BRIEF COMMUNICATIONS

Are Oral Health Status and Care Associated with Anxiety and Depression? A Study of Portuguese Health Science Students

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Abstract

The relationship between oral health and anxiety/depression were assessed in a cross-sectional study conducted in 388 Portuguese students from the Health Sciences (age: 21 ± 3 years, 75% women). Oral health included prevalence of reported tooth pain/gum bleeding, dentist attendance, and dentifrice and dental floss use. Anxiety and depression were assessed by the Hospital Anxiety and Depression Scale. Subjects with anxiety or depression had a higher frequency of perceived gum bleeding and reported a higher dentist attendance than normal subjects. On multivariate analysis, anxiety was significantly and independently related to perceived toothache (OR=2.90, 95%CI: 1.25 – 6.72) and dentist attendance (OR=2.15, 95%CI: 1.18 – 3.91) whereas depression was associated with perceived gum bleeding (OR=4.96, 95%CI: 1.68 – 14.59), and no differences were found regarding teeth brushing or dental flossing. The author concludes that anxiety and depression are related to perceived toothache and gum bleeding, but this association cannot be explained by decreased dental care.

Key Words: cross-sectional study, oral health, female, anxiety, depression

Introduction

Several studies have shown that psychological stress or depression are associated with increased plaque formation, gingivitis and periodontal disease (1, 2), probably due to decreased oral care (2, 3), although this latter hypothesis has been questioned. For instance, no association was found between depressive symptoms and dental caries, periodontal status, or number of teeth in one study (4), and mood status did not relate to changes in plaque or gingivitis after regular tooth brushing (1).

Thus, a small cross-sectional study was conducted in a sample of Portuguese students from Health Sciences in order to assess the relationships between anxiety and depression with perceived toothache, perceived gum bleeding and oral health practices such as dentist attendance, toothbrushing and dental floss use.

Material and Methods

Population. The survey was conducted between October, 1998 and January, 1999 in a large private higher education Institution near Lisbon after being approved by the Director of the institution. The courses of study included Nutrition, Dentistry, Pharmacy, Physical Activity and Psychology. All students were considered eligible and were invited to fill an anonymous questionnaire addressing oral health and psychological status.

The questionnaire on oral health included specific questions on perceived gum bleeding (yes/no), perceived toothache (yes/no), how many times had they consulted a dentist over the previous 12 months, daily frequency of tooth brushing, number of tooth brushes used per year, type of dentifrice used and dental flossing (yes/no). Anxiety and depression were assessed by the Hospital Anxiety and Depression Scale adapted to the Portuguese population, as described in other publications and conducted in other similar studies (1).

Statistical analysis. Statistical analysis was conducted using Epi-Info (CDC, Atlanta, U.S.A.) and SAS Enterprise Guide v.2.05 (SAS Institute, Cary, NC) software. Results are expressed as mean ± SD or percentage and (number of respondents.) Comparisons were performed by Wilcoxon's or Kruskall-Wallis non-parametric tests for quantitative variables, and by Chi-square or Fisher's exact test for qualitative variables. Multivariate analysis was performed using logistic regression. Statistical significance was assessed for $p<0.05$.

Results

Oral health. Overall, 635 students were invited to participate, of which 388 (mean age 21 ± 3 years, response rate 61%) completed the questionnaire on oral health status and practices. Two hundred and ninety (75%) were women. Their perceived oral health status according to gender is summarized in Table 1.

Women attended the dentist, used dental floss and also brushed their teeth more frequently than men, whereas no differences were found for perceived toothache, perceived gum bleeding, dentifrice use, average number of toothbrushes used per year, and perceived prevalence of anxiety and depression. Finally, students in the higher curricular years,

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TABLE 1
Oral health according to gender

Results are expressed as number of subjects and (percentage) or as mean ± SD. Statistical analysis by chi-square, Fisher's exact test or Wilcoxon test.

Parameters	Men (n=98)	Women (n=290)	p
Perceived toothache (%)	4 (4.1)	25 (8.7)	0.13
Perceived gum bleeding (%)	6 (6.1)	31 (11.0)	0.16
Dentist attendance the previous 12 months (%)	62 (63.3)	231 (80.5)	0.005
Number of visits the previous 12 months	2.4 ± 2.2	2.8 ± 2.3	0.13
Dentifrice use (%)	98 (100)	287 (99.0)	0.54
Dental flossing (%)	23 (23.5)	119 (41.0)	0.002
Daily brushing >1/day (%)	87 (88.8)	278 (95.9)	0.02
Average frequency of daily tooth brushing	1.4 ± 1.6	2.0 ± 1.6	0.002
Number of tooth brushes used per year	2.4 ± 2.2	2.7 ± 2.3	0.29
Anxiety (%)	24 (24.5)	88 (30.3)	0.54
Depression (%)	6 (6.1)	16 (5.5)	

despite using dental floss more frequently (48.6 vs. 31.9%, p<0.003), reported a higher frequency of perceived toothache than their junior counterparts (14.2 vs. 5.4%, respectively, p<0.003), whereas no differences were found for all other variables studied.

Effect of anxiety and depression. Oral health according to anxiety/depression status is summarized in Table 2. Since no between-gender differences were found for anxiety and depression, a pooled analysis was conducted. Subjects who were anxious or depressed reported more frequently gum bleeding and dentist attendance, whereas no differences were found for tooth brushing, dentifrice or dental floss use (Table 2).

Multivariate analysis. Multivariate analysis adjusting for age and curricular year were performed to assess the relative effect of gender, anxiety and depression on oral health status and practices. Subjects with anxiety had a 2.90 (95% CI: 1.25 – 6.72) higher likelihood of indicating perceived toothache and a 2.15 (95% CI: 1.18 – 3.91) higher likelihood of attending the dentist than nonanxious students. This relationship remained significant even after further adjusting for toothache and/or gum bleeding (OR=2.02, 95% CI: 1.11 – 3.69). Also, students with depression had a 4.96 (95% CI: 1.68 – 14.59) times higher likelihood of perceived gum bleeding than normal subjects.

Finally, female gender was associated with an increased dentist attendance, a higher frequency of tooth brushing and dental floss use, and those relationships remained even after adjusting for perceived toothache and gum bleeding (not shown).

Discussion

There is scarce available information regarding oral health practices in the Portuguese population (5-7). A recent survey showed that the prevalence of children free from caries was 18.9% among 15-year-olds, with only 75.7% retaining their full dentition (8), a figure below the WHO recommendations. Other studies have shown that the prevalence of daily tooth brushing or dentist attendance is rather low (5), but to the knowledge of the authors of this study, no data on flossing or on oral health practices among students has ever been performed.

Prevalence in this study of perceived toothache (7.5%) and gum bleeding (10%) were lower than previously reported (6). A likely explanation is that the good oral health practices of the responders may have prevented the occurrence of those symptoms. Indeed, one third of the students reported dental flossing, a figure higher than previously reported (9). Also, frequency of brushing > 1/day was reported by more than 90% of the participants, a figure higher that observed in Portugal for 35-44 year olds (65%) (5) or for adults (39%) (7). Finally, dentist attendance over the previous 12 months was also much higher than previously reported in the Portuguese population (40% among those aged 35-44 (5); 28% among adults (7)). Possible explanations for these findings are the facts that those Health Sciences students are more aware regarding oral hygiene, and the relatively high socioeconomic and educational status of those students (7, 9). Also, students in the higher curricular year reported using dental floss more frequently, but their other oral health practices were not different from their junior counterparts. Those findings are partly in agreement with several studies conducted among dental school students, where a significant increase in oral health practices with curricular year was found (10).

TABLE 2
Oral health according to anxiety and depression

Results are expressed as number of subjects and (percentage) or as mean ± SD. Statistical analysis by chi-square or Kruskall-Wallis test. NA: not assessable.

Parameters	Normal (n=254)	Anxiety (n=112)	Depression (n=22)	p
Perceived toothache (%)	14 (5.6)	13 (11.2)	2 (9.1)	0.12
Perceived gum bleeding (%)	19 (7.6)	12 (10.8)	6 (27.3)	0.01
Dentist attendance the previous 12 mos. (%)	179 (71.3)	95 (84.8)	19 (86.4)	0.02
Number of visits the previous 12 mos.	2.4 ± 1.7	3.1 ± 2.6	2.6 ± 1.6	0.31
Dentifrice use (%)	254 (100)	110 (98.2)	21 (95.5)	NA
Dental flossing (%)	93 (36.6)	41 (36.6)	8 (36.4)	0.99
Daily brushing >1/day (%)	143 (56.3)	60 (53.6)	10 (45.5)	0.58
Average frequency of daily tooth brushing	1.9 ± 1.6	1.8 ± 1.7	1.7 ± 1.8	0.89
Number of tooth brushes used per year	2.5 ± 2.1	2.9 ± 2.5	3.4 ± 2.5	0.48

In agreement with the literature, women reported better oral health practices than men (5, 10). Female gender was associated with an increased frequency of dentist attendance, tooth brushing and dental floss use even after adjusting for perceived toothache and gum bleeding, thus indicating that these better oral health practices are not related to an increased prevalence of toothache or periodontal disease.

The association of anxiety and perceived toothache is in agreement with the literature (1,2), as is the association between gum bleeding and depression. Nevertheless, and contrary to other studies (3), no differences in oral health practices were found between anxious, depressed or non-symptomatic students. Further, students with anxiety reported a significantly higher dentist attendance, which remained significant after multivariate adjusting. The findings in this study, that increased toothache or gum bleeding among anxious or depressed students cannot be accounted for by oral neglect, needs further investigation. More examination of the meaning of the associations among anxiety, depression and dental behaviours (e.g., Do oral symptoms cause anxiety or depression or visa versa? Are anxious individuals more obsessive about following up on symptoms?) is needed. Expanding understanding of these linkages might improve our theoretical understanding of anxiety, depression and oral health.

Acknowledgements

The authors would like to thank all the students who participated in the survey and Professor Ana Leonor Perdigão for her help in collecting the data.

Support

This survey was partly financed by a grant of the Portuguese Fundação para a Ciência e a Tecnologia (grant PRAXIS/PSAU/C/SAU/0042/96). The Unidade de Nutrição e Metabolismo of the Instituto de Medicina Molecular is partially funded by a grant from the FCT (Fundação para a Ciência e a Tecnologia) ref. RUN 437.

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