

Association between dental pain, use of dental services and school absenteeism: 2015 National School Health Survey, Brazil*

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Abstract

Objective: To analyze association between dental pain, use of dental services and school absenteeism in Brazilian adolescents. **Methods:** This was a cross-sectional study with data from the National School Health Survey (PeNSE 2015). The study's dependent variable was school absenteeism due to health reasons in the last 12 months. Socioeconomic characteristics, dental pain and use of dental services were the independent variables evaluated. Logistic regression was used to estimate odds ratios (OR) and respective 95% confidence intervals (95%CI). **Results:** Data on 102,072 schoolchildren were included. Absenteeism prevalence due to health reasons was 53.7% (95%CI 53.2;54.3). In the adjusted analysis, there was association between dental pain and school absenteeism (OR=1.35 – 95%CI 1.26;1.45), and an increase in absenteeism occurrence the greater the number of dental visits. **Conclusion:** The results suggest that dental pain and frequency of dental visits may be related to school absenteeism.

Keywords: Absenteeism; Oral Health; Dentistry; Dental Care; Cross-Sectional Studies.

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Introduction

Oral health is a key indicator of general health, wellbeing and quality of life.¹ Some dental disorders have been considered public health problems, since they can result in nutritional deficiencies, as well as aesthetic, speech, chewing and swallowing impairment.^{2,3} In addition, psychological disorders, especially those associated with low self-esteem, can be a consequence of oral health problems.³

Despite a significant improvement in child and adolescent oral health, the prevalence of dental problems during this stage of life is still great, mostly in economically disadvantaged groups.

Efforts aimed at oral health prevention and promotion have presented themselves as a worldwide reality.⁴ Despite a significant improvement in child and adolescent oral health, the prevalence of dental problems during this stage of life is still great, mostly in economically disadvantaged groups.⁴ In Brazil, in 2010, 60.8% of children at age 12 self-reported need of some sort of treatment; a similar result was observed for youths between 15 and 19 years of age, of whom approximately 65% reported requiring dental treatment.⁵

Children and adolescents with dental problems can have disadvantages in social, physiological and mental development compared to individuals without oral health conditions.⁶ There is suggestive evidence that individuals with oral health conditions are more likely to be absent from the classroom as a result of having to visit the dentist, as well as showing greater difficulty in concentration, thus impairing learning at school.⁷⁻¹¹ A recently published meta-analysis review of children and adolescents between the ages of 6 and 18 noted that dental caries and/or dental pain are negatively associated with student performance and attendance at school.¹¹

Literature on the impact of oral health problems on children and adolescents' daily school life, in population terms, is still scarce. This study aimed to analyze association between dental pain, use of dental

services and school absenteeism in adolescents aged 13 to 17 who participated in the 2015 National Adolescent School-based Health Survey (PeNSE).

Methods

This was a cross-sectional study, using secondary data from the PeNSE survey conducted in 2015.¹²

Data were collected from April to September 2015, with two distinct samples: one comprised of students attending grade 9 of elementary school, for comparability with previous editions of the survey; while the other was comprised of 13 to 17-year-old students who were attending grades 6 to 9 of elementary school (former grades 5 to 8) and grade 1 to 3 of high school. Students who regularly attended public and private educational institutions, located in urban and rural areas in municipalities covered by Brazil's 26 state capital cities and Federal District were included.^{12,13}

The 2015 PeNSE survey addressed socioeconomic, demographic, school context, general health and oral health matters.¹³ School absenteeism was the study's dependent variable and was defined as the number of days of absence from school for health reasons, measured by the question "*In the last 12 months, how many days did you miss school for reasons related to your health?*" and the following answer options: "*I did not miss school in the last 12 months for health reasons*"; or "*I missed school on at least one day in the last 12 months for health reasons*".

Race/skin color data were collected according to the classification proposed by the Brazilian Institute of Geography and Statistics (IBGE): white; black; brown, yellow; indigenous - the yellow and indigenous categories were consolidated as 'other'. The country's geographic regions were classified according to the division proposed by IBGE and adopted universally, namely five major national regions - North; Northeast; Southeast; South; and Midwest. Maternal education was defined by the question: "*What level of education (grade) has your mother completed or is currently at?*" and the following answer options: "*My mother did not go to school*"; "*My mother started elementary or primary school, but did not finish*"; "*My mother finished elementary or primary school*"; "*My mother started high school or secondary school, but did not finish*"; "*My mother finished high school or secondary school*"; "*My mother started college*".

(higher education), but did not finish”; or “My mother finished college (higher education)”. Seeking health services was defined by the question “In the last 12 months have you sought any health services or professionals for any care related to your own health?” and the answer options “Yes” or “No”.

Regarding oral health, the variables ‘dental pain’ and ‘use of dental services’ were used. Reporting dental pain in the last 6 months was measured by the question “In the last 6 months, have you had toothache? (exclude toothache caused by appliance use)” and the answer options “Yes” or “No”. Use of dental services was defined by the question “In the last 12 months, how many times did you go to the dentist?” and the following answer options: “None in the last 12 months (0 times)”; “Once in the last 12 months”; “Twice in the last 12 months”; or “Three or more times in the last 12 months”.

Demographic and socioeconomic characteristics, demand for health services, use of dental services and dental pain were used as independent variables. The socioeconomic and demographic variables were included as potential confounding variables (Figure 1).^{6,11,14,15}

Statistical analysis of the data was performed using Stata 15.0 software (StataCorp, College Station, TX, USA). The absolute and relative frequencies and 95% confidence intervals (95%CI) of the dependent variable ‘school absenteeism for health reasons’, as well as the independent variables, were verified by Pearson’s chi-squared test. Crude and adjusted logistic regression analysis was performed in order to analyze association of oral health variables with school absenteeism for health reasons, estimating odds ratios (OR) and respective 95%CIs. The *svy* command was used, considering the design effect.

In the adjusted analysis, adjustment variables that can confound association between the dependent variable (school absenteeism) and the independent variables related to oral health (use of dental services; dental pain) were used. The adjustment variables were ‘sex’, ‘race/skin color’, ‘age’, ‘maternal education’ and ‘seeking general health services’. Relationship was established according to a theoretical model, with two hierarchical levels: (i) Demographic and socioeconomic characteristics; (ii) Oral health condition and general and oral health service-related variables (Figure 1), based on the literature.^{6,11,14,15}

Variables with a p-value less than 0.20 in the crude analysis were included in the adjusted analysis, and those with $p \leq 0.05$ were kept in the model.

The study was approved by the National Health Council’s National Committee on Research Ethics: Opinion No. 1.006.467, published on March 30, 2015. The Free and Informed Consent form was displayed on the front page of the smartphone used to administer the questionnaire. Students voluntarily agreed to participate in the study and could quit at any time with no penalty or loss of benefits. Authorization of those responsible for the students was not obtained due to adolescent autonomy as guaranteed by law: Statute of the Child and Adolescent (ECA) - Act No. 8.069 dated July 13, 1990. The State and Municipal Education Departments and each school’s administration body also authorized the research.¹³

Results

A total of 102,072 primary and secondary school students from public and private schools in Brazil were evaluated through PeNSE, most of whom were female (51.3% - 95%CI 50.7;51.8) and 14 years old (51.0% - 95%CI 50.5;51.6). Of the interviewed students, 43.1% (95% CI 43.5;43.6) stated that they were of brown skin color/race. The national macro-region with the greatest proportion of students taking part in the survey was the Southeast (43.4% - 95%CI 42.8;43.9). Approximately 31% (95%CI 30.3;31.5) of the surveyed students’ mothers had completed high school (Table 1).

Regarding the variables referring to the students’ health, 55.3% (95%CI 54.8;55.9) had sought health services in the last year (last 12 months), and 37.1% (95%CI 36.6;37.7) reported having used dental services three or more times in the same period. Dental pain prevalence in the last 6 months in the studied population was 23.4% (95%CI 22.9;23.9). Also, when students were asked if they had ever missed class for health reasons, 53.7% (95%CI 53.2;54.3) answered “Yes”.

According to the results described in Table 1, school absenteeism prevalence was greater in students who presented dental pain in the last 6 months (60.0% - 95%CI 58.8;61.2). When comparing school absenteeism prevalence with use of dental services, an increase in absenteeism prevalence was observed as the number of consultations in the last 12 months increased. The difference in school absenteeism prevalence among

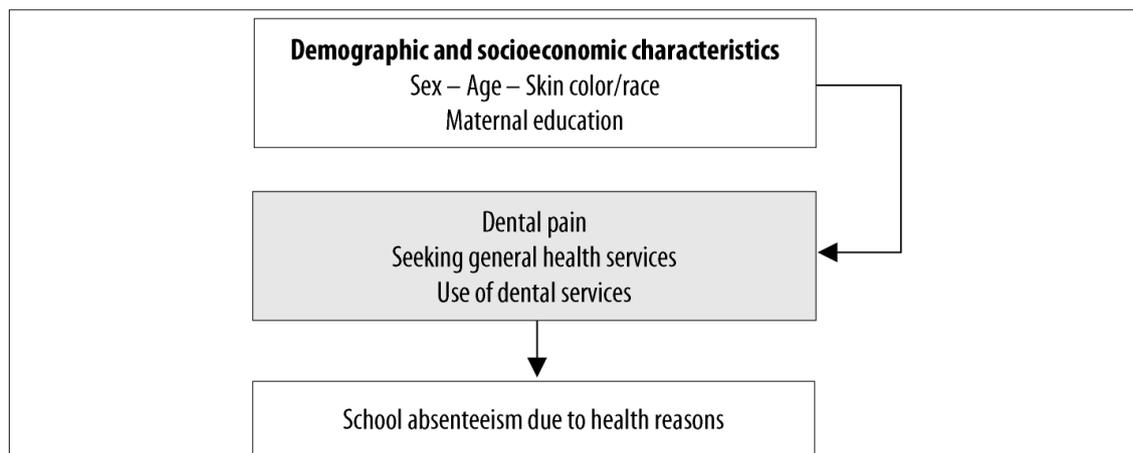


Figure 1 – Theoretical and conceptual model, in which the demographic and socioeconomic characteristics belong to the level most distal to the ‘school absenteeism for health reasons’ dependent variable, while ‘dental pain’ and ‘seeking general health services/use of dental services’ belong to the level proximal to that variable.

those with three or more dental appointments in the last 12 months (57.9% - 95%CI 56.9;58.8) and those who did not go to the dentist (46.9% - 95%CI 45.9;47.9) was approximately 10 percentage points. The variables ‘maternal education’, ‘use of dental services’ and ‘age’ (the latter, inversely) presented linear association with school absenteeism, with the linear trend test being significant for all three ($p < 0.001$).

Table 2 shows the associations between dental pain and use of dental services with school absenteeism for health reasons. After adjusting for socioeconomic variables and demand for general health services, the greater the number of child and adolescent dental consultations, the greater the increase in the occurrence of school absenteeism. Students that used dental services three or more times in the last year had a 12% higher odds ratio of missing classes (OR=1.12 - 95%CI 1.04;1.19) when compared to those who did not use dental services in the same period; and students that presented dental pain in the last 6 months had a 35% higher odds ratio of missing classes (OR=1.35 - 95%CI 1.26;1.45), compared to those who did not report dental pain.

Discussion

This study found association between school absenteeism for health reasons and dental pain occurrence and use of dental services in the last year. When the frequency of use of dental services

was analyzed, the strength of association was greater among those who consulted these services more than once in the last 12 months, in relation to those who sought them only once, the reference group being those who reported not having gone to the dentist in the last year. These results may represent, among this population, more students seeking dental care with the purpose of solving and treating oral problems than for preventing them.

School absenteeism is characterized by the unjustified absence of students from school. It can result from oral problems, capable of negatively impacting quality of life related to oral health and carrying out daily activities, such as classroom attendance.¹⁶ The results suggest the existence of an association of aspects related to oral health, such as use of dental services and dental pain occurrence, with school absenteeism among Brazilian adolescents. This is probably due to the often debilitating characteristic of dental pain, and the need to seek oral health services. Dental pain, despite depending on the individual’s perception level, can produce discomfort at different levels of intensity, to the point of affecting daily activities and social relationships.¹⁷⁻¹⁹

There are theories that explain the relationship between oral health and school absenteeism and performance, ranging from the student’s lack of concentration in the classroom, given their dissatisfaction with their oral condition, to their

Table 1 – Description of the socioeconomic and demographic characteristics related to health services and oral health in Brazilian students, based on data from the National Adolescent School-based Health Survey, 2015

Characteristics	N (%) ^a	95%CI ^b	School absenteeism: "Yes"		
			% ^a	95%CI ^b	p-value ^c
Sex (n=102,072)					<0.001
Male	49,290 (48.7)	48.2;49.3	50.2	49.4;51.0	
Female	52,782 (51.3)	50.7;51.8	57.1	56.3;57.8	
Age in years (n=102,072)					<0.001
≤13	17,260 (18.2)	17.8;18.7	56.2	54.8;57.6	
14	51,611 (51.0)	50.5;51.6	55.2	54.4;55.9	
15	20,864 (19.8)	19.4;20.2	50.9	49.7;52.1	
≥16	12,337 (11.0)	10.7-11.3	48.0	46.5;49.5	
Race/skin color (n=101,964)					<0.001
White	33,775 (36.2)	35.6;36.7	56.5	55.6;57.5	
Black	12,849 (13.4)	13.0;13.8	47.5	45.9;49.0	
Brown	46,935 (43.1)	43.5;43.6	53.6	52.8;54.4	
Other	8,405 (7.4)	7.1;7.7	52.2	50.4;54.2	
Country macro-regions (n=102,072)					<0.001
North	23,937 (9.6)	9.4;9.8	45.1	44.1;46.1	
Northeast	36,334 (27.7)	27.3;28.1	49.5	48.8;50.3	
Southeast	17,772 (43.4)	42.8;43.9	58.6	57.5;59.7	
South	9,850 (11.9)	11.6;12.2	52.8	51.5;54.1	
Midwest	14,179 (7.5)	7.3;7.6	53.5	52.5;54.5	
Maternal education (n=76,638)					<0.001
No education	5,531 (7.4)	7.1;7.7	47.3	45.2;49.5	
Incomplete primary education	18,217 (26.5)	25.9;27.1	52.9	51.7;54.2	
Complete primary education	12,299 (17.3)	16.6;17.6	54.8	53.2;56.3	
Complete secondary education	23,359 (30.9)	30.3;31.5	57.5	56.4;58.7	
Complete higher education	17,232 (18.1)	17.7;18.6	60.5	59.1;61.9	
Seeking health services in the last 12 months (n=100,992)					<0.001
No	44,681 (44.7)	44.1;45.2	38.8	38.0;39.7	
Yes	56,311 (55.3)	54.8;55.9	65.8	65.1;66.5	
Use of dental services in the last 12 months (n=101,411)					<0.001
None	30,319 (30.3)	29.8;30.8	46.9	45.9;47.9	
Once	17,645 (17.2)	16.8;17.6	53.4	52.1;54.7	
Twice	16,424 (15.4)	14.9;15.8	57.4	56.0;58.7	
Three or more times	37,023 (37.1)	36.6;37.7	57.9	56.9;58.8	
Toothache in the last 6 months (n=91,547)					<0.001
No	70,605 (76.6)	76.1;77.1	51.4	50.7;52.1	
Yes	20,942 (23.4)	22.9;23.9	60.0	58.8;61.2	
School absenteeism for health reasons (n=101,015)					
No	48,576 (46.3)	45.7;46.8	–	–	
Yes	52,439 (53.7)	53.2;54.3	–	–	

Notes: a) Estimate adjusted for sampling weight and design effect; b) 95%CI: 95% confidence interval; c) Pearson's chi-squared test.

Table 2 – Association between dental pain, use of dental services and school absenteeism, based on data from the National Adolescent School-based Health Survey, 2015

Variables	School absenteeism for health reasons	
	Crude OR ^a (95% CI ^b)	Adjusted ^c OR ^a (95% CI ^b)
Use of dental services in the past 12 months (n=100,818)		
None	Reference	Reference
Once	1.29 (1.21;1.38)	1.09 (1.01;1.18)
Twice	1.52 (1.42;1.63)	1.22 (1.12;1.33)
Three or more times	1.55 (1.47;1.64)	1.12 (1.04;1.19)
Toothache in the past 6 months (n=91,015)		
No	Reference	Reference
Yes	1.42 (1.34;1.50)	1.35 (1.26;1.45)

Notes: a) OR: odds ratio; b) 95%CI: 95% confidence interval; c) OR adjusted for sex, age, race/skin color, maternal education and seeking health services.

absence from school due to the limitation generated by dental pain or the need to visit the dentist at a time coinciding with school.^{20,21} It is known that toothache is a consequence of dental caries, a multifactorial disease which depends on diet and adequate oral hygiene habits, and can therefore be prevented.²² In this context schools could act as a legitimate environment in playing this role, contributing to prevention of oral health conditions and absenteeism and, consequently, to the improvement of both oral health and school attendance and performance.

The findings of this analysis are in line with those of recent studies,^{6,8,11,23,24} which point to the negative impact of poor oral health, not only on absenteeism but also on youths' school performance.¹¹ Chronic school absenteeism is often related to persistent health problems and is hence considered a possible indicator of school performance. However, this study was not able to assess repeated absenteeism from school.²⁵ The association between dental pain and school absenteeism among adolescents implies that students with impaired oral health face considerable barriers that can contribute to school absenteeism, attention difficulties and, therefore, influence their performance.¹¹ In Brazil, there are still regions with significant indicators of dental treatment need among children and adolescents,⁵ in addition to great dental pain prevalence.¹⁷ These are situations that can have an impact on school attendance or on the performance and learning of these individuals.

The findings having shown greater likelihood of school absenteeism, especially among adolescents that used dental services and experienced dental pain, coincides with associations found among adolescents in other countries,^{9,15} reinforcing the likely relationship between oral health and school attendance. Notwithstanding, it is important to emphasize that risk factors associated either with oral health or class absence, and the direction of this association, have not however been fully clarified. Social, environmental and psychological determinants are also related to oral conditions and school absenteeism.⁹ It is important to emphasize that, due to the difficulty in achieving control during the analysis of these determinants, the existence of residual confounding cannot be ruled out. Thus, secondary data, such as those used in this research, raise hypotheses and point to the need for new research and the development of further prospective studies, with adequate methodology, for a more consistent evaluation of this association.⁹

The limitations of this study include the impossibility of measuring whether use of dental services occurred for reasons related to prevention or treatment; however, absenteeism for dental reasons, even if motivated by prevention, can imply, even in smaller proportions, harm to school performance due to educational content loss. Moreover, adjusted analysis was performed in order to avoid confounding as to absenteeism due to use of health services other than dental services. Regarding the strengths of this research, the data we analyzed are population-based,

collected in the state capitals and Federal District, in the five Brazilian macro-regions, from students attending public and private schools, under different living conditions, which allows for greater sample representativeness.

The conclusion reached is that dental problems in adolescents can increase the chance of school absenteeism. When school absenteeism results from use of dental services, it could indicate the need to schedule dental appointments in primary health care centers at times other than those of school hours, in order to prevent both harm to oral health and to the learning of these students. However, the universality of public dental services cannot be compromised with this specific demand. Notwithstanding the efforts made to promote and protect oral health, the results

of this study can contribute as indicators of the need to develop public policies aimed at schools, in order to reduce the impact of oral problems on school absence and, consequently, on academic performance.

Authors' contributions

Karam SA e Costa FS contributed with the concept and design of the article, data analysis and drafting of the manuscript. Darley RM contributed with the concept and design of the manuscript. Correa MB and Demarco FF contributed with the concept and critical reviewing of the manuscript. All the authors have approved the final version and are responsible for all aspects of the work, including the assurance of its accuracy, precision and integrity.

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