

Prevalence and Experience of Dental caries in Students According to Faculty at Different Faculty at a Private University

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Abstract

Objective: Describe the prevalence and experience of dental caries in students according to faculty at the Universidad Peruana Cayetano Heredia (UPCH), Lima, Perú, in 2012.

Materials and Methods: A descriptive, observational and retrospective study, worked with records of 2 data bases (Base 1: 3454 records and Base 2: 3417 records) from UPCH students provided by the administrative area of the Teaching Dental Clinic of the same institution. The study variables were the prevalence and experience of dental caries (DMFT and DMFS indices) according to faculty, the statistical tests used were Chi-square and Kruskal Wallis, with a confidence level of 95% and $p < 0.05$, the program was used statistical SPSS v. 20.0.

Results: An association was found in the prevalence of dental caries ($p < 0.01$) and difference in averages of DMFT and DMFS indices ($p < 0.01$) according to UPCH faculty.

Conclusion: There were statistically significant differences between the prevalence and experience of dental caries in students as evidenced by faculty of the Universidad Peruana Cayetano Heredia, Lima - Perú, in 2012.

Keywords: *Epidemiology; Dental Caries; Social Determinants of Health; Social Gradient*

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Introduction

One of the most common dental diseases is dental caries, according to the World Health Organization (WHO), which affects between 60% and 90% of school age children between the ages of 5 and 17, according to the Pan American Health Organization (PAHO) report for this population. The CPOD Index varies between 1.08 and 8.3 with an average of 4.4. These values show problems not yet resolved [1-3].

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In Peru, dental caries is also one of the most prevalent diseases, increasing in severity according to the age of the individuals; therefore, the need for treatment will have a greater cost over the years as a result of poor oral health in the first years of life due to limited accessibility to health services and inadequate practices in the prevention of oral diseases. [4,5].

The purpose of this study was to measure the prevalence and experience of dental caries in students according to faculty of the Universidad Peruana Cayetano Heredia in 2012.

Materials and Methods

The present study had a descriptive, observational and retrospective design. The sample and population was the same, since records belonged to two databases of the Teaching Dental Clinic of the Roberto Beltrán School of Stomatology of the UPCH, and corresponded to the annual dental examination that was done to the students in 2012.

According to a records total of 3474 students were evaluated and the results were organized in two databases, the first with records of prevalence of dental caries, and the second with data on dental caries experience (this excluded incomplete records; Base 1: 3454 records and Base 2: 3417 records). The study variables were the prevalence of dental caries and experience of dental caries measured by the indices Decay, Missing, Filled Teeth (DMFT) and Decay, Missing and Filled Surfaces (DMFS). The diverse faculty of the University were used as co-variables. The co-variables were categorized and evaluated by departments or program as follows: Sciences and Philosophy, Nursing, Stomatology, Medicine, Veterinary Medicine and Zoo technics, Psychology, Public Health and Administration, and Medical Technology. Although the latter being a dependent on the Faculty of Medicine, for the study, it has been considered as a distinct faculty as it is a different career and has a significant volume of enrolled students.

Permission was requested to access the epidemiological data of the students of the Universidad Peruana Cayetano Heredia in 2012 through a letter addressed to the head of manager the diagnosis area at the Cayetano Heredia Teaching Dental Clinic. Using the records in the databases, we proceeded to debug, clean and process, the data into Microsoft Excel 2010 for further analysis in the statistical program SPSS v. 20.0. For the univariate analysis, we obtained the absolute and relative frequencies of dental caries prevalence, and the averages and standard deviation of the DMFT and DMFS indexes, in general and by faculty. For the bivariate analysis of the prevalence of dental caries, the Chi-square test was used. For the DMFT and DMFS indexes, the Kruskal Wallis nonparametric test was used, since the data follow a z-distribution proved by the Kolmogorov-Smirnov test. The present study had a confidence level of 95% and $p < 0.05$.

The research was approved by the Institutional Ethics Committee of the Universidad Peruana Cayetano Heredia (CIE-UPCH) on May 19, 2014.

Results and Discussion

In general, the prevalence of dental caries was 71.2% ($n = 2458$), with the highest prevalence in the Faculty of Nursing (82.0%, $n = 305$) and the lowest in the Faculty of Dentistry (60.5%, $n = 319$). An association was found between the prevalence of dental caries and the various faculties ($p < 0.01$) (Table 1).

In the overall evaluation of the students, an average DMFT index of 4.7 (SD = 3.5) and a DMFS of 7.3 (SD = 6.2) was obtained. In this case, the highest average of the DMFT index was reported by the Faculty of Stomatology ($X = 5.0$, SD = 3.4) and the lowest corresponded to the Faculty of Veterinary Medicine and Zoo technics ($X = 4.1$, SD = 3.0). In the case of DMFS, the highest average was presented by the Faculty of Public Health and Administration ($X = 11.1$, SD = 11.7) and the lowest value was given by the Faculty of Veterinary Medicine and Zoo technics ($X = 6.4$; SD = 5.5). A statistically significant difference was found between the average of both indices based on faculty ($p < 0.01$) (Table 2).

FACULTADES	POBLACION		SANOS		ENFEI
	N	n	%	n	
Ciencias y Filosofía	435	157	36.1	278	
Enfermería	372	67	18.0	305	
Estomatología	527	208	39.5	319	
Medicina	1119	328	29.3	791	
Medicina Veterinaria y Zootecnia	272	79	29.0	193	
Psicología	164	52	31.7	112	
Salud Pública y Administración	64	14	21.9	50	
Tecnología Médica*	501	91	18.2	410	
Total	3454	996	28.8	2458	

N: Población total.
 n: Frecuencia absoluta.
 %: Frecuencia relativa.
 *: Escuela profesional dependiente de la Facultad de Medicina.
 p: Significancia estadística.
 *: Prueba de Chi-cuadrado.
 Base de Datos 1: 3454 registros de estudiantes.

Table 1: Prevalence of dental cares in students of the Universidad Peruana Cayetano Here.

FACULTADES	POBLACIÓN	CPOD	p	CPOS
	N	X (DE)		X (DE)
Ciencias y Filosofía	436	4.5 (3.3)	<0.01*	6.6 (5.1)
Enfermería	371	4.2 (3.6)		7.2 (7.0)
Estomatología	474	5.0 (3.4)		6.9 (4.6)
Medicina	1135	4.9 (3.6)		7.5 (6.6)
Medicina Veterinaria y Zootecnia	272	4.1 (3.0)		6.4 (5.5)
Psicología	163	4.8 (3.2)		6.7 (4.6)
Salud Pública y Administración	64	4.8 (4.0)		11.1 (11.7)
Tecnología Médica*	501	4.9 (3.7)		7.9 (6.4)
Total	3417	4.7 (3.5)		7.3 (6.2)

CPOD: Dientes permanentes cariados, perdidos y obturados.
 CPOS: Superficies de dientes permanentes cariadas, perdidas y obturadas.
 *: Escuela profesional dependiente de la Facultad de Medicina.
 N: Población total.
 X: Promedio.
 DE: Desviación estándar.
 p: Significancia estadística.
 *: Prueba de Kruskal Wallis.
 Base de Datos 2: 3417 registros de estudiantes.

Table 2: Experience of dental caries according to CPOD and CPOS in students of the University.

Dental caries is a multifactorial disease, chronic and preventable, where it interacts with the diet, composed of fermentable carbohydrates, the micro flora, the host, as well as external factors (at a socioeconomic level) and internal factors (susceptibility of the tooth, flow and buffer capacity of saliva, oral hygiene, hereditary aspects and nutritional status among others). This disease affects millions of people since childhood. For this reason, WHO defines dental caries as the softening of the hard tissue of the tooth that is evolving until the formation of a cavity, affecting the general health and the quality of life of the individuals? Caries have become a public health problem due to the high prevalence worldwide [1,6].

According to WHO, the dental caries prevalence is between 60%-90% worldwide. By 2001 in Perú, the General Office of Epidemiology and General Direction of People’s Health (last nacional epidemiological study carried out by the Ministry of Health of Perú) reported a dental caries prevalence of 90.4% in school age. The departments with the highest prevalence were Ayacucho (99.8%), Ica (98.8%), Huancavelica (98.3%) and Cusco (97.2%). With respect to the geographic area, the prevalence in the urban area was 90.6% and 88.7% in the rural área. [1,4,5].

The results found in this study are within the range of global prevalence given by the WHO. However, it is below the prevalence at the national level. For the Ministry of Health of Perú (MINSA), in Lima, the prevalence was 88.3%. Ancash, the department with the lowest prevalence, reported 76.6% (4.5). That is to say, in all cases the global and students by faculty results are lower than the prevalence's results by departments. The differences are due to the characteristics of the students. The university is a private educational institution specialized in health, located in urban city Lima, the capital of the country, where students have access to health services and constant preventive medical and dental evaluations.

The Pan American Health Organization suggests classifying the DMFT Index according to its severity as very low (0.0-1.1), low (1.2-2.6), moderate (2.7-4.4), high [4,5-6,5] and very high (6,6 to more) [7]. At the UPCH, a DMFT of 4.7 ± 3.5 was obtained, which was placed at a high level according to the classification established by the Pan American Health Organization.

At a global level, according to the WHO report, the DMFT index is approximately 2.5 at 12 years old, a value that rises in Latin America by more than 3.5 deeming it the continent with the highest average (1). According to the MINSA, in 2001, the DMFT index at 12 years old was 3.67, and the departments with the highest DMFT index were Ayacucho (7.0), Ica (5.3) and Amazonas (5.0), and Ancash, with the lowest index (1.1). In Lima the value of the DMFT index was 2.2 (3). In this case, the value of students globally or by faculty is always higher than the national average and is more than double the average of Lima. It is important to mention that this indicator determines if the individual has suffered from dental caries throughout their life; and these students may have had the disease but may have received dental care, which shows the low prevalence but the high experience of dental caries.

In other reports, Álvarez A., *et al.* in 1996, evaluated 261 adult subjects in Spain presenting a caries prevalence of 99.6% [8]. On the other hand, in Colombia, López S., *et al.* carried out a study in 2011 with students of dentistry, nursing, bacteriology and surgical instrumentation of the Rafael Núñez University Corporation, in the second academic period of 2010 in Cartagena, showing a prevalence of dental caries of 56% [9]. Similarly, Arrieta K., *et al.* conducted a study in 2011 with 234 students of the Dentistry program of the University of Cartagena, reporting a prevalence of caries in the participating subjects of 55.9% [10]. When comparing the studies described, the prevalence's of dental caries of the students of the Universidad Peruana Cayetano Heredia were higher. One of the reasons could be the population size of the studies. The present study has a total of 3454 records of students. Another reason could be the heterogeneity of the population. Although all are students of health sciences, the characteristics of the students are diverse, which could influence the results.

Álvarez A., *et al.* also, reported a DMFT index of 12.5. In that study, the average of the components could be obtained: decay teeth (D = 2.9), missing teeth (M = 7.5) and filled teeth (F = 2.1). This index is considered very high [8]. Unfortunately, for the present study there was no data on the components of the index. As in the example, decayed teeth indicate the prevalence of dental caries and lost and filled teeth showed the access to health services. A population with high DMFT index, such as the population studied, does not necessarily mean that the people evaluated have a high degree of damage due to the disease that would be without the components of lost and filled being low compared to that of dental cares. And when contrasting the indicators of access to health services, a high component of missing teeth indicates access to services that are not very preventive or of low resolute capacity, contrary to a high indicator of filled teeth, which denotes a timely response to dental treatment.

The study conducted by Arévalo J., *et al.* in the year 2005, evaluated 271 university students who attended the Dental Clinic of the Student Services Direction of Honduras, reporting an average DMFT index of 14.6, which is very high [11]. In comparison, the study of Cisneros M y col., in 2009, evaluated 111 undergraduate students in their last year of Dentistry School in Mexico, reaching a DMFT index of 9.73 [12]. These values differ from the results of the present investigation, even when comparing the Faculty of Stomatology, which has the highest value of dental caries experienced.

Previous reviews agree with the results, although it is true that the prevalence data are high compared to other investigations, the DMFT and DMFS indexes values are low. This is possible because the students have accessibility to health services, which facilitates and strengthens a culture of prevention and promotion of health [13-15].

The investigation determined the existence of statistically significant differences in the prevalence and experience of dental caries according to faculty. Most importantly, the investigation shows that the distribution of the prevalence of dental caries correlates with the cost of education by faculty [16]. For instance, that is, the highest prevalence of dental caries was evident in the Professional Career in Medical Technology and in the Faculty of Nursing, which have the lowest earnings, unlike the Faculties of Stomatology, Sciences and Philosophy, and Medicine who recorded the lowest prevalence's being the students have the highest earnings.

This does not reflect in the same way with the DMFT index, which indicates the number of teeth affected by dental caries. However, the DMFS index, which is an indicator of the severity and magnitude of the dental caries experience, showed that the Faculty of Public Health and Administration and the Professional Career of Medical Technology have high values of tooth surfaces affected by dental caries, while the Faculties of Veterinary Medicine and Zoo technics, Sciences and Philosophy, and Stomatology have the lowest averages, establishing the relationship to the cost of education. This is to say that, since the UPCH is a private university and one of the most expensive in Perú, this expenditure on education made by the families of the students can be an indicator of socioeconomic differences, and confirms the effect of the social gap gradient on the health of people [17], despite their equal opportunity stance.

It is known that there are differences in health indicators according to social classes [18-21]. Vásquez E., *et al.* indicates that there is a higher prevalence of dental caries in populations with low socioeconomic status [22]. This economic factor may have an important role in the present study, as mentioned by the Dental Medical Association of Spain, through an oral health survey in 2010. The survey showed that the social level and the place of residence influenced the index of dental caries, sustaining that people of high socioeconomic status have greater opportunity in accessing health services compared to people of low socioeconomic status [23-25].

As mentioned above, this social gradient is based on the Social Determinants of Health, being a new paradigm in public health and considered by WHO as circumstances in which people are born, grow, live, work and age. This paradigm recognizes that the social gradient is the existing inequity according to the social position in a group of people, impacting on their health, and repeating itself in spite of supposed similarities. This is in accordance with the results of the investigation [26-29].

It is important to note that the study had several limitations. The most outstanding being that it has been based on secondary sources of data, the heterogeneity of the data size by faculty and the loss of data due incomplete data. Nevertheless, the research revealed the distribution of a disease of high prevalence nationally and globally, and also the existence of these differences according to faculty. If this happens in a private university dedicated to health sciences, it may be the same panorama in other private or state educational institutions. Therefore, it should be of interest to various authorities in helping establish strategies to solve the problem.

Conclusion

In conclusion, there were statistically significant differences between the prevalence and the experience of dental caries in students according to faculty of the Universidad Peruana Cayetano Heredia (UPCH), Lima-Perú, in the year 2012.

Conflict of interest

The authors have no conflicts of interest. It is an academic study.

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