

Correlation between oral health perception and clinical factors in a Brazilian community

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Objective: The aim of this study was to analyse associations between self-perception of oral health and relevant clinical, personal and socio-demographic factors in a Brazilian community. **Material And Methods:** Urban adults living in a city in southern Brazil were interviewed and examined. Individuals with acute pain and who needed multiple extractions of teeth were excluded. Self-perception and the *Oral Health Impact Profile* (OHIP-14) were applied to measure the impact of oral conditions on the quality of life. Socio-demographic and clinical indicators were also analysed. **Results:** The clinical examination revealed a high dental caries experience (DMFT = 18.9) and a high prevalence of periodontal disease. Oral condition was considered “normal” by 42% of respondents. The variables associated with the OHIP-14 were: education, age, self-assessment, dental caries and the DMFT index. **Conclusions:** Self-perception of oral health was associated with OHIP-14 and the clinical indicators had low influence in the self-perception. Therefore, the development of educational initiatives and preventive strategies for the adult population is recommended.

Key words: Dental health surveys, health conditions, oral health; questionnaires, self-concept, socioeconomic factors.

Introduction

Oral health affects quality of life in some way in the majority of people (Steele *et al.*, 2004). It plays a major role in patients' perceptions of their needs and their demands for dental treatment (Walter *et al.*, 2007). Hence, it is important to understand the relationship between self-perception of oral health and the impact that this can have on quality of life. The study of patients' self-perception of health has received increasing attention in medicine and dentistry (Lundergren *et al.*, 2004), but little information is available regarding the reproducibility and validity of self-perceived oral health measures (Heft *et al.*, 2003). A number of these Oral Health-Related Quality of Life measures (OHRQoL) have been developed and are being evaluated (Leao and Sheiham, 1996). These assess the functional, psychological and social impacts of oral diseases and disorders (Locker and Gibson, 2005).

The Oral Health Impact Profile (OHIP) is one of a number of self-reported measurements of the adverse impacts of oral conditions on daily life. The original 49-item questionnaire has been used in cross-sectional epidemiological studies of adults in Australia, Canada, Spain and the United States of America (Allen *et al.*, 2001; Locker *et al.*, 2004; Lopez *et al.* 2002; Lopez and Baelum, 2006). The subsequent development of a shortened questionnaire comprising of 14 items (OHIP-14) allowed the use in large surveys of a validated index of the impact of oral health (Steele *et al.*, 2004).

In Brazil, few studies have been conducted on the self-perception of oral health, and discordances have

been detected between subjective and objective indicators (Biazevic *et al.*, 2004; Silva and Fernandes, 2001; Silva *et al.*, 2005).

The objective of the present study was to assess the self-perception of oral health status, through OHIP-14, and to analyse the clinical, subjective and socio-demographic factors that influence this perception.

Material and methods

A cross-sectional study was conducted in the city of Ribeirão Preto, in the state of São Paulo, southern Brazil. The data collection was done by means of an epidemiological survey and the administration of a questionnaire to 100 adults who had received clinical dental care at the University of Ribeirão Preto, in the 18 months preceding the study. The service offered by the University is free of charge and is integrated with municipal health services. One hundred and eighty people were selected for this study, but persons were excluded who presented with acute pain, who needed multiple extractions of teeth or who did not attend for examinations. The mean age of the participants was 40.7 years (range 18 to 68 years, SD = 15.4). Because these people were easy to access, they formed a convenience sample.

Their perceptions of oral health were investigated using OHIP-14 and three questions. The OHIP-14 instrument is composed of 14 questions relating to dysfunction, discomfort and disability attributed to oral conditions and thus forms a comprehensive measure.

The Portuguese language version of OHIP-14 was tested and validated by Almeida *et al.* (Almeida *et al.*, 2004) with regard to internal consistency and homogeneity between the questions.

The OHIP-14 questions had following response format: “very often”= 4, “fairly often”= 3, “occasionally”= 2, “hardly never”= 1 and “never”= 0. The response format was standardized in this way and the additive method for scores was used. Consequently, the OHIP-14 scale ranged from 0 to 56 with higher scores indicating poorer oral health-related quality of life.

Other measures included self-perception of oral health, a single item rating of satisfaction with oral health status with two questions: “Have you had any problems with your teeth?” and “Have you had any problems with your gingivae” with following response format: “yes”, “no” or “I have no opinion” and the other was “How do you evaluate your teeth, gingivae or prostheses?” with following response format: “excellent”, “good”, “regular”, “poor”, “very poor”, “I have no opinion”. These questions were included in the study in order to obtain a subjective evaluation of oral conditions and their possible association with the OHIP-14 index, which measures the everyday impact of oral health.

The clinical oral health conditions observed were the DMFT index, used to measure caries experience; the community periodontal index (CPI), used to measure periodontal disease, and the use of and need for removable prostheses. For this evaluation the following were considered:

- The use of a removable prosthesis and whether it was full or partial;
- The need for a removable prosthesis;
- Whether the full or partial prosthesis in use was satisfactory or not
- Whether the person was edentulous;
- Whether the person had lost, or required the extraction of, four or more teeth in the same jaw, suggesting a need for a removable prosthesis.

If, clinically, dentures were broken, or lacked one or more teeth or did not replace missing teeth, the denture was considered inadequate. Loss of vertical dimension or the stability of the prosthesis were also evaluated.

In addition to oral health conditions, the following demographic variables were recorded: gender, age group 18–20, 21–30, 31–40 or ≥ 41 years (these categories were established from the sample median age; which was 40 years); educational level (0, 1–8, 9–12 or ≥ 13 years of study).

Data collection took place between July 2006 and January 2007 and was undertaken by one person who had previously been calibrated.

The individuals were examined in the school of dentistry of the University of Ribeirao Preto, Ribeirao Preto, SP, Brazil and the clinical dental assessments used a sterilized plane dental mirror, a WHO periodontal probe for use with the Community Periodontal Index and wooden spatula, complying with the biosafety standards recommended by the World Health Organization.

We obtained prior approval from the Research Ethics Committee of the State University of Ribeirao Preto and the participants were required to sign and the participants were required to sign a consent form.

The results of the questionnaire and the examinations were recorded using the Epi Info (version 6.04) computer programme. The frequency distributions of all variables were tabulated. Statistical tests aimed to determine associations between sociodemographic variables, clinical factors and subjective perceptions with the OHIP-14 (dependent variable). To determine whether there were significant differences between groups by dependent variable, we used non-parametric tests such as Kruskal-Wallis, Mann-Whitney and Pearson Chi-square.

The analysis used multivariate regression and SPSS software, version 15.0, to identify predictors of the OHIP-14. The analysis was conducted in two stages, with the independent variables entered in the following order: first the sociodemographic and subjective variables, then the clinical variables. The significance level in the tests was 5%.

Results

A total of 100 adults, of whom 71 were women, were interviewed and clinically examined. The mean age of the study population was 40.7 years and three people had never been to school. Half the participants had eight or fewer years of schooling.

Participants' clinical conditions were precarious with a mean DMFT score of 18.89 teeth, of which 8.29 were missing (43.9%, SD = 8.5), 3.76 were decayed (19.9%, SD= 3.7) and 6.84 were filled (36.2%, SD = 4.9). The CPI showed that only 21% of participants had no signs of periodontal disease and the majority of sextants had pathological pockets of between 4 mm and 5 mm (48%), or deeper (Table 1). Half the participants did not use, and were in need of, a prosthesis (Table 2).

The subjective data showed that participants had low perceptions of their oral health. Thus, 76% and 47% of the people claimed to have no problem with their teeth or gingiva, respectively. Dental condition was assessed as “normal” by 42% of participants (Table 3) and only 32% reported no impact of oral conditions on quality of life as measured by the OHIP-14. The index ranges from 0 to 56, and this study found an average of 13.6, indicating the severity of oral impacts.

The Kruskal-Wallis and Pearson's chi-square tested for differences between the subjective variables, clinical variables and self-assessments with the OHIP score. There were statistically significant associations with educational level ($p = 0.01$), age ($p = 0.03$), self-assessment ($p < 0.001$), the teeth ($p < 0.001$) and the DMFT score ($p = 0.03$). It was observed that people with higher average number of impacts had less education, were older, rated their oral health as poor, had more teeth and had a higher DMFT score.

The regression analysis shown in Table 4 was undertaken to determine the predictors of the OHIP score. The independent variables were analysed in two blocks, starting with the socio-demographic and subjective variables and ending with the clinical variables. Thus, it was possible to monitor the effects of different independent variables in predicting the dependent variable.

When the socio-demographic and subjective variables (gender, age, education and self-assessment) were compared, the explained variance or R^2 was 0.10; these

Table 1. Distribution of sextants according to the highest CPI index score reported by each individual. Ribeirão Preto, 2007, n=100.

<i>Findings</i>	<i>%</i>
No signs of periodontal disease	21
Gingival bleeding after gentle probing	4
Supragingival or subgingival calculus	5
Pathologic pockets 4-5 mm deep	48
Pathologic pockets ≥ 6 mm deep	9
Fewer than 2 teeth	13

Table 2. Frequency distribution of the prosthetic conditions. Ribeirão Preto, 2007.

<i>Condition prosthetics</i>	<i>n</i>
The participant does not require a prosthesis	30
The participant requires a prosthesis, however does not use	50
The participant uses the a prosthesis	20
TOTAL	100

Table 3. Frequency distribution of subjective factors. Ribeirão Preto, 2007, n=100.

<i>Self-assessment</i>	<i>%</i>	
Problems with the teeth	No	76
	Yes	12
	No opinion	12
Problems with the gingivae	No	47
	Yes	39
	No opinion	14
Oral condition	Excellent	5
	Good	23
	Normal	42
	Poor	15
	Very poor	3
	No opinion	12

Table 4. Values of the regression analysis in individuals attending the Dentistry Clinic, University of Ribeirão Preto, in 2007. Dependent variable: OHIP index.

<i>Independent Variables</i>	<i>Steps</i>			
	<i>1a.</i>		<i>2a.</i>	
	β	<i>p</i>	β	<i>p</i>
Age	-0.005	0.03*	-0.058	0.55
Gender	-0.205	0.26	0.275	0.10
Schooling	0.222	0.59	-0.123	0.14
Self-assessment	0.149	0.01*	0.150	0.02*
Problems with the teeth	0.092	0.52	0.002	0.88
Problems with the gingiva	-0.394	0.09	0.121	0.15
Decay			0.281	0.01*
Filled			0.150	0.18
Missing			0.054	0.49
DMFT			-0.652	0.10
CPI			-0.132	0.20
Prostheses			0.236	0.98
R ²	0.101		0.222	

*statistically significant

variables explained only 10% of the variation of OHIP. Only age ($p = 0.03$) and self-assessment ($p = 0.01$) were significant in this step.

Later, the clinical variables (caries experience, CPI and prosthetic condition) were introduced into the analysis and the R^2 rose to 0.17 indicating that 17% of the variation of OHIP could be explained by all the variables tested and 7% by the clinical variables alone. The greatest predictors of the OHIP score were the self-assessment ($p = 0.02$) and the teeth ($p = 0.01$).

The sign of the regression coefficient indicates that the OHIP index showed lower scores (i.e. fewer negative impacts) in younger people, who assessed their oral health as better and who had fewer teeth in the mouth.

Discussion

The principal limitations of this study relate to the sample size and the fact that these results cannot be generalized to the entire population, because the sample was drawn from a specific population (adults who had received public dental services). However, the results were similar to those from other studies (Silva and Fernandes, 2001), which also confirm the low correlation between clinical conditions and subjective measures, such as the OHIP-14 index.

In this population, the proportion of women was higher than the male proportion, comprising 71% of the persons examined. This difference in the participation of men and women has been reported by some authors (Silva and Fernandes, 2001; Slade, 1997; Walter *et al.*, 2007), and may indicate a greater demand by women for health care and health services.

The average age of those examined was 40.7 years, but with a large variation ($SD = 15.4$). The majority of participants (53%) had not completed primary school. Few people (12%) with university or technical level education participated. This socio-demographic profile in the sample was expected, because the university has an agreement with the Public Health System and persons who attend the Dentistry Clinic have been referred from the public service of the city of Ribeirao Preto.

The clinical conditions of participants were not satisfactory, according to several clinical indicators used, but they did not differ greatly from those found in other studies in adults and the elderly in Brazil (Mesas *et al.*, 2008; Silva and Fernandes, 2001; Silva *et al.*, 2005). The results contrast with research collected in Canada (Brodeur *et al.*, 2001; Walter *et al.*, 2007) where the majority of those studied had retained at least half their teeth (89%).

Dental caries experience was measured by the DMFT index and high levels were recorded. The score was 18.9, of which 43.9% of teeth were missing and 18.9% were decayed, highlighting a situation of poor dental health and poor access to dental care.

The CPI index was used to measure the periodontal condition. When only the highest score found in each individual was recorded, pathologic pockets 4-5 mm deep were the most frequent (49%) finding, and these participants had significant periodontal disease, which normally would require periodontal treatment. The presence of periodontal changes contributes to the increase of negative impacts on quality of life (Leao and Sheiham, 1995).

The analysis of the condition of prostheses indicated that only 30% did not need a denture, while 50% of individuals needed a denture but did not have one. We can conclude that the functional and aesthetic conditions were not satisfactory.

The clinical data obtained in this study show that the quality of life was compromised by the problems indicated by the clinical evidence.

Another registered factor in the study was the participant's own perception of his or her oral health. This self-assessment of oral conditions is an important indicator of health; it summarizes objective health, subjective feelings, values and cultural expectations. Self-assessment of oral conditions may contrast with the clinical condition, because the person may feel well even if the clinical condition is not satisfactory. This underlines that the individual assesses oral health with different criteria than the professional. According of Cascaes *et al.* (2009), self-rated oral health reflects numerous aspects, which are not sufficiently explained by other parameters traditionally used in normative assessments.

Although the DMFT index had a relatively high value (18.9), 76% of participants claimed not to have problems with their teeth, probably because many of the teeth were missing or filled. Some authors (Leao and Sheiham, 1995; Silva and Fernandes, 2001) have observed that the DMFT index does not show high correlation with self-assessment.

Gingival diseases were perceived by 39% of the participants, and many had substantial periodontal pockets. People cannot easily distinguish between gingival diseases, largely because they are frequently asymptomatic. According of Gilbert (1994), painful symptoms that interfere with daily activities are more easily recognized and are more significantly associated with perceptions of dental needs.

Other studies (Locker and Jokovic 1996) have shown that most people consider their oral health as favorable, even when the clinical conditions are not satisfactory, probably because the clinical measures used by health professionals are relatively poor predictors of people's perceptions of their oral health. One of the reasons for the weak association between clinical variables and self-evaluation is the fact that many diseases found in clinical examinations are asymptomatic and probably unknown to the individual (Jokovic and Locker 1996).

The use of the OHIP-14 index found that 32% of the population studied did not perceive any impact of oral conditions on their quality of life, while the average OHIP-14 score was 13.6. Younger people had better opinions about their oral health and less tooth decay. Sanders *et al.* (2009) in Australia also used the OHIP-14 index and 83.5% of participants reported no negative impacts of oral conditions; Biazevic *et al.* (2004), in Brazil, found an average score of 10.3.

Multivariate analysis, in which all variables are considered simultaneously, showed that the most important predictors of the OHIP-14 score were self-evaluation and the number of decayed teeth. Self-perception explained 10% of the variability of the OHIP, while the number of decayed teeth was another important predictor; when these variables were entered in the regression analysis, the explained variance increased by 10%.

People use different analytical criteria to assess their oral health compared with those used by the dentist. Their perceptions of oral health are closely related to variables that indicate need for treatment.

There is poor correlation between clinically defined and subjectively defined needs, and this explains the usefulness of subjective measures, and in particular self-perceived needs. If the objective is to identify all persons who have a clinically defined need for treatment, subjective indicators are not the ideal instrument for evaluation. However, as noted by Jokovic & Locker (1996), it may be more important to identify subgroups of people who need more attention than to assess the entire population. Consequently, whether or not a particular instrument is useful depends on the purposes and objectives of those using the instrument. Subjective indicators should not be used to diagnose diseases nor to replace the clinical examination, which is based on objective signs of disease, but subjective indicators may be used as an assessment tool that complements clinical indicators and may possibly identify people or populations that require preventive and educational interventions.

Studying the impact of oral conditions on the quality of life has shown that changes in oral health can have negative effects on the quality of life, as has been shown in other studies (Dini *et al.*, 2003; Drummond-Santana *et al.*, 2007). The results of this study reinforce the importance of subjective factors combined with clinical factors when assessing oral health related quality of life.

Conclusions

The clinical conditions found in this population were unsatisfactory and there were many decayed teeth and periodontal pockets. Participants' self-perception of the mouth was positive. They claimed not to have problems with teeth or gingivae; they evaluated their oral health as good or normal. The OHIP-14 index was associated with the subjective evaluation of oral conditions as the clinical indicators were not well correlated with self-perception of oral health.

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