ORIGINAL RESEARCH

Sociodemographic Factors Associated with Knowledge About Management of Cleft Lip and Palate Patients in Peruvian Dental Students: A Logistic Regression Analysis

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Background: Cleft lip and palate are relatively frequent craniofacial alterations caused by the lack of union of the frontonasal processes with the maxillary processes during the first weeks of intrauterine life. This study evaluated the sociodemographic factors associated with the level of knowledge about management of cleft lip and palate (CLP) patients in Peruvian dental students.

Methods: This analytical, observational, cross-sectional and prospective study evaluated 191 dental students belonging to two branches of a private Peruvian university (one branch in the capital city and the other in a province), from September to November 2022. A validated questionnaire of 14 closed multiple-choice questions was used. A logit model was used to evaluate the influence of the variables: sex, age, academic year of study, marital status, relationship with CLP persons, place of origin and area of residence, on the level of knowledge of the students considering a significance level of $p<0.05$.

Results: Of the total, 77%, 22.5% and 0.5% presented a poor, fair and good level of knowledge, respectively, on the dental management of the patient with cleft lip and palate. In addition, those who lived in urban areas were 2.8 times more likely to have poor knowledge about the dental management of patients with CLP, compared to those who lived in non-urban areas (OR = 2.83; 95% CI: 1.26–6.33). Finally, sex, age, marital status, place of origin, academic year of studies and relationship with CLP persons were not considered influential factors ($p>0.05$).

Conclusion: Most of the students showed a poor level of knowledge about the dental management of patients with cleft lip and palate, a risk factor being that the students live in an urban area. It is recommended that educational authorities include selected topics on CLP in subjects related to infant, child and adolescent care.

Keywords: cleft lip, cleft palate, associated factors, dentistry, level of knowledge, Peru

Introduction

Cleft lip and/or cleft palate (CLP) are relatively frequent craniofacial alterations caused by an embryological defect in the lack of union of the frontonasal processes with the maxillary processes during the first weeks of intrauterine life.[1–3] According to a report by the World Health Organization (WHO), this malformation affected more than 1 in every 1000 neonates in the world, both in isolation and in association with syndromes. In Peru the incidence is 1 per 700 neonates and in the high Andean areas the incidence is 1 per 600 neonates with 25% females with cleft palate, 25% males with cleft lip and 50% with both pathologies.[4–6]

Several factors can contribute to this congenital malformation, including genetics. Inherited from one parent, there is a 5% chance of the first child being affected. If not inherited, the second child would have a 15% risk of developing the condition.[7,8] In this regard, the disease may emerge randomly as a result of certain gene abnormalities. The most prominent of these is the alteration of IRF6 (Interferon regulatory factor 6), which, according to prior research, contributes significantly to facial growth. IRF6 participates in the proliferation and differentiation of keratinocytes in oral periderm formation, and its regulation is critical for maintaining proper palatal adhesion.[9,10] Furthermore, the FOXE1 gene (forkhead box protein E1) may also be altered, affecting the transportation of PVRL1 (poliovirus-related receptor 1) from the thyroid. This plays a crucial role in cell adhesion and could result in the failure of palatal ridges fusion during intrauterine life between the 5th and 12th week.[8,11] It is also important to consider other genes involved in this malformation such as MSX1, GLI2, JAG2, SATB2, LHX8, SKI, ERBB2, TGFA, TGFβ2, TGFβ3, FGF, SPRY2, TBX10 and MSX2.[7,8,12,13] Other possible factors include physical, chemical or environmental factors (drugs, smoking, alcohol) (Paradowska), diseases during the first trimester of pregnancy, eg rubella, influenza, gestational diabetes, radiation according to its intensity, duration and frequency of exposure, maternal age, use of teratogenic agents such as cortisone, carbamazepine, phenytoin, valproate, diazepam, diets low in riboflavin and folic acid, organic solvents, and stress. The latter can lead to increased adrenocortical activity with consequent release of cortisone, and if this event occurs during any stage of organogenesis, it can lead to various types of malformations and incidence of miscarriages.[14,15]

General problems in neonates and infants with cleft lip and palate include feeding reflux, sucking and swallowing disorders, mouth breathing and phonation problems.[8] They may also present with dental problems such as delayed tooth eruption, enamel hypoplasia, dental caries, dilacerations, anodontia, crowding, supernumerary teeth, ectopic teeth, hypodontia and severe G4 and G5 malocclusions according to the Goslon index (Great Ormond Street, London and Oslo) caused mainly by maxillary hypoplasia, among others.[11,14,16,17] To mitigate the consequences of this malformation, a series of protocols have been recommended for the feeding and maintenance of oral hygiene of these patients, especially in the early stages of development, as they are usually surgically intervened in the first months after birth.[1,6,15] However, it is important that the dentist and the dental student about to graduate know how to identify, classify and timely diagnose this malformation in order to carry out activities that may allow the development of an orientation plan, consultation with the head and neck surgeon, and orthodontic treatment that will contribute to improve the health of these patients and allow them to have a better quality of life.[8,15–17]

Because of the aforementioned, the present study aimed to determine the sociodemographic factors associated with the level of knowledge about the management of cleft lip and palate patients in Peruvian dental students.

Methods
Study Design

This analytical, observational, cross-sectional and prospective study was written in accordance with the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) guidelines for observational studies,[18] and was conducted from September to November 2022 at two locations of the School of Stomatology of the San Juan Bautista Private University (UPSJB): the main site located in the Peruvian capital (Lima) and a branch located in a Peruvian province (Ica). The present study respected the bioethical principles of the Declaration of Helsinki related to confidentiality, freedom, respect, and nonmaleficence.[19] It had the approval of an institutional ethics committee of the San Juan Bautista Private University with resolution No. 43–2022-CIEI-UPSJB dated January 17, 2022. In addition, voluntary informed consent was requested on the first page of the questionnaire.

Population and Selection of Participants

The population consisted of 353 students from the 3rd to the 5th academic year of study of the professional career of Stomatology of the UPSJB. Of these, 124 students belonged to the 3rd year, 133 students to the 4th year and 96 students to the 5th year. The sample size was 191 students (67 3rd year, 72 4th year and 52 5th year) and was calculated based on

a formula to estimate a proportion with finite population using the statistical software Epidat 4.2. The values were p=0.5 and q=0.5 considering an absolute precision of 5%. The selection method was stratified random.

Inclusion Criteria
- Students enrolled between the third and fifth year in the professional career of Dentistry at the UPSJB.
- Dental students enrolled in semester 2022–2.
- Dental students who have voluntarily given informed consent.

Exclusion Criteria
- Students who did not complete the entire questionnaire.

Variables
The dependent variable considered was knowledge about the management of patients with cleft lip and palate. The independent variables were sex $(X1)$[10–23] and age $(X2)$.[24] The possible confounding variables were academic year of study $(X3)$,[25] marital status $(X4)$,[18] place of origin $(X5)$,[23] area of residence $(X6)$ and relationship with CLP persons $(X7)$.[23,26]

Elaboration of the Instrument
A questionnaire of 14 closed-ended questions[27] was used and improved to evaluate knowledge about dental management of cleft lip and palate patients in four aspects: general knowledge with 5 questions (Q1 to Q5), treatment protocol with 4 questions (Q6 to Q9), feeding with 3 questions (Q10 to Q12) and oral hygiene with 2 questions (Q13 and Q14) [Table 1]. Overall knowledge levels were defined according to Stanones' rule [mean $(\bar{x}) \pm 0.75$ (Standard deviation)]: poor (0 to 7 points), fair (8 to 11 points) and good (12 to 14 points). One point was awarded for each correct answer. Furthermore, these levels of knowledge about the dental management of the CLP patient were dichotomized as poor = 1 and fair/good = 0. The cutoff point (7.5 points) was validated by Livingston's K^2 coefficient, with an acceptable value of 0.832.

Procedure
The questionnaire was distributed to each student in person by the principal researcher (B.R.L.P.). The informed consent of the students to participate in the study was at the beginning of the questionnaire, followed by the indications for its development. The questionnaire also contained the e-mail address, telephone number and full name of the principal researcher. It also contained the researcher's home university and the institutional e-mail address of the ethics committee. Students were free to refuse the evaluation if they did not wish to complete it during its completion. Only the principal researcher had access to the students' personal data such as their name, e-mail address and telephone number. No incentives were given for participation. The study was conducted from September to November 2022. Finally, the results of the study were sent to all those who requested the information by e-mail addressed to the principal researcher.

Validation of the Instrument
Three judges from dental research and public health fields with more than 20 years of experience evaluated and validated the content of the questionnaire. They reviewed the constructs and corresponding items, adapting the instrument to the research context. Aiken's V validity coefficient was acceptable with a value of 0.89 (95% CI: 0.85–0.92). According to the principal component analysis with varimax rotation and Kaiser normalization, four dimensions were identified: D1 (General knowledge) (Q1 to Q5), D2 (Treatment protocol) (Q6 to Q9), D3 (Nutrition) (Q10 to Q12) and D4 (Oral hygiene) (Q13 and Q14). Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure indicated acceptable values of $p = 0.004$ and 0.505 respectively.[28] Subsequently, the internal consistency reliability of the instrument was evaluated using Cronbach's alpha obtaining an acceptable result of 0.75 (95% CI: 0.70–0.80). To assess the repeatability of the instrument, 30 randomly selected participants were surveyed at two different times (within 10 days), altering the order of the questions to avoid recall bias (test-retest).[29] A Spearman's Rho of both scores was obtained with a very good value (Rho = 0.92; 95% CI:0.84–0.96).

Table 1 Questionnaire

Questions	Answers
General knowledge	
Q1. CLP embryogenesis occurs by fusion failure of the frontonasal process and maxillary processes. These maxillary processes are derived from the:	First gill arch Second gill arch Third gill arch Fourth gill arch
Q2. Epidemiologically, what type of CLP is most prevalent?	Right Left Central Right and left
Q3. In the new Kernahan classification, the shape of the fissure is plotted by means of numbered boxes that simulate anatomical parts. This classification is called:	Striped Y Striped T Striped I Striped U
Q4. When a baby with CLP is born in a Hospital Center, in the first days of life he/she goes to the Department of:	General Dental Department Surgical Department Orthopaedic Department Neonatology Department
Q5. They are part of the multidisciplinary team that treats CLP patients:	Plastic surgeon, maxillofacial surgeon, otorhinolaryngologist, orthodontist, general dentist, psychologist, speech therapist, paediatrician, geneticist. Maxillofacial surgeon, otorhinolaryngologist, general dentist, psychologist, paediatrician, paediatric dentist, geneticist, speech therapist. Orthodontist, maxillofacial surgeon, general dentist, psychologist, paediatrician, speech therapist, plastic surgeon, pulmonologist. Maxillofacial surgeon, otorhinolaryngologist, paediatrician and orthodontist.
Treatment protocol	
Q6. Currently the management of CLP patients includes preoperative orthopedics usually initiated before:	The first month of life The third month of life The first year of life The sixth month of life
Q7. After the orthopedic treatment of CLP in the first months of life, what type of surgery is performed?	Premaxilla Primary palate Lip Bony palate
Q8. How long should treatment of patients with CLP be followed up?	Until the surgical stage has been completed. Until the complete development and maturation of the skeleton. Until the age of 6 years Until the age of 12 years
Q9. Palatoplasty is performed by the plastic surgeon at the age of:	3 years 1 to 6 months 3 to 6 years 12 to 18 months
Nutrition	
Q10. Children with CLP and weight and/or nutritional problems respond poorly to shaping and palatal growth stimulation, so it is important to have a diet adequate in:	Protein and iron Vitamins Fruits Carbohydrates

(*Continued*)

Table 1 (Continued).

Questions	Answers
Q11. Can CLP patients drink milk from a feeding bottle? Q12. What position is favorable for the infant with CLP when breastfeeding?	Yes No Seated Semi-sitting Upright Seated and upright
Oral hygiene	
Q13. Can CLP patients be more predisposed to periodontal disease? Q14. In patients with CLP, for better oral cavity hygiene and to decrease communication with the nasal cavity and improve feeding, some recommend the use of:	Yes No Obturator plate Schwarz plate Hawley plate Palatal plate

Statistical Analysis

Data analysis, construct validation and reliability and repeatability analysis of the instrument were carried out with the Statistical Package for the Social Sciences (SPSS) version 28.0 (SPSS Inc., Chicago, IL, United States). Descriptive statistics were applied to obtain a table of absolute and relative frequencies and bar graphs. Pearson's chi-square test was used for bivariate analysis to test whether the distribution of the observed response is random or significantly associated with an independent variable. For the multivariate analysis, a logistic regression model with Odds Ratio (OR) was used, adjusting the model with the stepwise technique and considering the statistical prerequisites such as independent observations, sufficient sample size according to the number of independent variables, absence of multicollinearity, and goodness of fit of the model. The level of significance in all the analyses performed was $p<0.05$.

Results

The average age of the 191 dental students surveyed was 24.3 ± 4.2 years. The majority were women with 58.1% of the total. Of the participants, 54.5% were under 24 years of age. The 4th year students were the most numerous with 37.7% of the total. 90.1% of the participants were single. More than half of the participants (56.0%) were from the capital city and the great majority (83.2%) were urban residents. Likewise, more than half of the students did not have any type of relationship with people with cleft lip and palate (67.0%) [Table 2]. On the other hand, it was observed that 77% (95% CI: 71.0% - 82.9%), 22.5% (95% CI: 16.6% - 28.4%) and 0.5% (95% CI: 0.0% - 1.5%) presented poor, fair and good levels of knowledge, respectively, about the dental management of patients with cleft lip and palate [Figure 1].

The bivariate analysis showed that there was a significant association of the level of knowledge about dental management of patients with CLP with the place of origin and area of residence ($p = 0.021$ and $p = 0.010$, respectively). Sex, age group, academic year of study, marital status and relationship with CLP persons were not significantly associated with this level of knowledge ($p> 0.05$) [Table 3].

Regarding knowledge about the dental management of the patient with CLP, there was a significant association of sex with Q3 (In the new Kernahan classification, the shape of the fissure is plotted by means of numbered boxes that simulate anatomical parts. This classification is called) and Q9 (Palatoplasty is performed by the plastic surgeon at the age of) ($p = 0.011$ and $p = 0.025$; respectively). Age group was only significantly associated with Q12 (What position is favorable for the infant with CLP when breastfeeding?) ($p = 0.030$). The students' place of origin was only significantly associated with Q7 (After the orthopedic treatment of CLP in the first months of life, what type of surgery is performed?) ($p = 0.013$). Area of residence was significantly associated with Q6 (Currently the management of CLP patients includes preoperative orthopedics usually initiated before) and Q7 ($p = 0.013$ and $p = 0.004$; respectively). Finally, the relationship with CLP persons was significantly associated with Q4 (When a baby with CLP is born in a Hospital Center, in the first days of life he/she goes to the Department of) ($p = 0.033$) [Table 4].

Table 2 Sociodemographic Characteristics of Dental Students

Variable	Category	Frequency	Percentage
Sex	Male	80	41.9
	Female	111	58.1
Age group	≤ 23 years	104	54.5
	> 23 years	87	45.5
Academic year of study	3rd year	67	35.1
	4th year	72	37.7
	5th year	52	27.2
Marital status	Unmarried	172	90.1
	Married o cohabiting	19	9.9
Place of origin	Capital	107	56.0
	Province	84	44.0
Area of residence	Urban	159	83.2
	Non-urban	32	16.8
Relationship with CLP persons	Family	49	25.7
	Friend and/or Social	14	7.3
	None	128	67.0
Age	**Mean**	**Median**	**SD**
	24.3	23.0	4.2

Abbreviations: SD, Standard Deviation; CLP, Cleft lip and palate.

Under a logit model adjusted with the stepwise technique, it could be observed that the students' area of residence was a significant influential factor ($p = 0.012$) in the knowledge about the dental management of patients with CLP (categorized as poor = 1 and fair/good = 0). Those living in urban areas were 2.8 times more likely to have poor knowledge about the dental management of such patients compared to those living in non-urban areas (OR = 2.83; 95% CI: 1.26–6.33). Sex, age group, academic year of study, marital status, place of origin and relationship with CLP persons were not considered influential factors in the level of knowledge about this topic ($p > 0.05$) [Table 5].

Discussion

Cleft lip and cleft palate are the most common congenital malformations of the head and neck.[30] Children born with these conditions have severe difficulties in breastfeeding, eating, speaking, hearing, smiling, breathing and may have moderate to severe malocclusion. All this generates physical and psychosocial alterations that affect their quality of life.[30] Services and treatment for these conditions vary according to the severity of the cleft, the age, the needs of the child, and the
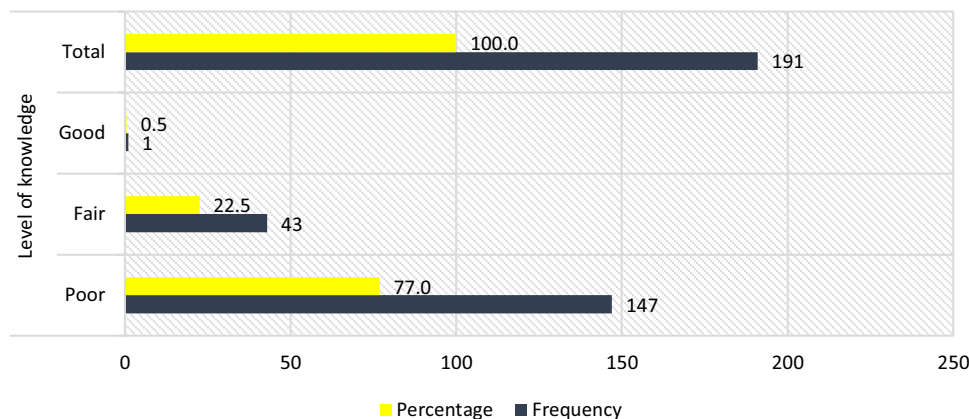

Figure 1 Frequency of the level of knowledge about dental management of patients with CLP in dental students.

Table 3 Sociodemographic Factors Associated with the Level of Knowledge About Dental Management of CLP Patients

Variable	Category	Knowledge			
		Poor	Fair / Good	χ2	*p
		f (%)	f (%)		
Sex	Male	61 (31.9)	19 (9.9)	0.040	0.842
	Female	86 (45.0)	25 (13.1)		
Age group	≤ 23 years	76 (39.8)	28 (14.7)	1.945	0.163
	> 23 years	71 (37.2)	16 (8.4)		
Academic year of study	3rd year	51 (26.7)	16 (8.4)	0.994	0.608
	4th year	58 (30.4)	14 (7.3)		
	5th year	38 (19.9)	14 (7.3)		
Marital status	Unmarried	131 (68.6)	41 (21.5)	0.625	0.429
	Married or cohabiting	16 (8.4)	3 (1.6)		
Place of origin	Capital	89 (46.6)	18 (9.4)	5.299	0.021*
	Province	58 (30.4)	26 (13.6)		
Area of residence	Urban	128 (67.0)	31 (16.2)	6.707	0.010*
	Non-urban	19 (9.9)	13 (6.8)		
Relationship with CLP persons	Family	38 (19.9)	11 (5.8)	3.384	0.184
	Friend and/or Social	8 (4.2)	6 (3.1)		
	None	101 (52.9)	27 (14.1)		

Notes: χ2: statistic based on Pearson's chi-square, *p<0.05 (significant association).

Table 4 Knowledge by Dimensions About Dental Management of CLP Patients Associated with Sociodemographic Factors

Questions	Incorrect	Correct	Sex	Age Group	Academic Year of Study	Marital Status	Place of Origin	Area of Residence	Relationship with CLP Persons
	f (%)	f (%)	*p	*p	*p	*p	*p	*p	*p
General knowledge									
Q1	116 (60.7)	75 (39.3)	0.860	0.585	0.056	0.820	0.134	0.569	0.148
Q2	151 (79.1)	40 (20.9)	0.653	0.663	0.744	0.990	0.614	0.418	0.418
Q3	106 (55.5)	85 (44.5)	0.011*	0.708	0.112	0.825	0.856	0.493	0.221
Q4	80 (41.9)	111 (58.1)	0.103	0.294	0.275	0.639	0.809	0.815	0.033*
Q5	126 (66.0)	65 (34.0)	0.705	0.269	0.045	0.812	0.174	0.203	0.842
Treatment protocol									
Q6	131 (68.6)	60 (31.4)	0.365	0.918	0.081	0.987	0.147	0.013*	0.211
Q7	154 (80.6)	37 (19.4)	0.852	0.247	0.251	0.677	0.013	0.004*	0.142
Q8	70 (36.6)	121 (63.4)	0.688	0.348	0.130	0.985	0.812	0.361	0.228
Q9	127 (66.5)	64 (33.5)	0.025*	0.963	0.829	0.403	0.964	0.350	0.899
Nutrition									
Q10	42 (22.0)	149 (78.0)	0.119	0.314	0.215	0.917	0.591	0.628	0.808
Q11	122 (63.9)	69 (36.1)	0.376	0.635	0.084	0.945	0.086	0.325	0.968
Q12	89 (46.6)	102 (53.4)	0.935	0.030*	0.929	0.679	0.967	0.458	0.455
Oral hygiene									
Q13	23 (12.0)	168 (88.0)	0.775	0.496	0.440	0.597	0.399	0.611	0.518
Q14	157 (82.2)	34 (17.8)	0.500	0.572	0.129	0.132	0.435	0.724	0.081

Notes: *Based on Pearson's chi-square, *p<0.05 (significant association).
Abbreviations: f, absolute frequency; CLP, cleft lip and palate.

presence of associated syndromes or other birth defects. Therefore, a multidisciplinary approach is important, with dentists playing an essential role.[31,32] It is therefore essential for students to acquire knowledge of etiopathogenesis, diagnosis, care protocols, oral hygiene and nutritional counseling of these patients during their academic training.[33] The

Table 5 Logistic Regression Model for Knowledge About Dental Management of CLP Patients

Variable	Category	Crude Model				Adjusted Model			
		OR	95% CI		*p	OR	95% CI		**p
			LL	UL			LL	UL	
Sex (X1)	Male	0.88	0.42	1.83	0.725				
	Female	Ref.							
Age group (X2)	≤ 23 years	0.53	0.25	1.14	0.103				
	> 23 years	Ref.							
Academic year of study (X3)	3rd year	1.26	0.50	3.16	0.620				
	4th year	1.40	0.54	3.60	0.484				
	5th year	Ref.							
Marital status (X4)	Unmarried	0.54	0.13	2.14	0.379				
	Married or cohabiting	Ref.							
Place of origin (X5)	Capital	1.52	0.67	3.45	0.313				
	Province	Ref.							
Area of residence (X6)	Urban	2.31	0.88	6.02	0.088*	2.83	1.26	6.33	0.012**
	Non-urban	Ref.					Ref.		
Relationship with CLP persons (X7)	Family	0.89	0.38	2.09	0.797				
	Friend and/ or Social	0.40	0.12	1.35	0.139				
	None	Ref.							

Notes: Logit model: all variables were entered in the statistical analysis of the raw model (*p<0.2; with potential association). However, the model was adjusted with the stepwise method, considering **p<0.05 as significant association. Pseudo R^2 = 0.068.
Abbreviations: OR, Odds Ratio; 95% CI, 95% Confidence Interval; LL, Lower Limit; UL, Upper Limit.

present study aimed to determine the sociodemographic factors associated with the level of knowledge about the management of cleft lip and palate patients in Peruvian dental students. The results obtained indicate that 77% of the respondents had a poor level of knowledge about the dental management of patients with CLP. This differs from that reported by Agha et al[31] who found that 73% of dental students had moderate knowledge about the management of these patients. This could be due to the fact that the students included in the present study were in their third to fifth year of study and did not take subjects with specific topics about the dental management of the CLP patient. In addition, the students surveyed received virtual theoretical education and most of their clinical practices were carried out in a semi presential manner, which could make it difficult to observe clinical cases of patients with this disorder. On the contrary, the study by Agha et al[34] only included dental interns who probably had a greater possibility of developing diverse practices, clinical experiences and training on patients with CLP since their rotations are commonly performed in hospital centers. This last argument is in agreement with Moore et al[35] who indicated that clinical experiences help to reinforce academic knowledge in students, thus favoring their learning.

The present study showed that the highest number of incorrect answers was in the questions about the most prevalent type of CLP, the continuity of orthopedic treatment after the first months of life, recommendations to improve oral hygiene, feeding, as well as the decrease in communication with the nasal cavity. This could be due to the fact that the respondents did not have the possibility to experience in situ the management of this type of patients. The learning of these students was based on discussion of clinical cases rather than clinical assessment, as the mode of teaching in 2022 was virtual, as due to the COVID-19 pandemic the students had been under compulsory social isolation for two years mandated by the central government.[36,37] This may have had a negative impact on their level of knowledge about CLP[35] since the methods available for learning did not allow them to reinforce their clinical management and link it with the theoretical learning.[38]

Likewise, the results obtained showed that the area of residence of the students was an influential factor in the knowledge about the dental management of the patient with CLP. Those who lived in urban areas were 2.8 times more

likely to have poor knowledge compared to those who lived in non-urban areas. This may be due to the fact that students living in rural areas are generally more sensitive to people with diseases or disabilities and because of their culture or lifestyle are accustomed to performing socially responsible activities to help their community.[24]

The results also showed that gender, age group, academic year of study, marital status, place of origin and relationship with CLP persons were not considered influential factors in the level of knowledge. These results are consistent with studies in other areas of knowledge where age,[20,24] marital status,[20,21,24] sex,[20–23] academic year of study,[25] place of origin[21,23] and relationship with vulnerable persons[23] were not considered influential factors. This could be because the students surveyed from the third to the fifth year of study had little or no clinical experience in the evaluation and/or care of patients with CLP because the audiovisual resources used in virtual and blended learning were learning complements that do not replace the actual clinical experience. This situation probably limited or hindered the predisposition (attitude) towards the search for knowledge about the care of patients with CLP since it has been reported that clinical experiences generate in the student greater motivation to acquire more knowledge about situations that are considered important in their professional training.[35,39]

We can mention as a strength of the design of this study, a cross-sectional study was conducted that evaluated the factors associated with knowledge of the management of patients with CLP, so these findings are of utmost importance, as dental students should acquire basic knowledge for the management of these patients in clinical practice. Furthermore, it should be noted that to date (June 2023) very few studies have been found in the literature assessing the level of knowledge about the management of CLP in dental students.[40,41] These studies did not consider questions on prevention strategies in relation to nutrition and oral hygiene in these patients, did not specify the general knowledge obtained by the students and did not evaluate the factors influencing knowledge on the management of CLP, as they reported knowledge on the frequency, diagnosis, distribution, aetiology, form of presentation and sequence of treatment of patients with CLP.[40,41] The oral and dental problems that occur in these patients are characterized by dental anomalies in addition to scarring results of orthopedic and early maxillary surgery that interfere with proper oral hygiene maneuvers and consequently increase the risk of dental caries and periodontal disease. In view of the above, it is important that students about to graduate and dental professionals have knowledge of preventive strategies (dietary patterns, oral hygiene, use of sealants and varnishes, among others)[42–45] as well as criteria for the proper diagnosis and treatment of patients with CLP in order to avoid oral problems that compromise their general health. The evaluation of knowledge in this regard is an essential tool to improve the performance of students as it evidences their preparation for the clinical field in this topic.[33]

This study had some limitations such as not including the entire student population since at the time the survey was conducted the students surveyed were developing some virtual and blended learning classes in the framework of the health emergency. For this reason, some did not agree to participate.[23,46] Despite this, it was possible to complete the minimum sample requirement with stratified probability sampling. Likewise, the decision to carry out this study in a private university with one campus in the capital and another in the province was due to the control of the variable "curricular plan" since the dental schools in Peru do not have the same curricular design. Finally, the cross-sectional design of this study did not allow us to evaluate the dynamism of knowledge and its sustainability over time.

According to the results obtained, it is recommended that educational authorities include selected topics on CLP in subjects related to infant, child and adolescent care. It is also recommended that the health authorities develop modules and guides for general dentists as well as the development of continuing education programs for the care of patients with CLP. Centers or networks of multidisciplinary health professionals should be established for the care of these patients that include general dentists, pediatric dentists, orthodontists, plastic surgeons, oral and maxillofacial surgeons, otolaryngologists, geneticists, prosthodontists, nutritionists, psychologists, speech therapists, among others, as well as education and counseling for children with this disorder and their families.[30] Finally, longitudinal studies should be performed to evaluate the effects of an educational intervention in students about the management of patients with CLP.

Conclusions

It can be concluded that the majority of students showed a poor level of knowledge about the dental management of patients with CLP, being a risk factor that the students live in urban areas. It is recommended that educational authorities include selected topics on CLP in subjects related to infant, child and adolescent care. It is also recommended that the

health authorities develop modules and guides for general dentists as well as the development of continuing education programs for the care of these vulnerable patients.

Abbreviations

CI, Confidence interval; CLP, Cleft lip and/or cleft palate; OR, odds ratio; STROBE, Strengthening the Reporting of OBservational studies in Epidemiology; SPSS, Statistical Package for the Social Sciences; WHO, World Health Organization.

Data Sharing Statement

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Ethic Approval and Consent to Participate

The present study respected the bioethical principles for medical research on human beings of the Declaration of Helsinki, related to confidentiality, freedom, respect and non-maleficence. It was also approved by the Institutional Research Ethics Committee of the Universidad Privada San Juan Bautista with resolution No. 43-2022-CIEI-UPSJB dated January 17, 2022. All participants understood and gave informed consent.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no conflict of interest with the development and publication of this research.

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