ORIGINAL ARTICLE

Impact Produced by Oral Disorders on the Quality of Life of Brazilian Adolescents

Maria Helena Monteiro de Barros Miotto[1], Jefferson José Benevides[2], Luana Renata Fernandes Postiglione[3], Debora Starling Santos Dessaune[4], Marcela Vieira Calmon[5], Eliana Zandonade[6]

[1]Department of Dental Clinic, School of Dentistry, Federal University of Espírito Santo, Vitória, ES, Brazil. 0000-0002-3227-7608

[2]Institute of Orthodontic Studies of São Paulo, São Paulo, SP, Brazil. 0000-0001-6880-074X

[3]Institute of Orthodontic Studies of São Paulo, São Paulo, SP, Brazil. 0000-0002-8404-1453

[4]Institute of Orthodontic Studies of São Paulo, São Paulo, SP, Brazil. 0000-0002-5106-9935

[5]Postgraduate Program in Public Health, Center for Health Sciences, Federal University of Espírito Santo, Vitória, ES, Brazil. 0000-0001-5936-7534

[6]Postgraduate Program in Public Health, Center for Health Sciences, Federal University of Espírito Santo, Vitória, ES, Brazil. 0000-0001-5160-3280

Author to whom correspondence should be addressed: Marcela Vieira Calmon, Health Sciences Center, Federal University of Espírito Santo, Av. Mal. Campos, 1468, Maruípe, Vitória, ES, Brazil. 29040-090. Phone: +55 27 98122-0302. E-mail: marcelavcalmon@gmail.com.

Abstract

Objective: To verify the impact produced by oral disorders on the quality of life of adolescents. **Material and Methods:** This is a cross-sectional study with a random sample of 680 individuals aged 15-19 years from public schools of Vitória, Brazil. The impact was assessed using the Oral Health Impact Profile (OHIP 14). Data were descriptively analyzed and then univariate analyses were performed with the Chi-square test and Fischer's exact test. The Mantel-Haenzsel test was used to evaluate the effects of the combined dimensions and Odds Ratio to evaluate the strength of the association. Logistic regression models were adjusted for each OHIP dimension. **Results:** The impact on the quality of life was 26.2%, more frequently in the psychological discomfort dimension. The highest perception of impact was in female subjects, in physical pain (p=0.009, OR=1.998) and psychological discomfort dimensions (p=0.050, OR=1.495). In variable maternal education, children of mothers with only complete elementary education are 1.6 times more likely to have an impact on the quality of life in the psychological discomfort dimension (OR=1.6 95% CI=1.037, 2.474). Halitosis was the independent variable with the highest frequency of impact in the combined Mantel-Haenszel test, and OR was found to be 2.81 (95% CI=1.670, 3.366) for individuals who perceive halitosis. In the logistic regression analysis in the seven OHIP dimensions, the results confirm that the variables that explain impact are gender (p=0.035, OR = 1.502) and halitosis (p<0.001, OR=2.365). **Conclusion:** Oral health problems significantly affect the quality of life of adolescents and that subjective indicators are important tools to determine the need for treatment, improving oral health and quality of life of this population.

Keywords: Quality of Life; Oral Health; Malocclusion; Adolescent Health.

Introduction

Adolescence is a period of transition between childhood and adulthood, characterized by the impulses of physical, mental, emotional, sexual and social development, as well as the need of adolescents to reach the goals related to cultural expectations of society in which they live [1,2]. This phase of development is characterized by various conflicts, insecurities, discoveries and experience intensity, with affective and sexual involvement and stronger physical contact.

In this context, neglect of self-care measures may occur, thus being considered a period of risk concerning to oral health problems [2,3]. Among so many oral disorders, studies on halitosis and malocclusions stand out. Halitosis has a strong social impact and interferes with the quality of life and is an important indicator of systemic diseases [4]. Malocclusions also have a negative social impact due to their association with aesthetic and functional limitations [5].

Quality of life can be negatively impacted when a person loses the ability to promote daily activities, thus being a broad and subjective concept that involves several physical, mental or functional, psychological and social well-being dimensions [6,7].

Oral epidemiology has used clinical indicators to decide the type of treatment of individuals taking into account their socio-psychic aspects that had been previously ignored [8]. In dentistry, recent efforts have been invested in developing indicators that go beyond traditional oral health measures used to point out the social and psychological consequences of oral diseases.

The creation of indicators that relate oral problems with the quality of life arose from the need to know the subjectively perceived health condition or the impact of oral health problems on quality of life. In this context, the Oral Health Impact Profile (OHIP) was developed as a safe and validated instrument to assess individuals' perceptions of the social impact of oral disorders, bringing potential benefits to clinical decisions and research [9].

Thus, knowing which oral disorders have the greatest impact on the quality of life of Brazilian adolescents may help in the creation of public policies to improve this reality. The present study evaluated the impact of oral disorders assessed by OHIP-14 on the quality of life of adolescents aged 15-19 years in the city of Vitória, Brazil.

Material and Methods

Study Design

A cross-sectional study was conducted with adolescents aged 15-19 years in public schools of the city of Vitória, Espírito Santo, Brazil.

Population and Sample

The city of Vitória has 13 urban public high schools, totaling 10,800 students enrolled in the age group of 15-19 years. The sample size calculation was based on a 95% confidence level, 4% margin of error, and 50% expected prevalence. This prevalence was used to maximize the sample, as the database was used in other studies. The estimated sample was 568 individuals and to compensate for possible losses, 20% were added to this number, resulting in a sample of 680 individuals.

Data Collection

The proportion of students enrolled in the thirteen schools was maintained; however, four schools would participate with less than 30 students and were therefore eliminated from the survey. Sampling was random, giving equal opportunity to all individuals to participate in the research. Participants were drawn from each class attendance list as follows: if the class has 30 students and ten students are required to participate in the survey, they were invited every three breaks, for example, the third student, then the sixth, then the ninth student on the list, and so on. As a substitution criterion due to the possibility of absence or not accepting to participate in the research, another individual of the same age and gender was chosen according to the following criteria: to be from the same class of the student previously drawn and following the draw, for example, the fourth student, if he/she does not meet the inclusion criterion, the fifth, and so on.

Inclusion criteria were students regularly enrolled in public high schools of Vitória; and were in good general health. Adolescents with oral health problems such as total or partial agenesia were excluded from the sample and in current or past orthodontic treatment. This was necessary because the research evaluated malocclusions and patients undergoing orthodontic treatment or toothless could interfere with results.

As the dependent variable, we used the OHIP scores in its reduced version, OHIP-14, in the seven dimensions of the impact of oral problems on quality of life: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and deficiency. This script aimed to evaluate the perception of respondents about impacts produced by oral health conditions on quality of life. OHIP assesses impairments and three dimensions of functional conditions (social, psychological and physical). Participants were asked to answer questions about how often they experience each problem over a given period (12 months). For coding OHIP responses, a Likert-type scale was used, which addresses the experienced frequency of impact into five questions: 0-never, 1-rarely, 2-sometimes, 3-repeatedly, 4-always.

In this study, we chose to use the method of expressing OHIP results in a dichotomous way: with impact (always and repeatedly) and no impact (sometimes, rarely and never). Independent variables were sociodemographic conditions, such as age, gender, socioeconomic status (CSE), maternal education; oral conditions such as malocclusion and halitosis; and use of dental services in the last 12 months.

Three more structured interview scripts were used, one script for the selection of participants, with information to identify individuals regarding inclusion criteria, considering age, gender and address. The second script with demographic characteristics to categorize the respondent's life situation through variables maternal education and CSE, which was categorized according to the possession of consumer goods and education of the head of household - class A, B, C, D and E - through the Brazil Economic Classification Criterion [10].

The third script was used for collecting information on the presence of malocclusion and the use of oral health services in the last 12 months. This type of information enables verifying the

degree of oral health service coverage and the perceived impacts according to the type of dental practice.

Malocclusion was assessed dichotomously, yes or no, indicating the presence of malocclusion in cases of an open bite, crossbite, crowding, diastema, overbite, among others, or absence. To define malocclusions, the following criteria were used: open bite - was considered when a 3 mm thick wooden toothpick was not seized by the patient when occluding the teeth; posterior crossbite - was recorded when two or more posterior teeth, including canines, had an occlusal problem in which the buccal cusps of the upper teeth occluded lingually in relation to the buccal cusps of the lower teeth; diastema - lack of lateral contact between anterior teeth; overbite - adolescents were asked to place their teeth in centric occlusion and overlapping of the upper anterior teeth over the lower teeth was observed as normal when incisal surfaces of the lower central incisors with contact on the palatal surfaces of the upper central incisors; deep bite - when incisal surfaces of lower central incisors touch the palate; crowding - considered absent when jaw and mandible are fully aligned and present in the maxilla and / or mandible when misalignment occurs.

A halitosis questionnaire was also applied, answered by each student without guidance from examiners to evaluate the participants' knowledge and perception of this variable. The question was about their perception about the presence or not of halitosis (dichotomous - yes / no).

In the collection of clinical data, examinations were performed in a single session and by a single examiner for each participant within the school environment. For this purpose, artificial light and natural light were used when possible, and volunteers should sit in chairs in an upright position facing the examiner. Intraoral clinical examinations were performed with the aid of disposable tongue-lowering spatula.

Statistical Analysis

Descriptive analysis was performed with absolute and relative frequency. Then, univariate analyses were conducted using Chi-square and Fischer's exact Tests. The Mantel-Haenzsel test was used to evaluate the effects of combined dimensions and odds ratio to assess the strength of the association. Logistic regressions were performed to verify which variables had the greatest influence on the perception of the impact of oral conditions on quality of life. The factors that remained associated with a level of $p \leq 0.05$ were kept in models at 95% confidence intervals.

Ethical Aspects

All ethical principles of this study were respected and study participants signed an informed consent form. This research project was approved by the Research Ethics Committee of the Health Sciences Center of the Federal University of Espírito Santo under registration number 172/2011.

Results

The final sample comprised a total of 656 individuals with a loss of 3.5%, which did not bring impairments to the study. Among participants, most were female (59.8%) and 264 male (40.2%), most of them aged 15-16 years (53%) and the remaining (47%) 17-19 years. Regarding socioeconomic class, 57.8% were from classes C, D and E and 42.2% from classes A and B. The maternal educational level of most participants is complete high school (39.5%), followed by 49.7% who had completed elementary school and only 10.8% had completed higher education.

Most of the students visited the dentist in the last 12 months (58.4%), suggesting that they had access to some type of dental care. Regarding the perception of oral condition, 43% reported having a halitosis problem, while a large number of adolescents (82.3%) were diagnosed with some occlusal disorder (Table 1).

Table 1. Perception and clinical evaluation of the oral health of students.

Variables	N	%
Went to the dentist in the last 12 months		
Yes	383	58.4
No	273	41.6
Halitosis		
Yes	282	43.0
No	374	57.0
Malocclusion		
Yes	540	82.3
No	116	17.7

When analyzing impact through OHIP in its seven dimensions, it was observed that the frequency of impact of oral health on the quality of life of adolescents was 26.2%. Of the seven OHIP dimensions, the highest frequency of impact was observed in the psychological discomfort dimension (16.2%) (Table 2).

Table 2. Frequency of impact by OHIP dimension of students.

Dimension	With Impact		Without Impact	
	N	%	N	%
Functional Limitation	25	3.8	631	96.2
Physical Pain	68	10.4	588	89.6
Psychological Discomfort	106	16.2	550	83.8
Physical Disability	30	4.6	626	95.4
Psychological Disability	99	15.1	557	84.9
Social Disability	39	5.9	617	94.1
Deficiency	21	3.2	635	96.8
Overall Score	172	26.2	484	73.8

Analyzing variable gender, the result obtained was statistically significant, and the female gender presented a higher frequency of impact on the OHIP dimensions compared to the male gender, especially in the Physical Pain dimension (p=0.009, OR=1.998) and in the psychological discomfort dimension (p=0.050, OR=1.495). In the Mantel-Haenszel test, OR was 1.456 (95% CI=1.012; 2.096) for female participants (Table 3).

When assessing maternal educational variable, it was observed that children of mothers with only complete elementary school are 1.6 more likely to have an impact on the quality of life in the psychological discomfort dimension (OR=1.6; 95% CI=1.037; 2.474).

Table 3. Frequency of impact, by dimension, by gender of students.

Dimension	Male		Female		p-value	OR (95% CI)
	N	%	N	%		
Functional Limitation						
With Impact	8	3.0	17	4.3	0.261	1.451
No Impact	256	97.0	375	95.7		0.617 − 3.412
Physical Pain						
No Impact	18	6.8	50	12.8	0.009	1.998
No Impact	246	93.2	342	87.2		1.138 − 3.509
Psychological Discomfort						
With Impact	38	14.4	68	17.3	0.184	1.248
No Impact	226	85.6	324	82.7		0.811 − 1.922
Physical Disability						
With Impact	8	3.0	22	5.6	0.085	1.903
No Impact	256	97.0	370	94.4		0.834 − 4.341
Psychological Disability						
With Impact	32	12.1	67	17.1	0.056	1.495
No Impact	232	87.9	325	82.9		0.950 − 2.000
Social Disability						
With Impact	16	6.1	23	5.9	0.522	1.035
No Impact	248	93.9	369	94.1		0.536 − 2.000
Deficiency						
With Impact	8	3.0	13	3.3	0.514	1.098
No Impact	256	97.0	379	96.7		0.449 − 2.686
Mantel-Haenszel					0.026	1.456 (1.012 − 2.096)

Analyzing socioeconomic condition, age and dental visit in the last 12 months, the differences found were not statistically significant, i.e., variables cannot be considered as explanatory factors for impact in this study.

Among variables studied, halitosis presented the highest frequency of impact on the quality of life, which was statistically significant in practically all OHIP dimensions, except for the deficiency dimension. Psychological discomfort (p<0.001; OR=2.677) and social disability dimensions (p<0.001; OR=4.172) are highlighted, in which the results were quite relevant, showing that halitosis interferes with adolescents' well-being. In the combined Mantel-Haenszel test, OR of 2.381 (95% CI = 1.670; 3.396) was found for individuals who perceive halitosis, i.e., these adolescents are 2.3 times more likely of having an impact when compared to those who do not (Table 4).

Table 4. Frequency of impact, by dimension, according to halitosis in students.

Dimension	With Halitosis		No Halitosis		p-value	OR (95% CI)
	N	%	N	%		
Functional Limitation						
With Impact	17	6.0	8	2.1	0.009	2.935
No Impact	265	94.0	366	97.9		1.248 − 6.902

Physical Pain						
With Impact	40	14.2	28	7.5	0.004	2.043
No Impact	242	85.8	346	92.5		$1.226 - 3.402$
Psychological Discomfort						
With Impact	67	23.8	39	10.4	<0.001	2.677
No Impact	215	76.2	335	89.6		$1.741 - 4.116$
Physical Disability						
With Impact	21	7.4	9	2.4	0.002	3.263
No Impact	261	92.6	365	97.6		$1.471 - 7.239$
Psychological Disability						
With Impact	56	19.9	43	11.5	0.002	1.907
No Impact	226	80.1	331	88.5		$1.238 - 2.938$
Social Disability						
With Impact	29	10.3	10	2.7	<0.001	4.172
No Impact	253	89.7	364	97.3		$1.998 - 8.714$
Deficiency						
With Impact	13	4.6	8	2.1	0.061	2.211
No Impact	269	95.4	366	97.9		$0.904 - 5.409$
Mantel-Haenszel					<0.001	$2.381 (1.670 - 3.396)$

The results found by dichotomously analyzing the malocclusion variable showed that it could not be considered a predictor of impact on adolescents' quality of life since no significance level below 0.05 ($p<0.05$) was observed.

Logistic regression analysis was performed for impacts on the seven OHIP dimensions. The results show that among variables that explain impact are gender ($p=0.035$, OR=1.502) and halitosis ($p<0.001$, OR=2.365). When analyzed OHIP dimensions separately, it was observed that halitosis is the variable of highest prediction of OR impact of 2.365 (95% CI=1.647; 3.397), being statistically significant in practically all dimensions except the deficiency dimension, while malocclusion variable did not show prediction for impact in any of the seven OHIP dimensions (Table 5).

Table 5. Logistic regression result for impact.

Parameters	B	S.E.	Sig.	OR	OR (95% CI)	
					Lower	Upper
Gender	0.407	0.193	0.035	1.502	1.029	2.191
Age	0.002	0.071	0.982	1.002	0.872	1.151
Maternal Education	0.011	0.088	0.901	1.011	0.852	1.200
CSE	0.008	0.016	0.600	1.008	0.977	1.041
Dentist Visit	-0.063	0.189	0.740	0.939	0.648	1.361
Halitosis	0.861	0.185	0.000	2.365	1.647	3.397
Malocclusion	0.450	0.259	0.083	1.568	0.944	2.606
Constant	0.819	1.330	0.538	2.268	-	-

Discussion

Most oral problems are not life-threatening, being composed of acute and readily treatable episodes. Thus, their impacts on well-being may not be obvious and often minimized by the context of other more serious chronic conditions. It is increasingly recognized that patients' perceptions of oral condition are important in assessing oral health needs and determining treatments in oral health care, as well as health promotion activities and programs.

The treatment decision is determined through objective findings and subjective symptom experiences. OHIP allows an effective reflection of subjective experiences associated with oral health and the perception of health and disease experience. Therefore, it is the most widely used instrument to assess the adverse impact caused by oral conditions on people's well-being and quality of life. The use of an indicator such as OHIP 14 may be useful for the planning of dental services, prioritizing the care of people with a high prevalence of impacts [11].

In this research, it was observed that 26.2% of adolescents reported an impact on the quality of life due to oral conditions. For the study population composed of adolescents, this result can be considered quite expressive, especially when compared with identical studies with adults and elderly who presented similar results in Espírito Santo, Brazil, 35% [11], 29% [12]; 32.5% [13], because oral problems are cumulative and worsen with age as evidenced in the latest report of the national oral health survey conducted by the Ministry of Health (Brazil) [14,15]. It was observed that consistent conclusions had not been found in the literature on this issue due to its multidimensional complexity of subjective nature.

Results of low impact intensity have been reported in several studies. According to research conducted on patients over 50 years of age in the city of Araraquara, Brazil, an average of 4.98 impacts of oral health on the quality of life of patients was found [16]. In another study, which evaluated the impact of oral health conditions on the quality of life of workers at the Federal University of Juiz de Fora, Brazil, the average found was 4.55 [17]. A study that evaluated the association between the impact of oral disorders on its physical / psychosocial dimensions and the quality of life of older adults from Montes Claros, Brazil, found a 20% prevalence of impact measured by OHIP [7]. According to analysis carried out with 184 adolescents from the city of Sumé, Brazil, the impact was considered weak in 90.8% of participants [2].

In contrast, a study of 301 adolescents from public schools of Goiania, Brazil, found higher scores, with 88% of adolescents being impacted in at least one OHIP dimension [18], showing that oral problems can be major influencers of negative impact on the quality of life for both aesthetic and functional reasons.

The dimensions that most contributed to OHIP general score were "psychological discomfort", "psychological disability" and "physical pain". This result corroborates others obtained from similar populations [2,19], as well as in distinct populations, in working adults [17].

The present study identified a higher percentage of females, according to several studies that present this predominance among adolescents [2,20-22]. In addition, the gender variable was statistically significant, showing greater impact, especially on the physical pain dimension. The high impact rate in females is also evidenced in the results of other studies [23,24], showing greater concern of women with health and self-esteem compared to men [19].

Most studies cited refer to adults, elderly, or in different age groups, which made it difficult to compare results related to age. This variable was not statistically significant. Further studies using OHIP in the age group of 15-19 years should be carried out to facilitate comparisons,

considering that this is a critical phase of self-perception and search for self-esteem and concern for social well-being.

Regarding socioeconomic status, this condition was categorized into two groups to facilitate data analysis, but this analysis may have been hampered by the fact that most participants are from class C, followed by class B, and the prevalence of class A, D and E to is practically null, corroborating other studies [19,23]. Given that the sample was obtained from public schools in the city of Vitória, Brazil, this result was expected, but cannot be considered an explanatory factor for the impact found in this study. This is in contrast to most studies using OHIP, in which individuals from lower economic classes declare the impaired quality of life produced by oral conditions [13].

Importantly, although studies point in the same direction, comparability is limited by the various cutoffs and the use of various social class indicators. It could be considered a study limitation the fact that maternal education had been answered by adolescents; however, the low education of mothers of research participants is noteworthy, agreeing with another study conducted in the northeastern region of the country, which found that 59.8% of mothers had only elementary school [2]. It is also reinforced that children of mothers with only complete elementary school are 1.6 more likely to have an impact on the quality of life in the psychological discomfort dimension, corroborating another study in which maternal educational level was associated with this outcome [4].

Most students had access to dental services in the last year, agreeing with another study conducted on pregnant adolescents from Araçatuba, Brazil [19]; however, the differences found were not statistically significant to explain the impact on the quality of life.

Regarding the perception of oral condition, a little less than half of the adolescents observed halitosis problem. A similar result was found in a study where 39.6% of adolescents from southern Brazil observed halitosis [4]. This variable presented the highest frequency of impact on the quality of life of respondents. When OHIP dimensions were analyzed, the frequency of impact was verified in six of the seven dimensions, confirming that halitosis interferes with the well-being of these adolescents. This result corroborates the study conducted in Passo Fundo, Brazil, in which self-reported halitosis was the researched variable with the greatest impact on the quality of life [22]. The social impact of halitosis is profound, damaging social and professional life. Even though it is a highly prevalent problem, there are few studies involving adolescents, including its impact on the quality of life.

Although halitosis self-assessment cannot be considered a reliable measure to assess the actual presence of halitosis, it cannot be denied that the findings are consistent with the literature, showing the importance of self-perceived oral health problems in proposing dental treatment, since halitosis has a significant impact on the quality of life of adolescents. Considering that halitosis is not a disease, but a warning sign that there is some abnormal condition that must be localized and corrected, oral health education programs aimed at this age group are suggested. Halitosis is a cause of social restriction and may lead to professional and affective embarrassment in the lives of

adolescents. The use of an indicator such as OHIP could be useful for the planning of dental services, prioritizing the care of people with impact produced by oral problems. Only this way, dentistry will achieve its major objective, which is to improve the population's quality of life.

When evaluating the malocclusion variable, most adolescents observed some occlusal disorder. Nevertheless, in disagreement with results found for halitosis, malocclusion did not present statistically significant results and cannot explain its association with the impact on the quality of life of respondents. A similar result was found in a cross-sectional study with a population of adolescents aged 13-20 years, which found no association among the various dental characteristics including malocclusions and OHIP [25], which may be explained by the fact that the severity of malocclusions was not assessed, and any deviation from normal occlusion was considered. International studies that evaluated malocclusions alone found significant results of the impact of malocclusions on quality of life [26,27]. This suggests that further analytical studies to assess the association of OHIP with each characteristic of dental occlusion alone are needed to verify their impact on the quality of life in Brazil.

Although the impact of oral health in adolescents had relatively low intensity, it is noteworthy that this result was similar to that found in adults and even in the elderly. It should be kept in mind that oral health problems are mainly cumulative and therefore should increase with age, thus emphasizing that the impact on this population should increase over time and reach higher scores than those found in studies to date. Thus, efforts of specific health promotion for this life cycle, particularly actions in public schools, should be the government's focus on health care policies [22].

Conclusion

The impact on the quality of life was 26.2%, most often on the psychological discomfort dimension. The greatest perception of impact was in women from socioeconomic class C and children of mothers with low education level. Halitosis was the independent variable with the highest frequency of impact.

Oral health problems significantly affect adolescents' quality of life and the use of subjective indicators complements clinical information and allows individual's perception of their oral condition and need for treatment, helping to formulate efficient health care programs and services to improve the quality of life of the population.

Conflict of Interest: The authors declare no conflicts of interest.

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