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# Evaluation of UiTM Dental Students' Knowledge and Attitude on the 2017 Periodontal Classification

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ABSTRACT

**Objectives:** To evaluate the knowledge and attitudes towards the 2017 Classification of Periodontal and Peri-Implant Diseases and Conditions among clinical dental students at Universiti Teknologi MARA (UiTM) Sungai Buloh. **Materials and Methods:** A cross-sectional questionnaire study was conducted among Year 3 to Year 5 dental students at UiTM Sungai Buloh during the 2024/2025 academic session. A validated self-administered questionnaire consisting of demographic information, knowledge-based questions, and attitude-related items was distributed using Google Forms. The questionnaire was reviewed by periodontal specialists for content validation prior to distribution. Descriptive statistics were used to summarize demographic characteristics and attitude scores. Welch's one-way ANOVA followed by Games-Howell post-hoc analysis was used to compare knowledge scores among academic years. Statistical significance was set at $p < 0.05$. **Results:** A total of 228 students participated in the study, comprising 79 (34.6%) Year 3 students, 77 (33.8%) Year 4 students, and 72 (31.6%) Year 5 students. The overall knowledge score was high, with students achieving approximately 79.4% of the cumulative total score. Year 5 students demonstrated significantly higher knowledge scores compared to Year 3 students (Mean Difference = -1.135, $p = 0.016$). Students generally showed positive attitudes toward the 2017 periodontal classification, particularly regarding satisfaction with educational resources (Mean = 4.04, SD = 0.688). However, lower confidence levels were observed in assessing the severity and complexity of periodontitis cases (Mean = 3.47, SD = 0.799). **Conclusion:** Clinical dental students demonstrated generally good knowledge and positive attitudes towards the 2017 periodontal classification. Knowledge improved with advancing academic year and

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clinical exposure. Nevertheless, students reported lower confidence in applying the classification system clinically, indicating the need for enhanced case-based learning and additional clinical training.

## 1. INTRODUCTION

Periodontal diseases are inflammatory conditions affecting the supporting structures of teeth, including the gingiva, periodontal ligament, cementum, and alveolar bone. Accurate diagnosis and classification of periodontal diseases are essential for appropriate treatment planning, prognosis determination, and long-term periodontal maintenance. Inadequate diagnosis may compromise both periodontal and restorative treatment outcomes.

In 2017, a new Classification of Periodontal and Peri-Implant Diseases and Conditions was introduced to replace the previous 1999 classification system. The updated classification introduced major conceptual changes, including staging and grading of periodontitis, which allow clinicians to assess disease severity, complexity, extent, progression rate, and associated risk factors. The staging component evaluates disease severity and treatment complexity, while grading estimates the rate of disease progression and considers systemic and behavioural risk factors such as smoking and diabetes mellitus.

Compared with the previous classification system, the 2017 classification requires a deeper understanding of clinical attachment loss, radiographic bone loss, tooth loss due to periodontitis, and risk factor assessment. Although the revised system provides a more comprehensive framework for periodontal diagnosis and treatment planning, its complexity may create challenges for undergraduate dental students, particularly during the transition from theoretical learning to clinical application.

Adequate understanding of the 2017 periodontal classification among dental students is important because undergraduate students are expected to diagnose periodontal diseases accurately and formulate appropriate treatment plans during clinical training. However, despite increasing implementation of the new classification system in dental curricula, there is limited evidence evaluating dental students' knowledge and attitudes toward its application in undergraduate clinical education.

Therefore, this study aimed to evaluate the knowledge and attitudes of clinical dental students at UiTM Sungai Buloh toward the 2017 Classification of Periodontal and Peri-Implant Diseases and Conditions.

## 2. MATERIALS AND METHODS

### 2.1 Study Design and Participant Selection

This study was designed as a cross-sectional questionnaire study involving clinical dental students from Year 3 to Year 5 at the Faculty of Dentistry, UiTM Sungai Buloh during the 2024/2025 academic session. Pre-clinical students and students not enrolled during the academic session were excluded.

The comparison between academic years was performed to evaluate whether increasing theoretical knowledge and clinical exposure influenced students' understanding and attitudes toward the 2017 periodontal classification system.

### 2.2 Questionnaire Construction and Validation

The questionnaire was developed by the authors based on literature related to periodontal education and the 2017 periodontal classification system. The questionnaire consisted of three sections:

(i) Sociodemographic information

(ii) Knowledge regarding the 2017 periodontal classification

(iii) Attitudes toward the classification system

The knowledge section consisted of 16 multiple-choice questions, while the attitude section included 11 Likert-scale items ranging from strongly disagree (1) to strongly agree (5). To ensure content validity, the questionnaire was reviewed by several periodontal specialists. Feedback regarding clarity, relevance, and appropriateness of the questions was incorporated before final distribution.

### 2.3 Data Collection Procedures

The questionnaire was distributed electronically through Google Forms via student emails and WhatsApp groups. Participation was voluntary, and informed consent was obtained before questionnaire completion. No personal identifying information was collected apart from academic year classification.

### 2.4 Data Management and Statistical Analysis

Data obtained from Google Forms were transferred into Microsoft Excel for data cleaning and verification before being imported into IBM SPSS Statistics for analysis.

Descriptive statistics including frequencies, percentages, means, and standard deviations were used to summarize demographic data and attitude responses. Knowledge scores among academic years were compared using Welch's one-way ANOVA due to unequal variances identified through Levene's test. Games-Howell post-hoc analysis was subsequently performed for pairwise comparisons.

Statistical significance was set at $p < 0.05$.Overall knowledge percentage was calculated by dividing the cumulative mean score by the maximum possible score and multiplying by 100. Knowledge levels were categorized as:

(i) Low knowledge: <30%

(ii) Moderate knowledge: 30–60%

(iii) High knowledge: >60%

### 2.5 Study Limitations

This study only focused on the periodontal diseases and conditions component of the 2017 classification system and excluded peri-implant diseases and conditions due to limited undergraduate clinical exposure to implant dentistry.

Additionally, as the survey was conducted online, participants may have accessed external learning resources while answering the questionnaire, potentially influencing knowledge scores.

## 3. RESULTS

### 3.1 Demographic Characteristics

A total of 228 clinical dental students participated in this study. Female students represented the majority of respondents (73.2%), while male students accounted for 26.8%. The distribution across academic years was relatively balanced, with 79 (34.6%) Year 3 students, 77 (33.8%) Year 4 students, and 72 (31.6%) Year 5 students. Most students reported having attended lectures related to the 2017 periodontal classification

(93.0%), while only 26.3% had additional courses beyond lectures. More than half of the respondents (58.3%) perceived the classification system as easy to understand.

Table 1: Demographic characteristics of respondents

| Characteristics | n(%) |
|---|---|
| Gender | |
| Male | 61 (26.8) |
| Female | 167 (73.2) |
| Year of Study | |
| Year 3 | 79 (34.6) |
| Year 4 | 77 (33.8) |
| Year 5 | 72 (31.6) |
| Had lectures about the new periodontal classification 2017? | |
| Yes | 212 (93.0) |
| No | 16 (7.0) |
| Had any other courses apart from the lectures? | |
| Yes | 60 (26.3) |
| No | 168 (73.7) |
| Difficulty of periodontal classification 2017? | |
| Difficult | 11 (4.8) |
| Not sure | 84 (36.8) |
| Easy | 133 (58.3) |

### 3.2 Knowledge of the 2017 Periodontal Classification

The mean knowledge scores increased progressively across academic years. Year 3 students recorded a mean score of 12.10 (SD = 3.157), Year 4 students achieved 12.77 (SD = 2.025), and Year 5 students obtained the highest mean score of 13.24 (SD = 1.614). Levene's test demonstrated unequal variances among groups ($p < 0.001$); therefore, Welch's ANOVA was applied. Welch's ANOVA revealed a statistically significant difference in knowledge scores among academic years, $F(2,145.008) = 4.237$, $p = 0.016$. Games-Howell post-hoc analysis identified a significant difference between Year 3 and Year 5 students (Mean Difference = -1.135, $p = 0.016$). No significant differences were observed between Year 3 and Year 4 students or between Year 4 and Year 5 students. The overall cumulative knowledge score percentage was approximately 79.4%, indicating generally high knowledge levels among participants.

Table 2: Descriptive Statistics Table for Knowledge Scores

| Group | n | Mean | Std. Deviation |
|---|---|---|---|
| Year 3 | 79 | 12.10 | 3.157 |
| Year 4 | 77 | 12.77 | 2.025 |
| Year 5 | 72 | 13.24 | 1.614 |

Table 3: Homogeneity of Variances and Welch's ANOVA Table for Knowledge Scores

| Test | Statistic | df1 | df2 | Sig. (p-value) |
|---|---|---|---|---|
| Levene's Test | 14.302 | 2 | 225 | <.001 |
| Welch's ANOVA | 4.237 | 2 | 145.008 | 0.016 |

Table 4: Games-Howell Post Hoc Test for Knowledge Scores

| Comparison | Mean difference | 95% Confidence Interval | Sig. (p-value) |
|---|---|---|---|
| Year 3 - Year 4 | -0.665 | -1.67 to 0.34 | 0.262 |
| Year 3 - Year 5 | -1.135* | -2.09 to -0.18 | 0.016 |
| Year 4 - Year 5 | -0.470 | -1.18 to 0.24 | 0.262 |

Note: *shows a statistically significant difference.

### 3.3 Attitudes Toward the 2017 Periodontal Classification

Students generally demonstrated positive attitudes toward the classification system. Satisfaction with educational resources received the highest mean score (Mean = 4.04, SD = 0.688), followed by satisfaction with lectures (Mean = 4.00, SD = 0.693).

Students also agreed that the classification improved their understanding of periodontal maintenance care (Mean = 3.99, SD = 0.647).

However, lower confidence scores were reported in assessing the severity and complexity of periodontitis cases (Mean = 3.47, SD = 0.799) and distinguishing between different stages of periodontitis (Mean = 3.69, SD = 0.735).

Table 5: Descriptive Statistics Table for Attitudes Scores

| Question | Mean | Std. Deviation |
|---|---|---|
| How satisfied are you with the lectures provided on the 2017 Classification of Periodontal and Peri-Implant Diseases and Conditions? | 4.00 | 0.693 |
| Are you satisfied with the educational resources (e.g., textbooks, case studies, online materials) provided to help you understand the 2017 classification? | 4.04 | 0.688 |
| Are you satisfied with the hands-on training provided to apply the 2017 classification in clinical scenarios? | 3.97 | 0.739 |
| Do you feel confident in distinguishing between the different stages of periodontitis based on the 2017 classification? | 3.69 | 0.735 |
| How well do you understand the criteria for assigning grades of periodontitis using the 2017 classification? | 3.73 | 0.718 |
| How confident are you in assessing the severity and complexity of periodontitis cases using the 2017 classification? | 3.47 | 0.799 |
| How well do you understand the criteria for determining the extent and distribution of periodontitis as part of diagnosis using the 2017 classification? | 3.66 | 0.687 |
| Do you find the grading criteria (A, B, and C) for periodontitis in the 2017 classification easy to apply in clinical practice? | 3.86 | 0.675 |
| Are you satisfied with how the 2017 classification incorporates clinical and radiographic findings into decision-making? | 3.92 | 0.625 |
| How well do you feel the 2017 classification system has been integrated into your clinical training for diagnosing and managing periodontal diseases? | 3.87 | 0.681 |
| Do you feel the 2017 classification has improved your understanding of how to approach periodontal maintenance care? | 3.99 | 0.647 |

## 4. DISCUSSION

This study evaluated the knowledge and attitudes of clinical dental students regarding the 2017 Classification of Periodontal and Peri-Implant Diseases and Conditions. Overall, the findings demonstrated that students possessed generally good knowledge and positive attitudes toward the classification system. However, varying levels of confidence were observed regarding its clinical application, particularly in assessing severity, complexity, and staging of periodontitis cases.

The findings revealed that Year 5 students achieved significantly higher knowledge scores compared with Year 3 students. This finding may be attributed to greater clinical exposure, increased patient management experience, and repeated reinforcement of periodontal concepts throughout the later stages of undergraduate dental training. The 2017 periodontal classification system requires integration of theoretical understanding with clinical reasoning, including interpretation of clinical attachment loss, radiographic bone loss, staging, grading, and risk factor assessment. Students with more extensive clinical exposure are therefore more likely to develop stronger diagnostic understanding and application skills.

The absence of a significant difference between Year 3 and Year 4 students may indicate that theoretical teaching alone is insufficient to significantly improve understanding without adequate clinical reinforcement. Although Year 4 students begin clinical exposure, their experiences may still be limited compared with senior students who manage more complex periodontal cases independently. Previous educational studies have similarly reported that active learning strategies, repeated case discussions, and hands-on clinical training significantly enhance students' diagnostic abilities and confidence in clinical decision-making.

Despite the significant difference observed between Year 3 and Year 5 students, the cumulative knowledge score of approximately 79.4% suggests that the majority of students possessed relatively high overall knowledge regarding the classification system. This finding indicates that the current periodontal curriculum and educational resources at UiTM generally provide an adequate theoretical foundation for understanding the 2017 classification system.

With regard to attitudes, students generally expressed positive perceptions toward the educational resources, lectures, and integration of the classification system into clinical learning. Satisfaction with educational resources received the highest mean score, indicating that students perceived the available learning materials, case discussions, and lectures as beneficial in supporting their understanding of the classification system. Similarly, high satisfaction with lectures suggests that the theoretical delivery of the classification system was generally well accepted among students.

However, students demonstrated lower confidence levels in assessing the severity and complexity of periodontitis cases and distinguishing between stages of periodontitis. These findings are clinically important because accurate periodontal diagnosis requires integration of multiple parameters, including clinical attachment loss, probing depth, radiographic bone loss, furcation involvement, tooth loss, and systemic risk factors. The complexity of the staging and grading framework may therefore contribute to uncertainty among students, particularly during early clinical training.

The lower confidence levels observed in this study may also reflect insufficient opportunities for direct clinical application. While lectures and educational materials may improve theoretical understanding, clinical confidence often develops through repeated patient encounters, case-based discussions, and supervised treatment planning exercises. Previous studies have similarly reported that undergraduate dental students often feel less confident in diagnosing and treatment planning despite satisfactory theoretical knowledge.

The findings of this study highlight the importance of strengthening practical and clinically oriented learning approaches within undergraduate periodontal education. Incorporating more structured case-based learning sessions, simulation exercises, clinical workshops, and objective structured clinical examinations (OSCEs) may help students improve their confidence and ability to apply the classification system accurately in clinical practice. Greater exposure to diverse periodontal cases may also enhance students' understanding of staging, grading, and treatment planning.

Several limitations should be acknowledged in this study. First, the questionnaire only focused on the periodontal diseases and conditions component of the 2017 classification and excluded peri-implant diseases and conditions due to limited undergraduate implant exposure. As a result, the study may not fully represent students' understanding of the complete classification system.

Second, the use of an online questionnaire may have allowed participants to access external learning resources during completion of the knowledge section. This may have influenced the knowledge scores and reduced the ability to assess students' actual independent understanding.

Future studies should consider including peri-implant components and evaluating students from multiple institutions to improve generalizability of findings. In addition, future assessments may benefit from supervised or controlled environments to minimize the influence of external resources.

## 5. CONCLUSION

In conclusion, this study demonstrated that clinical dental students at UiTM Sungai Buloh generally possessed good knowledge and positive attitudes toward the 2017 Classification of Periodontal and Peri-Implant Diseases and Conditions. Knowledge scores improved progressively across academic years, with Year 5 students demonstrating significantly higher knowledge compared with Year 3 students, suggesting that increasing clinical exposure contributes positively to students' understanding of the classification system.

Although students expressed satisfaction with lectures and educational resources, lower confidence levels were observed in the clinical application of staging, grading, and assessment of disease severity. These findings indicate that theoretical knowledge alone may not be sufficient to develop clinical confidence and competency.

Therefore, greater emphasis should be placed on case-based learning, practical workshops, and supervised clinical training to enhance students' ability to apply the 2017 periodontal classification effectively in clinical settings. Strengthening these educational approaches may improve diagnostic confidence, treatment planning skills and overall periodontal patient management among undergraduate dental students.

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## CONFLICT OF INTEREST

The authors declare that no conflict of interest is involved.

## AUTHORS' CONTRIBUTIONS

Nur Syamira and Nur Syarah conducted the research, including data collection, data analysis, and interpretation of results. They jointly developed the methodology, managed the research workflow, and prepared the initial manuscript draft. Dr. Hafizul Izwan supervised the overall research process, provided critical feedback on the study design and methodology, and reviewed the manuscript for intellectual content. Dr. Melati Mahmud co-supervised the project contributed to manuscript revisions.

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