



## ORIGINAL ARTICLE

# Concern of adolescents in conflict with the Law about their oral health *Preocupação de adolescentes em conflito com a Lei sobre sua própria saúde bucal*

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### KEYWORDS

Dental caries  
Dental health surveys  
Institutionalized  
adolescent

### ABSTRACT

**Objective:** To assess the self-perception of adolescents in conflict with the law about their concern with oral health, in addition to tracing their relationship with other related variables.

**Methods:** A cross-sectional study involving male institutionalized adolescents in a city in southern Brazil who underwent clinical examination and interviews to understand their concern for their oral health and the relationship between this outcome and associated factors. Concern about oral health was obtained through a validated questionnaire. Two fitted models were performed using Poisson regression ( $\alpha < 0.05$ ). One of them used the decayed, missing, and filled teeth index (DMF-D), and another considered the components of this index as exploratory variables.

**Results:** Sixty-eight adolescents were included, and a high occurrence (75%) of concern about their oral health was observed. In the final multivariate analysis that included DMFT, this index (prevalence ratio [PR]: 1.033; 95% confidence interval [95%CI]: 1.004 - 1.063) and concern about tooth color (PR: 2.208; 95%CI: 1.028 - 4.740) were significantly associated with oral health concerns. When the various index components were included in the multivariate model, only the number of decayed teeth (PR: 1.073; 95%CI: 1.007 - 1.144) and concerns about tooth color (PR: 2.250; 95%CI: 1.057 - 4.793) were associated with the outcome.

**Conclusion:** Institutionalized adolescents are highly concerned about their oral health, being associated with a DMF index, especially the decayed component, and a concern with the color of their teeth.

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**PALAVRAS-CHAVE**

Adolescente  
institucionalizado  
Dente cariado  
Inquéritos de saúde  
bucal

**RESUMO**

**Objetivo:** Avaliar a autopercepção de adolescentes em conflito com a Lei sobre sua preocupação com saúde bucal, além de traçar sua relação com outras variáveis relacionadas.

**Métodos:** Estudo transversal envolvendo adolescentes institucionalizados do sexo masculino em uma cidade no sul do Brasil, que passaram por exame clínico e entrevistas buscando compreender a preocupação com sua própria saúde bucal e a relação deste desfecho com fatores associados. Preocupação com a saúde bucal foi obtida por meio de um questionário validado. Dois modelos ajustados foram realizados por meio da regressão de Poisson ( $\alpha < 0,05$ ). Um deles utilizou o índice de dentes cariados, perdidos e obturados (CPO-D) e outro considerou os componentes desse índice como variáveis exploratórias.

**Resultados:** Sessenta e oito adolescentes foram incluídos, e uma alta ocorrência (75%) de preocupação com sua saúde bucal foi observada. Na análise multivariada final que incluiu o CPO-D, esse índice (razão de prevalência [RP]: 1,033; intervalo de confiança de 95% [IC95%]: 1,004 - 1,063) e preocupação com a cor dos dentes (RP: 2,208; IC95%: 1,028 - 4,740) estiveram significativamente associados com preocupação com a saúde bucal. Quando os diversos componentes do índice foram incluídos no modelo multivariado, apenas número de dentes cariados (RP: 1,073; IC95%: 1,007 - 1,144) e preocupação com a cor dos dentes (RP: 2,250; IC95%: 1,057 - 4,793) estiveram associados com o desfecho.

**Conclusão:** Adolescentes institucionalizados possuem alta preocupação com sua saúde bucal, sendo associadas com índice CPO-D, especialmente o componente cariado, e preocupação com a cor dos dentes.

**INTRODUCTION**

Lately, there has been an increase in the concept of awareness of one's own body, including care for dental appearance and oral health, especially in adolescence and early adulthood<sup>1</sup>. This finding is directly related to Oral Health-Related Quality of Life (OHRQoL), which plays an essential role in patients' assessments of their oral health<sup>2</sup>. General health is a subjective holistic state; thus, this knowledge is not different from oral health, as several biopsychosocial aspects are related, whether at individual, family, or community levels<sup>2</sup>. Within this context, adolescents' self-perception of general health is associated with their well-being and acceptance in society<sup>3</sup>.

The worldwide two most prevalent chronic oral diseases are caries and periodontal diseases, which generally do not present symptoms in the early stages and, therefore, do not seem to be strongly associated with a more significant impact on quality of life in adolescents<sup>4</sup>. However, halitosis<sup>5</sup>, malocclusion, which can affect speech, swallowing, chewing, and esthetics<sup>1</sup>, and dental esthetics alone<sup>6</sup> are examples of significant problems in the quality of life of adolescents.

When Brazilian children and adolescents commit any infractions, they are prone to unique accountability processes, with the fulfillment of socio-educational measures in state units<sup>7</sup>. According to data from the National Council of Justice, in 2017, 26,109 adolescents were serving socio-educational measures in a closed regime in Brazil<sup>9</sup>. In 2014, most convicts complied with these measures for theft or drug trafficking<sup>10</sup>.

In the Brazilian state of Rio Grande do Sul, the institution responsible for minors in conflict with the Law is the "Fundação de Atendimento Socio-Educativo" (FASE). The institution has 12 prison units, called Socio-Educational Assistance Centers (SEAC), distributed between the capital and other cities. In SEAC, adolescents are deprived of their liberty and removed from society until the sentence is fully served.

Among adolescents and adults, it was found that vulnerable family situations, adverse social contexts, and poor living conditions affect their perceptions of oral health<sup>11</sup>, and each adolescent experiences this life cycle differently. Identity construction is personal and social, occurring interactively through exchanges between the individual and his environment. Therefore, the care of oral conditions is individual and ends up involving several factors and, for these institutionalized adolescents, biopsychosocial aspects become even more relevant<sup>12</sup>.

Oral health can be defined as a pattern of oral tissues that contributes to physical, psychological, and social well-being, allowing individuals to perform collective actions without discomfort<sup>13</sup>. Self-report data on health perception are essential for understanding and indicating a patient's health status<sup>14</sup>. In this sense, this study evaluated the self-perception of institutionalized adolescents about their concern with oral health.

**METHODS***Study design*

This cross-sectional study involved only male adolescents deprived of freedom, aged 15 to 19 years, from a SEAC in the city of Passo Fundo, State of Rio Grande do Sul, Brazil. The SEAC unit belongs to the FASE, responsible for the intern's socio-educative actions and semi-liberty of any adolescent in conflict with the Law. This study was conducted in December 2014. At that moment, the SEAC unit had 74 adolescents, all of whom were invited to participate. Therefore, no sample size calculation was made for this study.

*Ethical considerations*

This study was approved by the Ethical Committee of the University of Passo Fundo, protocol #016/2014.

The study followed the ethical principles recommended by Resolution 466/12 of the National Health Council and the Declaration of Helsinki of 1964. Subsequently, formal authorization was obtained from the FASE dean. All adolescents included consented to participate after explaining the objectives of this study without any attempts at coercion. A consent form was signed for each adolescent by the legal guardian of the SEAC unit.

### *Interviews and clinical exam*

All data collection was performed by a research team composed of two interviewers and two clinical examiners. The study coordinator previously trained the team to standardize the data. All procedures were performed under supervision and security provided by the SEAC unit. A structured questionnaire was applied, including demographic data, socioeconomic conditions, general health behavior, and health history, based on the validated PCATool-SB Brazil's adult version questionnaire<sup>15</sup>. The translated and validated Portuguese version of the "Child's and Parent's Questionnaire about Teeth Appearance" was applied to collect oral health self-perception variables<sup>16</sup>.

For the clinical examination, the Decayed, Missing, and Filled Teeth Index (DMFT) was used, according to the criteria of the World Health Organization<sup>17</sup>. Examinations were performed with gauze, exploratory probe, and clinical mirror under natural lighting. Expository lectures about the topic, including several images of dental caries, were used. The calibration process was performed by examining twice fifteen adolescents, students from a public school in Passo Fundo, with similar characteristics, such as sex and age, of the adolescents included in the present study. The interval between the two exams was at least seven days. The inter-examiner agreement showed a *kappa* index of 0.74, while the minimum intra-examiner *kappa* index was 0.81.

### *Outcome definition*

The primary outcome of this study was the oral health concern. Therefore, a question from the "Child's and Parent's Questionnaire about Teeth Appearance" was adapted and used. That question says: "My teeth are very healthy, slightly healthy, neither healthy nor sick, slightly sick, or very sick? Am I worried about this?" Regarding the concern question, the possible answers were "yes" or "no". Accordingly, adolescents were dichotomized into "concerned about oral health" and "unconcerned about oral health".

### *Independent variables*

The following independent variables were used in this study: age, skin color, level of education, smoking exposure, health problems, medication or illicit drugs use, access to the dentist in the last 12 months, toothbrush frequency, history of dental trauma, the number of decayed, missing, or filled teeth, concern

with teeth alignment, concern with teeth color, and self-reported halitosis.

Age, in years, was analyzed as a continuous variable. Regarding skin color, individuals were dichotomized into white and non-white, including those referred to as brown, black, yellow, or indigenous. For the level of education, the sample was divided into those with incomplete elementary school or at least complete elementary school.

Regarding smoking exposure, it was considered those who smoked during the data collection moment, those who reported quitting smoking, and those who had never smoked. The presence of at least one health problem, use of daily medications, and history of use of illicit drugs were categorized into "yes" or "no". Marijuana, crack, and cocaine were considered illicit drugs.

Access to the dentist in the last 12 months was also categorized into "yes" or "no." The daily toothbrush frequency was dichotomized into  $\leq 3$  times per day and  $> 3$  times per day. The adolescents were asked about their history of dental trauma, which dichotomized the sample into "yes" and "no". The numbers of decayed, missing, and filled teeth, including the DMFT of each individual, were considered continuous variables. History and presence of dental caries were considered the primary exposure of the study.

Two additional questions of the "Child's and Parent's Questionnaire about Teeth Appearance" were used as independent variables in the study. One of them asked about the concern about teeth alignment and the other about the concern with teeth color. For both questions, the response options were "yes" or "no". Self-reported halitosis was assessed by asking: "How often do you have bad breath?" The response options were never, rarely, sometimes, repeatedly, or always. Halitosis was characterized as "yes" (those who responded sometimes, repeatedly, or always) and "no" (those who responded never or rarely).

### *Statistical analysis*

The association between oral health concern and independent variables were measured using the chi-square, Fisher's exact, or Mann-Whitney tests. The Shapiro-Wilk test tested the normality of continuous variables, and an asymmetric distribution was identified in all of them.

Moreover, bi- and multivariate analyses were performed using Poisson regression with robust variance. Only variables that presented a *p*-value  $< 0.20$  were included in the initial multivariate model through a "backward" strategy. A combination of *p*  $< 0.05$  and effect modification analysis was considered in the final multivariate model.

In this study, we aimed to understand the history of dental caries and their relationship with concerns with oral health. Therefore, two independent multivariate models were built. The DMFT index was included as an exposure variable in one of them. The number of decayed, missing, and filled teeth was considered separately in the other model. Both models maintained these variables in the final multivariate model regardless of the observed *p*-value.

Multicollinearity analyzes were performed, but they were not observed in the two multivariate models performed. Statistical analyses were performed using SPSS software (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY, USA: IBM Corp).

## RESULTS

Among the 74 institutionalized adolescents involved in this study, 68 answered the questionnaire, resulting in a response rate of 91.9%. The mean age was  $17.2 \pm 1.1$  years (15 to 19). The level of education of most adolescents was low, as 53 (77.9%) of them did not complete elementary and high school. Additionally, 66

(97.1%) had school delays. The mother's level of education was unknown to most of the adolescents (50%) or, for those who were aware, most had only completed elementary or high school (41.2%). Regarding skin color, 47 (69.1%) reported being non-white.

When asked about oral health concerns, 51 adolescents (75%) reported being concerned, while 17 (25%) expressed no concern. Detailed information on the frequency distribution regarding the classifications of oral health can be found in Table 1. Proportionally, the group that expressed a more significant oral health concern was the adolescents who reported having very sick teeth, as five adolescents (100%) of the five response categories reported being concerned about their oral health.

**Table 1** – Frequency distribution of the adolescents in conflict with the Law regarding the Child's and Parent's Questionnaire about Teeth Appearance, considering the whole sample, adolescents concerned with their oral health and those not concerned.

Question	Answer	Whole sample	Concerned (n=51; 75%)	Not concerned (n=17; 25%)
During the past two months, how much has the appearance of your teeth bothered you?	A lot	11 (16.2)	11 (21.6)	0 (0)
	A few	30 (44.1)	22 (43.1)	8 (47.1)
	Very few	6 (8.8)	5 (9.8)	1 (5.9)
	Nothing	18 (26.5)	10 (19.6)	8 (47.1)
	Do not know	3 (4.4)	3 (5.9)	0 (0.0)
During the past two months, how much did the appearance of your teeth worry you?	A lot	14 (20.6)	13 (25.5)	1 (5.9)
	A few	29 (42.6)	24 (47.1)	5 (29.4)
	Very few	2 (2.9)	2 (3.9)	0 (0.0)
	Nothing	20 (29.4)	10 (19.6)	10 (58.8)
	Do not know	3 (4.4)	2 (3.9)	1 (5.9)
During the past two months, how much has the appearance of your teeth prevented you from smiling spontaneously?	A lot	8 (11.8)	8 (15.7)	0 (0.0)
	A few	13 (19.1)	12 (23.5)	1 (5.9)
	Very few	7 (10.3)	6 (11.8)	1 (5.9)
	Nothing	38 (55.9)	24 (47.1)	14 (82.4)
	Do not know	2 (2.9)	1 (2.0)	1 (5.9)
The variables below refer to the following question: "Rate your teeth according to the description below and indicate if the situation concerns you:"				
My teeth are	Very aligned	9 (13.2)	7 (13.7)	2 (11.8)
	Slightly aligned	16 (23.5)	14 (27.5)	2 (11.8)
	Neither aligned nor crooked	9 (13.2)	5 (9.8)	4 (23.5)
	Slightly crooked	28 (41.2)	20 (39.2)	8 (47.1)
	Very crooked	6 (8.8)	5 (9.8)	1 (5.9)
Am I worried about this? (Concern with teeth alignment)	Yes	45 (66.2)	39 (76.5)	6 (35.3)
	No	23 (33.8)	12 (23.5)	11 (64.7)
My teeth are	Very white	3 (4.4)	0 (0.0)	3 (17.6)
	Slightly white	18 (26.5)	12 (23.5)	6 (35.3)
	Neither with nor stained	12 (17.6)	9 (17.6)	3 (17.6)
	Slightly stained	30 (44.1)	26 (51.0)	4 (23.5)
	Very stained	5 (7.4)	4 (7.8)	1 (5.9)
Am I worried about this? (Concern about the color of teeth)	Yes	53 (77.9)	46 (90.2)	7 (41.2)
	No	15 (22.1)	5 (9.8)	10 (58.8)
My teeth are	Very healthy	9 (13.2)	2 (3.9)	7 (41.2)
	Slightly healthy	18 (26.5)	14 (27.5)	4 (23.5)
	Neither healthy nor sick	12 (17.6)	9 (17.6)	3 (17.6)
	Slightly sick	24 (35.3)	21 (41.2)	3 (17.6)
	Very sick	5 (7.4)	5 (9.8)	0 (0.0)

**Table 2** – Descriptive characteristics and association with concern with oral health and independent variables among adolescents in conflict with the Law. Values in n (%).

Variables	Concerned (n=51; 75%)	Not concerned (n=17; 25%)	p-value
Age (mean ± SD)	17.1±1.1	17.4±1.1	0.380 <sup>§</sup>
Skin color			
White	15 (29.4)	7 (41.2)	0.369*
Non-white	36 (70.6)	10 (58.8)	
Adolescents' level of education			
Incomplete elementary school	42 (82.4)	11 (64.7)	0.177 <sup>#</sup>
At least complete elementary school	9 (17.6)	6 (35.3)	
Smoking exposure			
Smokers	14 (27.5)	3 (17.6)	0.721*
Former smokers	24 (47.1)	9 (52.9)	
Never smokers	13 (25.5)	5 (29.4)	
Health problem			
Yes	4 (8.2)	2 (11.8)	0.643 <sup>#</sup>
No	45 (91.8)	15 (88.2)	
Use of medication			
Yes	28 (54.9)	10 (58.8)	0.778*
No	23 (45.1)	7 (41.2)	
Use of illicit drugs			
Yes	15 (29.4)	4 (23.5)	0.761 <sup>#</sup>
No	36 (70.6)	13 (76.5)	
Access to the dentist in the last 12 months			
Yes	29 (56.9)	11 (64.7)	0.569*
No	22 (43.1)	6 (35.3)	
Toothbrush frequency (per day)			
≤3 times	3 (5.9)	3 (17.6)	0.160*
>3 times	48 (94.1)	14 (82.4)	
Dental trauma			
Yes	13 (25.5)	4 (23.5)	>0.99 <sup>#</sup>
No	38 (74.5)	13 (76.5)	
Number of missing teeth (mean ± SD)	0.9 ± 1.8	0.5 ± 0.8	0.683 <sup>§</sup>
Number of decayed teeth (mean ± SD)	1.3 ± 1.8	0.3 ± 0.6	0.031 <sup>§</sup>
Number of filled teeth (mean ± SD)	1.1 ± 1.8	0.7 ± 1.0	0.826 <sup>§</sup>
DMFT Index (mean ± SD)	3.3 ± 3.6	1.5 ± 1.3	0.110 <sup>§</sup>
Concern with teeth alignment			
Yes	12 (23.5)	11 (64.7)	0.002*
No	39 (76.5)	6 (35.3)	
Concern with teeth color			
Yes	5 (9.8)	10 (58.8)	< 0.001*
No	46 (90.2)	7 (41.2)	
Self-reported halitosis			
Yes	21 (41.2)	12 (70.6)	0.036*
No	30 (58.8)	5 (29.4)	

\*Chi-square; #Fisher's exact test; § Mann-Whitney test. To all continuous variables, the Shapiro-Wilk test demonstrated a p-value < 0.001. Therefore, a non-parametric test was used.

Table 2 demonstrates the comparative data for the independent variables associated with oral health concerns. The following variables were significantly associated with oral health concern: the number of decayed teeth ( $p = 0.031$ ), concern with tooth alignment ( $p = 0.02$ ), concern with tooth color ( $p < 0.001$ ), and self-reported halitosis ( $p = 0.036$ ). Otherwise, other variables showed no significant association with oral health

concern, such as skin color ( $p = 0.369$ ) and DMFT index ( $p = 0.110$ ).

Similarly, the number of decayed teeth ( $p = 0.001$ ), concern with tooth alignment ( $p = 0.015$ ), with tooth color ( $p = 0.010$ ), and self-reported halitosis ( $p = 0.045$ ) were also significantly associated with oral health concern in the bivariate analysis (Table 3). Besides these variables, the DMFT index showed that, for each

decayed, missing, or filled tooth, there was a 4.1% increase in the prevalence ratio (PR) of adolescents reporting being concerned with their oral health (confidence interval of 95% [95%CI]: 1.014 - 1.088).

For the initial multivariate models, all these variables were included, along with the adolescents' level of education. However, two independent multivariate models were constructed: one included the DMFT index, and the other included the components of the index separately (number of decayed teeth, number of missing teeth, and number of filled teeth).

Table 4 shows the results of the final multivariate analysis, considering the model that included the DMFT index. Only the DMFT index and concern with tooth alignment were significantly associated with oral health concerns. There was a 3.3% increase in the PR of adolescents reporting being concerned with oral health for each decayed, lost, or filled tooth (95%CI: 1.004 - 1.063). Moreover, adolescents who reported being concerned with the color of their teeth showed 2.208 times higher PR than those without this concern (95%CI: 1.028 - 4.740).

**Table 3** – Bivariate analysis for the association between concern with oral health and independent variables in adolescents in conflict with the Law.

Variables	Prevalence ratio (95%CI)	p-value
Age	0.939 (0.823 - 1.071)	0.348
Skin color		
White	1	0.404
Non-white	1.148 (0.831 - 1.586)	
Adolescents' level of education		
Incomplete elementary school	1	0.211
At least complete elementary school	0.757 (0.490 - 1.170)	
Smoking exposure		
Smokers	1	0.422
Former smokers	0.883 (0.652 - 1.196)	
Never smokers	0.877 (0.611 - 1.259)	
Health problem		
Yes	1	0.693
No	1.125 (0.627 - 2.018)	
Use of medication		
Yes	1	0.777
No	1.040 (0.791 - 1.368)	
Use of illicit drugs		
Yes	1	0.623
No	0.931 (0.699 - 1.240)	
Access to the dentist in the last 12 months		
Yes	1	0.562
No	1.084 (0.826 - 1.422)	
Toothbrush frequency (per day)		
≤3 times	1	0.291
>3 times	1.548 (0.688 - 3.485)	
Dental trauma		
Yes	1	0.869
No	0.974 (0.716 - 1.327)	
Number of missing teeth	1.043 (1.000 - 1.087)	0.052
Number of decayed teeth	1.088 (1.038 - 1.142)	0.001
Number of filled teeth	1.034 (0.982 - 1.088)	0.205
DMFT Index	1.041 (1.014 - 1.068)	0.002
Concern with teeth alignment		
Yes	1	0.015
No	1.661 (1.105 - 2.497)	
Concern with teeth color		
Yes	1	0.010
No	2.604 (1.263 - 5.367)	
Self-reported halitosis		
Yes	1	0.045
No	1.347 (1.007 - 1.802)	

**Table 4** – Multivariate analysis for the association between concern with oral health and independent variables among adolescents in conflict with the Law, considering the DMFT index as an independent variable. The initial model included the following variables: adolescents' level of education, DMFT index, concern with teeth alignment, concern with teeth color, and self-reported halitosis.

Variables		Prevalence ratio (95%CI)	p-value
DMFT Index		1.033 (1.004 - 1.063)	0.024
Concern with teeth alignment	No	1	0.408
	Yes	1.155 (0.820 - 1.627)	
Concern with teeth color	No	1	0.042
	Yes	2.208 (1.028 - 4.740)	
Self-reported halitosis	No	1	0.155
	Yes	1.196 (0.935 - 1.529)	

**Table 5** – Multivariate analysis for the association between concern with oral health and independent variables among adolescents in conflict with the Law, considering each component of the DMFT index separately as an independent variable. The initial model included the following variables: adolescents' level of education, number of missing teeth, number of decayed teeth, number of filled teeth, concern with teeth alignment, concern with teeth color, and self-reported halitosis.

Variables		Prevalence ratio (95%CI)	p-value
Number of missing teeth		0.992 (0.938 - 1.049)	0.777
Number of decayed teeth		1.073 (1.007 - 1.144)	0.029
Number of filled teeth		1.037 (0.976 - 1.102)	0.241
Concern with teeth alignment	No	1	0.487
	Yes	1.138 (0.790 - 1.640)	
Concern with teeth color	No	1	0.035
	Yes	2.250 (1.057 - 4.793)	
Self-reported halitosis	No	1	0.205
	Yes	1.180 (0.913 - 1.524)	

When the multivariate model was performed with the components of the DMFT separated (Table 5), it was observed that concern with tooth color remained significantly associated with concern with oral health (PR: 2.250; 95%CI: 1.057 - 4,793). However, only the number of decayed teeth was significantly associated with the outcome of this study (PR: 1.073; 95%CI: 1.007 - 1.144)

## DISCUSSION

This study evaluated the occurrence of oral health concerns and associated factors among institutionalized adolescents. A high rate of concern was demonstrated, associated with teeth color. Similarly, the DMF index, especially its decayed component, had a significant association with this outcome.

The high number of adolescents concerned with oral health can be explained by the advance of current and relevant information, which is fundamental for general and oral health and well-being<sup>18</sup>. In adolescence, there are greater opportunities to engage in health-risk behaviors, such as inadequate diet, negligence with hygiene, and experimental consumption of illicit drugs

and alcohol<sup>19</sup> that, separately or together, can cause dental caries<sup>20</sup>, periodontal disease<sup>21</sup>, and other conditions of general health, which can lead to more significant oral health concern. However, another study quantitatively reported good toothbrushing in a group of school adolescents, demonstrating that 96.6% of them brushed their teeth daily<sup>22</sup>. This indicates that these factors vary among adolescents, depending on their context.

Malocclusion, including problems with dental alignment, has a negative effect on the OHRQoL of the adolescents<sup>23,24</sup>, predominantly affecting the emotional and social aspects of life<sup>25</sup>. Furthermore, the esthetic component of the smile, including the color of the teeth, can play an essential role in this phase of life<sup>26</sup>, especially when considering abnormal facial appearance and the occurrence of bullying<sup>27</sup>. Despite these findings, the variable concern with dental alignment was not significantly associated with concern with oral health in this study.

Conversely, concern with tooth color was significantly associated with the outcome. Concern with the color of teeth is related to the need to make a good first impression on other people<sup>28</sup> since people judge physical appearance, including weight, height, and

dentofacial aesthetics<sup>29</sup>. This aesthetic factor concerns oral health, especially among adolescents, who have high aesthetic demand, as previously mentioned, and who are undergoing physiological and physical changes<sup>30</sup>. Additionally, more important than the pain and loss of function with tooth loss for adolescents is the shame of not having a tooth<sup>31</sup>.

When showing the impact of concern with dental alignment and teeth color of the adolescents studied, those with greater aesthetic and low self-esteem reported worse impacts on OHRQoL<sup>23</sup>, which leads to the possibility that psychological factors are more closely related to OHRQoL compared to clinical factors<sup>23</sup>. Bearing this in mind, it is evident that the self-reported concern of adolescents about their health and oral hygiene is of great importance, as it impacts their psychological health. Regarding dental caries, OHRQoL is also negatively affected, as it is estimated that the more severe the caries lesions, the greater the impact on the quality of life of children and adolescents<sup>31,32</sup>.

The DMFT index, especially its decayed component, has a significant association with the outcome concern with oral health. Among adolescents with more significant dental caries experiences, this greater concern may be caused by painful experiences during previous dental appointments<sup>33</sup>, which can cause fear or anxiety<sup>34</sup>, in addition to aesthetics factors, due to the clinical aggravation of dental caries.

Another study<sup>18</sup> reported that former homeless adolescents were more likely to eat cariogenic foods and have inadequate oral hygiene practices, even when knowing the causes of dental caries and gingival bleeding. Within this context, it is necessary to understand the social particularities of each adolescent and how this influences the occurrence of oral health problems.

These social problems, such as internalization, isolation, or externalization problems, cause feelings of anger<sup>35</sup> and depression<sup>36</sup>, a growing global health problem<sup>37</sup>. These conditions are more frequently observed among children in out-of-home care compared to children in ordinary home care<sup>35</sup>. This is observed because most of them experienced stressful events, such as a history of criminality, abuse by family members, parental mental illness, and low socioeconomic status<sup>35</sup>. Institutionalization also intensifies the process that leads to depression, as it is considered a type of deprivation of parents and daily life<sup>35</sup>.

In these circumstances, institutionalized adolescents are expected to develop or intensify these

psychological problems. Depression and routine within institutions affect health, including oral health, and compromise the well-being and quality of life<sup>12</sup>. Some of these individuals still suffer from other physical health conditions, which, combined with the institutionalization, can make oral health a lower priority<sup>38</sup>. All these factors must be considered when interpreting the present study results. It is important to emphasize that factors related to the mental health of these adolescents were not collected, which can be seen as a limitation.

Self-esteem is related to the socialization of the institutionalized individuals and can be defined as a personal judgment of the individual's dignity, derived from the evaluation of other people, having a dimension with "positive" and "negative" aspects. When the assessment is negative, the level of self-esteem is low<sup>39</sup>, which can negatively impact oral hygiene. It has been suggested a positive relationship between self-esteem and the behavior of toothbrushing and in the motivation to control oral hygiene. Adolescents with higher self-esteem standards showed more favorable behaviors to their oral health compared to adolescents with lower levels of self-esteem, regarding toothbrush frequency<sup>22</sup>. Despite these findings, 62 (91.2%) adolescents reported toothbrushing more than three times daily. It can be speculated that most adolescents perform their oral hygiene routines with low efficiency, which explains the poor oral health condition identified.

This study has limitations, restricting the extrapolation to females, as only male adolescents were included. However, 90% of the population of adolescents in conflict with the Law in Brazil are male<sup>40</sup>. Additionally, this study was conducted in only one institution, which restricts the sample size, and, considering the cross-sectional design, an association of temporality was not possible to allow causality. However, the response rate of this census research strategy was favorable. The literature on the oral health of institutionalized adolescents is relatively scarce, which indicates the need for progress in this area.

## CONCLUSION

Concern with oral health was high among institutionalized adolescents. Furthermore, concern with oral health was associated with teeth color and DMFT index, mainly the decayed component.

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