

Investment in training and knowledge of periodontal diseases in dental careers

Formación odontológica para enfermedades periodontales

Rosario Leonela Auqui Coronel*
Damián Alfredo Tello Terán*
Isabel Cristina Auqui Coronel*
Edwin Patricio Villavicencio Urvina*



Abstract

Periodontal disease involves a state of chronic progressive destruction of the supporting tissues of teeth caused by predisposing factors most often poor hygiene. The knowledge acquired by students during their undergraduate studies on the management of periodontal disease is of vital importance for their performance in their dental practice. Objective: To evaluate the level of knowledge about periodontal disease in students of the Dentistry course at the Catholic University of Cuenca, Azogues Campus during the academic period March - August 2024. Methodology: The data were collected through the application of a survey previously validated by Díaz (2023), which was aimed at the students of this university campus. The sample size consisted of 235 students from fifth to tenth grade. Results: Periodontal knowledge was rated as good in 48.5%

* Estudiante de la Carrera de Odontología
Universidad Católica de Cuenca
rosario.auqui.68@est.ucacue.edu.ec
<https://orcid.org/0009-0005-0490-8344>
* Especialista en Periodoncia e Implantología
Docente de la Carrera de Odontología
Universidad Católica de Cuenca
damian.tello@ucacue.edu.ec
<https://orcid.org/0000-0002-1279-3779>
* Odontóloga General
Universidad Católica de Cuenca
icaquic76@est.ucacue.edu.ec
<https://orcid.org/0009-0008-3943-307X>
* Estudiante de la Carrera de Odontología
Universidad Católica de Cuenca
edwin.villavicencio@est.ucacue.edu.ec
<https://orcid.org/0009-0008-5260-3619>

and fair in 36.17% of the participants. The socio-demographic variables studied did not represent any relative significance, among these were: sex, origin and academic cycle and the level of periodontal knowledge. Although the majority of respondents were female, this did not have a significant impact on the level of knowledge. Both men and women showed similar levels according to the knowledge assessed, irrespective of their origin or academic cycle. Conclusions: The research carried out evidences that the level of knowledge in the different students evaluated is good emphasising the need to promote continuing education in diagnosis, prevention of the same.

Keywords: Periodontal disease, perception, knowledge, prevention, oral health.

Resumen

La enfermedad periodontal involucra un estado de destrucción progresiva crónica de los tejidos de soporte de las piezas dentales ocasionado por factores predispones con mayor frecuencia la mala higiene. El conocimiento adquirido en los estudiantes durante su pregrado para el manejo de la misma es de vital importancia para su desempeño en su práctica odontológica. Objetivo: Evaluar el nivel de conocimiento sobre enfermedad periodontal en los estudiantes de la carrera de Odontología de la Universidad Católica de Cuenca, Campus Azogues durante el periodo académico marzo – agosto 2024. Metodología: Los datos se recolectaron a través de la aplicación de encuesta previamente validada por Díaz (2023), misma que estuvo orientada a los estudiantes de este campus universitario. El tamaño muestral se conformó de 235 estudiantes de quinto a décimo ciclo. Resultados: El conocimiento periodontal fue catalogado como bueno en un 48.5% y regular en un 36.17% de los participantes. Las variables sociodemográficas estudiadas no representaron significación relativa alguna, entre estas estuvieron: sexo, procedencia y ciclo académico y el nivel de conocimiento periodontal. Aunque la mayoría de los encuestados fueron mujeres, esto no tuvo un impacto significativo en el nivel de conocimiento. Tanto hombres como mujeres mostraron niveles similares de acuerdo al conocimiento evaluado, independientemente de su origen o del ciclo académico. Conclusiones: La investigación realizada evidencia que el nivel de conocimiento en los diferentes alumnos

evaluados es bueno recalcando la necesidad de fomentar la educación continua en diagnóstico, prevención de las mismas.

Palabras Clave: Enfermedad periodontal, percepción, conocimiento, prevención, salud oral.

Introduction

The concept of periodontal diseases emphasises a series of inflammatory processes that occur within the oral cavity, specifically the periodontium is related to structures such as: gingiva, bone and periodontal ligament, which if left untreated for a certain period of time can cause the loss of teeth; as a predisposing factor is the accumulation of bacterial plaque that in the long term conditions the appearance of inflammatory periodontal diseases (Rufasto Goche et al., 2023).

Gingivitis and periodontitis, depending on different degrees of evolution and extent, can be classified in different ways with severe consequences for the carrier from the inflammatory state to tooth loss. Therapeutic control of these diseases by eliminating the factors that help the progression of the patient's disease through preventive habits or health-promoting actions (Alzammam and Almalki, 2019; Santa Cruz-Gonzalez et al., 2019).

According to data published by the World Health Organisation (WHO), when referring to the term dental balance, it emphasises much more than having teeth without any pathological affectation. Periodontal diseases have become a global health impact problem that is present in most populations, statistically speaking approximately 40 % of humans have inflammatory diseases of the periodontium (Canales and Cooper, 2019; Mofidi et al., 2022). Within this context, nine out of ten patients seen during dental consultations have periodontal conditions. For example, in Ecuador, approximately 45 % of our population has plaque-induced gingivitis, while 52.5 % has periodontitis, thus corroborating the relative significance of these types of diseases in today's society (Falcón and Falcón, 2021).

The main oral health problems affecting oral health in recent decades have been periodontal diseases, which is why it is necessary for future dental professionals, in their role, to contribute to their prevention, control and treatment, revealing a concern for the

knowledge imparted in the classroom and the different academic cycles of dental careers, specifically in the subjects related to periodontics. Therefore, in order to avoid unsuccessful consequences on the patient's oral health or possible acts of negligence during professional practice, this study seeks to identify the degree of educational knowledge on this topic and thus to elicit future timely educational solutions that will have an impact on the training of students from the initial stages of their teaching and learning process.

For the above reasons, the objective of this research is to evaluate the level of knowledge about periodontal disease in students of dentistry at the Universidad Católica de Cuenca campus Azogues during the academic period March - August 2024.

The present research project on the level of knowledge about periodontal disease in students of the Dentistry course at the Catholic University of Cuenca Campus Azogues in the academic period 2024, transcends in different areas, such as the social, by contributing to the academic training of practitioners will allow to have a higher quality care, the same that will benefit the oral health of the population in general. Scientifically, when talking about periodontal disease, it is essential to know the methods of diagnosis, treatment and pharmacological interventions, so that they become the focus of other future research that will help in the development of educational training, ensuring the cognitive capacity of students to be able to decipher much more complicated clinical cases.

The term periodontal disease refers to the progressive act of inflammation of the tissues of the periodontium, which usually begins with oedema of the marginal gum around the tooth known as gingivitis. However, if the necessary therapeutic approach is not provided, it can evolve into periodontitis, which is responsible for the degradation of the tissues that support the tooth, causing tooth loss as a serious consequence. In this context, when we talk about this disease we refer to the constant inflammatory infection in which bacteria enter the periodontal tissues, severely damaging them (de León Ramírez et al., 2022; Malla et al., 2017).

This condition is manifested by oedematisation of the gums, which is observed through increased gum size, bleeding during brushing and erythema. The main cause is the increased production of blood vessels in the affected area. It is crucial to note that not all patients

develop this condition, but when it occurs and is not treated in a timely and adequate manner, it can progress to periodontitis. This progression can cause aggressive and severe damage to the individual, compromising the tooth-supporting tissues and potentially leading to tooth loss. To avoid these complications and preserve good oral health, prevention and early treatment are essential (Naruishi et al., 2022). The accumulation of bacterial plaque exposed for several days on the tooth surface is considered to be the cause of the development of gingivitis. If not adequately removed, it becomes mineralised tissue that is difficult to remove by mechanical brushing and is called dental calculus. It is an essential factor in the development of periodontal disease that can cause anything from halitosis to pain in the orofacial area. Thus, the presence of bacteria located in the periodontium together with poor hygiene in the long term causes tooth loss that may not even be rehabilitated, hence the importance of knowledge of students to create an effective treatment plan (Sood et al., 2010). It is important to recognise that studies on the aetiology of gingivitis agree that the main cause is the presence of dental plaque accumulation, but there may be other variables that help in its progression but not in its evolution (Parsegian et al., 2021).

In terms of aetiology, the origin of gingival disease is described as multifactorial, with bacteria being the main aggressor, and the interrelationship with the host and the environment may act together to develop periodontal disease (Wu et al., 2021). The main reasons for the existence of periodontium diagnosed with periodontal disease is the presence of bacterial biofilm due to poor oral hygiene, lack of use of hygienic elements according to the patient's need that allow the entry of these microorganisms into the gingival sulcus (Al-Zarea, 2013). Thus, the entry of bacterial strains initiates inflammation that is triggered as a defensive response to the presence of foreign bodies in the tissues of the periodontium. Its process occurs through bacterial aggregation, by a process of extravasation and the presence of different chemical factors, through this reaction a defensive process is initiated that consists of various cells of the immune system that act to prevent overgrowth of the affected gingival area, in this way by the type of mechanism of affection is likely to be reversible, with proper control of plaque, mechanical self-learning of toothbrushing and periodic controls through prophylaxis by an oral health professional (Sedghi et al., 2021).

It is an affection of the periodontal tissues (bone, gum, cementum, periodontal ligament) but unlike gingivitis, it usually affects the support of the dental organ causing bone loss with the formation of periodontal pockets, increased clinical attachment loss, gingival recession, endoperiodontal lesions, furcation lesions, abscesses and vertical bone defects (Sedghi et al., 2021). The process of destruction that occurs in periodontitis is the spread of inflammation towards the supporting tissues in which there is extreme aggression to the bone and ligament that support the tooth. It manifests with symptoms such as oedema, erythema and gingival haemorrhage, the main predisposing factors being stress, smoking, overweight, diabetes and, of course, poor oral hygiene (Wilder et al., 2009).

In terms of aetiology, there is an interrelationship between several factors, these can be, according to :

- Local factors: they have repercussions on the oral microbiota, on the periodontium in such a way that they originate an inflammatory infectious process such as: the accumulation of bacterial plaque and tartar, dental malocclusions, defective dental restorations, ill-fitting prostheses, occlusal trauma and parafunctional habits such as bruxism.
- Systemic factors: diabetes mellitus, hormonal disorders, immunodeficiencies, cardiovascular diseases, as well as tobacco consumption and chronic stress have an unfavourable influence on the periodontium with its destruction and also on its regenerative capacity.

Cleaning: Therapeutic care of a periodontal disease starts with the analysis and planning of a professionally trained prophylaxis, it is important that the patient is aware of his disease, its causes, possible consequences and the necessary therapeutic actions to reverse the disease. In this context, during the oral hygiene phase, we teach the patient the proper maintenance of oral hygiene, according to the clinical characteristics of their disease, we indicate different oral health care additions, and they should be aware of the repercussions that bacterial plaque has on the periodontium (Benza-Bedoya and Pareja-Vásquez, 2017).

Scaling and root planing: When mineralised deposits are present, the health of the periodontium must be restored by deflating the gingival tissues using appropriate instruments such as curettes. RAR (scaling

and root planing) defines it as the process by which the root surface is scraped and smoothed, to leave the dental organs free of calculus, sometimes only scraping is needed to obtain a healthy periodontium, since, with the removal of subgingival calculus, and controlling the predisposing factors, we can maintain the results of the therapy in the long term, avoiding the recurrence of periodontal disease (Benza-Bedoya and Pareja-Vásquez, 2017; Sanz-Sánchez and Bascones-Martínez, 2017).

After completion of periodontal treatment, the periodontal maintenance phase is scheduled, which involves re-evaluation of the treated areas and, if necessary, reinstrumentation to prevent the formation of new periodontal pockets. Check-ups are performed 3 months after the patient is discharged, and then depending on the patient's compliance, every 6 months, but if in the course of the check-ups inflammation sites appear, a new periodontal treatment approach is performed (Mendoza, 2022; Rischmoller, 2020).

Materials and methods

The study is qualitative, descriptive and cross-sectional.

The study population will be composed of 241 students enrolled in the fifth to tenth cycles of the Dentistry course at the Universidad Católica de Cuenca Campus Azogues in Ecuador, during the March-August 2024 academic year.

For the study, the sample consisted of 235 students from the total population who agreed to participate voluntarily and met the stated inclusion and exclusion criteria.

In addition, it is emphasised that no descriptive data containing private information about the student or the interviewers in charge of the implementation process will be requested or provided in order to avoid affinity bias. The data will be single-blinded so that the evaluators do not have access to the information of the students being evaluated.

- All students regularly enrolled and taking the pre-professional clinical area from fifth to tenth cycle of the Dentistry Career of the Universidad Católica de Cuenca Campus Azogues in March 2024 - August 2024.

- Students who freely accept their participation in this research study through informed consent.

- All students who register their answers through the virtual application form of the Google forms survey.
- Students who do not attend the survey application day.

After holding face-to-face meetings with the students and explaining to them the composition of the questionnaire, the duration (15 minutes), the ethical parameters and requesting their signature on the informed consent form. After the verbal explanation of the survey, the students were asked to access the link to the Google Forms form. Results were obtained on the knowledge of periodontal diseases.

The instrument that was applied corresponds to the study by Díaz et al. (2017), which contains 16 questions sectioned into two parts, of which the first 10 questions are related to knowledge and the 6 are linked to the qualitative measurement of the students' perception.

The distribution of questions was as follows: question 1 was about the conceptualisation of the disease, the next 4 questions were about the classification, 5 questions were about the treatment plan, the last 6 questions were about the perception of the practitioners in the dental clinics when dealing with these diseases.

The score given for the assessment of the questionnaire is 10 points, divided into categories which are: bad, fair, good. In relation to the attitude section, there is a score from 0 to 3 points considered as not good, up to a score of 6 as good. It is important to stress that this instrument is evaluated with a pilot test with a regular sample of students that maintains an Aiken coefficient to evaluate attitudes effectively. Also, for the evaluation of the validity of this questionnaire in the knowledge section, the Richardson test was used which has a reliability percentage of 82.9%, while for the evaluation of perceptions through the Cronbach test with a reliability percentage of 84.9%. In addition, the questionnaire was pre-approved by experts as suitable for the assessment of dental students.

For the determination of knowledge, each correctly answered question will be assessed with a score:

- To assess knowledge, a score of 10 points was established and categorised as follows.
- 0 to 3 poor
- from 4 to 7 fair

- from 8 to 9 good
- from 10 very good

As for the section on attitudes, its valuation is of one point, corresponding to questions 11 to 16 of the questionnaire, according to the results, the following will be obtained:

- 0 to 3 will be considered unfavourable or negative.
- 4 to 6 will be considered favourable or positive.

The data collected were recorded using a Microsoft Excel spreadsheet. The data were analysed using descriptive statistics and SPSS version 25 statistical software was used to elaborate the frequency tables of the numerical and categorical variables. The Chi-Square test was used to establish the association between the variables and was assessed with a significance of $p < 0.05$.

The questionnaire is based on anonymity and confidentiality, at no time will the identity of the respondent be revealed. It is important to mention that the students included in the study agreed to participate in the study by signing the informed consent form. In addition, the research has the approval of the bioethics committee.

Results

In this research, the level of periodontal knowledge of 235 students who agreed to participate in the study was established, of whom 142 (60%) were female and 93 (40%) were male. In relation to the level of periodontal knowledge according to its classification, it can be observed that there is a predominantly good level of knowledge among the students, which is not optimal, followed by a regular level of knowledge, very good and with a smaller group as bad, with a percentage of only 2.55%. 55%, with respect to the sex variable, a $p = 0.544$ was obtained, which determines that there is no significant relationship between the variables, the predominance was reflected in the female sex, with a knowledge between good and regular, in the same way in the male sex with representative percentages, however it must be considered that the sample size has a prevalent dominance since the female sex represents the majority of the surveyed population.

As for the level of periodontal knowledge according to the variable of origin, $p = 0.648$ was obtained, which determines that there is no

significant relationship between the variables. There was a higher prevalence of students from urban areas with good knowledge, followed by average. Meanwhile, students from rural areas also had good and regular knowledge, but with a smaller population size.

The level of knowledge of students by academic cycle respectively studied, a good predominance was obtained in the academic cycles from fifth to tenth cycle, followed by a regular one, taking into account that the percentage in the classification of very good is relatively low in the respondents. The value $p < 0.001$ indicates that there is a significant association between the variables of academic cycle and level of knowledge.

The level of knowledge of periodontal diseases is evident in 235 students, where the majority achieved a score of 8 representing 26%, followed by 22.6% who received a score of 9 and 18.7% a score of 7, and 12.8% with a perfect percentage of 10, these cumulative scores suggest a tendency towards high knowledge. The lowest scores were between 2 and 3 points with 9% and 1.7% respectively.

The categorisation of the level of knowledge into four levels: very good, good, fair and poor. Very good was obtained by 30 students or 12.8% of the total, good by 114 students or 48.5%, fair by 85 students or 36.2% and bad by 6 students with 2.6% of the total sample universe. Respondents demonstrate Good or Very Good knowledge of periodontal disease, representing 61.3% of the total sample.

A significant 94.47% of the participants (222 people) consider their periodontal status to be favourable, suggesting that the majority of students believe they have good periodontal health. On the other hand, only 5.53% (13 people) have an unfavourable perception, indicating that these people believe they have periodontal problems.

Discussion

This research project involved a population of 235 students, with a predominance of the female sex representing 60% of the total over the male sex, an important fact to consider in the interpretation of the

results, because we observed the presence of a greater number of women during their academic training at the Catholic University of Cuenca in the Azogues Campus of Dentistry. It is relevant to highlight that, although there is a greater predominance of females than males, both sexes present comparable levels of knowledge within each category, which suggests that the level of periodontal knowledge is not significantly influenced by gender, but rather by other factors such as academic training and origin.

Similar to the data presented in the research of Diaz Reissner et al. (2017), which also evaluated the knowledge and perception of students who are in a university field of Dentistry, through their findings determined that there is a good level with a percentage of 82% associated with the definition of periodontal disease, but was not associated with the sex variable significantly with a $p > 0.05$. Furthermore, it was found that 75% of the students consider periodontal disease to be an oral condition that requires immediate attention, 59% consider oral hygiene to be an important triggering factor and only 45% are frequently trained to educate their patients on prevention.

This study significantly evidenced that the knowledge acquired about periodontal diseases and their perception in the different students is relatively good, similar to the study by Canales and Cooper (2019) conducted in Honduras, which reflects that the knowledge about this disease was 75% in a good categorisation, with the parameters of the survey being more accurate to the definition, classification and treatment of the same.

According to the study conducted by Santa Cruz-González et al. (2019) in Peru obtained a level of knowledge between the parameters of fair to good in the same categories with a high perception of periodontal diseases, taking into account that this increased according to the academic cycle belonging, the significant differences are prioritised between the cycles with the recently acquired chair of Periodontics in relation to the last cycles.

On the other hand, when evaluating periodontal knowledge according to the variable of origin, no relative significance was observed, because the students surveyed from both rural and urban areas demonstrated the same ability, taking into account that the majority of students from urban areas had a good knowledge of 57% compared to 43% from rural areas. It is important to emphasise the

fact that in both distributions knowledge was found to be at a good level, followed by fair, as academic training is homogeneous regardless of the background of each student, although the differences could be related to the accessibility of educational resources that could influence understanding. However, in Quispe's (2018) research in Paraguay, a higher proportion of knowledge was found in students who come from rural areas compared to urban areas due to the time dedicated and differential study methods.

With regard to the distribution by academic cycle, it is observed that students in the fifth cycle have a knowledge rated as good with a representative percentage of 27.2%, followed by the sixth cycle with 23.7%, suggesting that the academic cycles with recently acquired knowledge have more information than students in the last cycles who are no longer taught the subject, reflecting the importance of continuous educational training and academic reinforcement for dental practice. Similarly, the study by Mendoza (2022) showed that the level of knowledge increased gradually according to the academic cycle studied by each student.

The students' perception of periodontal health with questions asked by means of the survey significantly demonstrated their positive perception without significant differentiation of the academic year studied, which can be associated with the academic training from the beginning of the course because it is based on oral hygiene habits and the prevention of oral diseases, which are confirmed in the results of this research. In the study by Díaz Reissner et al. (2017), the perception was 80% favourable and 20% unfavourable, which is attributed to the diversity of factors that can modify these aspects, such as the level of interest in a subject on the part of the student, continuous preparation to provide care to society and prevent periodontal diseases.

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