Oral Health-Related Quality of Life and Associated Factors in Institutionalized Adolescents

Qualidade de Vida Relacionada à Saúde Bucal e Fatores Associados em Adolescentes Institucionalizados

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Abstract

This study aimed to associate oral health-related quality of life (OHRQoL) and related factors in adolescents deprived of freedom. In this cross-sectional observational study, sixty-eight male adolescents deprived of freedom (from the Socio-Educational Assistance Centers from Passo Fundo, Brazil) were included. The sample was dichotomized into those with lower impact (sum scores <16) and higher impact (sum score ≥16) on OHRQoL. Sociodemographic characteristics, medical and dental histories, and a structured questionnaire about dental perception were collected. Clinical examination was performed by using the Decayed, Missing, Filled Index. Associations between the outcome and independent variables were analyzed by uni- and multivariate Poisson regression with robust variation. Overall, a mean score OHIP-14 was 13.15±11.17. In the multivariate analysis, former smokers and current smokers presented a significant higher prevalence ratio (PR) of higher OHIP-14 scores than nonsmokers (PR= 4.70; 95%CI: 1.21–18.22 and 4.83; 95%CI:1.25–18.58, respectively). Additionally, to every decayed tooth, a significant increase in the PR of having higher OHIP-14 was 28% (PR=1.28 – 95%CI: 1.11–1.47). Conversely, adolescents that were not concerned about teeth alignment presented a significantly lower PR of being in the higher impact of OHRQoL (PR=0.42 – 95%CI: 0.19–0.93). Adolescents deprived of freedom present a high impact on OHRQoL. The number of decayed teeth and smoking exposure were associated with higher impact on OHRQoL. However, absence of teeth alignment concern was associated with lower impact on OHRQoL.

Keywords: Quality of Life. Adolescent. Institutionalized. Psychometrics. Adolescent Health Services.

Resumo

Esse estudo objetivou associar a qualidade de vida associada a saúde bucal (QVASB) e fatores relacionados em adolescentes privados de liberdade. Sessenta e oito adolescentes privados de liberdade foram incluídos. QVASB foi avaliada pelo Oral Health Impact Profile-14. A amostra foi dicotomizada em baixo impacto (soma de escores <16) e alto impacto (soma de escores ≥16) na QVASB. Características sociodemográficas, histórico médico e odontológico e um questionário estruturado sobre percepção dental foram coletados. Exame clínico foi realizado utilizando-se o Índice de dentes cariados, perdidos e obturados. Associações entre o desfecho e as variáveis independentes foram analisadas por regressão uni e multivariada de Poisson com variância robusta. Em toda a amostra, a média de escores do OHIP-14 foi de 13,15±11,17. Na análise multivariada, ex-fumantes e fumantes apresentaram significativa maior razão de prevalência (RP) de apresentarem maiores escores do OHIP-14 do que os não fumantes (RP=4,70; IC95%: 1,21 – 18,22 e 4,83; IC95%: 1,25 – 18,58, respectivamente). Além disso, para cada dente cariado, houve aumento significativo de 28% RP de ter maiores escores de OHIP-14 (RP=1,28 – IC95%: 1,11 – 1,47). Por outro lado, adolescentes que não se preocupam com o alinhamento dos seus dentes apresentaram significativo melhor RP de terem maior impacto na QVASB (RP=0,42 – IC95%: 0,19 – 0,93). Adolescentes privados de liberdade apresentaram alto impacto na QVASB. O número de dentes cariados e exposição ao fumo estiveram associados com alto impacto na QVASB. Entretanto, a ausência de preocupação com o alinhamento esteve associada com menor impacto na QVASB.

Palavras-chave: *Qualidade de Vida. Adolescente Institucionalizado. Psicometria. Serviços de Saúde do Adolescente.*

1 Introduction

The impact of oral health on quality of life has been reported in the literature, proving that aspects related to tooth pain, presence of caries, periodontal disease and missing teeth may impair the well-being of individuals[1,2]. In a recent longitudinal study, it was pointed out that oral health may be a predictor of subjective well-being in individuals over the age of fifty[3]. In the same way, authors also reported that oral health can impact the quality of life in children and adolescents, as other studies have indicated that the main aspects related to oral health that influence the quality of life of young individuals are predominantly related to caries lesions and malocclusion[4,5].

The presence of caries lesions has been responsible for representing a negative experience regarding quality of life, and it is estimated that the more severe caries lesions, the higher will be the reflection on quality of life in children and adolescents[5]. Regarding malocclusion, it is currently demonstrated that the misaligned teeth and the need for orthodontic correction of the jaws are able to significantly influence quality of life[6]. It is still possible to indicate that this

relation turns more intense with increasing age, suggesting that in adolescents this association is more pronounced[6].

It is also known that external factors may affect quality of life, such as sociodemographic factors, which may involve socioeconomic status and level of education[7]. Moreover, different groups and cultures may have different impacts regarding oral health and quality of life[8]. When putting this into perspective, it is important to consider the existence of a distinct group of adolescents, the adolescents deprived of freedom, who are those in conflict with the law and, for this reason, live in institutions provided by the state.

Data from the National Council of Justice survey indicate that, in 2016, 189,000 adolescents were in conflict with the law in Brazil and of these 29,794 were complying sentences incarcerated. Among the main causes of imprisonment are robbery and drug dealing. The predominant age group is 15 to 20 years, and 90% of adolescents are males[9]. It was estimated that these numbers increase each year. A study conducted by the Brazilian Institute of Geography and Statistics (IBGE) pointed out that from 1996 to 2014 the number of juvenile offenders in the country increased six-fold[10].

In the state of Rio Grande do Sul, the institution responsible for minors in conflict with the law is the Socio-Educational Support Foundation (FASE), with 12 prison units distributed between the capital and other cities[11]. According to data from the current foundation, the population of young people deprived of freedom in Rio Grande do Sul is approximately 1,317, aged from 12 to 20 years of age. Those adolescents are mainly responsible for crimes that represent a serious threat or violence. The prison units are called Socio-Educational Assistance Centers (CASE in Portuguese), in which the adolescent remains away from society until the sentence is completed[11]. The main objective of the CASE is the resocialization of the internal adolescents through socio-educational activities[11].

Therefore, considering that adolescents deprived of freedom comprise a distinct group of young people living under different conditions, the objective of this study is to analyze the association between oral health-related quality of life and associated factors in adolescents deprived of freedom in a city of Rio Grande do Sul, Brazil.

2 Material and Methods

2.1 Study design and data setting

This cross-sectional study is based on a convenience sample and involved only male adolescents deprived of freedom, aged 15 to 19 years old, of the CASE in the city of Passo Fundo, state of Rio Grande do Sul, Brazil. This CASE unit belongs to the Socio-Educational Support Foundation (FASE in Portuguese), which is responsible for the socio-educational actions of internment and semi-freedom of adolescents with any conflict with the law. This study was conducted in December 2014. At that moment, the CASE

unit had 74 adolescents, of which all of them were invited to participate. In this sense, no sample size calculation was performed for the present study.

2.2 Ethical considerations

The present study was approved by the Ethical Committee of the University of Passo Fundo, under protocol #016/2014. Afterwards, a formal authorization was obtained by the head of FASE. All the adolescents included consented to participate, and a consent form was signed, for each adolescent, by the legal responsible of the CASE unit.

2.3 Clinical examination and interview

All data collection was performed by a research team, composed of two interviewers and two clinical examiners. The team was previously trained by the study coordinator in order to standardize data. All procedures were undertaken by supervision and security provided by the CASE unit. We applied a structured questionnaire that included demographic data, socioeconomic condition, general health behavior, health record, and oral health self-perception variables. It was applied with the use of a set of questions from the PCATool-SB Brazil adult version, validated in Brazil[12]. Additionally, questions related to teeth appearance and perception were obtained by a questionnaire validated to Portuguese[13]. The Oral Health Impact Profile-14 (OHIP-14), the Brazilian validated version[14], was also applied in order to assess the oral health-related quality of life (OHRQoL).

For the clinical examination, the Decayed, Missing, Filled (DMF) Index was used, according to the World Health Organization (WHO) criteria[15]. The exams were performed with gauze, exploratory probe and clinical mirror, under natural illumination. Two trained and calibrated examiners performed the clinical evaluation in the present study. The training consisted of expositive lectures about the topic, and also using several images of dental caries. The calibration process was performed by examining twice fifteen adolescents, students of a public school from Passo Fundo, with a 15-days interval between exams. These adolescents had similar characteristics, such as sex and age, of the included adolescents in the present study. The interexaminer agreement showed a kappa index of 0.74, meanwhile the minimum intraexaminer kappa index was 0.81.

2.4 Statistical analysis

The dependent variable of this study was OHRQoL assessed by the OHIP-14. We dichotomized the sample into two groups: one with low impact and other with higher impact in the OHRQoL. The tertile of scores sum of OHIP-14 determined how the sample was dichotomized. Two thirds of the sample had a score of OHIP-14 sum <16 (n=45), this is the group with the lowest impact on OHRQoL. One third of the sample had a score sum ≥16 (n=23), that group had the

highest impact.

Ethnicity/skin color was categorized into white or non-white. The non-white group was composed by the adolescents who reported to be black, yellow, brown or indigenous. Smoking exposure was divided into never smokers, current smokers or former smokers, to those that reported quitting smoking at the moment of the interview.

The use of medication was classified in two groups: one with adolescents who reported the use of one or more medicines, and another group that reported no use. Toothbrush frequency was dichotomized into those that referred to brush their teeth up to 2 times a day and those that brush 3 or more times a day. The history of dental bleaching was categorized into no, to those with no history of bleaching, and yes, to those that reported the history of any bleaching treatment, including the use of whitening dentifrice, at-home or in-office tooth bleaching. Age, number of lost teeth, decayed and filled teeth was obtained continuously.

Concern with oral health, teeth alignment, and teeth color were assessed by the questionnaire of teeth appearance and perception[13]. For these three questions, the sample was dichotomized into yes or no. The adolescent's and mother's level of education was also assessed.

All statistical analyses were performed in the software SPSS, version 21.0 SPPS, version 21.0 (SPSS, version 21.0, IBM Corp., Armonk, NY, USA). No continuous variables presented a normal distribution with the Shapiro-Wilk test. Associations between the outcome and the independent variable were performed by chi-square, Fisher exact test or Mann-Whitney test. Uni- and multivariate analyses were performed by Poisson regression with robust variance. Only the variables that presented P<0.20 in the univariate analysis were included in the multivariate model. We only maintained the independent variables that presented a *P*-value <0.05, but effect changes were also considered in the final model. Multicollinearity analyses among the independent variables were performed and none was observed. The cut-off point for multicollinearity was determined as variance inflation factor <5 and tolerance >0.2.

3 Results and Discussion

Among the 74 adolescent institutionalized at the moment of our study, 68 were included. Therefore, the response rate was 91.89%. Six adolescents did not consent to participate in the study. The mean age was 17.15±1.05 (ranging from 15 to 19 years of age). The level of education of most of the adolescents was low, as 53 (77.94%) of them did not complete the elementary school. Additionally, 97.06% (n=66) presented a school delay. The mother's level of education was either unknown by the adolescent (50%) or up to complete elementary school (41.18%).

The overall mean OHIP-14 score was 13.15±11.17. In the present study, the group with the lowest impact on OHRQoL showed a mean score of 6.56±4.94, and the group the highest impact presented a mean score of 26.04±8.28 (Table 1). The Mann-Whitney test showed that the groups presented statistically significant differences (p <0.001), demonstrating that they had different impact on OHRQoL. Additionally, the groups with the highest impact on OHRQoL showed significantly higher scores in all OHIP-14 domains (Table 1).

Table 1 - OHIP-14 total scores and scores per domain in different groups. Values are reported as mean ±standard deviation (median)

	Whole-sample	Low impact (n =45 – 66.2%; OHIP-14 <16)	High impact (n =23 – 33.8%; OHIP-14 ≥16)	*P*-value*
Total score	13.15±11.17 (11.0)	6.56±4.94 (6.0)	26.04±8.28 (24.0)	<0.001
Functional limitation	1.24±1.83 (0.0)	0.44±0.84 (0.0)	2.78±2.24 (2.0)	<0.001
Physical pain	2.98±2.22 (3.0)	2.04±1.55 (2.0)	4.78±2.24 (4.0)	<0.001
Psychological discomfort	3.25±2.76 (3.0)	2.18±2.35 (2.0)	5.35±2.29 (6.0)	<0.001
Physical disability	1.47±2.36 (0.0)	0.49±1.04 (0.0)	3.39±3.00 (2.0)	<0.001
Psychological disability	1.84±2.08 (2.0)	0.91±1.18 (0.0)	3.65±2.29 (4.0)	<0.001
Social disability	1.13±2.14 (0.0)	0.13±0.50 (0.0)	3.09±2.73 (4.0)	<0.001
Handicap	1.25±1.93 (0.0)	0.36±0.96 (0.0)	3.00±2.15 (3.0)	<0.001

Legend: * Mann-Whitney test for the comparison between low and high impact groups.
Source: Research data.

Overall, the mean number of decayed teeth was 1.06±1.65 (ranging from zero to seven). Regarding this variable, there is a statistically significant difference between groups, as the groups with the highest impact on OHRQoL presented a mean number of 1.74±2.00 of decayed teeth (p=0.033), while the low impact group showed a mean of 0.71±1.32 decayed teeth (Table 2).

Table 2 - Description characteristics of the adolescents deprived of freedom and the association of oral health-related quality of life and independent variables. The sample was divided according to the tertiles of total OHIP-14 scores

Variables	Mean±SD n – (%)	Low impact	High impact	*P*-value
Age		17.22±1.15	17.00±0.85	0.561&
Ethnicity/skin color	**White** **Non-white**	12 (26.7) 33 (73.3)	10 (43.5) 13 (56.5)	0.161*
Smoking exposure	**Never smokers** **Former smokers** **Smokers**	16 (35.6) 20 (44.4) 9 (20.0)	2 (8.7) 13 (56.5) 8 (34.8)	0.051*
Use of medication	**Yes** **No**	24 (53.3) 21 (46.7)	14 (60.9) 9 (39.1)	0.554*
Access to the dentist in the last 12 months	**Yes** **No**	28 (62.2) 17 (37.8)	12 (52.2) 11 (47.8)	0.426*
Toothbrushing frequency (per day)	**≤3 times** **>3 times**	38 (84.4) 7 (15.6)	21 (91.3) 2 (8.7)	0.430*
Dental bleaching	**Yes** **No**	16 (35.6) 29 (64.4)	11 (47.8) 12 (52.2)	0.328*
Number of lost teeth		0.91±1.78	0.65±1.23	0.594&
Number of decayed teeth		0.71±1.32	1.74±2.00	0.051&
Number of filled teeth		1.11±1.84	0.70±0.93	0.725&
Concerns with oral health	**Yes** **No**	31 (68.9) 14 (31.1)	20 (17.3) 3 (13.0)	0.104*
Concerns with teeth alignment	**Yes** **No**	26 (57.8) 19 (42.2)	19 (82.6) 4 (17.4)	0.041*
Concerns with teeth color	**Yes** **No**	32 (71.1) 13 (28.9)	21 (91.3) 2 (8.7)	0.057*

Legend: *Chi-square; #Fisher exact test; & Mann-Whitney
Source: Research data.

In the univariate analysis, smokers presented a higher prevalence ratio (PR) of being in the group with the highest impact on OHRQoL (PR= 4.24 – 95%CI: 1.04 – 17.18). Moreover, to each decayed tooth, there was a 22% increase in the PR of being in the groups with the highest impact on OHRQoL (PR=1.22 – 95%CI: 1.04 – 1.42). In this analysis, no other variables presented significantly associated with impact on OHRQoL, such as age (PR=0.87 – 95%CI: 0.65 – 1.17), number of teeth lost (PR=0.92 – 95%CI: 0.73 – 1.17, and number of filled teeth (PR=0.87 – 95%CI: 0.70 – 1.08) (Table 3).

Table 3 - Univariate analysis for the association between the impact on the oral health-related quality of life and the independent variables. Passo Fundo, 2014

Variables		Prevalence ratio (95%CI)	*P*-value
Age		0.872 (0.652 – 1.166)	0.356
Ethnicity/skin color	**White** **Non-white**	Ref. 0.622 (0.325 – 1.190)	0.151
Smoking exposure	**Never smokers** **Former smokers** **Smokers**	Ref. 3.545 (0.898 – 14.001) 4.235 (1.044 – 17.184)	0.071 0.043
Use of medication	**Yes** **No**	Ref. 0.814 (0.410 – 1.619)	0.558
Access to the dentist in the last 12 months	**Yes** **No**	Ref. 1.310 (0.677 – 2.535)	0.424
Toothbrushing frequency (per day)	**≤3 times** **>3 times**	Ref. 0.624 (0.175 – 2.222)	0.467
Dental bleaching	**Yes** **No**	Ref. 0.718 (0.372 – 1.388)	0.325
Number of lost teeth		0.923 (0.730 – 1.168)	0.506
Number of decayed teeth		1.216 (1.042 – 1.418)	0.013
Number of filled teeth		0.868 (0.696 – 1.084)	0.212
Concerns with oral health	**Yes** **No**	Ref. 0.450 (0.152 – 1.328)	0.148
Concerns with teeth alignment	**Yes** **No**	Ref. 0.412 (0.159 – 1.069)	0.068
Concerns with teeth color	**Yes** **No**	Ref. 0.337 (0.089 – 1.275)	0.109

Source: Research data.

Table 4 shows the multivariate analyses for the association between impact on OHRQoL and independent variables. In the initial model, we included the following variables: number of decayed teeth, smoking exposure, ethnicity/skin color, concerning with oral health, concern

with teeth alignment, concern with teeth color. Only number of decayed teeth, smoking exposure, and concerning with teeth alignment remained in the final multivariate model, and all independent variables were significant associated with impact on OHRQoL.

Table 4 - Multivariate analysis for the association between the impact on the oral health-related quality of life and the independent variables. Passo Fundo, 2014

Variables		Prevalence ratio (95%CI)	*P*-value
Number of decayed teeth		1.277 (1.106 – 1.474)	0.001
Smoking exposure	**Never smokers** **Former smokers** **Smokers**	Ref. 4.699 (1.212 – 18.219) 4.825 (1.254 – 18.573)	0.025 0.022
Concerns with teeth alignment	**Yes** **No**	Ref. 0.418 (0.187 – 0.934)	0.033

The initial model included the following variables: number of decayed teeth, smoking exposure, ethnicity/skin color, concerning with oral health, concern with teeth alignment, concern with teeth color.
Source: Research data.

To every decayed tooth, there was an increase of 28% in the PR of being in the group with the highest impact on OHRQoL (PR= 1.28 – 95%CI: 1.11 – 1.47). Additionally, former smokers (PR=4.70 – 95%CI: 1.21 – 18.22) and current smokers (PR=4.26 – 95%CI: 1.25 – 18.57) were significantly associated with higher impact on OHRQoL. Conversely, the adolescent who reported to not worry about teeth alignment presented 58% lower PR of being in the group with the highest impact on OHRQoL (PR=0.42 – 95%CI: 0.19 – 0.93).

The objective of this study was to evaluate the impact of oral health on a distinct group of adolescents in conflict with the law that are deprived of freedom. The multivariate analysis showed that aspects, such as decayed teeth, smoking and concerning with tooth alignment are capable of affecting the OHRQoL oral health-related quality of life.

Currently, there is few information about the oral health of adolescents deprived of freedom and its impact on OHRQoL[16,17]. Other studies that involved adolescent deprived of freedom reported only their general health or psychological conditions[18,19]. The main oral conditions in adults that have an association with OHRQoL are related to caries lesions and periodontal disease, but when it comes to adolescents the evidence does not show very consistent results in these relationships[20,21]. The experience of caries has been related as a significant impact on the OHRQoL of adolescents, especially when associated with pain[5]. Moreover, the literature also shows a dose-response gradient in this association, as the greater the number of sound teeth in the mouth, the lower the limitations due to oral problems to perform daily activities[20]. Similar findings have been demonstrated in the literature indicating not only the probable association between caries lesions and adolescents' OHRQoL but also that the more severe these lesions are related to the presence of pain, the higher the impact[5,21].

However, it is important to consider the fact that adolescents can experience different situations in different

ways. Evidence has supported that oral health may represent distinct impact on unequal groups. One study evaluated the OHRQoL regarding oral health in two groups of adolescents[22]. It was demonstrated that caries experience and impact on OHRQoL in the presence of tooth pain were higher in adolescents who lived in suburban areas than in those living in central areas in a city in the interior of São Paulo[22]. Moreover, a higher impact on OHRQoL was also detected in high school students from public schools when compared to students from private schools[23].

An important aspect of our findings is the impact of smoking exposure on OHRQoL. In another study conducted with adolescents in conflict with the law, it was also reported a significant influence of tobacco on increasing the OHRQoL scores[17]. Many studies have already proven the negative effects of smoking and its association with several diseases, such as oral cancer, periodontal disease and incidence of tooth loss[24-26]. Additionally, it is well established that smokers tend to have a worse perception of their oral health when compared to non-smokers. Likewise, smokers are also inclined to have a greater impact of OHRQoL[27].

Regarding the aesthetic factors, the perception of dental alignment had a significant impact on our results. It was demonstrated that adolescents without concerning with teeth alignment presented 58% lower PR of being in the groups with high impact of OHRQoL than adolescent with such concern. This has been a common finding in other study of OHRQoL with adolescents[6]. Among the main implications of malocclusions on quality of life, discomfort in social interactions and problems with self-esteem have been highlighted[28]. In a study carried out in Brazil, when evaluating the quality of life related to malocclusion in schoolchildren, a worse impact of OHRQoL in those who presented malocclusion or misalignment and were from lower-income families was demonstrated[29].

A recent systematic review revealed that the greatest

impact of malocclusion or perceived dental alignment on OHRQoL has been demonstrated in young people over 14 years of age[4]. These findings are in accordance with the age range of our study that was 15 to 19 years old, at which age a dental misalignment could represent a greater influence on OHRQoL. Moreover, in adolescents with dental misalignment or malocclusion, it was demonstrated that orthodontic treatment is capable of improving the OHRQoL[30].

This study presents some limitations, as only male adolescent were included, the results may not be extrapolated for females. However, 90% of the population of adolescents in conflict with the law in Brazil are men. In addition, this study was performed only in one institution, which restricts the sample size and considering the cross-sectional delineation of the study, a temporality association is not possible. Moreover, it should be highlighted that no sample size calculation was performed, as all adolescents deprived of freedom were invited to participate.

4 Conclusão

It was concluded that in male adolescents in conflict with the law and deprived of freedom the number of decayed teeth and smoking exposure is associated with higher impact on the OHRQoL. Conversely, the absence of concerning with teeth alignment was associated with lower impact on OHRQoL.

Acknowledgments

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