

# Dental pain associated with socioeconomic status, psychosocial factors and oral health\*

*Odontalgia associada a variáveis socioeconômicas, psicossociais e saúde bucal*

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## SUMMARY

**BACKGROUND AND OBJECTIVES:** Knowing factors associated with dental pain is important to provide adequate intervention and attention to this major health care problem. This study aimed at understanding the prevalence of dental pain as reason for the most recent dental appointment among 15-year old adolescents and at checking its association with socioeconomic factors, behavioral variables and oral health.

**METHOD:** The probabilistic sample was made up of 592 students of 10 state schools. Dental pain variable was evaluated by questionnaires applied at the school. Clinical oral exam was performed according to World Health Organization's criteria and remaining variables were investigated by self-applicable questionnaires. Data were classified by the Excel program and Odds Ratio was used to associate variables.

**RESULTS:** From 592 participants, 33.44% have reported dental pain as reason for their most recent dental appointment. After statistical analysis, dental pain was associated with low income ( $p = 0.04$ ), higher number of people living in the same home ( $p < 0.01$ ), low frequency of daily tooth brushing ( $p = 0.01$ ), long

interval between dental appointments ( $p < 0.001$ ), longer time elapsed since last dental appointment ( $p < 0.001$ ), dental anxiety ( $p < 0.01$ ), consumption of cariogenic food ( $p = 0.03$ ), high dental caries experience ( $p < 0.01$ ) and with the presence of untreated dental caries ( $p < 0.001$ ).

**CONCLUSION:** Dental pain is related to dental caries experience and activity and to socioeconomic and psychosocial factors, showing the need for further attention to these conditions.

**Keywords:** Adolescent's behavior, Dental pain, Oral health, Social conditions.

## RESUMO

**JUSTIFICATIVA E OBJETIVOS:** É importante conhecer os fatores associados à odontalgia para proporcionar uma adequada intervenção e atenção a este significativo problema dos serviços de saúde. O objetivo do estudo foi conhecer a prevalência de odontalgia como motivo de última consulta odontológica de adolescentes de 15 anos e verificar sua associação com fatores socioeconômicos, variáveis comportamentais e saúde bucal.

**MÉTODO:** A amostra probabilística contou com 592 alunos de 10 escolas estaduais. A variável odontalgia foi avaliada por questionário aplicado em ambiente escolar. O exame clínico bucal foi realizado segundo critérios da Organização Mundial de Saúde e as demais variáveis foram investigadas utilizando questionários autoaplicáveis. Os dados foram tabulados no Excel e a associação entre as variáveis foram avaliadas utilizando *Odds Ratio*.

**RESULTADOS:** Do total de 592 participantes, 33,44% dos adolescentes relataram a dor de origem dentária como motivo da última consulta odontológica. Após análise estatística, a odontalgia foi associada

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à baixa renda ( $p = 0,04$ ), ao maior número de pessoas residentes no mesmo domicílio ( $p < 0,01$ ), a baixa frequência de escovação diária ( $p = 0,01$ ), ao alto intervalo entre consulta odontológica ( $p < 0,001$ ), ao maior período de tempo em que se deu a última consulta odontológica ( $p < 0,001$ ), à ansiedade odontológica ( $p < 0,01$ ), ao consumo de alimentos cariogênicos ( $p = 0,03$ ) à alta experiência de cárie ( $p < 0,01$ ) e à presença de lesão cariosa não tratada ( $p < 0,001$ ).

**CONCLUSÃO:** A odontalgia está relacionada com a experiência e atividade de cárie dentária e a fatores socioeconômicos e psicossociais, mostrando a necessidade de maior atenção com estas condições.

**Descritores:** Condições sociais, Comportamento do adolescente, Odontalgia, Saúde bucal.

## INTRODUCTION

Dental orofacial pain or toothache is poorly investigated in oral health epidemiology and affects considerable proportions of human populations, causing distress and difficulty to perform daily activities<sup>1</sup>.

Pain is considerably significant for those involved with health care, and adequate diagnosis and handling are fundamental skills for clinical Dentistry, representing a challenge even for the most experienced professional<sup>2</sup>. For many people, pain is closely related to dentistry, and very often, pain is the driver leading patients to look for dental treatment.

Toothache affects people of different social classes, but some studies indicate higher prevalence of pain in people with higher individual and social vulnerability<sup>3</sup> and the social environment may be directly or indirectly related to dental pain<sup>1</sup>.

Since orofacial pain is one of the commonest types of pain, and toothache is the most prevalent orofacial pain<sup>2</sup>, it is necessary to evaluate which social, economic and psychological characteristics and oral health factors are associated with toothache, and to estimate to what extent it is responsible for looking for dental treatment.

This study aimed at investigating toothache as the reason for the most recent dental appointment, and at evaluating its association with socioeconomic, psychosocial and oral health variables.

## METHOD

After the Research Ethics Committee, School of Dentistry of Piracicaba, State University of Campinas approval (Unicamp, protocol 005/2010) and the sig-

natures of the Research Free and Informed Consent Term by guardians, participated in this study 15-year old students from 10 state public schools of Piracicaba-SP. Inclusion criteria were being 15 years old, being enrolled in a school selected for the research, and being free from systemic diseases that could be related to periodontal disease, such as leukemia, acquired immunodeficiency syndrome, quantitative and qualitative neutrophils deficits.

Sample was probabilistic by conglomerate. Raffle was performed in two stages, first raffling 10 among 30 state schools of the city and then students from selected schools. Sample was calculated based on the caries index of the Survey of Oral Health Conditions of the Brazilian Population in 2003 (SP Brazil 2003), which has obtained for the Southeastern region, mean caries index which evaluates decayed, lost and crowned teeth (CPO-D) of 5.94, with standard deviation of 4.66 in adolescents from 15 to 19 years of age.

Since this is a sample by conglomerates, the number obtained was afterward multiplied by 2, corresponding to the design effect, considering that raffle was in two levels, school and student. To the result, 20% were added, corresponding to possible losses. To obtain the estimate with 95% confidence interval and sample error of 10%, final sample size was 568 individuals. In logistic regression, sample size provides detectable odds ratio of 2, with power of 0.80 and significance level of 5%<sup>4,5</sup>.

Study dependent variable, toothache, was investigated by a self-applicable questionnaire<sup>6</sup>. The questionnaire has multiple-choice questions and just one alternative may be checked.

After the authorization of the city State Department of Education and of the direction of all schools, volunteers were raffled. Investigators have explained the aim and nature of the study to participants and the Research Free and Informed Consent Term (FICT) and the socioeconomic questionnaire were sent to parents or guardians. After the participation consent, adolescents have filled the questionnaires and then were submitted to clinical oral evaluation.

Students were divided in two groups according to the answer to the question investigating the reason for their most recent dental appointment, which has as alternatives: pain, gingival bleeding, accident/fall, decayed tooth, review or control, re-treatment and others. This was an open question for adolescents to mention the reason.

Answers were grouped in "pain", involving pain and

caries/pain, and “other reasons”, this latter involving accident/fall, caries, re-treatment and preventive reasons, review or control, including orthodontic treatment.

In addition to individuals reporting pain as reason for the most recent appointment, those reporting caries as the reason for the most recent appointment and stating that they have looked for assistance only in case of pain were also included in this group, which allowed the following answers: every six months, once a year, every two years, or only looking for the dentist in case of pain.

The socioeconomic questionnaire used and adapted from a study<sup>7</sup>, aimed at investigating economic and social aspects, such as family monthly income, type of home, education of parents and number of people living in the same home, and was answered by parents or guardians. Answers about housing were dichotomized according to presence or absence. Parents' education was classified in two groups, according to current school cycles: up to eight years of education, corresponding to fundamental learning, and above nine years of education, corresponding to incomplete and complete high-school. Family monthly income was divided in up to 2 and more than 2 monthly minimum wages and the number of people living in the same home was dichotomized according to its median (4 people living in the same home).

Psychosocial variables studied were family cohesion and adaptability, anxiety with dental treatment and oral health behaviors. Family cohesion and adaptability were evaluated by the FACES III questionnaire validated for the Brazilian population<sup>8</sup>. Dental anxiety was investigated with the DAS evaluative scale (Dental Anxiety Scale) transculturally adapted<sup>9</sup>. Family cohesion and adaptability and dental anxiety were dichotomized by the median.

The questionnaire about oral health behaviors has investigated oral hygiene habits and assiduity to dental appointments. Answers to questions daily tooth brushing frequency, interval between dental appointments and time elapsed from latest visit were dichotomized, respectively in: up to twice a day and 3 or more times a day; once or twice a year and less than once a year; in up to one year and more than one year. The inventory about food consumption at school has evaluated the quality of food consumed at school, which was classified according to consumption or not of cariogenic food such as sweets, biscuits and dainties. Questionnaires about psychosocial variables were answered by the adolescents at school, under supervi-

sion of investigators, being assured total confidentiality of answers.

For caries evaluation, the CPO-D index was used, which evaluates the caries experience of adolescents by adding the number of decayed teeth (C), teeth lost by caries (P) and restored/crowned teeth (O). Evaluation was under natural light, with the help of a flat mirror number 05 and OMS probe, without previous prophylaxis, according to WHO recommendations. Caries experience (CPO-D) and the presence of active caries (C), lost tooth (P) and restored/crowned teeth (O) were dichotomized according to their medians. Gingival health evaluation, which has investigated gingival bleeding, was dichotomized according to the presence or absence of bleeding in more than two sextants.

Three examiners were previously trained for dental clinical exam by a gold-standard reference examiner, with theoretical discussions and practical activities, being found good reproducibility inter and intra-examiners (Kappa > 0.89 and from 0.85 to 1.00, respectively).

Data were submitted to descriptive analysis. The association of the dependent variable “dental pain as reason for most recent dental appointment”, and socioeconomic, psychosocial and oral health factors were evaluated by Odds Ratio test, with confidence interval of 95% and significance level of 0.05.

## RESULTS

From 725 adolescents invited to participate, 14.62% (n = 106) have refused and 0.5% (n = 4) were excluded for not meeting sample inclusion criteria. So, 615 15-year old adolescents were examined, but due to incomplete or inaccurate filling of the questionnaire addressing oral health behavior, blank alternatives or with more than one checked alternative, 23 adolescents were excluded from the statistical analysis. Final sample for statistical analysis was made up of 592 individuals of both genders.

From total sample, 318 were females and 274 were males. Approximately 4% of the sample (n = 24) had never visited the dentist. CPO-D index was 1.67 (PD = 2.21) and 138 volunteers (23.3%) had untreated caries. Decayed, lost and crowned components corresponded to 28.6%, 4.2% and 67.2% of CPO-D index, respectively.

With regard to dental pain, 198 adolescents (33.44%) were classified as “pain” or “caries/pain” as the reason for their most recent dental appointment.

The association of dependent variable dental pain as reason for the most recent appointment with socioeconomic, psychosocial and oral health factors analyzed by Odds Ratio test are shown in tables 1, 2 and 3, respectively.

Dental pain was associated to low income ( $p = 0.04$ ), to the higher number of people living in the same

home ( $p < 0.01$ ), to low daily tooth brushing frequency ( $p = 0.01$ ), to low dental appointments frequency ( $p < 0.001$ ), to longer period since the latest visit ( $p < 0.001$ ), to anxiety with dental treatment ( $p < 0.01$ ), to consumption of cariogenic food at school ( $p = 0.03$ ), to high caries experience ( $p < 0.01$ ) and to the presence of untreated caries ( $p < 0.001$ ).

Table 1 – Prevalence of dental pain as reason for the most recent dental appointment in a sample of 15-year old adolescents and its association with socioeconomic factors. Piracicaba. 2010.

Variables	Categories	Total	Pain		Odds Ratio		
			n (%)	Other Reasons n (%)	OR	IC95%	p
Gender	Female	318	101 (31.76)	204 (64.15)	0.82	0.58-1.16	0.30
	Male	274	97 (35.40)	161 (58.75)			
Income	≤ 2 salaries	227	86 (37.88)	128 (56.38)	1.46	1.02-2.09	0.04*
	> 2 salaries	352	105 (29.82)	229 (65.05)			
Father education	≤ 8 years of education	331	116 (35.04)	195 (58.91)	1.35	0.94-1.95	0.11
	> 8 years of education	238	70 (29.41)	160 (67.22)			
Mother education	≤ 8 years of education	315	116 (36.82)	183 (58.09)	1.40	0.98-2.01	0.07
	> 8 years of education	245	73 (29.79)	162 (66.12)			
Housing	Not owned	197	73 (37.05)	115 (58.37)	1.28	0.89-1.85	0.20
	Own	387	121 (31.26)	245 (63.30)			
Car	Don't have	169	64 (37.86)	93 (55.02)	1.40	0.96-2.06	0.09
	Have	416	131 (31.49)	268 (64.42)			
People at home	More than 4	275	106 (38.54)	154 (56.00)	1.64	1.15-2.34	0.007*
	Less than 4	307	89 (28.99)	206 (67.10)			

\* $p < 0.05$

Table 2 – Prevalence of dental pain as reason for the most recent dental appointment in a sample of 15-year old adolescents and its association with psychosocial variables. Piracicaba. 2010.

Variable	Categories	Total	Pain		Odds Ratio		
			n (%)	Other Reasons n (%)	OR	IC95%	p
Daily oral hygiene	Less equal 2x	142	58 (40.84)	73 (51.40)	1.66	1.11-2.49	0.01*
	> 2 times	448	138 (30.80)	290 (64.73)			
Time from last dental visit	More than 1 year	160	73 (45.62)	85 (53.12)	1.95	1.34-2.86	0.0007*
	Up to 1 year	401	121 (30.17)	276 (68.82)			
Frequency of visits	Mais de 1 ano	165	97 (58.78)	68 (41.21)	4.26	2.89-6.29	0.0000*
	Até 1 ano	369	92 (24.93)	275 (74.52)			
Family cohesion	Low	300	110 (36.66)	173 (57.66)	1.39	0.98-1.97	0.07
	High	292	88 (30.13)	192 (66.09)			

continues...

Table 2 – continuance

Variable	Categories	Total	Pain	Other Reasons	OR	Odds Ratio	
			n (%)	n (%)		IC95%	p
Family adaptability	Low	284	96 (33.80)	176 (61.97)	1.01	0.71-1.42	0.97
	High	308	102 (33.11)	189 (61.36)			
Dental anxiety	Anxious	240	97 (40.41)	130 (54.16)	1.72	1.21-2.45	0.002*
	Not anxious	352	101 (28.69)	234 (66.47)			
Consumption of cariogenic food	Yes	407	150 (36.85)	243 (59.70)	1.56	1.05-2.31	0.03*
	No	181	47 (25.97)	119 (65.74)			

\*p &lt; 0.05

Table 3 – Prevalence of dental pain as reason for the most recent dental appointment in a sample of 15-year old adolescents and its association with oral health. Piracicaba, 2010.

Variables	Categories	Total	Pain	Other Reasons	OR	Odds Ratio	
			n (%)	n (%)		IC95%	p
CPOD	> median	240	99 (41.25)	133 (55.41)	1.74	1.22-2.47	0.002*
	≤mediana (1)	353	99 (28.04)	232 (65.72)			
C (Caries)	Present	138	62 (44.92)	66 (47.82)	2.06	1.38-3.08	0.0005*
	Absent (c = 0)	454	136 (29.95)	299 (65.85)			
P (Lost)	Yes	27	15 (55.55)	12 (44.44)	1.72	0.79-3.77	0.23
	No	565	183 (32.38)	253 (44.77)			
O (Crowned)	Present	224	87 (38.83)	134 (59.82)	1.35	0.95-1.92	0.11
	Absent (c = 0)	368	111 (30.16)	231 (62.77)			
Bleeding	Present	109	48 (44.03)	61 (55.96)	1.30	0.85-2.00	0.26
	Absent	432	154 (35.64)	256 (39.25)			

\*p &lt; 0.05

## DISCUSSION

When associating pain as reason for the most recent appointment with socioeconomic, psychosocial and oral health factors, it is possible to identify which population characteristics are more prevalent according to the painful condition, aiming at optimizing socioeducational activities and health intervention. The association of pain with psychosocial variables, such as family cohesion, is poorly explored by the literature.

The prevalence of toothache found may be considered high as compared to a different study<sup>10</sup>, however the

authors have evaluated the prevalence of pain in a different way as compared to our study, evaluating pain presented in the six months prior to investigation. Another study<sup>11</sup> evaluating, among other variables, pain/caries as reason for the most recent dental appointment among 12-year old students, has shown pain and caries prevalence similar to our findings.

Dental pain was associated to socioeconomic factors, such as low monthly family income and high concentration of people in the same home, indicating the social vulnerability of individuals suffering of toothache. It is also known that most Brazilian studies



investigating toothache during childhood and adolescence have shown the relationship of one or more socioeconomic factors, such as per capita income, parents' education and type of school, with toothache<sup>12</sup>. It should also be stressed that similarly to socioeconomic factors, aspects of family context where toothache occurs should be considered for the implementation of preventive toothache measures<sup>13</sup>.

Toothache was more prevalent among adolescents with higher anxiety with dental treatment. Toothache may imply a more severe clinical presentation, such as the need for more invasive procedures, which are more anxiolytic. Confirming this hypothesis, a study<sup>14</sup> investigating the relationship between anxiety and dental pain has shown that 27.6% of fearful people hope that their next dental appointment will be due to pain or some oral problem, as compared to 17% of less fearful people.

Our study has shown that pain was associated with longer intervals between appointments, showing that among adolescents reporting pain as the reason for their most recent appointment, there is higher prevalence of avoiding visiting the dentist.

Toothache was also associated with other oral health behaviors, such as daily tooth brushing frequency and consumption of cariogenic food. Food ingestion corresponded only to the period the adolescent is at school, but school food was associated to pain, indicating the importance of observing the quality of ingested food. In addition, adolescents and children remain most of the day at school, which justifies the investigation of their feeding habits.

It is known that cariogenic food is part of the etiology of caries, and that caries is associated with pain. We have not evaluated whether cariogenic food consumption was restricted to school and there is the need to evaluate how is adolescents' feeding in different times and places, in addition to the family environment.

Pain as reason for most recent dental appointment was associated with the presence of active caries and with adolescents' caries experience, similarly to findings of a different study involving 12-year old students of a public school<sup>15</sup>. Even with the low CPO-D index, approximately one third of evaluated adolescents have referred pain or caries as reason for their most recent dental appointment.

Our study has evaluated only public school students, which may be considered a limitation of the research. The investigation of the same variables among private school students could show different results due to the diversity of their social context and the association

between socioeconomic factors and pain.

Because this is a transversal study, it does not aim at establishing causal relationship between pain and independent variables studied. It is necessary a longitudinal approach, analyzing clinical, behavioral, social and economic factors during a longer period of time to establish possible causal relationships between them.

## CONCLUSION

Toothache is related to dental caries experience and activity and to socioeconomic and psychosocial factors, showing the need for further attention to these conditions.

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