



Evaluation and Promotion of Patients' Oral Hygiene in Uruguay

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Abstract

The first aim of this study was to describe patients' attitudes with respect to oral self-care practices, social norms, expected social outcomes of having healthy teeth, and oral hygiene behavior, as assessed with the Spanish version of the Oral Hygiene Behavior Index in dental patients of the Faculty of Odontology of the Catholic University in Montevideo, Uruguay. The second aim of the study was to examine the relevant predictors of this oral hygiene behavior. Eighty participants filled out a questionnaire during dental care they received from students. Overall, patients exhibited an adequate level of oral hygiene behavior, a positive attitude, positive social norms (especially on part of the dentist and the family), and positive social outcomes of having healthy teeth. Regression analysis revealed that attitude and social norms explained 21.8% of the variance in reported oral hygiene behavior. The present findings suggest that patients' inadequate oral hygiene habits can be changed in the right direction and indicate that social psychological factors play an important role in oral health care. Moreover, the findings indicate that patients' oral hygiene behavior can be improved not only by promoting a more positive attitude toward the performance of this specific oral hygiene behavior, but especially, by promoting support by significant others, such as the dentist and the patients' family.

Key words: Behavioral Sciences; promoting oral hygiene behavior, attitude, social norms

Even though the importance of oral hygiene is widely acknowledged, it seems to be a problem for individuals to perform oral hygiene practices in an appropriate and efficient manner (Kay and Locker, 1996; Davidson, Rams and Andersen, 1997). Oral self-care based on personal choice may be considered as an important aspect of oral hygiene behavior (Parodi, 2008). Therefore, individual beliefs and attitudes toward adequate oral hygiene behavior are important in the maintenance of good oral health. In line with this notion, it has been suggested that with regard to oral hygiene behavior the more positive the attitude toward oral self-care practices, and the stronger the social norms, the more likely it is that an individual will perform adequate oral hygiene behavior (Schou, 2000).

Health-related concerns are probably not the only motive for oral hygiene behavior. Smith (1974) suggested that behaviors that may promote health are often performed for reasons other than improvements in general health; for example, tooth brushing is related to the desire to look more attractive. Indeed, as noted by Sugiyama (2005) in a review of the literature on physical attractiveness, oral health may have an important, though often neglected, effect on a person's appearance. According to Sugiyama, from an evolutionary point of view, "...strong, even white teeth provide a constellation of cues to health, developmental history, masticatory efficiency, and genotypic quality, and are thus predicted to be attractive" (p. 310). In a similar vein, Stokes, Ashcroft, and Platt (2006) suggested that unhealthy teeth are perceived as negatively affecting a person's image. In the present study, therefore, the perceived social consequences, i.e. how healthy teeth might affect a person's interpersonal interactions, were also assessed.

The relevance of the behavioral sciences for modifying individual oral health behavior has been shown since the early 1970s, and since then these sciences have been definitively linked with dentistry in the Fédération Dentaire Internationale's publication of *Social Sciences and*

Dentistry (Richards and Cohen, 1971). For instance, McCaul, Glasgow, and Gustafson (1985) successfully applied social learning theory (Bandura, 1977) to predict levels of oral hygiene behavior. According to the findings of a study by Freeman and Linden (1995) among 214 participants, adequate oral hygiene behavior (tooth brushing and the use of interdental cleaning aids) was associated with an individual's attitude toward oral health – 'clean teeth' and 'fresh breath' – and with the perceived influence of 'important others', such as the dentist, family, and friends. The primary aim of this study was to describe patient attitudes with respect to oral self-care practices, social norms, expected social outcomes of having healthy teeth, and oral hygiene behavior. The second aim of this study was to examine the relevant predictors of this oral hygiene behavior.

Material and method

Participants and procedure

The participants were patients of the Faculty of Odontology of the Catholic University of Uruguay. Ethical approval for this study was obtained from the ethics committee of the faculty. The questionnaires were filled out by patients who attended the Faculty for different reasons during the period March 28th – September 21st of 2008. For logistical reasons and after providing informed consent, a multiple-choice paper-and-pencil questionnaire was filled out by the patients during their dental check-up or treatment by dental students. The Geisinger procedure (1994) was partly used for the translation of the measures in the questionnaire. The measures were first translated into Spanish by three native speakers of Uruguayan descent, two dental students and a psychologist. Next, each member, working separately, carefully reviewed the three versions of the translation into Spanish and then compared them with the English version. In a group meeting, the members discussed discrepancies and reconciled all differences and concerns regarding the translation, until they agreed that the language was clear and understandable for Uruguayan dental patients and that the instruments tapped the intended construct in this Latin-American population. At the end of the translation process, a translator checked the final questionnaire.

Measures - questionnaire

General part of the questionnaire

The original questionnaire consisted of 36 items divided into several parts, including some demographic questions identifying gender, age, nationality, education and marital status. These and all the other questions were open questions, multiple-choice questions or questions to be answered on bi-polar adjective rating scales.

Oral hygiene behavior

The oral hygiene behavior was measured with the Oral Hygiene Behavior index, developed by Buunk-Werkhoven, Dijkstra and Van der Schans (2008). This index included eight items about tooth brushing, interdental cleaning and tongue cleaning. For example, the item "I brush my teeth as follows" is followed by images explaining different tooth-brushing methods, such as horizontal, vertical, circular brushing, and the Bass method (see Appendix I for the Spanish version of the Oral Hygiene Behavior index). Next, on the basis of weighted item scores the sum score was computed. The sum score of this index ranged from 0 to 16. A high score indicated a high level of oral self-care practices.

Attitude, social norms and oral hygiene behavior variables

Attitudes and social norms regarding general oral hygiene behavior were evaluated on the basis of a total of 14 items.

Oral hygiene behavior was described as: “Brush your teeth twice a day (of which once at night before going to bed) with a fluoride toothpaste and a soft toothbrush; Place the bristles of the toothbrush against the gum line and brush back and forth gently in order to remove plaque and food debris; Brush for 2 minutes, first the inside and the outside surfaces and after that, the chewing surfaces of each tooth and finally use toothpicks or dental floss to remove plaque and food debris between the teeth”.

Directly after having presented this description to the patients, their oral hygiene behavior (OHB) was assessed by asking them if they usually performed their oral hygiene care as described. The scores for this item were: 1 = yes or 0 = no. If the patients answered ‘yes’, they were asked: “How long have you been cleaning your teeth in this way?”

Attitude

The attitude towards this general oral hygiene behavior was measured with nine items written in a differential semantic format ($\alpha = .82$). The participants indicated on a scale of 1 – 7 how they evaluated this behavior for each of nine characteristics, i.e. “not important - important”, “unpleasant - pleasant”, “healthy - not healthy”, “negative - positive”, “boring - not boring”, “useful - not useful”, “insipid - exciting”, “painful - painless” and “stupid - smart”. The scores of these items were added up (ranging from 9 – 63) as a measure of the attitude of the participants. The higher the scores, the more positive their attitude.

Social norms

To assess the social norms, the participants were asked to rate on 7-point scales the perceived opinions of five different significant others with respect to taking better care of their teeth, e.g. “my dentist”, “my partner”, “my friends”, “my colleagues” and “my family (parents, brothers and sisters).” The social norms scale was based on these 5 items ($\alpha = .86$) so the scores ranged from 5 to 35.

Expected social outcomes

Expected social outcomes (Buunk-Werkhoven et al., 2008) of having healthy teeth included 6 items (Cronbach’s $\alpha = .80$). An example of this 5-point scale is “Is it important in social contacts to have fresh breath?” The answers varied from 1 = strongly disagree to 5 = strongly agree. The sum score was registered (varying from 6 to 30).

At the end of the questionnaire, patients were asked if they thought that others should notice if they had improved their oral hygiene behavior. The question: “If I take better care of my teeth, people around me will notice it” varied from 1 = strongly disagree to 5 = strongly agree.

Statistical Analysis

Data were analyzed to statistically describe the results of the measured variables. The internal consistency (reliability) of the scales used was assessed by Cronbach’s alpha. Pearson correlations were calculated for univariate associations between the variables, and linear regression analyses were performed to identify the variables that accounted for a significant proportion of the variance in oral hygiene behavior. The Statistical Package for Social Sciences (SPSS) 14.0 was used.

Results

Patient characteristics

A total of 80 participants, of whom 68% were women and 32% men of Uruguayan nationality (94%), were interviewed and filled out a questionnaire. Their average age was 35.43 years (SD = 13.93; [18 - 68]) and 44% of them were single. The highest education level was university (50%) and 43% had finished secondary school. Five participants (6%) had a lower level of education. Table 1 shows the percentages per item of the Spanish version of the Oral Hygiene Behavior index, and Table 2 the mean scores with standard deviations and the range values of the main variables: oral hygiene behavior, attitude, social norms and expected social outcomes.

Items	Alternatives	P
tooth brushing	never	3
frequency (N 80)	once a day	19
	twice a day	61
	more than twice a day	17
toothbrush moment	in the morning, before breakfast (N = 72)	46
	in the morning, after breakfast (N = 76)	76
	at noon (N = 80)	80
	after dinner, in the evening (N = 71)	61
	before going to bed (N = 72)	73
tooth-brushing force	gently (1,2,3) (N = 1)	1
	gently / not forcefully (4,5) (N = 55)	68
	forcefully (6,7) (N = 24)	30
duration of tooth brushing	less than one minute (N = 5)	6
	one minute (N = 24)	30
	two minutes (N = 30)	38
	three minutes (N = 12)	15
	more than three minutes (N = 9)	11
tooth-brushing method	horizontal method (N = 5)	6
	vertical method (N = 24)	30
	circular method (N = 8)	10
	Bass method (N = 10)	13
	combination of methods (N = 32)	40
toothpaste	toothpaste with fluoride (N = 71)	89
	toothpaste without fluoride (N = 6)	8
	I don't know (N = 3)	4
tongue cleaning	never (N = 12)	15
	sometimes (N = 33)	41
	always (N = 35)	44
use of dental floss, dental sticks, interdental brushes	never (N = 11)	14
	sometimes (N = 22)	27
	once or twice a day (N = 47)	59

It can be seen that 51 patients (64%) in this sample show adequate current oral hygiene behavior and that this subgroup has performed this oral hygiene behavior for an average of 12 years, ranging from 1 to 45 years. So, out of the total sample, one third (33%) of the patients (mean age = 33.46 years, SD = 14.07) does not perform adequate oral health self-care as described. It is worth noting that almost three quarters of the patients believe that others would notice it if they improve their oral hygiene behavior.

In general, patients felt that they had a reasonably high level of oral hygiene behavior ($M = 11.41$, $SD = 2.55$). For instance, according to the oral hygiene behavior index about half of the patients brushed their teeth as recommended by professionals, two minutes (38%) twice a day (61%). In addition, almost all (89%) used toothpaste containing fluoride, and about 40% also used interdental cleaning aids (mainly floss) and always cleaned their tongues.

The patients evaluated the described oral hygiene behavior extremely positively, compared with the scale's midpoint of 36 ($M = 48.49$, $SD = 6.07$). However, they also reported that the recommended oral hygiene behavior was a little boring. Moreover, within a range of 5 to 35, they reported considerable pressure from their social environment to perform adequate oral hygiene behavior ($M = 17.69$, $SD = 8.53$). It is worth noting that the patients perceived more pressure from the dentist and their family or partner than from their friends and colleagues. Within a range of 6 to 30, the patients valued the positive social outcomes of having healthy teeth highly ($M = 25.88$, $SD = 3.98$).

Table 2.

Cronbach's α , Range, Means, and Standard deviation (SD) for the main variables

Variables	Cronbach's α	Range	Mean (SD)
Oral hygiene behavior _a	--	0 - 16	11.41 (2.55)
Attitude _b	.82	9 - 63	48.49 (6.07)
Social norms _c	.86	5 - 35	17.69 (8.53)
Expected social outcomes _d	.80	6 - 30	25.88 (3.98)

Note. In the sample: ^an = 78. ^bn = 74. ^cn = 65. ^dn = 80.

In addition, correlational analyses were carried out to establish the direction and magnitude of the associations between the variables (Table 3). Oral hygiene behavior was found to correlate positively and significantly with attitude ($r = .28$, $p < .05$), and negatively and significantly with social norms ($r = -.42$, $p < .001$). Expected social outcomes were not significantly correlated with oral hygiene behavior but were associated with attitude ($r = .39$, $p < .001$) and with social norms ($r = -.27$, $p < .05$). These relations go in the expected directions. Apparently, the question: "If I take better care of my teeth, people around me will notice" was correlated with social norms ($r = .39$, $p < .001$).

Table 3.

Correlations between the main variables and adequate oral hygiene behavior				
Variables	1	2	3	4
1. Oral hygiene behavior	—			
2. Attitude	.28*	—		
3. Social norms	-.42**	-.13	—	
4. Expected social outcomes	.16	.39**	-.27*	—

* $p < .05$. ** $p < .001$.

In linear regression analysis, in which the attitude and social norms were entered simultaneously, the prediction of oral hygiene behavior proved to be significant $F(2,58) = 9.34, p < .001$, and accounted for 21.8 % of the variance. While both attitude and social norms had an effect on oral hygiene behavior, the effect of social norms was stronger.

Table 4.

Linear regression of oral hygiene behavior on attitude and social norms	
Variables	Oral hygiene behavior β
Attitude	.24*
Social norms	-.40**

* $p < .05$. ** $p < .001$.

$R^2 = .22 F(2,58) = 9.34, p < .001$

Discussion

The findings of this research are particularly important as an elaborate Oral Hygiene Behavior index was used that corresponds closely with what professionals consider adequate oral hygiene behavior. The Spanish version of the Oral Hygiene Behavior index appears to be a useful method for assessing and evaluating the oral hygiene behavior of dental patients in Uruguay. It is worth noting that while many patients mentioned the use of dental floss, virtually no one used dental sticks or interdental brushes.

The real test of a measurement system such as the Oral Hygiene Behavior index is when it is employed in relation to general oral health. This Spanish version of the index needs to be used in other clinical and general populations in Spanish speaking countries.

Furthermore, the predictors related to oral hygiene behavior were also determined.

Regression analysis indicated that social norms were the best predictor of Oral Hygiene Behavior and explained, together with attitude, 21.8 % of the variance in reported oral hygiene behavior.

This study has some limitations that need to be addressed in future studies. First, the large proportion of female participants, who are generally more interested in health issues, may have biased the results. Because of the selective sample of mainly adult, highly educated, unmarried women, these findings cannot be considered representative of the population as a whole. As known from past studies, there are apparent differences in oral health behavior across demographic variables (e.g., gender, age and lifestyle) and socioeconomic status.

For instance, females brush their teeth more often than males (Sakki, Knuuttila, & Antilla, 1998; Schou, 2000). Although this does not imply that the relationships between the variables used differ in different populations, it is recommended that these results be replicated in different groups and in diverse contexts.

The present study may have several implications and it is safe to make practical recommendations for clinical practice based on these findings, which suggest that, in order to increase oral hygiene behavior, interventions should target social norms and attitudes in particular. This study may assist oral health professionals working with patients in what Özcan (2008) refers to as “the most dignified tasks” of the dentists, i.e. educating patients in oral health and changing individual’s oral hygiene habits.

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Appendix I

Index for oral hygiene behavior

The following questions are about your oral hygiene self-care practices.

1. *How often do you brush your teeth?*

- not every day
- once a day
- twice a day
- more than twice a day

2. *When do you brush your teeth?*

- | | | |
|-----------------------------|------------------------------|-----------------------------|
| morning before breakfast | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| morning after breakfast | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| noon | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| after dinner in the evening | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| before going to sleep | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

3. *How do you brush your teeth?*

I brush my teeth

- | | | | | | | | | |
|--------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| gently | <input type="checkbox"/> | forcefully |

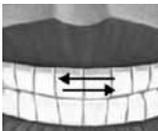
4. *How much time do you spend on brushing your teeth?*

I brush my teeth for

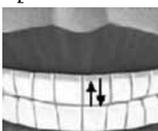
- less than one minute
- one minute
- two minutes
- three minutes
- more than three minutes

5. *I brush my teeth as follows:*

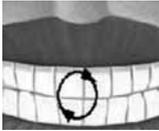
- back-and-forth movement ('horizontal' method)



- up-and-down movement ('vertical' method)



- circular movement ('circular' method)



- brushing gently, massaging the gum ('Bass' method)



6. What do you use to clean your teeth?

Mostly I use:

- toothpaste **with** fluoride
- toothpaste **without** fluoride
- I don't know

7. Do you clean your tongue?

- never
- sometimes
- every day

8. Which of the following interdental tools do you use?

	never	not every day	once a day	twice or more times a day
dental floss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
tooth sticks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
interdental brushes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>