services should be activated, and an automated external defibrillator (AED) should be used if available. Question 14 evaluated awareness regarding the emergency colour code used for cardiac arrest, with postgraduate participants demonstrating greater familiarity with institutional emergency protocols^(7,9).

Questions related to cardiopulmonary resuscitation (CPR), specifically Questions 15 and 16, assessed participants' understanding of CPR cycles and the immediate response required in cases of sudden cardiac arrest in the dental chair⁽⁹⁾. Correct knowledge includes awareness of the 30:2 compression-to-ventilation ratio and the need to initiate basic life support and activate emergency medical services immediately⁽²⁾.

Postgraduate students exhibited the highest level of knowledge in CPR-related questions. This may be due to their increased participation in advanced life support training programs and greater clinical responsibility in patient management^(10,11).

Conclusion

There are notable variations in dental students' perceived competence and degree of knowledge about medical management of emergencies across academic levels. The most prepared students were postgraduates, followed by interns, while final-year students were relatively less prepared.

Strengthening undergraduate education through required life support certification programs, realistic simulations, and structured modules is crucial to guaranteeing proficient emergency management in dentistry practice.

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