https://doi.org/10.4995/reinad.2022.18159
© Reinad, UPV, 2022

ORAL HEALTH-RELATED QUALITY OF LIFE AND ASSOCIATED FA CTORS IN ADOLESCENTS

(Calidad de vida relacionada con la salud bucal y fatores asociados en adolescentes)

Marcela Vieira Calmon
Professora da Faculdade Pitágoras deLinhares e da Escola Superior São Francisco de Assis (Brasil)

Maria Helena Monteiro de Barros Miotto
Professora Titular da Universidade Federal do Espírito Santo (Brasil)

Abstract

This cross-sectional study aimed to evaluate the impact of oral health on the quality of life of 387 students aged 15 to 19 years. These students came from state public school of the state network located in urban and rural areas in a southeastern region of Brazil. Three structured scripts were applied and visual tactile clinical examination was performed. Quality of life associated with oral health was verified by Oral Health Impact Profile (OHIP-14). Logistic regression models were adjusted for each dimension. The frequency of impact was 26.4%. Living in the rural area was associated with a lower impact of oral health on quality of life. Caries and tooth loss were statistically significant. However, when logistic regression was performed, the greatest impact prediction of oral health on the lives of adolescents was associated with gender, halitosis and crowding.

Keywords: Oral Health, Quality of life, Adolescents.

Resumen

Este estudio transversal tuvo como objetivo evaluar el impacto de la salud bucal en la calidad de vida de 387 estudiantes de 15 a 19 años. Estos alumnos procedían de escuelas públicas estaduales de la red estatal ubicadas en áreas urbanas y rurales de una región del sureste de Brasil. Se aplicaron tres guiones estructurados y se realizó examen clínico visual táctil. La calidad de vida asociada con la salud bucal se verificó mediante el Perfil de impacto en la salud bucal (OHIP-14). Se ajustaron modelos de regresión logística para cada dimensión. La frecuencia de impacto fue del 26,4%. Vivir en el área rural se asoció con un menor impacto de la salud bucal en la calidad de vida. La caries y la pérdida de dientes fueron estadísticamente significativas. Sin embargo, cuando se realizó la regresión logística, la predicción de mayor impacto de la salud bucal en la vida de los adolescentes se asoció con el género, la halitosis y el hacinamiento.

Palabras clave: Salud Bucal, Calidad de vida, Adolescentes.

1. INTRODUCTION

The influence of diseases and their treatment on quality of life have gained increasing importance (Colussi, Hugo, Muniz, & Rösing, 2017). The main oral disorders are not life-threatening, being composed of acute and readily treatable episodes. Thus, their influence on well-being are often not visible and can minimize the context of other more serious chronic conditions (Miotto et al., 2019).

Among several oral disorders, caries, tooth loss, malocclusions and halitosis stand out. Caries is the main cause of tooth loss and its treatment improves quality of life related to long-term oral health (de Paula et al., 2015). Malocclusions also have a negative social effect due to their association with both aesthetic and functional limitations (Corso et al., 2016). Halitosis has a strong social impact besides interfering in quality of life and representing an important indicator of systemic diseases (Lopes, Rösing, Colussi, Muniz, & Linden, 2016).

Several instruments were created to quantify the extent of oral disorders regarding people's well-being and to evaluate the influence of oral health on physical and psychosocial development. Slade and Spencer developed OHIP in 1994, and later it was simplified to a 14-item version (Slade, 1997; Slade & Spencer, 1994).

An indicator such as OHIP-14 can be useful for the planning of dental services, prioritizing the care of people with a high prevalence of impacts (Miotto, Barcellos, & Velten, 2012). Studies ensure that the instrument has good psychometric properties when applied in adolescents and could be a promising tool to prioritize care for this age group (Silveira, De Pinho, & Brito, 2019; Xavier et al., 2016).

Thus, this study aimed to evaluate the influence of oral disorders on quality of life and possible associations between sociodemographic variables, oral clinics and use of services in adolescent students from the urban and rural areas in a southeastern municipality of Brazil.

2. METHODS

2.1. Participants

This analytical observational study involved adolescents aged 15 to 19 years old from public schools of the state network in the urban and rural areas in a southeastern municipality of Brazil.

2.2. Instruments

Three scripts structured with sociodemographic information, oral clinical variables and OHIP-14 were used.

To record dental caries, the tactile-visual examination was performed with the aid of a mirror and a dental explorer. The methodology of the World Health Organization (WHO) was used with the adoption of the codes and criteria recommended for the diagnosis of dental crown caries. The classification of the dental element regarding the occurrence of dental caries was defined according to the conditions presented in the examination and the standard diagnostic criterion, designating it as a healthy tooth; decayed with cavitation involving dentin; filling; extracted or with indicated extraction (for caries reasons). The collected data were recorded in the dental record that was part of the guide.

The DMFT index was used, summing its indicators of Decayed, Missing, and Filled Teeth in permanent teeth per individual, and, subsequently, the average among all participants of the investigation was estimated.

Regarding halitosis, the adolescent was first asked objectively whether he/she perceived halitosis and the answer, yes or no, recorded in the form. Clinical confirmation of the halitosis condition was later executed, and a halimeter was used for its measurement. This device analyzes the expired air by the patient based on semiconductor technology for measuring volatile sulfur compounds and hydrocarbon gases, allowing breath analysis in five seconds, and classifying it at six levels according to the amount of these gases. For the recording of halitosis level, it was considered: without the presence of halitosis for levels zero and one; level two was considered adjacent (non-conclusive); with the presence of halitosis for levels three, four and five. The evaluation was repeated in all students to confirm the results.

Regarding the condition of dental occlusion, seven occlusal characteristics were evaluated and then dichotomously classified as presence or absence without assessing the gravity or severity of them: lip seal; anterior crowding; incisor diastemas; anterior open-bite; anterior maxillary overjet; anterior mandibular overjet; and anteroposterior molar relationship.

Dental trauma was evaluated dichotomously as present or absent. The attitudes taken after the trauma were also evaluated, such as: if the individual sought for care; if not, what was the reason; if the individual was treated; if so, what type of treatment; if not, what would be the necessary treatment. Furthermore, the site where the trauma occurred and its cause.

Finally, the participants completed the OHIP-14. This script evaluates the perception of respondents about the impacts of oral conditions on quality of life.

For the analysis, a Likert frequency scale was used with five frequency options to evaluate how often each problem is experienced in a given period. The scale consists in the following options: always; often; sometimes; rarely and never / does not apply.

The answers were evaluated dichotomously: “always” and “often” indicate impact on quality of life, whereas “sometimes,” “rarely” and “never” indicate no impact on quality of life.

2.3. Data Collection

After the initial interview, the adolescents were invited to participate in the clinical examination at the school facilities.

The tests were performed in a single session and by a single examiner for each person interviewed. Artificial light from the examination place was used, and natural light was used when possible. The volunteers sat in chairs facing the examiner.

Intraoral clinical examinations were performed with the aid of wooden tongue depressors marked with measurements in millimeters to assist in diagnosing some dental occlusal diseases. The tongue depressors are also useful for pulling the lips away from the cheeks.

2.4. Data analysis

Descriptive analysis of the data was performed based on frequency tables with number and percentage for each of the items of the investigation instrument.

Considering the nature of the variables studied, the following statistical tests were used: T-test; Chi-Square Test; Fischer’s Exact Test; Mantel-Haenszel test, and Cross-Product Ratio (OR) Test. Logistic regression was used to find which variables most influence students’ quality of life.

The IBM SPSS 20 statistical package was used for this analysis. The comparison of the percentages between the school zones was performed via Chi-square test. The level of significance adopted in the evaluations was $\alpha = 5\%$.
Ethical considerations

This study was approved by the local Investigation Ethics Committee.

3. RESULTS

From the 387 adolescents who participated in the study, 321 (82.9%) were from the urban area. The majority, 220 (56.8%), were female aged 16 years old, 128 (33.1%), and 17 years old, 125 (32.3%). In 213 (55%) students the self-declared mixed race as skin color followed by 92 (23.8%) that self-declared as black. Regarding socioeconomic status of the adolescents, 115 (29.7%) were from lower middle class 1 (C1) and 109 (28.2%) from lower middle class 2 (C2) (Table 1).

Table 1 – Demographic data of 387 adolescents aged 15 to 19 years in a municipality in southeastern Brazil.

Characteristic	Number	Percentage
Gender		
Male	167	43.2
Female	220	56.8
Age		
15 years old	100	25.8
16 years old	128	33.1
17 years old	125	32.3
18 years old	33	8.5
19 years old	1	0.3
Race/skin color		
White	58	15
Black	92	23.8
Asian	15	3.9
Mixed race	213	55
Indigenous	9	2.3
Socioeconomic status		
A	4	1
B1	23	5.9
B2	87	22.5
C1	115	29.7
C2	109	28.2
D – E	49	12.7
Place of residence		
Urban	321	82.9
Rural	66	17.1
Total	387	100

Regarding dental caries, the mean DMFT index of adolescents was 2.08 and standard deviation 2.65.

When asked about the use of oral health services, 239 (61.8%) students reported not having sought a dentist in the last 12 months. The 148 (38.2%) students sought this professional due to prevention/routine in 89.2% of the cases.

For the halitosis variable, we first asked if they perceived the presence of halitosis, then we measured it using halimeter test. In total, 300 (77.5%) students answered not to perceive halitosis, and when measured, 329 (85%) presented levels 0 and 1. Regarding dental trauma, 83.7% of the adolescents had not episodes of dental trauma, and for those who answered yes, the fracture involving only enamel was the most common (79.4%) (Table 2).

In the analysis of malocclusion, lip seal was present in 381 individuals (98.4%), 113 (29.2%) presented crowding among the anterior teeth, 40 (10.3%) presented diastema among the upper central incisors, 29 (7.5%) had anterior open bite, 367 (94.8%) and 374

(96.6%) had no maxillary overjet and mandibular overjet. In the anteroposterior relationship of molars, 200 (51.7%) adolescents were classified as Angle Class I.

Table 2 – Use of oral health services and oral clinical variables of 387 adolescents aged 15 to 19 years in a municipality in southeastern Brazil.

Characteristic	Number	Percentage
Search dentist last 12 months		
Yes	148	38.2
No	239	61.8
Reason for dentist search		
Urgency/Pain	16	10.8
Routine/Prevention	132	89.2
Perceived halitosis		
Present	87	22.5
Absent	300	77.5
Measured halitosis (halimeter)		
Present (levels 3 and 4)	34	8.8
2 – bordering	24	6.2
Absent (levels 0 and 1)	329	85
Dental trauma		
Yes	63	16.3
No	324	83.7
Type of trauma		
Fracture involving enamel	50	79.4
Fracture involving enamel and dentin	7	11.1
Fracture involving enamel, dentin and pulp	4	6.3
Loss due to trauma	1	1.6
Combined trauma	1	1.6
Lip seal		
Present	381	98.4
Absent	6	1.6
Crowding		
Present	113	29.2
Absent	274	70.8
Diastema		
Present	40	10.3
Absent	347	89.7
Anterior open bite		
Present	29	7.5
Absent	358	92.5
Anterior maxillary overjet		
Present	20	5.2
Absent	367	94.8
Anterior mandibular overjet		
Present	13	3.4
Absent	374	96.6
Anteroposterior relationship of molars		
Normal occlusion	140	36.2

Class I	200	51.7
Class II	11	2.8
Class III	36	9.3

Table 3 shows the data on the influence of oral health on adolescents. Overall, 102 (26.4%) students showed an impact in some dimension evaluated. The dimensions with the highest prevalence of impact were psychological discomfort (19.4%) and psychological disability (10.6%).

Table 3 – Impact of oral health of 387 adolescents aged 15 to 19 years in a municipality in southeastern Brazil.

Dimension	With impact		Without impact	
	N	%	N	%
Functional limitation	11	2.8	376	97.2
Physical pain	23	5.9	364	94.1
Psychological discomfort	**75**	**19.4**	312	80.6
Physical disability	8	2.1	379	97.9
Psychological disability	**41**	**10.6**	346	89.4
Social disability	13	3.4	374	96.6
Disability	16	4.1	371	95.9
General	**102**	**26.4**	285	73.6

When comparing the impact caused by the oral condition according to residential zone, the result was statistically significant in the psychological discomfort dimension (p=0.035) and in the general dimension (p=0.017). Showing a greater influence of oral condition on quality of life in adolescents living in the urban area.

Table 4 shows data on the influence of oral health according to gender, presence of caries, tooth loss, crowding and halitosis perceived in the students evaluated. The other variables did not present a statistically significant association with Oral Health Impact Profile (OHIP-14).

A statistically significant difference was found between genders in terms of oral health. Being female increased the chances of self-reported worse oral health by 2.8 times [OR 2.887 (CI 1.049-7.944)] in the physical pain dimension.

Considering the variable caries, the result was statistically significant in the psychological disability dimension (p=0.003). In the Mantel-Haenszel test, the chance of influence in adolescents with caries was 1.6 times higher (p=0.032 / OR 1.656 CI 1.042-2.632).

Tooth loss was the variable that presented the most statistically significant results in the following dimensions of the OHIP-14: psychological discomfort (p=0.026 OR 2.114 CI 1.080-4.135); physical disability (p=0.030 OR 4.453 CI 1.029-19.268); deficiency (p=0.019 OR 3.467 CI 1.150-10.457).

Adolescents with crowding presented statistically significant results in the psychological discomfort (p=0.002 OR 2.279 CI 1.352-3.840) and psychological disability (p=0.029 OR 2.068 CI 1.068-4.002) dimensions. When the Mantel-Haenszel test was applied, adolescents with crowding presented 1.9 times more chances of impact quality of life (p=0.004 OR 1.988 CI 1.233-3.206).

Adolescents who perceive halitosis were 2.1 times more likely to have an impact on quality of life in the psychological discomfort dimension [OR 2.147 (CI 1.149-4.013)].

Table 4 – Distribution of frequency of exposures regarding the prevalence of impact on quality of life by dimension in 387 adolescents aged 15 to 19 years in a municipality in southeastern Brazil.

	Gender				Halitosis			Caries			Tooth loss			Crowding		
	Male	Fem.	Sig.	OR	Presence	Sig.	OR	Presence	Sig.	OR	Presenc e	Sig	OR	Presence	Sig.	OR
Functional limitation	5 (3%)	6 (2.7%)	0.555	1.101 0.33 – 3.67	4 (6.9%)	0 66	3.407 0.965 – 12.035	3 (2.2%)	0.567	1.477 0.385 – 5.659	3 (6.3%)	0.1 29	2.758 0.706 – 10.779	5 (4.4%)	0.229	2.068 0.618 – 6.918
Physical pain	5 (3%)	18 (8.2%)	**0 33**	2.887 1.049 – 7.944	1 (1.7%)	0.144	4.085 0.54 – 30.911	10 (7.3%)	0.404	1.435 0.612 – 3.366	3 (6.3%)	0.9 23	1.063 0.304 – 3.722	8 (7.1%)	0.544	1.316 0.542 – 3.196
Psychological discomfort	29 (17.4)	46 (20.9%)	0.382	1.258 0.751 – 2.107	18 (31.5%)	**0 15**	2.147 1.149 – 4.013	30 (21.9%)	0.354	1.277 0.761 – 2.144	15 (31.3%)	**0 26**	2.114 1.08 – 4.135	33 (29.2%)	**0 2**	2.279 1.352 – 3.84
Physical disability	3 (1.8)	5 (2.3%)	0.744	1.271 0.299 – 5.397	0 (0%)	0.230	-	4 (2.9%)	0.383	1.85 0.455 – 7.515	3 (6.3%)	**0 30**	4.453 1.029 – 19.268	4 (3.5%)	0.191	2.477 0.609 – 10.082
Psychological disability	12 (7.2%)	29 (13.2%)	0 58	1.961 0.969 – 3.97	5 (8.6%)	0.596	1.302 0.489 – 3.47	23 (16.8%)	**0 3**	2.6 1.349 – 5.012	8 (16.7%)	0.1 44	1.855 0.801 – 4.295	18 (15.9%)	**0.029**	2.068 1.068 – 4.002
Social disability	4 (2.4%)	9 (4.1%)	0.359	1.738 – 5.744	0 (0%)	0.124	-	4 (2.9%)	0.722	1.242 0.375 – 4.109	1 (2.1%)	0.6 0	1.725 0.219 – 13.57	3 (2.7%)	0.621	1.389 0.375 – 5.144
Disability	6 (3.6%)	10 (4.5%)	0.641	1.278 0.455 – 3.589	1 (1.7%)	0.317	2.723 0.353 – 21.021	9 (6.6%)	0 75	2.441 0.888 – 6.706	5 (10.4%)	**0 19**	3.467 1.15 – 10.457	4 (3.5%)	0.7 6	1.248 0.039 – 3.955
Mantel Haenszel	-	-	0 62	1.56 0.976 – 2.491	-	-	-	-	**0 32**	1.656 1.042 – 2.632	-	0 61	1.821 0.966 – 3.434	-	**0 4**	1.988 1.233 – 3.206

Logistic regression models were adjusted for each dimension to control potential confounding factors. Table 5 shows data on the logistic regression of the influence of oral health on the life of adolescents. The explanatory variables of the outcome quality of life in adolescents were gender [OR 1.760 (1.078-2.875)], halitosis [OR 2.383 (1.405-4.041)] and crowding [OR 2.072 (1.262-3.401)].

Table 5 – Logistic regression of the impact of oral health on the quality of life of 387 adolescents aged 15 to 19 years in a municipality in southeastern Brazil.

Variables	B	p value	OR	Confidence Interval	
				WB	UL
Gender	0.565	**0.024**	1.76	1.078	2.875
Halitosis	0.868	**0.001**	2.383	1.405	4.041
Caries	0.395	0.117	1.484	0.906	2.43
Tooth loss	0.495	0.151	1.641	0.834	3.226
Crowding	0.728	**0.004**	2.072	1.262	3.401
Constant	1.011	0.022	0.364	-	-

4. DISCUSSION

Adolescence is a period of transition between childhood and adulthood, characterized by the impulses of physical, mental, emotional, sexual and social development. Moreover, in this period the individual also has to achieve the cultural expectations of the society. This phase of life is also characterized by different conflicts, insecurity, discoveries and intensity in the experience. This context of intensities can result in the neglect of health-related self-care measures, being considered a period of risk concerning oral health problems (Paredes, Leal Júnior, Paredes, Fernandes & Menezes, 2015).

This study evaluated the influence of factors related to oral health on the quality of life of adolescents. The influence of sociodemographic factors and the use of dental services on quality of life was also evaluated. The study shows that gender, halitosis, caries, tooth loss and crowding were associated with OHIP-14.

The investigation sought to represent adolescents enrolled in public schools of the state network in the urban and rural areas in the southeastern of Brazil. In each school, a simple random sample of students was selected and the response rate was 91.9%. The researchers frequently visited the schools and this fact can explain the high response rate obtained.

In Brazil, there are adolescents out of school and with significant school delay (Colussi et al., 2017), so this study cannot implicate representation for all adolescents. Also, private schools were not included due to the difficulty in getting authorization to execute the investigation. To reduce biases, especially those related to the instruments of data collection, they were explained in the classroom and then individually and all questions were clarified before collection.

In the last epidemiological survey of oral health conducted in Brazil (Brasil, 2012), adolescents aged 15 to 19 years old had at least one type of influence on quality of life related to oral conditions in 39.4% of the sample. Oral conditions such as caries presence, tooth loss, malocclusion, among others, negatively increased the impact on quality of life in these adolescents. Moreover, sociodemographic variables such as gender, skin color, schooling, and socioeconomic status, represented differences in the impact on the quality of life of less favored adolescent.

We used the frequency in general percentage and by dimension to present OHIP-14 data. Literature shows no consensus regarding to the best way of presenting these results. Some studies present the influence by mean and gravity (Colussi et al., 2017; Xavier et al., 2016). However, an approach similar to that of our study is also reported in the literature (Drachev, Brenn, & Trovik, 2018; Gonzales-Sullcahuamán, Ferreira, de Menezes, Paiva, & Fraiz, 2013; Miotto et al., 2019).

Another cross-sectional study with adolescents from the capital of the state of Espírito Santo observed that 26.2% reported a type of influence on quality of life due to oral conditions (Miotto et al., 2019), a similar frequency for both: for our study — that was conducted in a country city in the same state — the frequency was 26.4%; and for

another study — conducted in another country city in the Southern region of the country — the frequency was 27.4% (Dallé et al., 2019).

Oral problems are cumulative and worsen with aging, so this result can be considered quite expressive when compared with the results of other studies conducted in adults and older people who presented similar frequencies of 29%, (Bombarda-Nunes, Miotto, & Barcellos, 2008), 32.5% (Miotto, Almeida, & Barcellos, 2014) and 35%. (Miotto et al., 2012).

Psychological discomfort and psychological disability were the dimensions that most contributed to the overall OHIP-14 score, similar to that found in investigation with the same public (Gonzales-Sullcahuamán et al., 2013; Lima, Moimaz, Garbin, Sundefeld, & Saliba, 2016; Miotto et al., 2019; Paredes et al., 2015; Xavier et al., 2016).

The psychological discomfort dimension refers to concerns or nervousness regarding oral health conditions, so the most expressive of these domains suggests that the adolescents have concerns regarding their oral health status and its possible consequence (Xavier et al., 2016). In the psychological disability dimension, aspects related to difficulty in relaxing and shame related to oral condition evidence the social impact that oral problems can cause on the adolescent.

Socioeconomic status has been reported as an important predictor of impact on Oral health-related quality of life (OHRQoL). Worse indicators of average income in the school neighborhood, family income and maternal education are associated with greater impacts on OHRQoL in adolescents over time (Sfreddo, Moreira, Nicolau, Ortiz, & Ardenghi, 2019).

The residence area is a constitutive dimension of the oral health situation of social groups. Brazilian rural areas have the worst income, basic sanitation and educational level indicators. Thus, these areas can configure an important concentration pole for oral health disorders (Cavalcanti, Gaspar, & de Goes, 2012). However, in this study, adolescents living in the rural area had less impact of oral health on quality of life.

Individuals presenting similar social profiles (income, education, gender, age group, skin color, among others) may have different levels of oral health, depending on their place of residence and the attributes of this place (Moreira, Nico, & Tomita, 2007).

The rural area studied has agricultural production as its main source of income, besides presenting almost zero indicators of violence and having a satisfactory health care network with a family health strategy team and oral health for more than 15 years working in the community. Public policies are essential to facilitate access to dental care and should focus on the guidance and counseling of its users, in addition to providing prevention and early treatment measures to improve oral health status and the quality of life for adolescents living in rural areas (Roque, Magnani, Paiva, & Abreu, 2021).

Thus, it is not possible to infer a worsening condition of live to the residents of rural areas. Hence, studies should conduct qualitative investigation to verify the existence of

cohesion in the community, social and family support network, which are important attributes for people's better living conditions.

The caries index in Brazil has reduced. According to the WHO classification, the country had a low rate in 2010, 2.1 (BRASIL, 2012). The adolescents participating in the investigation had a DMFT of 2.08, lower than the same age group in the last survey conducted in Brazil in 2010, which had a DMFT index of 4.2. The lowest rates are found in the South and Southeast regions, which may explain such a difference considering the inequalities found in the regions of the country. Moreover, these studies have a difference of almost 10 years, reinforcing the tendency of reducing this index.

The presence of caries is associated with decreased quality of life related to oral health in adolescents. The chance of impact in adolescents with caries experience was 1.6 times higher than in those without the disease.

Another aspect little addressed in adolescence is the impact of tooth loss and issues involving aesthetics and appearance on quality of life. Most studies addressing tooth loss in adolescents do not include the assessment of its impact on quality of life.

The results of our study show that tooth loss negatively impacts the students' quality of life, especially in the psychological discomfort; physical disability; and deficiency dimensions. A similar study also indicates that psychological issues and physical limitations have important consequences on quality of life as well as a dental mutilation in age (Xavier et al., 2016). Different results were found in other study indicating that caries, tooth loss, self-perceived oral health and issues related to appearance and aesthetics were not associated with OHIP-14 scores (Colussi et al., 2017).

Less than half of the adolescents reported seeking for dental services regularly. A study conducted with academics in the South of the country found a similar prevalence of 45% of regular use and showed an association with socioeconomic class, indicating that the poorest individuals — usually those who need it the most — use dental service less (Echeverria, Silva, Agostini, Schuch, & Demarco, 2020). This reinforces the need to stimulate the habit of dental care and periodic visits to the dentist, especially in this phase of life on which oral health care is overlooked.

Unlike other studies (dos Santos, Silva, Souza, Alves, & Sarmento, 2021; Marinho, Martins, Bittencourt, Martins, & Bendo, 2019), dental trauma did not present statistically significant results in the impact of OHRQoL. The involvement of the anterior teeth due to oral problems, such as dental trauma, can exert a great influence on the perception of OHRQoL of adolescents. More severe trauma affecting dentin and/or pulp can lead to greater impacts, including difficulty in feeding and sanitizing the mouth, as well as emotional and socializing problems (Marinho et al., 2019). However, the prevalence of trauma was low and the most common type was trauma involving enamel, which brings lower aesthetic and social consequences to those involved, and may explain the lack of association.

In the analysis of logistic regression, caries and tooth loss did not present statistically significant results, agreeing with another study (Colussi et al., 2017). The variables that

really explained the outcome quality of life in adolescents were gender, halitosis and crowding.

Females had a greater influence of the oral condition on quality of life, with an important result in the physical pain dimension. This was evidenced in several studies (Drachev et al., 2018; Maia, Mendes, & Normando, 2018; Maria et al., 2017; Miotto et al., 2019), including an investigation conducted in the rural area (Roque et al., 2021). Several reasons have been proposed to explain this difference, including more marked pubertal physiological changes, hormonal imbalance and different adaptation mechanisms between the genders (Maria et al., 2017), suggesting a greater sensitivity to negative impacts on females.

Among the bad occlusions evaluated, crowding influenced the quality of life of adolescents on psychological discomfort and psychological disability dimensions. Crowding can affect the anterior tooth and is more easily perceived, which may generate aesthetic discomfort, especially in adolescents.

Studies conducted in other countries and in Brazil found significant results of the impact of bad occlusions on quality of life in adolescents and adults (Masood et al., 2017; Sierwald et al., 2015; da Rosa et al., 2016). This negative impact is probably related to dental and/or skeletal aesthetic involvement caused on the individual's face. An altered smile or unfavorable facial appearance can cause psychological discomfort in adolescents affected by malocclusion, inhibiting them from maintaining social interactions (Roque et al., 2021).

For other types of bad occlusions, impact on quality of life related to oral health apparently is not observed, corroborating other studies (Colussi et al., 2017; Miotto et al., 2019). Maybe the severity of bad occlusions was not evaluated, and it could explain these findings, since studies indicated that the increase in severity of bad occlusions is related to the increased impact on quality of life related to oral health (da Rosa et al., 2016; Siluvai et al., 2015). Moreover, adolescents can psychologically adapt to their morphological condition, especially because the development of malocclusion is a slow process. Furthermore, daily activities seem to be more affected by psychological characteristics than dentofacial appearance (Dallé et al., 2019).

The 22.5% frequency of perceived halitosis was lower than that reported in other studies (Lopes et al., 2016; Miotto et al., 2019). In the analysis of measured halitosis, this percentage was even lower, 15%. Moreover, the social impact of halitosis is profound even for adolescents, harming social and professional life (Colussi et al., 2017).

In this study, adolescents who perceived halitosis were more likely to have an impact on quality of life in the psychological discomfort dimension. A study conducted in the South of the country found expressive results of halitosis as a factor associated with a greater impact on quality of life (Colussi et al., 2017). In another study, self-reported halitosis was the variable with the greatest impact on quality of life (Miotto et al., 2019). Adolescent health needs the attention from health services since it is a critical stage of life in which behavioral transformations physical, psychosocial and emotional occur, generating internal conflicts.

5. CONCLUSIONES

Researchers should further study the impact of oral conditions on quality of life in adolescents in Brazil and execute qualitative investigation.

Studies must analyze and understood such impacts to reduce psychological, emotional and social consequences, since appearance and social interaction are highly valued in adolescents and can negatively interfere in their lives.

Bibliografía

- Bombarda-Nunes, F. de F., Miotto, M. H. M. de B., & Barcellos, L. A. (2008). Autopercepção de Saúde Bucal do Agente Comunitário de Saúde de Vitória, ES, Brasil. *Pesquisa Brasileira Em Odontopediatria e Clínica Integrada*, *8*(1), 7–14. https://doi.org/10.4034/1519.0501.2008.0081.0003

- Brasil. (2012). *Pesquisa Nacional de Saúde Bucal. Ministério da Saúde.Biblioteca Virtual em Saúde do Ministério da Saúde Resultados Principais*. https://doi.org/10.3310/hta21210

- Cavalcanti, R. P., Gaspar, G. da S., & de Goes, P. S. A. (2012). Utilização e acesso aos serviços de saúde bucal do SUS -uma comparação entre populações rurais e urbanas. *Pesquisa Brasileira Em Odontopediatria e Clinica Integrada*, *12*(1), 121–126. https://doi.org/10.4034/PBOCI.2012.121.19

- Colussi, P. R. G., Hugo, F. N., Muniz, F. W. M. G., & Rösing, C. K. (2017). Oral health-related quality of life and associated factors in Brazilian adolescents. *Brazilian Dental Journal*, *28*(1), 113–120. https://doi.org/10.1590/0103-6440201701098

- Corso, P. F. C. de L., Oliveira, F. A. C. de, Costa, D. J. da, Kluppel, L. E., Rebellato, N. L. B., & Scariot, R. (2016). Evaluation of the impact of orthognathic surgery on quality of life. *Braz. Oral Res. (Online)*, *30*(1), e4–e4. Retrieved from http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1806-83242016000100205

- da Rosa, G. N., Del Fabro, J. P., Tomazoni, F., Tuchtenhagen, S., Alves, L. S., & Ardenghi, T. M. (2016). Association of malocclusion, happiness, and oral health-related quality of life (OHRQoL) in schoolchildren. *Journal of Public Health Dentistry*, *76*(2), 85–90. https://doi.org/10.1111/jphd.12111

- Dallé, H., Vedovello, S. A. S., Degan, V. V., De Godoi, A. P. T., Custódio, W., & de Menezes, C. C. (2019). Malocclusion, facial and psychological predictors of quality of life in adolescents. *Community Dental Health*, *36*(4), 298–302. https://doi.org/10.1922/CDH_4633Dalle05

- de Paula, J. S., Sarracini, K. L. M., Meneghim, M. C., Pereira, A. C., Ortega, E. M. M., Martins, N. S., & Mialhe, F. L. (2015). Longitudinal evaluation of the impact of dental caries treatment on oral health-related quality of life among schoolchildren. *European Journal of Oral Sciences*, *123*(3), 173–178. https://doi.org/10.1111/eos.12188

- dos Santos, J. F. D., Silva, L. R. de M., Souza, E. R. L. de, Alves, N. M., & Sarmento, T. C. de A. P. (2021). Influência do traumatismo dentário na qualidade de vida de crianças de 8 a 10 anos do município de Patos – PB, Brasil. *ARCHIVES OF HEALTH INVESTIGATION*, *10*(2), 241–247. https://doi.org/10.21270/archi.v10i2.4857

- Drachev, S. N., Brenn, T., & Trovik, T. A. (2018). Oral Health-Related Quality of Life in Young Adults: A Survey of Russian Undergraduate Students. *International Journal of Environmental Research and Public Health*, *15*(4). https://doi.org/10.3390/ijerph15040719

- Echeverria, M. S., Silva, A. E. R., Agostini, B. A., Schuch, H. S., & Demarco, F. F. (2020). Regular use of dental services among university students in southern Brazil. *Revista de Saúde Pública*, *54*, 85. https://doi.org/10.11606/s1518-8787.2020054001935

- Gonzales-Sullcahuamán, J. A., Ferreira, F. M., de Menezes, J. V., Paiva, S. M., & Fraiz, F. C. (2013). Oral health-related quality of life among Brazilian dental students. *Acta Odontológica Latinoamericana : AOL*, *26*(2), 76–83.

- Lima, D. P., Moimaz, S. A. S., Garbin, C. A. S., Sundefeld, M. L. M. M., & Saliba, T. A. (2016). Impacto da saúde bucal na qualidade de vida de adolescentes grávidas. *ARCHIVES OF HEALTH INVESTIGATION*, *5*(6), 318–324. https://doi.org/10.21270/archi.v5i6.1715

- Lopes, M. H., Rösing, C. K., Colussi, P. R. G., Muniz, F. W. M., & Linden, M. S. (2016). Prevalence of self-reported halitosis and associated factors in adolescents from Southern Brazil. *Acta Odontologica Latinoamericana : AOL*, *29*(2), 93–103.

- Maia, C. de V. R., Mendes, F. M., & Normando, D. (2018). The impact of oral health on quality of life of urban and riverine populations of the Amazon: A multilevel analysis. *PLoS ONE*, *13*(11). https://doi.org/10.1371/journal.pone.0208096

- Maria, A. T., Guimarães, C., Candeias, I., Almeida, S., Figueiredo, C., Pinheiro, A., Martins, S. (2017). Qualidade de vida relacionada com a saúde em crianças e adolescentes portugueses: estudo numa população escolar. *Acta Pediátrica Portuguesa*, *48*(3). https://doi.org/10.21069/app.2017.8088

- Marinho, C. S., Martins, L. P., Bittencourt, J. M., Martins, S., & Bendo, C. B. (2019). Impacto do traumatismo dentário na qualidade de vida de crianças, adolescentes e suas famílias: revisão crítica da literatura. *Arq Odontol*, *55*(e08), 1–12.

- Masood, M., Suominen, A. L., Pietila, T., & Lahti, S. (2017). Malocclusion traits and oral health-related quality of life in Finnish adults. *Community Dentistry and Oral Epidemiology*, *45*(2), 178–188. https://doi.org/10.1111/cdoe.12276

- Miotto, M. H. M. de B., Almeida, C. S., & Barcellos, L. A. (2014). Impacto das condições bucais na qualidade de vida em servidores públicos municipais. *Ciencia e Saude Coletiva*, *19*(9), 3931–3940. https://doi.org/10.1590/1413-81232014199.12912013

- Miotto, M. H. M. de B., Barcellos, L. A., & Velten, D. B. (2012). Avaliação do impacto na qualidade de vida causado por problemas bucais na população adulta e idosa em município da Região Sudeste Evaluation of the impact on quality of life caused by oral health problems in adults and the elderly in a southeastern Brazil. *Ciência & Saúde Coletiva*, *17*(2). https://doi.org/10.1590/S1413-81232012000200014

- Miotto, M. H. M. de B., Benevides, J. J., Postiglione, L. R. F., Dessaune, D. S. S., Calmon, M. V., & Zandonade, E. (2019). Impact produced by oral disorders on the quality of life of Brazilian adolescents. *Pesquisa Brasileira Em Odontopediatria e Clinica Integrada*, *19*(1). https://doi.org/10.4034/PBOCI.2019.191.140

- Moreira, R. D. S., Nico, L. S., & Tomita, N. E. (2007). A relação entre o espaço e a saúde bucal coletiva: Por uma epidemiologia georreferenciada. *Ciencia e Saude Coletiva*, *12*(1), 275–284. https://doi.org/10.1590/S1413-81232007000100032

- Paredes, S. de O., Leal Júnior, O. de S., Paredes, A. de O., Fernandes, J. M. F. de A., & Menezes, V. A. (2015). Oral Health Influence on the Quality of Life of School Adolescents. *Rev Bras Promoç Saúde*, *28*(2), 266–273 https://doi.org/10.5020/18061230.2015.p266.

- Roque, T. V., Magnani, I. Q., Paiva, S. M., & Abreu, L. G. (2021). Acta odontologica latinoamericana. *Acta Odontol Latinoam*, *34*(1), 81–87 https://doi.org/10.54589/aol.34/1/081.

- Sfreddo, C. S., Moreira, C. H. C., Nicolau, B., Ortiz, F. R., & Ardenghi, T. M. (2019). Socioeconomic inequalities in oral health-related quality of life in adolescents: a cohort study. *Quality of Life Research*, *28*(9), 2491–2500. https://doi.org/10.1007/s11136-019-02229-2

- Sierwald, I., John, M. T., Schierz, O., Jost-Brinkmann, P. G., & Reissmann, D. R. (2015). Zusammenhang von Overjet und Overbite mit ästhetischen Beeinträchtigungen der mundgesundheitsbezogenen Lebensqualität. *Journal of Orofacial Orthopedics*, *76*(5), 405–420. https://doi.org/10.1007/s00056-015-0300-x

- Siluvai, S., Kshetrimayum, N., Reddy, C. V. K., Siddanna, S., Manjunath, M., & Rudraswamy, S. (2015). Malocclusion and related quality of life among 13- to 19-year-old students in mysore city - a cross-sectional study. *Oral Health & Preventive Dentistry*, *13*(2), 135–13541. https://doi.org/10.3290/j.ohpd.a32339

- Silveira, M. F., De Pinho, L., & Brito, M. F. S. F. (2019). Validity and reliability of the oral health impact profile instrument (OHIP-14) in adolescents. *Paideia*, *29*. https://doi.org/10.1590/1982-4327e2921

- Slade, G. D. (1997). Derivation and validation of a short-form oral health impact profile. *Community Dentistry and Oral Epidemiology*, *25*(4), 284–290 https://doi.org/10.1111/j.1600-0528.1997.tb00941.x

- Slade, G. D., & Spencer, A. J. (1994). Development and evaluation of the Oral Health Impact Profile. *Community Dental Health*. https://doi.org/10.1111/ger.12124

- Xavier, A., de Carvalho, É. S., Bastos, R. da S., Caldana, M. de L., Damiance, P. R. M., & Bastos, J. R. de M. (2016). Impact of dental caries on quality of life of adolescents according to access to oral health services: A cross sectional study. *Brazilian Journal of Oral Sciences*, *15*(1), 1–7. https://doi.org/10.20396/bjos.v15i1.8647090