ODOVTOS
International Journal of Dental Sciences

UNIVERSIDAD DE COSTA RICA FOd Facultad de Odontología

https://revistas.ucr.ac.cr/index.php/Odontos

CLINICAL RESEARCH:

Prevalence of Oral Diseases in a Predoctoral Pediatric Dentistry Clinic in Mexico: Data from 2023-2024

Prevalencia de enfermedades orales en una clínica universitaria de odontopediatría en México: datos de 2023-2024

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Received: 19-IX-2025 Accepted: 20-XI-2025

ABSTRACT: Oral diseases constitute a significant public health problem due to their high epidemiology and profound impact on the quality of life of children and their families. In particular, Mexico is one of the countries with a high burden of oral diseases, registering alarming rates among the pediatric population. It is essential to conduct research that identify prevalence patterns and associated factors, especially in University Dental Clinics where Predoctoral students are learning. The aim of the study was to determine the prevalence of the most common oral diseases in pediatric patients treated at a Predoctoral Pediatric Dentistry Clinic in Mexico during the years 2023 and 2024. Descriptive, retrospective and cross-sectional study. All patient records of newly admitted pediatric patients aged 4 to 14 years at a Predoctoral Pediatric Dentistry Clinic during the years 2023 and 2024 were reviewed. A database was used to organize the information obtained from the SMILE digital record system. The presence of oral diseases, such as caries, gingivitis, and malocclusion, was recorded. Microsoft Excel's functions were used for the analysis. The overall prevalence for the period 2023-2024 was 67.08% for incipient caries lesions, 77.58% for cavitated caries lesions in enamel and/or dentin, 55.51% for gingivitis, and 28.11% for malocclusion. The information is valuable for better understanding the trends of oral diseases in the pediatric population treated at University Dental Clinics by Predoctoral students. Further research on this topic will help develop epidemiological databases and strengthen Dental Education in Mexico and other countries.

KEYWORDS: Oral diseases; Pediatric dentistry; Predoctoral clinic.

RESUMEN: Las enfermedades bucodentales constituyen un problema de salud pública de gran relevancia debido a su elevada epidemiología y su profundo impacto en la calidad de vida de los niños y sus familias. En particular, México es uno de los países con una alta carga de enfermedades orales, registrando tasas preocupantes en cuanto a la prevalencia de estas afecciones. Es fundamental contar con investigaciones que permitan identificar los patrones estadísticos y los factores asociados. El objetivo del estudio fue determinar la prevalencia de enfermedades bucodentales en los pacientes atendidos en una Clínica Universitaria de Odontopediatría en México en el periodo 2023-2024. Estudio descriptivo, retrospectivo y transversal. Se revisaron todos los expedientes de los pacientes pediátricos de 4 a 14 años de nuevo ingreso en la Clínica de Odontopediatría durante el periodo 2023-2024. Para la realización del estudio se utilizó una base de datos en Microsoft Excel para organizar la información obtenida desde el sistema de expedientes digitales SMILE. Se registró la presencia de enfermedades bucodentales: caries, gingivitis y maloclusión. Se emplearon las funciones de Microsoft Excel para el análisis. La prevalencia general para el periodo 2023-2024 fue de 67.08% para lesiones de caries incipientes, 77.58% para lesiones de caries en esmalte y/o dentina, 55.51% para gingivitis y 28.11% para maloclusión. La información obtenida es valiosa para entender mejor las tendencias y características de las enfermedades bucodentales en la población pediátrica que se atiende en Clínicas Universitarias. Las nuevas investigaciones ayudarán a incrementar las bases de datos epidemiológicos y a fortalecer la Educación Odontológica en México y en otros países.

PALABRAS CLAVE: Clínica universitaria; Enfermedades orales; Odontología pediátrica.

INTRODUCTION

The World Health Organization (WHO) has estimated that in recent years untreated oral pathologies have affected approximately half of the world's population, indicating the limited access to health services globally (1). Oral diseases are a significant Public Health problem due to their high epidemiology and profound impact on individuals, families and society in general. Their consequences are broad, as they affect physical and emotional health, causing pain, functional disability, social limitations, among others (2). For children, they can cause difficulty in eating, speaking and even affect their self-esteem, with a greater negative impact on their growth, development and quality of life (3).

In particular, Mexico is one of the countries with a high burden of oral diseases, registering alarming rates among the pediatric population. In 2021, a prevalence of 88.5% of caries lesions was reported in Mexican children (4). In Mexico City, it was estimated that 39% of children had gingivitis and 61% had malocclusion during 2011 (5,6).

It is essential to conduct studies that identify prevalence patterns and social, economic, and cultural factors that influence children's oral health, in order to develop more effective intervention policies and strategies (7). Therefore, Public Institutions and University Dental Clinics in Mexico are dedicated to develop epidemiological reports regarding oral diseases (4).

In this sense, the aim of this study was to determine the prevalence of the most common oral diseases in pediatric patients treated at a Predoctoral Pediatric Dentistry Clinic in Mexico during the years 2023 and 2024. Special emphasis was placed on three pathologies in the pediatric population: dental caries, gingivitis, and malocclusion.

MATERIALS AND METHODS

STUDY DESIGN

Retrospective, descriptive and cross-sectional study carried out at the Predoctoral Pediatric Dentistry Clinic of the School of Dentistry of La Salle Bajío University (León, Guanajuato, Mexico) during the years 2023 and 2024. The study, which followed the guidelines of the Declaration of Helsinki, was approved by the Research Committee of the School of Dentistry with the code 180825L19. All clinical files were complemented with informed consents signed by the parents for pediatric procedures and behavior management.

POPULATION AND SAMPLE

All records of newly admitted pediatric patients at the Predoctoral Pediatric Dentistry Clinic during the years 2023 and 2024 were reviewed. The age range admitted to the Clinic was 4 to 14 years.

The Department of Pediatric Dentistry at the Predoctoral Program had nine faculty members who supervised the fulfillment of forms by final-year Predoctoral students (seventh and eighth semesters). Efforts were made to maintain the same standards for patient review and file authorization.

The inclusion criteria were: newly admitted patients during the years 2023 and 2024 registered in the Clinic's logbook, and correctly completed digital records authorized by a professor of Pediatric Dentistry. The exclusion criteria were: errors in file codes (non-existent or adults), duplicate file numbers and empty files.

DATA COLLECTION TECHNIQUES

Every clinical shift, the faculty recorded data about dental care provided by final-year dental students in a paper logbook and a digital database. At the end of the 2023-2024 academic period the Head of the Department verified the logbook completion, and the analysis was performed with the assistance of a Social Service dental intern.

For analytical purposes, Microsoft Excel tools were used to identify the total number of first-time pediatric records during the years 2023 and 2024. The information was organized in a table with additional data obtained from the SMILE electronic record system, collecting the following: patient's date of birth, date of admission to the Clinic, patient's sex and age, systemic condition, allergies, birth delivery, type of dentition, and presence of oral diseases: caries, gingivitis, and malocclusion.

The diagnostic criteria for oral diseases were:

- Caries: The lesions were classified as “incipient” when they presented the initial stages corresponding to white spots and superficial pigmentation, and as “enamel and/or dentin” lesions when they presented evident cavities using the WHO dmft index. The diagnostic criteria for caries are described in the WHO Manual “Oral Health Surveys, Basic Methods, Fifth Edition”(8).
- Gingivitis: It was classified as “present” when it showed the classic signs of redness, inflammation, and bleeding of the gums. The diagnostic criteria for gingivitis are described in the American Academy of Pediatric Dentistry (AAPD) classification of periodontal conditions (9).
- Malocclusion: It was classified as “present” when any of the following variables were identified: Anterior Open Bite (AOB), Anterior Crossbite (ACB), Posterior Crossbite (PCB), or Mixed Malocclusion. Occlusal conditions are mentioned in the American Academy of Pediatric Dentistry (AAPD) guideline to manage the developing dentition and occlusion (10).

In the Excel database, the counting, average, and percentage functions were used for the analysis. The calculations were verified to be correct, and the results were organized into tables.

The formula used to calculate the prevalence (11) of each of the oral diseases was the following:

Prevalence = (Total number with disease) / (Population at risk for the disease).

RESULTS

Based on the collected data from the Predoctoral Pediatric Dentistry Clinic, the sample consisted of 587 records (311 in 2023 and 276 in 2024) with an age range from 4 to 14 years.

Considering the exclusion criteria, 25 files were discarded (14 in 2023 and 11 in 2024) for the reasons previously mentioned in the Methodology. Therefore, the final analysis was conducted on a total of 562 files: 297 from 2023 and 265 from 2024.

DEMOGRAPHIC ANALYSIS

Of the 562 records analyzed between 2023 and 2024, 309 female patients (54.98%) and 253 male patients (45.02%) were identified. Education level was classified into three groups: primary school with 398 patients (70.82%), secondary school with 76 patients (13.52%), and the remaining 88 records did not specify their education level (15.66%, probably preschool). The age range was 4 to 14 years, and the average age was 8 years. Demographic data were summarized in Table 1.

MEDICAL HISTORY

Regarding the medical records, 469 patients (83.45%) were found to be systemically healthy, while 75 (13.35%) did present some systemic condition, and the rest did not specify. The three most frequent medical conditions were: respiratory, gastrointestinal, and neurological. Regarding allergies, 15.30% (n=86) presented some, with Penicillin being the most common cause. As for birth delivery, 276 patients (49.11%) were born by vaginal delivery, 262 patients (46.62%) by cesarean section, and 24 patients (4.27%) presented some perinatal complication. Data were summarized in Table 2.

TYPE OF DENTITION

According to the type of dentition, 95 cases were in the primary dentition stage (16.90%), 398 cases had mixed dentition (70.82%), and 69 patients already had permanent dentition (12.28%). Therefore, the majority of patients treated at the Clinic were in the mixed dentition stage. Data were summarized in Table 3.

OVERALL PREVALENCE OF ORAL DISEASES

According to the WHO dmft index, caries lesions were classified as 1) incipient and 2) cavitated in enamel and/or dentin. The results obtained for the 2023-2024 period were: 67.08% (n=377) for the prevalence of incipient lesions, and 77.58% (n=436) for the prevalence of enamel and/or dentin lesions.

On the other hand, the prevalence of gingivitis was 55.51% (n=312) in pediatric patients, while the overall prevalence of malocclusion was 28.11% (n=158). The results are presented in Table 4.

PREVALENCE OF ORAL DISEASES BY GROUPS OF AGE

According to the WHO age classification, data were divided into two groups: children (n=399,

4 to 9 years old) and adolescents (n=163, 10 to 14 years old). Among children, 64.91% of them had incipient caries lesions, and 83.46% had enamel and/or dentin cavities. For adolescents, the prevalence was 72.39% and 63.19%, respectively.

Regarding gingivitis, the prevalence rate was 51.88% for children, and 64.42% for adolescents. Furthermore, malocclusions were present in 27.07% of children, and 30.67% in adolescents. The information was organized in Table 5.

Table 1. Demographic data of newly admitted patients in the period 2023-2024.

			n	%
Period 2023-2024 n=562	Sex	Female	309	54.98%
		Male	253	45.02%
	Education level	Primary	398	70.82%
		Secondary	76	13.52%
		Not specified	88	15.66%

Table 2. Medical history of pediatric patients in the period 2023-2024.

			n	%
Period 2023-2024 n=562	Systemic conditions	Yes	75	13.35%
		No	469	83.45%
		Not specified	18	3.20%
	Allergies	Yes	86	15.30%
		No	457	81.32%
		Not specified	19	3.38%
	Birth	Vaginal	276	49.11%
		Cesarean	262	46.62%
		Complications	24	4.27%

Table 3. Distribution of pediatric patients by type of dentition in the period 2023-2024.

			n	%
Period 2023-2024 n=562	Dentition	Primary	95	16.90%
		Mixed	398	70.82%
		Permanent	69	12.28%

Table 4. Overall prevalence of oral diseases in the period 2023-2024.

		n	%
Overall Prevalence n=562	Incipient caries lesions	377 of 562	67.08%
	Cavitated caries lesions in enamel and/or dentin	436 of 562	77.58%
	Gingivitis	312 of 562	55.51%
	Malocclusion	158 of 562	28.11%

Table 5. Prevalence of oral diseases by groups of age in the period 2023-2024.

			n	%
Prevalence by Groups of Age n=562	Incipient caries lesions	Children	259 of 399	64.91%
		Adolescents	118 of 163	72.39%
	Cavitated caries lesions in enamel and/or dentin	Children	333 of 399	83.46%
		Adolescents	103 of 163	63.19%
	Gingivitis	Children	207 of 399	51.88%
		Adolescents	105 of 163	64.42%
	Malocclusion	Children	108 of 399	27.07%
		Adolescents	50 of 163	30.67%

DISCUSSION

The aim of this study was to determine the prevalence of the most frequent oral diseases in newly admitted patients at the Predoctoral Pediatric Dentistry Clinic of the School of Dentistry of La Salle Bajío University during the 2023-2024 period. The overall prevalence was 67.08% for incipient caries lesions, 77.58% for cavitated caries lesions in enamel and/or dentin, 55.51% for gingivitis, and 28.11% for malocclusion.

Updating epidemiological data on oral diseases, particularly in children, is a fundamental task for healthcare institutions. University Dental Clinics, as part of educational institutions, also require recent and accurate information on this topic. In Mexico, data is reported mostly from public institutions, so including data obtained from private schools is crucial to achieve a better understanding and a broader view of the social, economic, and cultural patterns and factors that influence children's oral health, thus enabling the development of more effective intervention policies and strategies (7).

It should be noted that this study was conducted at the Predoctoral level, thus the degree of specialization was not as detailed. Generally, dental students require more supervision from faculty and also a greater number of corrections when completing medical records, especially for students treating pediatric patients for the first time. Once they gain more experience, higher quality clinical procedures are expected.

Regarding caries, Márquez-Pérez *et al*. mentioned that since the 1980s and up to the present, a high trend of caries lesions has been observed in children. Thus, in 2021, a prevalence of 88.5% for caries was reported in Mexican children (4). The results of this study still project a high level of caries lesions in the pediatric population (67.08% for incipient caries lesions, and 77.58% for cavitated caries lesions in enamel

and/or dentin). Some causes could include: high consumption of sugary foods, poor oral hygiene, and low frequency of dental visits, among others. These same factors have also been reported in international studies (12). It is also necessary to consider that the presence of dental caries in the primary dentition is a risk factor for developing lesions in the mixed and permanent dentition (13).

Moreover, gingivits has been considered the precursor to periodontal disease in subjects of all ages, including children and adolescents. Botero *et al*. reported that the prevalence of gingivitis in Mexican children was 23% in 2015 (14). In contrast, Carvajal *et al*. reported a prevalence of 99.6% for the year 2020 (15). This implies a very wide range of variability. The results obtained in this study show an intermediate rate (55.51%), which can be considered an alarming percentage as it involves more than half of newly admitted patients. To reduce the prevalence of gingivitis, it is necessary to educate children (and especially their parents) about the importance of oral hygiene through brushing and flossing from an early age. In previous studies, the presence of gingivitis in children has been associated with the presence of the disease in their mothers and a lack of instruction on how to brush their teeth (16).

Regarding malocclusion, Lombardo *et al*. reported that the global prevalence in children and adolescents was 56% in the period 2009-2019, while the frequency for Latin America was 53% (17). The prevalence of malocclusion found in this study was lower than previously reported (28.11%).

Since 2021, the Latin American Oral Health Association (Asociación Latinoamericana de Salud Bucal) has published epidemiological data for Latin American and Caribbean countries regarding the experience of dental caries across the continent. For the pediatric population aged 5-13 years, a prevalence ranging from 18.3% to 90.0% was found, with a wide variation among the 26 countries included in the analysis (18). It is relevant to note that the Association has worked with a systematic approach in partnership with the Schools of Dentistry of the Spanish-speaking Latin American countries to achieve a Consensus (2023) on a competency-based curriculum in Cariology (19). Furthermore, in 2024 the Consensus on Periodontology for Latin America and the Caribbean was held, which outlined recommendations for reducing the impact of diseases on the quality of life of Latin Americans. These recommendations included the expansion of epidemiological and multicenter studies, as well as the development and communication of Public Health programs (20).

Regarding the limitations, this study focused on patients aged 4 to 14, which is an age range considered appropriate for treatment in a Predoctoral Dental Clinic. Therefore, broader analyses are needed to cover the entire stages of childhood and adolescence. Likewise, there is always the possibility of human error in data capture, in the completion of records and logbooks, as well as some discrepancies in diagnostic criteria, so the data presented may have some inconsistencies. However, constant work is being done to establish standardized criteria for improving student learning and clinical care for patients. Furthermore, the indices used in the study were also considered the simplest to be applied by Predoctoral students. Different results may be found when using other indices, such as ICDAS for caries. In other instances, Predoctoral students typically request support from the Department of Periodontics to assess more severe cases of gingivitis, or consult with the Department of Orthodontics to diagnose malocclusions in more detail. Also, the present study did not analyze personal, family, or environmental factors associated with oral disease indices. These topics would be interesting to study in future research.

Nonetheless, the strengths of this study reside in the importance of early diagnosis, prevention, and future research on oral health trends among pediatric populations treated in University Dental Clinics, addressing a topic of great relevance to both Public Health and Dental Education.

Regarding the perspectives, it would be valuable to further analyze epidemiological data based on the social, cultural, and economic characteristics of patients. Furthermore, it is crucial that the results be updated regularly (for example, annually) to accurately reflect the progress of oral health in the pediatric population. It would also be interesting to include records of developmental defects of enamel (DDE) in the files, which would require more extensive academic preparation at the Predoctoral level. Similarly, the prevalence of dental anomalies and oral lesions could provide important information.

Based on the results, and also considering the limitations and strengths of this study, it is hoped that a deeper understanding will be generated about the prevalence of oral diseases in the Mexican and Latin American pediatric population treated at University Dental Clinics. Additionally, it must be taken into consideration that the Dental Education community presents the important task of contributing positively to society, seeking to reduce oral diseases through small and local actions. Schools of Dentistry at the regional and global level can have a great impact on Public Health, with the responsibility of conducting epidemiological studies and encouraging their students and teachers in research, especially during the Predoctoral stage when students are developing the knowledge and skills they will put into practice in their professional lives.

Finally, it is worth mentioning that Schools of Dentistry must educate their students so they can participate "proactively with members of the dental team and other professionals, in the management and promotion of health" (21), seeking a better quality of life for their populations.

CONCLUSION

Based on this study conducted at a Predoctoral Pediatric Dentistry Clinic in Mexico, the prevalence of oral diseases in the pediatric population still show a high percentage of affectation in children and adolescents, especially for caries and gingivitis.

The findings of this analysis are expected to provide valuable information for better understanding the trends of oral diseases in the pediatric population treated at University Dental Clinics by Predoctoral students. Further research on this topic will help develop epidemiological databases and strengthen Dental Education in Mexico and other Latin American countries.

FUNDING: The authors didn't receive any funding for the study.

CONFLICT OF INTEREST: The authors have no conflicts of interest to declare.

AUTHOR CONTRIBUTIONS STATEMENT: Conceptualization and design, Literature review, Investigation and data collection, and Writing-original draft preparation: N.O.; Methodology and validation, Formal analysis, Resources, Data analysis and interpretation, Writing-review & editing, and supervision: H.D.L.S.

ACKNOWLEDGEMENTS: The authors would like to thank the Department of Pediatric Dentistry (School of Dentistry, La Salle Bajío University, León, Guanajuato, Mexico) for their support in supervising the daily work performed by dental students.

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