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Association between Normative and Self-Perceived Dental Treatment Need in Brazilian Students

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Abstract

Aim and objectives: To assess the level of agreement and association between clinical and self-perceived need for dental treatment in young students.

Methodology: A cross-sectional study was conducted with 1470 adolescents aged 15-19 years in 36 cities in southern Brazil. The data were collected in 2011 from a questionnaire and clinical oral examination. The clinical criteria used to determine the need for dental treatment were the positive result of clinical examination for one or more variables of presence of caries, gingival bleeding, trauma, need for restorative treatment and need for aesthetic treatment. The question: "Do you think you currently need dental treatment?" was used to assess the self-perceived need for treatment.

Results: Of the adolescents, 55.9% were female and 47.1% had an average family income of 1-3 minimum wages. The majority (87.40%) presented normative needs. Regarding self-perception, 74.60% reported a need for dental treatment. There was significant positive agreement between positive self-perceived assessment of dental treatment needs and normative assessment. The sensitivity value was 76.90%, and specificity was 40.90%. The positive predictive value was 90%, whereas the negative predictive value was 20.30%. Adolescents presenting dental caries had a 24% higher prevalence of self-perceived need for dental treatment. The results of this study showed strong agreement between the need for self-perceived treatment and the need for clinical treatment.

Conclusion: The positive self-perception of the need for dental treatment in young people can be useful to evaluate oral health conditions, since it can be used to meet their normative needs.

Introduction

Self-perception of treatment needs can be used to identify people who need clinically defined treatment, by prioritizing services according to the impact of the need, and by planning services to meet their needs better. Assessment of needs in dentistry has focused mainly on needs defined normatively and professionally [1]. Self-perception is divided into self-perception of health, self-perception of health needs and self-perception of treatment needs. Self-perception of health is the individual's understanding of his health condition [2], representing his subjective perspectives [3]. The self-perception of health needs may be related to the beliefs and knowledge of the affected person, influenced by psychological, socioeconomic and cultural factors 1, and also by the values of those responsible for the well-being of this individual [4]. The self-perception of the need for treatment may be related to the presence of pain or discomfort [5]. Often, self-perceived need for dental treatment indicates the impact that the disease has on the individual [6].

The clinical indicators (normative need) that usually guide the evaluation of an individual's need for treatment [7] serve only to identify a disease. That is to say, they point out the number of dental services that must be performed for people to stay or become healthy, but do not consider the patient's attitudes and behaviors [3]. Indexes such as DMFT (decayed, missing and filled teeth) indicate only the extent and type of treatment already offered to the patient, as well as his difficulty in obtaining adequate and accessible oral health services [8]. To date, few studies have investigated the relationship between the self-perceived treatment need and the normative need for dental treatment. In one of the first studies on the subject [9] no association was found, but more recent studies have indeed found a relationship [7,10], thus concluding that questionnaire and interview data are valid measures of oral health status.

Accordingly, the present research compared the questionnaire data with the need for normative treatment. The authors conducted an investigation that provided information on perceived and clinically evaluated treatment needs in a population of adolescents. A comparison between the perceptions of dental treatment need and the normative assessments made by a dentist was performed to assess the level of agreement and association between clinical need and self-perceived need for dental treatment in adolescents.

Methods

A cross-sectional school-based study was conducted. The database used was obtained from previous research [11], which included an analysis of the oral health profile of 1771 school-going adolescents

aged 15 to 19 years, from 36 municipalities with fewer than 50 thousand inhabitants in southern Brazil, carried out between June and December 2011.

The municipalities were selected according to the objectives of the main research. A total of 125 schools (98 urban and 27 rural; 5 private and 120 public) participated in the study. The sample size was calculated using the Decayed Missing Filled Teeth (DMFT) means, based on the same municipalities, selected from Brazil's national health survey conducted in 2009 [12].

The required sample of 1771 adolescents was found by estimating a level of significance of 0.05 and a power of 95%, a non-response rate of 20% and a design effect of 1.5. The sample was distributed by a weighted average attributed among different schools, and student selection was performed using a systematic, random process. A pilot study with 102 students did not take part in the main study was carried out to train and calibrate the examiners, and assess the suitability of the research instruments.

Data were collected through questionnaires and clinical oral examinations performed under artificial light, using flat mirrors and probes, following the World Health Organization criteria [13,14]. After the informed consent forms were signed and the questionnaires were completed, the clinical exams were performed by four previously trained and calibrated dentists.

The socio demographic variables used included sex (male and female), age (15 to 19 years old), monthly family income (up to 1 minimum wage; 1 to 3 minimum wages; and more than 3 minimum wages), based on the current minimum wage at the time of data collection (US $327.92), and maternal years of schooling (up to 4 years; 5 to 9 years; and 10 years or more).

The self-perceived need for dental treatment was assessed with the question: "Do you think you currently need dental treatment?" ("Yes" or "no"). After answering the questionnaire, the adolescents were examined for presence of caries, gingival bleeding, and dental trauma, as well as the recommended need for orthodontic treatment.

The criteria recommended by the WHO for the condition of the dental crown and the need for treatment were related to dental caries, using scores from 0 to 9, as follows: healthy tooth (0), carious crown (1), restored and carious crown (4), tooth missing for other reasons (5), sealant (6), bridge or crown support (7), unruptured crown (8), and trauma and excluded tooth (9). Data analyses were performed by classifying the variable as: 0 (no need); and 1 (categories 1-8).

The indication of the treatment was performed after the condition of the crown was recorded, using the following numerical codes: 0 (no need), 1 (need for filling of 1 side), 2 (filling of 2 or more sides), 3 (need for crown), 4 (veneers), 5 (pulp treatment and filling, 6 (extraction), 7 (remineralization), 8 (sealant) and 9 (no information). The need for treatment variable was categorized into 0 (no need), and 1 (with need in the categories 1- 8).

The gingival condition (bleeding and presence of calculus or pouch) was evaluated using the Community Periodontal Index (CPI). Only the conditions of absence (0) or presence (1) of gingival bleeding or dental calculus were used for this study. The mouth was divided into six sextants for the purpose of index registration. The observed condition was recorded in boxes of the representative sextant sheet after probing six index teeth of each sextant (teeth 16,11,26,36,31 and 46).

A tooth missing part of its coronary surface as a result of trauma, and having no evidence of caries, was considered as traumatized. The following adaptation of the dental trauma classification proposed by the World Health Organization was used to perform this evaluation: healthy tooth/without trauma (0); with enamel fracture (1); enamel and dentin fracture (2); enamel fracture and dentin with pulp exposure (3); and tooth loss due to trauma (4). The dental trauma variable for performing data analysis was categorized into 0 (no need) and 1 (categories 1,2,3,4).

The criteria for determining the clinical need for orthodontic treatment used in this study were those recommended by the Dental Aesthetic Index (DAI). This index evaluates the following factors: number of incisors, canines and missing premolars, crowding in the incisor region, spacing in the incisor region, diastema, maxillary misalignment, mandibular misalignment, and anterior maxillary over jet, mandibular over jet, anterior open bite, and anteroposterior molar ratio. After evaluating the clinical need, an equation was applied to calculate the values obtained (WHO, 1997), categorizing the need according to the conditions of normal occlusion and the malocclusion defined, either severe or incapacitating. The outcome of the DAI evaluation of treatment needs according to the factors assessed was: no or little need for treatment (DAI ≤ 25), elective need for treatment (DAI=26-30), and highly recommended need for treatment (DAI ≥ 31).

A new variable called normative need was created to measure clinical treatment needs. It included the treatment needs for caries, bleeding, restorative treatment and trauma. The dependent variable was the self-perceived treatment need. The independent variables were the following: presence of caries, need for restorative treatment, presence of bleeding, trauma, need for orthodontic treatment, female, income, maternal educational level, and normative need.

Data analysis was carried out using the Statistical Package for Social Sciences (SPSS) for Windows. It included the frequency distribution of the studied variables and the Pearson's chi-square test. The prevalence ratio was calculated (95% confidence interval) by Poisson regression with robust univariate and multivariate variance. The level of statistical significance of all the analyses was set at 5% ($p < 0.05$).

Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of self-perceived need for dental treatment were also calculated in relation to the normative needs. The present study was submitted to and approved by the Research Ethics Committee of the Dental School of the Federal University of Rio Grande do Sul (No. 15370) and the Research Ethics Committee of the School of Public Health of Rio Grande do Sul State (No. 624/11). All individuals identified with normative needs were referred to the public health centers of their cities.

Results

Of the 1771 adolescents evaluated, 1470 answered the question about self-perception. Only these 1470 individuals were considered in this study. There was a predominance of females (Table 1). The average family income was 1 to 3 Brazilian minimum wages in 47.1% of the group examined, and more than 3 minimum wages in a little over 1/3 of the group. The majority of the participants had mothers with 5 to 9 years (39.3%) of schooling, whereas 35.5% had mothers with more than 10 years of schooling.

Variables	Total sample	N	%
Self-perceived need for dental treatment	1470	1044	71
Presence of caries	1470	475	32.3
Need for restorative treatment	1470	421	28.6
Bleeding	1432	684	47.8
Trauma	1470	315	21.4
Need for orthodontic treatment	1353	240	17.6
Women	1470	822	55.9
Income	1470		
<1 Brazilian minimum wage		209	14.2
1-3 Brazilian minimum wages		692	47.1
>3 Brazilian minimum wages		569	38.7
Level of schooling	1470		
Up to 4 years		370	25.2
5-9 years		578	39.3
≥ 10 years		522	35.5

Table 1: Sociodemographic and clinical characterization of the sample.

Regarding the need for self-perceived treatment, 71% reported that they perceived the need for dental treatment; this perception was higher in the female sex (74.8%) than the male sex (66.2%). Regarding caries, almost 1/3 of the patients had one or more decayed teeth. Concerning bleeding, almost half of the group presented bleeding in at least one sextant. More than 70% of the analyzed patients presented no need for restorative treatment. In 1155 young people (78.6%), there was no diagnosis of trauma. In 17.6%, the diagnosis was a highly recommended need for orthodontic treatment. The prevalence of normative treatment need was higher for bleeding, followed by caries. When the normative needs (caries, bleeding, need for restorative treatment and trauma) were combined into a single variable called normative need, the sample dropped from 1470 to 1182 participants, including only valid questionnaire answers and clinical exams. Of these (Table 2), 881 had a self-perceived need for dental treatment. Dentists identified needs in 1033 adolescents.

	Perceived assessment	Normative assessment	Sensitivity	Specificity	PPV	NPV
Total sample	74.60%	87.40%	76.90%	40.90%	90.00%	20.30%
Male	70.10%	89.30%	71.80%	43.90%	91.50%	15.60%
Female	78.40%	85.80%	81.30%	39.10%	89.00%	25.70%

Note: PPV: Positive Predictive Value; NPV: Negative Predictive Value

Table 2: Self-perceived and normative evaluation of the total sample by sex (n=1182).

Of all the students who had a normative dental treatment need (n=1033; 87.40%), 794 (76.90%) perceived this need. Among the 149 students (12.60%) who did not need any standard treatment, 60 adolescents (40.90%) perceived that they did not need dental treatment. The rest of this group (n=89; 59, 10%) perceived that they did need dental treatment.

Of the 881 patients (74.60%) who perceived that they needed dental treatment, 792 (90%) was right. Of the 301 adolescents (25.40%) who self-perceived having no need, 61 students (20.30%) really did not need treatment. The remaining 240 adolescents (79.70%) perceived themselves as not needing dental treatment, whereas they actually did need clinically identified dental treatment.

The positive predictive value observed was very high (Table 2) for both sexes, and the negative predictive value was very low, also for both sexes. Regarding gender, women perceived the need for treatment more than men, but men presented more normative needs than women (Table 2).

Poisson regression analysis (Table 3) shows that the factors independently associated with self-perceived need for dental treatment were presence of caries, presence of bleeding, need for orthodontic treatment and the female sex (that most perceives the need for dental treatment). Family income and mother's schooling did not significantly influence the self-perceived need for dental treatment among the adolescents studied.

Evaluating the presence of caries variable, it was observed that adolescents with dental caries had a 24% higher prevalence of self-perceived need for dental treatment (95% CI=1.08-1.43). Adolescents who were diagnosed with a need for orthodontic treatment had a 13% higher prevalence of self-perceived need for treatment (95% CI=1.02-1.25), and students with bleeding in at least one sextant showed a 12% higher prevalence of self-perceived need for dental treatment (95% CI=1.01-1.23). The female gender also showed statistically significant results, considering that women had an 11% higher prevalence of self-perceived need for dental treatment (95% CI=1.00-1.22).

Variables	Univariate		Multivariate	
	PR not adjusted	**p**	**PR adjusted**	**p**
	(IC 95%)		**(IC 95%)**	
Presence of caries	1.38 (1.29-1.46)	<0.001	1.24 (1.08-1.43)	0.003
Need for restorative treatment	1.13 (1.02-1.26)	<0.001	1.08 (0.94-1.24)	0.29
Presence of bleeding	1.18 (1.10-1.26)	<0.001	1.12 (1.01-1.23)	0.027

Trauma	1.05 (0.97-1.13)	0.23	1.04 (0.93-1.16)	0.499
Need for orthodontic treatment	1.13 (1.02-1.26)	0.019	1.13 (1.02-1.25)	0.017
Female	1.13 (1.06-1.21)	<0.001	1.11 (1.00-1.22)	0.041
Income				
<1 Brazilian minimum wage	1.18 (1.07-1.29)	0.001	1.04 (0.90-1.20)	0.603
1-3 Brazilian minimum wages	1.12 (1.04-1.20)	0.005	1.02 (0.92-1.14)	0.683
>3 Brazilian minimum wages	1		1	
Maternal educational level				
Up to 4 years	1.14 (1.05-1.24)	0.003	1.05 (0.92-1.20)	0.459
5-9 years	1.11 (1.02-1.20)	0.011	1.10 (0.99-1.23)	0.09
≥10 years	1		1	
Normative need	1.30 (1.13-1.49)	<0.001	1.30 (1.13-1.49)	<0.001

Table 3: Poisson regression analysis to assess factors independently associated with the self-perceived need for dental treatment.

Discussion

The data reported above suggest that self-perceived interviews are useful for assessing the oral health status and treatment needs of individuals. Self-assessment and professional assessment identified a closely matching number of people with dental treatment needs. Thus, this study shows that schoolchildren aged 15 to 19 years have a positive perception of their oral health. One would have expected a higher proportion of the adolescents to have consulted the dentist, given the expressed treatment need.

Variables that may not be related to pain were used in this study. Nevertheless [15], asymptomatic diseases were perceived satisfactorily, following clinical diagnosis [10,16]. A few cases of non-clinically identified self-perceived treatment needs were observed. These may be related to flecks and pigmentation perceived in self-diagnosis [17]. The perceived incidence of a disease also depends on the true incidence and its degree of recognition [18]. Whereas a dental surgeon evaluates the condition based on the absence or presence of disease, a patient more easily observes the symptoms and the functional and social problems caused by the presence of a disease [19], thereby explaining the difference found between self-perceived evaluation and normative evaluation.

In the present study, adolescents with clinically observed caries had a 24% higher self-perception prevalence of dental treatment. Most of the time, the reason why people do not seek dental care is that they do not perceive its need. The perception of the oral health condition and the importance given to it are useful health indicators, since they synthesize the health condition, the values and the cultural expectations that influence an individual's behavior [20]. This is related to the negative predictive value observed in this study, where 80% of the sample who perceived no treatment need actually did present a clinical need.

Despite the variety of etiological factors involved in the cause of tooth pain, its most common agent is dental caries [21], observed in almost 1/3 of those evaluated in the present study. Moreover, the results for the Poisson regression showed that a greater number of adolescents perceived that they needed treatment based on their caries experience. Dental pain is highly prevalent in children [22], and may have a deep effect on overall health and quality of life [23].

This study worked with 15 to 19 year-old students. The fact that the self-perceived need for dental treatment was high in this investigation could be attributed to the age of this group. "Older" adolescents are in an advanced process of developing critical awareness, in relation to the younger ones [24]. In older teens, sociability and concern about aesthetics elicit the need for self-care, mainly in girls. This explains the result of the higher prevalence of their self-perceived dental treatment need, the presence of bleeding, and the need for orthodontic treatment found in this research.

In addition to the higher prevalence of self-perceived need for dental treatment, the female sex also showed greater agreement between the need for normative treatment and the need for self-perceived treatment, with a sensitivity of 81.30% compared with men (71.80%). This may be explained by aspects of social and cultural norms. Women perceive their oral health needs more frequently than men, seeking and paying more attention to health services [25,26]. Unlike other studies [1,6] the present research has shown that the family's average income and the mother's schooling do not significantly interfere with the adolescent's self-perception.

This study presents some limitations. Because of its cross-sectional design, it does not allow establishing whether the perceived need changes in populations as the normative levels of these parameters change. The self-assessment of health may also be associated with the emotional state and the feelings of the participants at the time studied [27], and may be sensitive to uncertainties and bias of interpretation [28]. Whereas the findings of this study suggest a relationship between perceived need and normative need, the correlation between the two should be investigated in populations with different levels of need.

Conclusion

The agreement between normative and self-perceived dental treatment needs, by Brazilian students aged 15 to 19 years, even without the presence of painful symptomatology, was found to be very satisfactory in this study. This indicates that subjective measures are useful to identify groups who need clinically defined treatment or health promotion actions. However, it should be acknowledged that the self-perception of 'no dental treatment need' was not in agreement with the clinically evaluated need in more than half of the adolescents.

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