

Periodontal condition of adolescents and associated factors

Condição periodontal de adolescentes e fatores associados

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ABSTRACT

Objective: This study aimed to describe the periodontal condition of adolescents and identify its potential determinants. **Methods:** This is a cross-sectional population-based study (n=763) conducted in a city in Northern Minas Gerais. Multistage probability cluster sampling method was used. Trained and calibrated professionals carried out the intraoral examinations and the interviews at the participants' homes. Logistic regression model was used to identify the factors associated with the periodontal condition. **Results:** It was found that around 30% of the adolescents presented periodontal changes, being gingival bleeding (14.1%) and dental calculus (14.0%) the most prevalent impairments. Periodontal changes were associated in adolescents who did not attend school (OR=1,9; p=0.031), attended public schools (OR=2,0; p=0.005), never went to the dentist (OR=1,7; p=0,047), used public/philanthropic services (OR=1,7; p=0,002), smoked (OR=1,6; p=0,003), consumed alcohol (OR=1,6; p=0,016) and self-perceived their oral health as too bad/bad (OR=2,4; p=0,032) and regular (OR=1,5; p=0,023). **Conclusion:** About one-third of adolescents have periodontal changes, which were associated with the type of school and type of dental service they attend, smoking, alcohol consumption and self-perception of oral health.

Indexing terms: Adolescent. Adolescent health. Oral health. Periodontal diseases. Public health. Social determinants of health.

RESUMO

Objetivo: Objetivou-se descrever a condição periodontal entre adolescentes e identificar seus potenciais determinantes. **Métodos:** Trata-se de um estudo transversal de base populacional (n=763) realizado em município da região norte de Minas Gerais. Adotou-se amostragem probabilística por conglomerado em múltiplos estágios. Profissionais treinados e calibrados realizaram os exames intrabucais e entrevistas nos domicílios. Foi utilizado modelo de regressão logística para identificar os fatores associados à condição periodontal. **Resultados:** Verificou-se que 29,5% dos adolescentes apresentaram alterações periodontais, sendo que o sangramento gengival (14,1%) e o cálculo dentário (14,0%) foram os agravos mais prevalentes. As alterações periodontais foram associadas em adolescentes que não estudavam (OR=1,9; p=0.031), que estudavam em escolas públicas (OR=2,0; p=0.005), que nunca foram ao dentista (OR=1,7;

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$p=0,047$) utilizaram os serviços públicos/filantropicos ($OR=1,7$; $p=0,002$), que fumavam ($OR=1,6$; $p=0,003$), que consumiam bebida alcoólica ($OR=1,6$; $p=0,016$) e que autoperceberam auto perceberam sua saúde bucal como péssima/ruim ($OR=2,4$; $p=0,032$) e regular ($OR=1,5$; $p=0,023$). **Conclusão:** Cerca de um terço dos adolescentes possui alterações periodontais, que foram associadas ao tipo de escola e ao tipo de serviço odontológico que frequentam, tabagismo, consumo de bebida alcoólica e autopercepção da saúde bucal.

Termos de indexação: Adolescentes. Saúde do adolescente. Saúde bucal. Doenças periodontais. Determinantes sociais da saúde. Saúde pública.

INTRODUCTION

Oral health in adolescence represents a good individual health indicator and it is crucial to understand it at this age in order to subsidize health promotion actions [1]. However, oral health problems are highly prevalent in this population [2].

Periodontal disease can begin in childhood and adolescence and progress slowly throughout life, showing significant prevalence in this age group [2-4]. It is a major oral health problem, considered one of the leading causes of tooth loss at its more advanced stages, which could result in serious functional and aesthetic impairment for the patient [5-7]. Gingivitis, less severe and most common form of periodontal disease, currently affects 33.8% of adolescents in Brazil and periodontitis, 10.5% [8].

Clinical signs such as gingival bleeding, supragingival calculus, probing depth and loss of insertion are indicators of periodontal disease that isolated or in association with other parameters, provide data to diagnose the presence or absence of periodontal inflammation [9]. Most epidemiological studies [3] follow the parameters recommended by the World Health Organization, and use periodontal disease indicators systematized in indices such as the periodontal community index (CPI) - gingival bleeding, calculus presence and bag depth. It has as advantage simplicity, reproducibility and international uniformity [10].

Several potential risk factors for periodontal disease have been reported in oral health epidemiological surveys, namely being male, of black origin, low socioeconomic status and low educational level, smoking, alcoholism, poor oral hygiene, biological factors, genetic factors, psychosocial conditions such as stress and depression and diabetes [2,3,11-16]. Measures like oral hygiene education, patient empowerment for self-care, dental care and intersectoral and interdisciplinary actions and the establishment of public policies are critical to the prevention and treatment of this disease [1,5,7,13,14].

In view of the scarcity of information on periodontal condition among adolescents in Brazil and the assumption that factors such as sociodemographic, behavioral, use of dental services and self-perception of oral health could be determinants of the periodontal conditions among adolescents, the aim of this study was to describe the periodontal condition and identify its potential determinants among a population of adolescents in Northern Minas Gerais, Brazil.

METHODS

Ethical aspects

The present study was approved by the Ethics Committee in Research – approval number 318/08. All individuals participating in the study signed the Informed Consent Form.

Study design

It is a cross-sectional population-based study conducted in Montes Claros, a city located in Northern Minas Gerais, in the São Francisco River Basin, with approximately 360,000 inhabitants. In this study, the population of interest consisted of adolescents aged between 15 and 19 years living in the urban and rural areas of the municipality.

Sample size

The sample size was calculated in order to estimate population parameters with a prevalence of 0.50, 95% confidence level and 5.0% margin of error. Correction for the design effect was used ($d_{eff} = 2$), with a 20% increase to compensate for possible losses. The result was a sample of at least 761 individuals.

The two-stage cluster sampling was the method used. In the first stage, 52 of the 276 urban census sectors existing in the municipality were randomly selected through simple random sampling (SRS). In the second stage, a sample fraction was selected through SRS from the blocks in each of the 52 sectors randomly selected, resulting in an average of seven blocks per sector. All households in the selected blocks were sequentially visited and the residents within the age range studied were invited to participate in the study. In the rural area, the single-stage cluster sampling was the method used. Two of the eleven rural areas identified were randomly selected, and all households located at a distance of up to 500 meters from a reference institution (school) were selected and their residents aged between 15 and 19 years were invited to participate in the survey.

In order to incorporate the complex sampling design structure into the data analysis, each respondent was associated with a weight w , corresponding to the inverse of his/her inclusion probability in the sample (f) [17]. In the urban area, the inclusion probability was obtained by the product of the inclusion probability in each of the two stages ($f = f_1 \times f_2$), being $f_1 =$ inclusion probability in the first stage (number of sectors randomly selected / total number of sectors) and $f_2 =$ inclusion probability in the second stage (number of blocks randomly selected / total number of blocks of the sector). Moreover, the possibility of refusal to participate in the study was also taken into account, which would result in different inclusion probabilities. Thus, the response rate (rr) in each sector was incorporated and the final inclusion probability of each individual was obtained by the expression $f = f_1 \times f_2 \times rr$. In the rural area, the selection of individuals consisted of only one stage, so the inclusion probability was calculated by the expression $f = f_1 \times rr$, considering $f_1 =$ inclusion probability in the first stage (number of rural areas randomly selected / total number rural areas). Finally, each respondent's weight was obtained by the inverse of the inclusion probability ($w = 1/f$).

Fieldwork

The fieldwork was conducted by 24 teams composed of an examiner and a note taker, all previously trained and calibrated. The data were collected using a handheld computer with a program created specifically

for that purpose, enabling simultaneous and automatic database building [18]. Interviews and intraoral examinations were carried out in a wide environment under natural light with a mouth mirror and CPI probe (WHO) previously sterilized [19]. The data stored on the handheld computer were transferred to a central computer, and then exported to the Statistical Package SPSS version 17.0 to be checked, reviewed and corrected.

The dependent variable "periodontal status" was assessed using the Community Periodontal Index (CPI). Dentition was divided into six sextants and the most serious situation found in the sextant examined was recorded. The scores adopted for the CPI evaluation were: 0= healthy periodontium; 1= presence of bleeding on probing; 2= presence of calculus; 3= 4-5 mm pocket; 4= 6 mm pocket or over 19. Adolescents presenting $CPI > 0$ were considered as having periodontal changes and those with $CPI = 0$ were classified as having no periodontal changes.

The other independent variables investigated were arranged into four groups: demographic characteristics and socioeconomic status, use of dental services, health-related behavior, and subjective oral health status (Table 1).

Data analysis

The variables were described by means of their frequency distributions, with correction for the design effect ($deff$). A 95% interval was estimated for the prevalence of periodontal changes, set up from the CPI categorization.

The logistic regression model was used in the analysis of the factors associated with periodontal changes. Initially, bivariate analyses were performed and the variables showing descriptive level $p < 0.20$ at this stage were selected for the multivariate analysis. In order to build the multiple regression model, the step forward procedure was adopted. The variables significantly associated with the outcome at the level of 0.05 remained in the final model. Crude and adjusted odds ratios were estimated with their respective 95% confidence intervals. Hosmer & Lemeshow test was used to evaluate the goodness of fit of the logistic model. All analyses were performed with the Statistical Package SPSS version 17.0, using the *Complex Sample* module to analyze data from complex samples, in order to adjust the variability estimates in the cluster sampling.

Table 1. Independent variables and their categories. Montes Claros (MG), 2008/2009.

Demographic characteristics and socioeconomic status	
Variables	Categories
Age	In complete years
Gender	Male; Female
Self-declared skin color	White; Black/Indian/Brown/Yellow
Marital status	Married/stable union; Single
Education (years in school)	Up to 8 years; 09 to 11 years; Over 11 years
Currently at school	No; Yes
Type of school	Public; Private
Currently working	No; Yes
Monthly <i>per capita</i> income *	≤R\$200,00; >R\$200,00
Housing	Rent/lent; Own
Number of people living in the house	> 1 person/room; ≤ 1 person/room
Use of dental services	
Variable	Categories
Type of dental service	Public/philanthropic; Private/dental care plan/health care plan
Time since last dentist appointment	Within ≥ 1 year; < 1 year
Reason for last year's appointment	Treatment; Routine/maintenance
Visits dentist periodically	No; Yes
Received oral hygiene instructions	No; Yes
Health-related behavior	
Variables	Categories
Frequency of tooth brushing	< 3 times/day; ≥ 3 times/day
Use of dental floss	Does not use; Uses
Use of topic fluoride	No; Yes
Self-examination of mouth	No; Yes
Smoking	Yes; No
Consumes alcohol	Yes; No
Practices physical activities	Rarely/Never; Occasionally; Always/often.
Subjective conditions of oral health	
Variables	Categories
Self-perception of oral health	Excellent/good; Fair; Poor/very poor
Self-perception of chewing	Excellent/good; Fair; Poor/very poor
Self-perception of teeth and/or gingival appearances	Excellent/good; Fair; Poor/very poor
Self-perception of speech	Excellent/good; Fair; Poor/very poor
Self-perception of relationship affected by oral health	Does not affect; Affects
Self-perception of need for dental treatment	Needs; Does not need
Toothache and or gingival pain in the last six months	Absent; Present

Note: *The cut-off point was defined by the median distribution.

RESULTS

The study comprised 763 subjects (99.6% from the urban area), with a response rate of 91.5%. Subjects

not found after three home visits were excluded from the study, being that the main reason for the losses.

The mean age of the adolescents was 17.1 years, most of them were female (52.7%), single (94.7%), self-

declared brown skin color (52.8%), attending education institutions (73.9%), had already attended over eight years of regular education (77.2%), did not work (75.5%), and held a monthly per capita income equal to or below R\$ 200,00 (58.7%). Over 80.0% of adolescents lived in own homes. On average, their homes had 6.3 rooms housing 4.8 people, with a person-to-room ratio of less than or equal to one in 81.5% of the cases interviewed.

Most of the population studied (93.9%) had used dental services at least once in life, 46.4% of whom used dental services over a year prior to the beginning of the study. More than half of the adolescents who had access to dental treatment (55.6%) had the treatment done in public services, and 40.3% reported dental treatment as the reason for their last visit to the dentist. Only 26.2% of the adolescents reported visiting the dentist periodically.

It was noticed that 28.9% of the adolescents did oral hygiene less than three times a day, 58.8% did not use dental floss, 58.8% had never used topical fluoride, 41.2% reported one or more deleterious oral habits and 79.0% had never done oral self-examination. A significant

percentage (31.8%) of the adolescents reported not or rarely practicing physical activity; smoking and drinking habits were reported by 5.1% and 18.8% of the respondents, respectively.

As for the subjective aspects of oral health, the following percentages of negative self-perception (fair/poor or very poor) were found: self-perception of oral health (34.4%), chewing (22%), appearance (35.4%), speech due to the teeth and gingivae (14.0%). Self-perception of toothache and/or gingival pain in the last six months was reported by 32.8% of the respondents.

Periodontal change (CPI>0) was found in 246 (29.5%) adolescents being gingival bleeding (14.1%) and dental calculus (14.0%) the most prevalent damages in this population. The presence of shallow or deep periodontal pockets was observed in only 1.3% of the subjects and 2.9% of the population studied (n=27) presented the six sextants affected (Table 2).

Table 3 shows the results of the crude analysis of the factors associated with periodontal changes. The variables

Table 2. Distribution of adolescents according to periodontal condition and the frequency of healthy sextants, with gingival bleeding, calculus and periodontal pockets assessed by the Community Periodontal Index (CPI). Montes Claros (MG), 2008/2009.

Periodontal condition	n	% (CI _{95%})	Mean (S.E)
CPI			
CPI=0 (with no periodontal change)	513	70.5 (61.8-78.0)	5.2 (0.1)
CPI > 0 (with periodontal change)	246	29.5 (22.0-38.1)	
CPI-Categories			
Healthy	513	70.5 (61.8-78.0)	5.2 (0.1)
Bleeding on probing	131	14,1 (8.8-21.8)	0.5 (0.1)
Dental calculus	105	14.0 (10.3-18.8)	0.3(0.1)
Shallow pocket	09	1.2 (0.6-2.4)	0.0 (0.0)
Deep pocket	01	0.1 (0.0-0.7)	0.0 (0.0)
Sextant excluded	04	0.1 (0.0-0.7)	0.0 (0.0)
Total	763	100.0	

Number of sextants affected	Healthy		Bleeding		Calculus		Shallow pocket		Deep pocket	
	n	%	n	%	n	%	n	%	n	%
None	40	4.9	591	81.2	648	85.4	750	98.8	758	99.9
1 sextant	24	3.0	67	8.1	53	7.7	4	0.5	1	0.1
2 sextants	19	1.8	35	3.9	17	1.9	2	0.3	-	-
3 sextants	33	3.6	19	1.9	18	1.8	3	0.4	-	-
4 sextants	48	5.5	21	2.0	5	0.6	-	-	-	-
5 sextants	82	10.7	10	1.3	7	1.3	-	-	-	-
6 sextants	513	70.5	16	1.6	11	1.3	-	-	-	-

Note: CI 95%: 95% confidence interval; SE: standard error. *Descriptive statistics - absolute, relative and average frequencies.

Table 3. Association among demographic characteristics, socioeconomic status, health-related behaviors, use of dental services, Subjective conditions of oral health and periodontal change: crude and adjusted analysis. Montes Claros, MG, 2008/2009.

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Variables	Prevalence of	Crude analysis		Adjusted analysis	
	PC (%)	OR (CI _{95%})	p-Value	OR (CI _{95%})	p-Value
Demographic and socio-economic characteristics					
Self-declared skin color					n.s
Black/Indian/Brown/Yellow	32.1	1.4 (1.0-1.9)	0.080		
White	22.2	1.0			
Typo of school					
Does not study	29.3	2.0 (1.1-3.5)	0.017	1.9 (1.1-3.4)	0.031
Public	31.3	2.1 (1.3-3.6)	0.004	2.1 (1.2-3.6)	0.005
Private	19.5	1.0		1.0	
Currently working					n.s
Yes	35.6	1.4 (1.0-2.0)	0.058		
No	27.4	1.0			
<i>per capita</i> income					n.s
Up to R\$ 200,00	33.6	1.4 (1.0-1.9)	0.045		
Over R\$ 200,00	29.0	1.0			
Housing					n.s
Rented/lent	39.2	1.4 (1.0-2.1)	0.052		
Own	27.2	1.0			
Number of people living in the house					
>1 person	28.2	1.5 (1.0-2.2)	0.064		n.s
≤1 person	34.7	1.0			
Use of dental service and behavior					
Kind of service					
Never went to the dentist	40,0	1,9 (1,1-3,6)	0,046	1,7 (1,1-3,3)	0,047
Public /philanthropic	31,7	1,9 (1,4-2,6)	0,000	1,7 (1,2-2,4)	0,002
Private / health insurance	24,9	1,0		1,0	
Time since last visit dentista					n.s
Never went to the dentist	40,0	1,6 (0,8-2,9)	0,169		
≥1 year	30,5	1,3 (1,0-1,8)	0,091		
<1 year	27,2	1,0			
Received oral hygiene Guidance					n.s
No	35,9	1,4 (1,0-2,1)	0,086		
Yes	28,3	1,0			
Frequency of dental brushing					n.s
<3 times/Day	33,1	1,3 (0,9-1,8)	0,167		
≥3 times/Day	27,9	1,0			

Table 3. Association among demographic characteristics, socioeconomic status, health-related behaviors, use of dental services, Subjective conditions of oral health and periodontal change: crude and adjusted analysis. Montes Claros, MG, 2008/2009.

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Variables	Prevalence of	Crude analysis		Adjusted analysis	
	PC (%)	OR (CI _{95%})	p-Value	OR (CI _{95%})	p-Value
Perform self-examination of the mouth					n.s
No	28,2	0,7 (0,5-1,1)	0,091		
Yes	34,2	1,0			
Smoker					
Yes	39,7	2,2 (1,2-4,1)	0,017	1,6 (1,2-2,3)	0,003
No	28,9	1,0		1,0	
Consume alcoholic beverage					
Yes	37,1	1,7 (1,1-2,4)	0,007	1,6 (1,1- 2,4)	0,016
No	27,6	1,0		1,0	
Subjective Conditions of Oral Health					
Self-perception of oral health					
Too bad/bad	46,1	2,5 (1,2-5,5)	0,011	2,4 (1,1-5,2)	0,032
Regular	36,1	1,7 (1,2-2,4)	0,001	1,5 (1,1-2,1)	0,023
Excellent /good	25,1	1,0		1,0	
Self-perception of chewing					n.s
Too bad/bad	45,9	1,8 (0,9-3,9)	0,116		
Regular	34,0	1,3 (0,9-2,0)	0,141		
Excellent /good	27,6	1,0			
Self-perception of the appearance of teeth / gums					n.s
Too bad/bad	37,6	1,8 (1,1-3,2)	0,031		
Regular	35,7	1,5 (1,1-2,2)	0,027		
Excellent /good	25,3	1,0			
Self-perception of relationship affected by oral health					
Affects	40,9	1,9(1,1-3,1)	0,014		n.s
Does not affect	27,0	1,0			
Pain in the teeth /gums in the last six months					n.s
Yes	84,5	1,4 (1,0-2,1)	0,074		
No	26,9	1,0			
Self-perception of the need for dental treatment					
Yes	23,5	0,6 (0,4-1,0)	0,064		n.s
No	32,6	1,00			

Note: PC: Periodontal Change; OR: *odds ratio*; CI 95%: 95% Confidence interval; n.s: not significant. χ^2 HL: (8) =3,07; p=0,929 (teste Hosmer & Lemeshow). *Logistic regression model. **Hosmer & Lemeshow test

that did not show statistically significant association ($p\text{-value}>0.20$) were not included in the table. Table 3 also shows the results of the adjusted analysis, whose variables associated with periodontal change ($p\text{-value}\leq 0.005$) were: type of school, type of dental service, smoking, alcohol consumption and self-perception of oral health. It was found that the chances of periodontal changes among the subjects who did not attend school and among those who attended public schools were 1.9 times and 2.0 times, respectively, the chances observed among the subjects who attended private schools. In the groups of variables "use of dental services" and "health-related behavior" the chances of periodontal changes were higher among the subjects who never went to the dentist ($OR=1.7$), used public/philanthropic services ($OR=1.7$), smoked ($OR=1.6$) and consumed alcohol ($OR=1.6$). Among the subjective conditions of oral health, it was found that the adolescents who self-perceived their oral health as poor/very poor ($OR=2.4$) and fair ($OR=1.5$) presented higher chances of periodontal changes. The Hosmer-Lemeshow test showed goodness of fit of the final model ($p=0.929$).

DISCUSSION

The occurrence of periodontal damages in its various forms has been a reality among adolescents and may impact their lives [2,14]. This study has identified a significant prevalence of adolescents with some periodontal change ($CPI>0$) in the city of Montes Claros - MG, however, lower than that found in Ireland, and other national scenarios such as in the town of Água Doce - SC, in the Vale do Jequitinhonha - MG and in all Brazilian regions as reported in the last national oral health survey [6,8,14,20].

Gingival bleeding and dental calculus were the most prevalent damages and shallow or deep periodontal pockets showed low prevalence (1.4%), which is in line with previous studies [12,14,20,21]. The prevalence of gingival bleeding identified in this study was higher than those observed among adolescents in the Brazilian regions, ranging from 7.1% (North) to 11.7% (South) [8] and lower among those living in the municipalities of the Vale do Jequitinhonha - MG [14]. On the other hand, dental calculus was less prevalent when compared to adolescents in the Southeast and North regions of Brazil [8] and more prevalent compared to the findings in a study conducted in the Vale do Jequitinhonha - MG [14].

Regarding the demographic characteristics and socioeconomic status, only the variable "type of school" was associated with the outcome after adjusting for the other variables analyzed, showing higher chances of periodontal change among adolescents who did not attend school and who attended public schools when compared to those who attended private schools. The higher prevalence of periodontitis among individuals with low education level has been reported in Mangalore, India [2]. Survey of Rio Janeiro adolescents found that those who were from private schools had better quality of life related to health in comparison to public schools [22].

It should be considered that the highest chance of periodontal diseases among public school students could be partly explained by the socioeconomic factor, which might be lower among these students. Previous studies have shown that the socioeconomic status influences the development and progression of periodontal disease in different age groups, including among adolescents, which could be related to oral hygiene habits and access to dental services, oral care products and appropriate treatment [2,5,21,23,24]. Low socioeconomic status over youth's life is presented as a risk factor for lack of dental care in a prospective study in Sobral (CE) [25].

In the group "use of dental services and health-related behaviors", the chances of periodontal involvement were higher among adolescents who had never been to the dentist, which is in line with the findings of a study conducted in São Paulo [11]. The presence of mild periodontal disease among Cuban adolescents was related to lack of oral hygiene [26]. Lower prevalence of gingivitis was observed among Indian adolescents who reported regular tooth brushing and visits to the dentist [2]. It is possible that adolescents who have using dental services at least once in life are more likely to have access to maintenance, prevention and early treatment procedures. The effect of maintaining good oral hygiene on the periodontium has been well-documented [2]. A previous study found that individuals who did not receive oral health information in adolescence and consulted the dentist for more than one year during the youth showed a higher number of teeth without dental care [25].

The odds of periodontal changes were also higher among adolescents who used public or philanthropic services. It is also believed that private service users have greater purchasing power to buy oral hygiene products

such as dental floss, which has been identified as a protective factor for periodontal conditions among young adults [5]. Adolescents from Ceará who used the private service throughout their life were more likely to receive immediate dental care [25].

The negative effect of cigarette smoking on the periodontal condition has also been observed, as already evidenced in other studies with populations of different age groups [6,15,27]. Smoking has been considered as one of the main risk factors involved in the prevalence, extent and severity of periodontal diseases and quitting smoking as a factor to maintain periodontal health [13,15]. A study conducted in Japan has shown that both active and passive smoking can have harmful effects on men's periodontal health, which demands that people be made aware of the negative effects of smoking, not only on their own health, but also on other individuals' health [28].

Similarly, a significant association between periodontal change and alcohol consumption has also been identified. A study carried out with adults in Southern Brazil has shown that individuals who consume more alcohol are more likely to have periodontitis. Furthermore, alcohol consumption affects men's and women's periodontal health differently [16].

There was an association between periodontal condition and self-perception of oral health, being the prevalence of unfavorable periodontal condition (CPI>0) higher among those who evaluated their oral health negatively. This finding could be partly explained by the presence of signs and symptoms of periodontal changes such as halitosis and bleeding, which can cause discomfort with consequent negative impact on the individuals' perception of their own oral health. This fact reinforces the idea that epidemiological surveys in oral health should include, in addition to the normative aspects, subjective questions of oral health in order to gain a comprehensive view of the individuals' real needs, which has also been highlighted in a previous study [13].

It can be realized from this study that, the efforts towards prevention, detection and treatment of periodontal changes in adolescents, besides requiring an in-depth knowledge of periodontics, calls for a wider understanding of oral health taking into account the associated factors and the behavioral changes needed in this population [2,13]. Therefore, it is crucial to invest in health promotion and prevention actions, considering

the impact of periodontal disease on quality of life [29], with emphasis on oral health education for adolescents, held mainly by schools as well as within the scope of the Primary Health Care, in view of their close proximity to this population, so as to empower them to play an active role in their own health care [2,13,14].

The use of the Community Periodontal Index (CPI) to assess the presence of periodontal changes should be considered as a limitation in the present study. The hierarchical record of periodontal conditions (bleeding, calculus and periodontal pocket) in populations with low prevalence of periodontal pockets may underestimate the prevalence of gingival bleeding, since the record of dental calculus (CPI=2) does not allow concurrent identification of bleeding (CPI=1) in the same sextant, a fact that raises questions as to the use of the CPI. Nevertheless, the CPI was adopted in this study because it is regarded as an international index used in several epidemiological studies in oral health, and recommended by the WHO to study and compare the periodontal condition in different populations [6,8,11,19,21].

The periodontal condition of the adolescents in this study showed the need to implement actions related to the prevention, detection and control of these alterations by dental surgeons in order to avoid their repercussions on oral health and the life of this population. This fact is essential, considering this phase of the life cycle, considering that the health behaviors can last through the adult life. Social, economic and cultural situations among adolescents should be considered when planning intervention measures. Inequalities in access and lack of equity in relation to dental care need to be minimized.

The development of educational actions based on active learning methodologies is necessary in order to produce the public's knowledge about this condition and to promote reflection and encouragement for the development of healthy habits, especially the appropriate oral hygiene practices and the prevention of alcohol and tobacco consumption, important variables related to periodontal diseases.

It is important to establish acceptable oral health parameters from a regional perspective, taking into account local characteristics and peculiarities. The findings described here may help gain a deeper insight into the periodontal condition of this age group living in northern Minas Gerais.

CONCLUSION

About one-third of adolescents have periodontal changes, which were associated with the type of school and type of dental service they attend, smoking, alcohol consumption and self-perception of oral health. It is suggested to carry out prospective studies that evaluate the interaction of multiple factors involved in the alterations of the periodontal conditions throughout the life course of the individual.

Collaborators

We inform that MF SILVEIRA participated in the design of the project, analysis and interpretation of the data, essay writing, critical review of the intellectual content, and final approval of the version to be published. RS FREIRE participated in the analysis and interpretation of the data, relevant critical revision of the intellectual content, and final approval of the version to be published. MFSF BRITO participated in the writing of the article, relevant critical revision of the intellectual content, and final approval of the version to be published. AMEBL MARTINS participated in the project design, data analysis and interpretation, article writing, and final approval of the version to be published. LF MARCOPITO participated in the design of the project, writing the article, critical review relevant intellectual content, and final approval of the version to be published.

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