Psychosocial and Behavioral Aspects of Pain and Perception of Oral Health

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Aims: To evaluate the contribution of the psychosocial and behavioral aspects of pain to the perception of oral health in a sample of Brazilian dental patients. **Methods:** This cross-sectional study involved 436 patients who sought dental care in the School of Dentistry of São Paulo State University and who reported some type of orofacial pain. The study group's mean age (± standard deviation [SD]) was 39.9 ± 13.6 years, and the sample was 74.5% female. The Portuguese version of the Oral Health Impact Profile Short Form (OHIP-14) and the Multidimensional Pain Inventory (MPI) were used. The data were included in a structural equation model in which perception of oral health was considered the dependent variable. The evaluation of the contribution of psychosocial and behavioral aspects of pain to the perception of oral health was based on the statistical significance of causal paths (β) evaluated by z tests (α = 5%). **Results:** The fit of the models of OHIP-14 and MPI were adequate. Interference, self-control, negative mood, and punishing responses provided significant contributions to the perception of oral health. The structural model presented adequate fit to the data (explained variance = 28.0%). **Conclusion:** These findings provide evidence that psychosocial and behavioral aspects of pain such as interference of pain in activities, self-control, negative mood, and punishing responses contribute to the perception of oral health. *J Oral Facial Pain Headache 2017;31:210–216. doi: 10.11607/ofph.1742*

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Orofacial pain, ranging from dental sensitivity to complex temporomandibular and neuropathic disorders, is a major symptom involved in clinical dental conditions, with a high prevalence in diverse populations.[1,2] Over the last few decades, the psychosocial and behavioral aspects of pain and their interference in the quality of life and well-being of populations have been widely investigated.[3–7] These investigations have contributed to advances in this area, introducing new prevention strategies and treatment modalities.[8]

Some studies have suggested that pain, whether acute or chronic, is able to influence individuals' perceptions of their own health.[9–11] This perception can have direct consequences on health care, the patient's decision to seek treatment, and the patient's compliance with previously implemented treatments.[12,13]

According to the current definition,[14] perception of health is a subjective measure based on individual reports and knowledge and is considered an important indicator of population health and quality of life. To measure individuals' perceptions of their oral health, Slade and Spencer[15] developed the Oral Health Impact Profile (OHIP). OHIP assesses the physical, psychological, and social impacts generated by discomfort and disabilities that result from diseases and dental disorders. This instrument considers an individual's priorities and behaviors involved in oral health and provides information on the individual's perception of oral health. It is understood that the greater the impact on oral health, the higher the score on the OHIP.[16] The OHIP includes a full version with 49 items[15] and a short version with 14 items.[17] In both versions, the items are distributed across seven factors: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.

Other instruments have been developed to measure the psychosocial and behavioral aspects of pain, such as the Brief Pain Inventory (BPI)[18] and the Multidimensional Pain Inventory (MPI).[19] The MPI is theoretically based on a cognitive-behavioral perspective. The MPI evaluates the perception of pain and its effects on life and has been widely used in the scientific literature.[20–22] The original version of the MPI is composed of 12 factors divided into 3 orthogonal parts, 1 psychosocial (Part 1) and the other 2 behavioral (Parts 2 and 3).[19]

Several studies have investigated the association between an individual's perception of oral health and clinical indicators such as tooth loss, periodontal disease, rehabilitation, and the need for dental treatment.[23–26] Locker[27] also has emphasized that pain and tooth loss have important impacts on perception of oral health and has suggested that further studies on these topics should be performed.

Nunes and Abegg[26] performed a study in a sample of Brazilian elderly individuals to determine their perceptions of oral health and associated factors. The results suggest that dental pain and the need for rehabilitation might be the main factors affecting individuals' perceptions of their oral health. A recent study performed by Boggero and Carlson[20] investigated the contributions of the somatosensory component of pain (intensity) and the affective component of pain (pain unpleasantness) to emotional, social, and daily functioning in chronic pain patients. The authors used a visual analog scale (VAS) and the MPI and proposed a theory based on the synergistic action of the somatosensory and affective components of pain.

Despite the expected association between orofacial pain and perception of oral health, no studies so far have estimated the contribution of psychosocial and behavioral aspects of pain to the perception of oral health. Thus, given the lack of studies and the frequent need to increase knowledge about the effects of orofacial pain on the perception of oral health, this study was proposed to evaluate the contribution of the psychosocial and behavioral aspects of pain to the perception of oral health in a sample of Brazilian dental patients.

Materials and Methods

Study Design and Sampling

A cross-sectional study with a nonprobabilistic sampling design was developed. The minimum sample size was estimated on the basis of a power analysis.[28] Considering the degrees of freedom of the model, a significance level of 5%, and a power of 80%, a minimum sample size of 310 subjects was determined. Forecasting a loss of approximately 15% of the sample, the minimum sample size required for analysis was 357 subjects.

All patients who sought dental care in the School of Dentistry of São Paulo State University (UNESP) Araraquara Campus from September 2012 to April 2013 were invited to participate (n = 1,925), and the acceptance rate was 62.5% (n = 1,203). Of these, 436 reported some type of current orofacial pain and were included in the study. Data on gender, age, economic class, dental status (dentate, edentulous, or partially edentulous), use of dental prosthesis (yes or no) and the type (fixed partial denture, removable partial denture, or complete denture), chronic disease, and the location of pain were collected to characterize the sample. The economic classes were classified according to the Brazilian Economic Classification Criterion (ABEP).[29] The Research Ethics Committee of the School of Dentistry (UNESP) approved this study (CAAE: 01040312.5.0000.5416). Only adult individuals who agreed and signed the informed consent form were included.

Measuring Instruments

The Portuguese versions of the OHIP-14[30] and MPI[5] were used. The instruments were presented on paper and were self-completed by the participants in the waiting room of the clinics of School of Dentistry of UNESP Araraquara Campus. The OHIP-14 was used to measure the perception of oral health. This abbreviated version is composed of 14 items arranged in 7 first-order factors (functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap). The answers are given on a 5-point Likert scale ranging from never (score = 0) to always (score = 4). Zucoloto et al[16] tested the adequacy of the factorial structure of the OHIP-14 in a sample of 1,162 dental patients with characteristics similar to those of the sample of the present study. The authors proposed a three-factor hierarchical model composed by the second-order factors physical, psychological, and social and attested the validity and reliability of this model (χ^2/df = 7.67; comparative fit index [CFI] = 0.94; goodness of fit index [GFI] = 0.93; root mean square error of approximation [RMSEA] = 0.08; α = 0.62–0.77; composite reliability [CR] = 0.63–0.77). This structure was adopted in this study.

The MPI was used to assess the psychosocial and behavioral aspects of pain. The Portuguese version of the MPI is composed of 20 items arranged in 5 first-order factors (pain severity, interference, self-control, support, and negative mood). The answers are given on a 7-point rating scale, and the individual is asked to give a score of 1 to 7 for each item in Part 1. Part 2 consists of 14 items divided

into 3 first-order factors (punishing responses, solicitous responses, and distracting responses). Part 3 consists of 16 items divided into 4 first-order factors (household chores, outdoor work, activities away from home, and social activities). The answers to Parts 2 and 3 are distributed on a 6-point rating scale ranging from never to very often.

Structural Models

For the construction of the predictive model, the first-order factors of the three parts of the MPI (pain severity, interference, self-control, support, negative mood, punishing responses, solicitous responses, distracting responses, household chores, outdoor work, activities away from home, and social activities) and the demographic variables age and gender were considered independent variables. The third-order hierarchical model (TOHM) of the OHIP-14 was the dependent variable. It should be noted that the predictive model was constructed systematically; ie, first, the influences of demographic variables on the dependent variable were considered, followed by influences of the first-order factors of Part 1, Part 2, and Part 3, separately. Variables/factors that presented significant paths (β) when assessed separately were included in the initial model (Model A). In this model, all variables/factors were included simultaneously. Model A was estimated and refined, and only the variables that presented significant paths were maintained in the refined model, Model B.

After the direct effects of the independent variables on the central construct were determined, a model considering the theory proposed by Boggero and Carlson[20] was tested. In this model, the severity of the pain acts directly on the pain interference and not on the perception of oral health. This model was named Model C.

The models were estimated using the maximum likelihood method, and their fits were first analyzed using the goodness of fit indices, being considered appropriate when χ^2/df ≤ 2.0, CFI and GFI ≥ 0.90, PGFI ≥ 0.60, and RMSEA < 0.10.[28] The contribution of independent variables to the central construct was based on the statistical significance of the causal paths (β) and evaluated using the *z* test for a significance level of 5%. Comparison of the models was assessed with Akaike information criterion (AIC), Bayes information criterion (BIC), and Browne-Cudeck criterion (BCC). The models with the lowest values for these indices were considered the most parsimonious models.[28]

Factorial Invariance

Factorial invariance analysis was performed to assess the stability of the most parsimonious structural models in different samples. Factorial invariance was assessed using multigroup analysis through chi-square difference (χ^2). For this purpose, the sample was divided into two groups: patients with dental pain (n = 283) and patients with nondental pain (n = 153). This analysis first assessed whether the factorial weights were equivalent (metric invariance [λ]), second whether the factorial weights and the intercepts were equivalent (scalar invariance [Int]), and finally whether the factorial weights, intercepts, and residues' variance/covariance were equivalent (strict invariance [Cov]).[28–31] A *P* value of < .05 was considered significant.

Results

The mean (standard deviation [SD]) age of the 436 participants was 39.9 (13.6) years, and 74.5% were female. The sample consisted mostly of patients with low socioeconomic status: 1.8% belonged to economic class A (monthly family income of approximately US $2,315.00), 27.7% belonged to class B ($663.00 to $1,310.00), 57.4% belonged to class C ($286.00 to $421.25), and 13.1% belonged to classes D or E ($194.00 or less).

Of the included participants, 28.4% were dentate, 67.7% were partially edentulous, and 3.9% were edentulous, and 71.6% reported having some kind of chronic disease, with hypertension (25.3%) and diabetes mellitus (20.2%) being the most prevalent. As for the location of their pain, 65.2% had tooth pain, 14.5% pain in the face, 4.4% headache, 6.9% pain in the region of the ear or temporomandibular joint (TMJ), and 9.0% in other orofacial regions.

Both the OHIP-14 (TOHM: χ^2/df = 3.09; CFI = 0.95; GFI = 0.93; RMSEA = 0.07) and MPI (Part 1: χ^2/df = 2.67; CFI = 0.97; GFI = 0.92; PGFI = 0.60; RMSEA = 0.06; Part 2: χ^2/df = 2.97; CFI = 0.97; GFI = 0.93; RMSEA = 0.07; Part 3: χ^2/df = 3.19; CFI = 0.96; GFI = 0.92; RMSEA = 0.07) presented adequate fits to the sample data.

Table 1 presents the results of the predictive model and Model A. Age (β = 0.02), the factors severity of pain (β = 0.06) and social support (β = 0.04) of Part 1, the factors solicitous responses (β = −0.01) and distracting responses (β = 0.03) of Part 2, and all factors of Part 3 did not contribute to the perception of oral health; therefore, they were not included in the initial model analysis (Model A). The fit of Model A to the data was adequate (χ^2/df = 1.88; CFI = 0.96; GFI = 0.90; PGFI = 0.74; RMSEA = 0.04; r^2 = 0.28; AIC = 1004.86; BIC = 1383.87; BCC = 1020.16).

A contribution of the factors of the MPI to the OHIP-14 was observed. Gender was not significant in Model A (β = 0.07) and was therefore excluded, and the analysis continued with the refined model,

Table 1 Estimative of Predictive Models Elaborated Separately from the Demographic Variables and of Parts 1, 2, and 3 of the MPI, and Estimative of Initial Model (Model A) Considering OHIP as the Dependent Variable

	Estimate				Model A			
Variable/concept	β	βstandardized	SE	*P*	β	βstandardized	SE	*P*
Demographic								
Gender	0.37	0.16	0.12	.01	0.17	0.07	0.10	.10
Age	0.01	0.02	0.01	.64	–	–	–	–
Part 1								
Severity	0.03	0.06	0.04	.44	–	–	–	–
Interference	0.16	0.29	0.04	.01	0.16	0.29	0.03	< .01
Self-control	−0.71	−0.14	0.03	.02	−0.51	−0.10	0.25	.04
Negative mood	0.11	0.22	0.03	.01	0.08	0.17	0.32	< .01
Social support	0.04	0.08	0.03	.15	–	–	–	
Part 2								
Punishing responses	0.35	0.37	0.05	.01	0.15	0.15	0.52	< .01
Distracting responses	0.02	0.02	0.08	.75	–	–	–	–
Solicitous responses	−0.01	−0.01	0.06	.86	–	–	–	–
Part 3								
Household chores	−0.01	−0.02	0.04	.82	–	–	–	–
Outdoor work	0.01	0.01	0.04	.82	–	–	–	–
Activities away from home	0.18	0.23	0.16	.26	–	–	–	–
Social activities	−0.23	−0.22	0.20	.26				

β = regression coefficient; SE = standard error; MPI = Multidimensional Pain Inventory; OHIP = Oral Health Impact Profile.

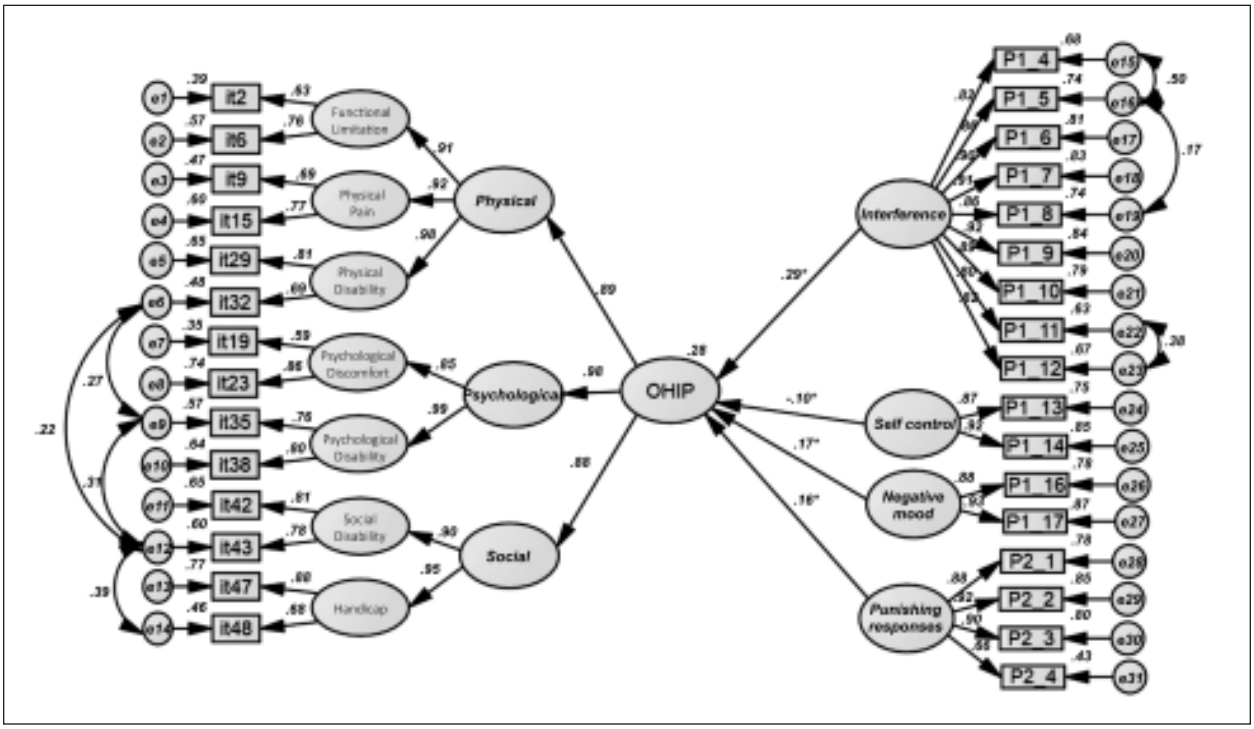

Fig 1 Refined structural model (Model B) fitted with the standardized paths (β) of pain interference, self-control, negative mood, and punishing responses on the OHIP-14.

Model B. Model B presented an adequate fit to the data (χ^2/df = 1.90; CFI = 0.96; GFI = 0.90; PGFI = 0.74; RMSEA = 0.04; AIC = 949.82; BIC = 1312.52; BCC = 963.99) (Fig 1). The explained variance was not changed in the analysis of the refined model (28.0%).

Model C, based on the theory that severity acts directly on interference and the interference acts on the perception of oral health, presented an adequate fit to the data (χ^2/df = 2.03; CFI = 0.95; GFI = 0.88; PGFI = 0.74; RMSEA = 0.05; AIC = 1,205.56; BIC = 1,596.71; BCC = 1,222.40) (Fig 2). There

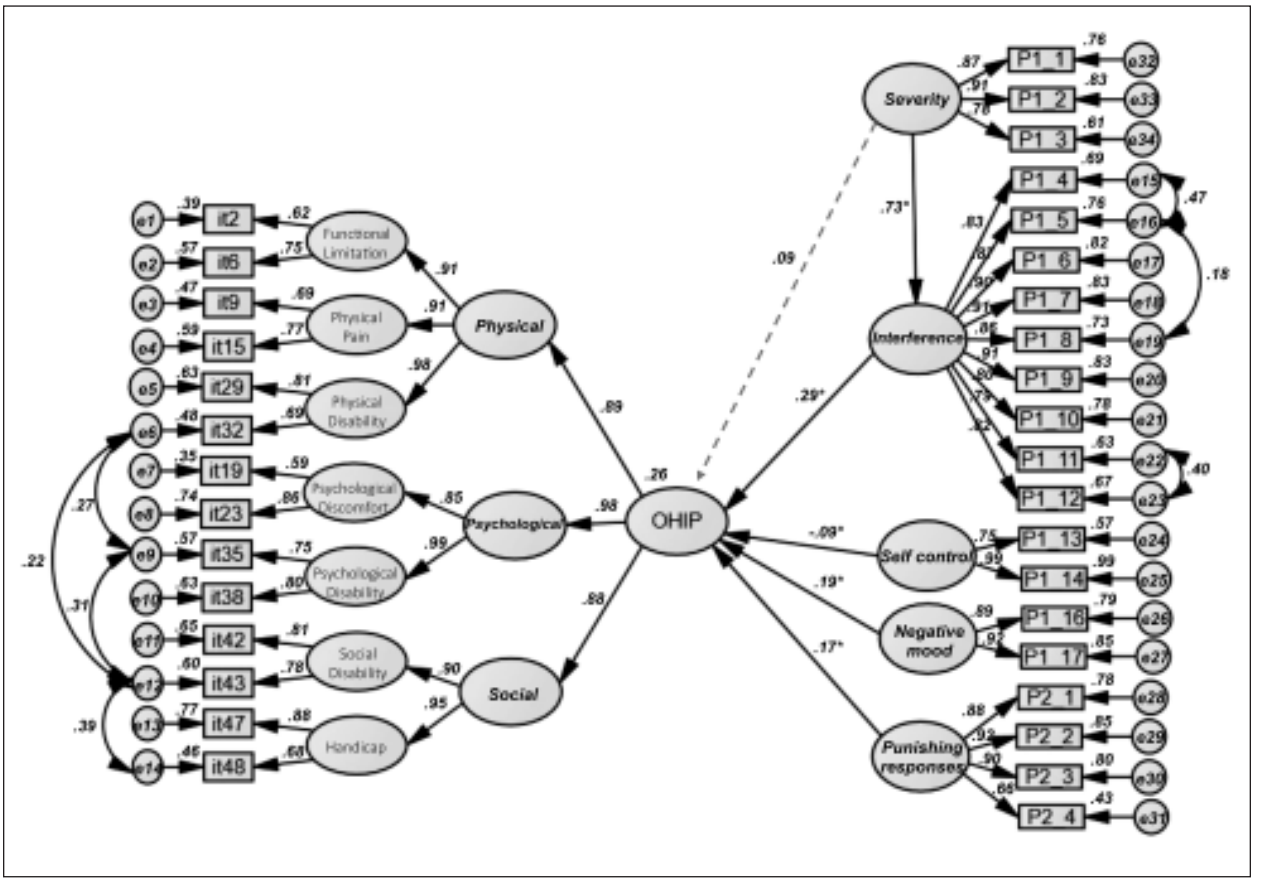

Fig 2 Structural model modified (Model C) fitted with the standardized paths (β) of severity acting directly on interference and the contribution of interference, self-control, negative mood, and punishing responses to the OHIP-14.

was a significant and positive contribution of the severity of pain to pain interference (β = 0.73; $P < .01$). The explained variance of Model C was 26.0%. The direct effect of severity on the OHIP-14 remained nonsignificant ($P = .31$).

In the model comparison, considering the AIC, BIC, and BCC indices, Model B was the most parsimonious. Regarding the factorial invariance of Model B in the samples of patients with dental pain and nondental pain, Model B presented metric (λ: $\chi^2 = 21.93$; $P = .34$), scalar (Int: $\chi^2 = 37.27$; $P = .20$), and strict (Cov: $\chi^2 = 11.65$; $P = .31$) invariance. The results of this analysis showed that Model B behaved in the same manner in the sample of patients with dental pain as in the sample with pain in other regions.

Discussion

The results of this study indicate a significant contribution (26% to 28%) of psychosocial and behavioral aspects of pain to the perception of oral health.

The first significant aspect was interference of pain in daily activities (item 4, Part 1), ability to work (items 5 and 10, Part 1), social activities (items 6, 7, 9, and 12, Part 1), and close personal relationships (item 8, Part 1) and friendships (item 11, Part 1). It was found that the greater the interference of orofacial pain, the greater the impact on oral health, a result that underscores the need to consider this aspect in the evaluation of individuals' perceptions of oral health. Boggero and Carlson's theory[20] on the assessment of the interference of pain should also be considered since it points to an important influence of severity/intensity of pain in the perceived interference of pain in patients' lives. Their theory was confirmed in this study (Fig 2).

Self-control was also found to contribute significantly to individuals' perceptions of oral health in the sample. Self-control is understood as how much control individuals feel they have over their lives (item 13, Part 1) and how able they are to cope with everyday problems (item 14, Part 1). It is understood that greater levels of self-control are indicative of a more limited impact of pain on oral health. According

to Moffitt et al[32] and Duckworth,[33] individuals with self-control better regulate their emotional and behavioral impulses as well as their attention. As a result, they may be healthier individuals who are less prone to risky behavior. Thus, they may present better physical and mental health, a conclusion that is consistent with the findings of this study.

Another significant aspect of perception of oral health was negative mood, a factor related to how irritable and tense individuals reported feeling during the last week (items 16 and 17, Part 1). The current study verified that individuals who felt irritated and/or tense due to orofacial pain reported that their pain had a greater impact on their oral health. Similar findings have also been reported by Fredrickson et al,[34] who found that individuals with more positive emotions provide more positive reports regarding their physical health and social relations.

Punishing responses associated with pain were also significant in individuals' perceptions of their oral health. These responses evaluate the behavior of individuals close/intimate to the respondent in relation to irritation (item 1, Part 2), anger (item 2, Part 2), and other negative attitudes toward cases of pain (items 3 and 4, Part 2). It was found that the more frequent the reports of punishing responses, the greater the impact of pain on oral health. On the other hand, aspects such as social support and solicitous and entertainment responses were not significant. This difference suggests that negative attitudes and/or negative feelings interfere more substantially in the everyday lives of individuals with pain than positive attitudes and/or positive feelings.

The behaviors of populations faced with their health problems are constructed from their health perceptions.[35] In this sense, the great importance of this study is based on a better understanding of the psychosocial and behavioral aspects of pain and how these aspects may negatively affect the perception of oral health. In addition, knowledge about the modulating factors of this perception is fundamental in clinical practice, guiding clinicians in treatment choices and priorities, producing treatments that are more effective, and optimizing disease prevention strategies.

It is important to note that, because there is a lack of studies on how psychosocial and behavioral aspects of pain contribute to perception of oral health, it is not possible to make a direct comparison of the present results with those of previous studies. Additional studies would increase the knowledge on this matter and generate discussions that may advance pain management techniques for patients.

The limitations of the present study included its cross-sectional study design, which did not allow for a cause-and-effect relationship between variables to be inferred. However, the option for using this study design was based on the need to understand how the variables are associated, to describe these associations, and, mainly, to generate hypotheses to be investigated in other studies with different designs. In addition, the participants were not clinically evaluated in this study. This lack of clinical evaluation does not compromise the relevance of the results, but it is likely that the inclusion of clinical variables would increase the predictive ability of the model. Although Model B showed strong invariance (stability) in both the sample of patients with dental pain and the sample of patients with nondental pain presented in this study, data collection should be expanded to include comparisons with other types of pain and locations in future studies. Such expansion was not possible in this study due to the low representativeness of patients with different locations of nondental pain. Thus, psychosocial and behavioral variables should be included in future studies regarding the perceptions of health and oral health due to the relevance of these perceptions to health promotion programs.

Conclusions

This study has provided evidence that patients with orofacial pain who presented feelings like tension and irritability, had punishing responses from intimate individuals and lower rates of self-control, and who reported interference of pain in daily activities, ability to work, social activities, and close personal relationships and friendships presented greater impacts on oral health. Knowledge about the psychosocial and behavioral aspects of pain and perceptions of oral health is relevant to clinical management, to guiding clinicians in treatment choices and priorities, to producing treatments that are more effective, and to optimizing disease prevention strategies.

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References

1. Wan KY, McMillan AS, Wong MC. Orofacial pain symptoms and associated disability and psychosocial impact in community-dwelling and institutionalized elderly in Hong Kong. Community Dent Health 2012;29:110–116.
2. Mashoto KO, Astrøm AN, David J, Masalu JR. Dental pain, oral impacts and perceived need for dental treatment in Tanzanian school students: A cross-sectional study. Health Qual Life Outcomes 2009;7:73.

3. Fordyce WE. Behavioural science and chronic pain. Postgrad Med J 1984;60:865–868.
4. Magnusson JE, Becker WJ. Migraine frequency and intensity: Relationship with disability and psychological factors. Headache 2003;43:1049–1059.
5. da Silva JA, Ribeiro NP. Avaliação e Mensuração de Dor Pesquisa, Teoria e Prática. Ribeirão Preto, Brazil: Funpec, 2006.
6. Ulinski KG, do Nascimento MA, Lima AM, et al. Factors related to oral health-related quality of life of independent Brazilian elderly. Int J Dent 2013;2013:705047.
7. Yang SE, Park YG, Han K, Min JA, Kim SY. Dental pain related to quality of life and mental health in South Korean adults. Psychol Health Med 2016;21:981–992.
8. Turk DC, Okifuji A. Psychological factors in chronic pain: Evolution and revolution. J Consult Clin Psychol 2002;70: 678–690.
9. Alonso J, Vilagut G, Adroher ND, et al. Disability mediates the impact of common conditions on perceived health. PLoS One 2013;8:e65858.
10. de Waure C, Soffiani V, Virdis A, Poscia A, Di Pietro ML. Italian university students' self-perceived health and satisfaction of life. Ann Ist Super Sanita 2015;51:121–125.
11. Locker D, Clarke M, Payne B. Self-perceived oral health status, psychological well-being, and life satisfaction in an older adult population. J Dent Res 2000;79:970–975.
12. Gaston-Johansson F, Johansson G, Felldin R, Sanne H. A comparative study of pain description, emotional discomfort and health perception in patients with chronic pain syndrome and rheumatoid arthritis. Scand J Rehabil Med 1985;17:109–119.
13. Kumar MS, Barnah D, Roy AS. Perceived health and hygiene practices of elderly living in a slum of Delhi: A preliminary survey. Ind J Gerontol 2015;29:100–108.
14. Iversen VC, Sam DL, Helvik AS. Psychological distress and perceived health in inmates in Norwegian prisons. Scand J Public Health 2014;45:171–176.
15. Slade GD, Spencer AJ. Development and evaluation of Oral Health Impact Profile. Community Dent Health 1994;11:3–11.
16. Zucoloto ML, Maroco J, Campos JA. Psychometric properties of the Oral Health Impact Profile and new methodological approach. J Dent Res 2014;93:645–650.
17. Slade GD. Derivation and validation of a short-form Oral Health Impact Profile. Community Dent Oral Epidemiol 1997;25: 284–290.
18. Daut RL, Cleeland CS, Flanery RC. Development of the Wisconsin Brief Pain Questionnaire to assess pain in cancer and other diseases. Pain 1983;17:197–210.
19. Kerns RD, Turk DC, Rudy TE. The West Haven-Yale Multidimensional Pain Inventory (WHYMPI). Pain 1985;23: 345–356.
20. Boggero IA, Carlson CR. Somatosensory and affective contributions to emotional, social, and daily functioning in chronic pain patients. Pain Med 2015;16:341–347.
21. Soler MD, Cruz-Almeida Y, Saurí J, Widerström-Noga EG. Psychometric evaluation of the Spanish version of the MPI-SCI. Spinal Cord 2013;51:538–552.
22. Zucoloto ML, Maroco J, Duarte Bonini Campos JA. Psychometric properties of the Multidimensional Pain Inventory applied to Brazilian patients with orofacial pain. J Oral Facial Pain Headache 2015;29:363–369.
23. Lemos MMC, Zanin L, Jorge MLR, Florio FM. Oral health conditions and self-perception among edentulous individuals with different prosthetic status. Braz J Oral Sci 2013;12:5–10.
24. Montero J, Castillo-Oyagüe R, Lynch CD, Albadejo A, Castaño A. Self-perceived changes in oral health-related quality of life after receiving different types of conventional prosthetic treatments: A cohort follow-up study. J Dent 2013;41:493–503.
25. de Moura WVB, Costa ICC, de Andrade FB, et al. Oral health and self-perception in the elderly. Health 2014;6:3045–3053.
26. Nunes CI, Abegg C. Factors associated with oral health perception in older Brazilians. Gerodontology 2008;25:42–48.
27. Locker D. Concepts of oral health, disease and the quality of life. In: Slade GD (ed). Measuring Oral Health and Quality of Life. Chapel Hill, NC: University of North Carolina, 1997:11–24.
28. Maroco J. Análise de Equações Estruturais: Fundamentos Teóricos, Software & Aplicações, ed 2. Lisboa: ReportNumber, 2014.
29. Associação Brasileira de Empresas de Pesquisa. Critério de Classificação Econômica Brasil. Dados com base no Levantamento Sócio Econômico, 2008.
30. Oliveira BH, Nadanovsky P. Psychometric properties of the Brazilian version of the Oral Health Impact Profile—Short form. Community Dent Oral Epidemiol 2005;33:307–314.
31. Kaplan D. Structural Equation Modeling: Foundations and Extensions. Thousand Oaks, CA: Sage, 2000.
32. Moffitt TE, Arseneault L, Belsky D, et al. A gradient of childhood self-control predicts health, wealth, and public safety. Proc Natl Acad Sci U S A 2011;108:2693–2698.
33. Duckworth AL. The significance of self-control. Proc Natl Acad Sci U S A 2011;108:2639–2640.
34. Fredrickson BL, Cohn MA, Coffey KA, Pek J, Finkel SM. Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential personal resources. J Pers Soc Psychol 2008;95:1045–1062.
35. Uchôa E, Vidal JM. Antropologia médica: Elementos conceituais e metodológicos para uma Abordagem da saúde e doença. Cad Saúde Publica 1994;10:497–504.