Original Articles

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Self-perceived oral health among adults in Northeastern Brazil

ABSTRACT

OBJECTIVE: To identify self-perceived oral health in adults and associated variables.

METHODS: The study involved primary data from the Brazilian Oral Health Survey (SBBrasil) 2010 with 2,456 adults aged 35 to 44 in the Northeastern Brazil. The dependent variable was self-perceived oral health and the independent variables were grouped into four blocks: demographic, predisposing/facilitation, oral health status and those related to self-perceived need for treatment. The Rao and Scott test was used to test the association between these variables. To test the effect of the independent variables on the outcome, a multinomial logistic regression model was used according to the hierarchical model, resulting in an analysis divided into two stages: simple analysis and hierarchical multiple regression analysis.

RESULTS: Positive self-perception of oral health was observed in 37% of the participants. In the final model, the features directly associated with this perception were being white, having a household income exceeding R$ 500.00, owning goods number above the median, having more sound teeth, not experiencing bleeding, not requiring prosthesis, Oral Imparcts on Daily Performances = 0, not requiring treatment, having gone to the dentist less than 3 years ago.

CONCLUSIONS: The results show that self-perceived oral health in adults living in the Northeast is directly associated with a multidimensional structure of factors. The poor economic conditions associated with poor clinical conditions impact heavily on this population's self-perception of oral health.

DESCRIPTORS: Adult. Diagnostic Self Evaluation. Oral Health. Socioeconomic Factors. Dental Health Surveys.

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INTRODUCTION

The concept of quality of life is closely related to self-perception which, in health care, can be understood as the interpretation of experiences and the state of health in the context of everyday life. It is based on information and knowledge of health and disease, modified by the experience and social and cultural norms of each individual.[4,11,22]

The importance of social and psychological aspects is recognized and interest is growing in understanding the impact of these factors on the individual's oral health. Thus, many research tools, such as questionnaires, are being developed to study the influence of the condition of the individual's teeth on their quality of life. Such evaluations, carried out using self-perception, are very important for health care professionals as each patient's behavior is conditioned by this perception, by the importance given to it and by their cultural values and previous experience of the health care system.[19]

Some authors[18,19] state that self-perceived oral health has multi-dimensional aspects, associated with physical and subjective conditions related to the mouth. Self-perceived oral health is directly influenced by social, economic and psychological motives, which can only be explained and understood when the patients are listened to and when their self-diagnoses and opinions are taken into consideration.

Thus, in order to understand the multi-dimensional aspects of self-perceived oral health, models were created which seek to understand the factors related to this perception, as well as the inter-relationship between these factors. For example, Gift et al[6] (1998) conjectured a theoretical conceptual model in which self-perceived oral health is a function of multiple factors, including individual demographic characteristics (age and skin color), predisposition and facilitating factors (schooling, income, overall self-perceived health and guidance perceived), factors related to oral health conditions and self-perceived need for treatment.[22]

They also noted that in order for self-perceived oral health to be observed, as well as the multiple factors which affect this process, a variety of indices have also been created to evaluate functional, social and psychological problems due to oral health problems. As examples they cite the Geriatric Oral Health Assessment Index,[2] the Oral Health Impact Profile[20] and the Dental Impact of Daily Living.[9] The Oral Impacts on Daily Performances (OIDP) a socio-dental indicator which assesses the frequency and severity of impacts on daily life through nine questions, giving an individual impact score.[7] In 2010, a national survey was carried out on the oral health conditions of the Brazilian population, making use of the OIDP.[17]

The aim of this article was to prevent the self-perceived oral health of adults living in the Northeast and to identify associated factors.

METHODS

The study used primary data from the National Oral Health Survey - Pesquisa Nacional de Saúde Bucal (SBBrasil 2010), carried out by the Ministério da Saúde, with the aim of describing the oral health conditions of the Brazilian population.

The SBBrasil 2010 analyzed a sample of individuals in 177 municipalities from five age groups: Age five, 12, 15-19, 35-44 and 65-74 years old. A total of 37,519 individuals were examined, of which 10,390 were resident in the Northeast.[a] The sampling plan contained domains in the state capitals and municipalities in the interior. The primary sampling units were: (a) municipality, for the interior of the regions and (b) census tract, for the state capitals.[17]

Oral examinations were carried out to assess the prevalence and severity of the main oral health problems, and questionnaires were used to collect data on socio-economic conditions, use of dental services and perceived health. These examinations were carried out within the homes selected by a field work team formed of an examiner and a note taker, who had been through a training and calibration process.[17]

For this study, all individuals from the SBBrasil 2010 resident in municipalities in the Northeast of Brazil (in state capitals and interior) and aged between 35 and 44 were selected. The dependent variable was self-perceived oral health, determined by the following question: "*With regards your teeth and mouth, are you...?*" with five options: *Very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, very dissatisfied*. However, in order to understand and organize the results of this article better, there responses were grouped into three categories: 1) satisfied (very satisfied + satisfied) 2) neither satisfied nor dissatisfied, and 3) dissatisfied (dissatisfied, very dissatisfied).

The independent variables were selected based on the theoretical model of Gift et al[6] (1998), with some adaptations, resulting in a model composed of four blocks of variables (Figure).

It is important to emphasize the OIDP index, used as one of the variables in block 4 (variables related to self-perceived need for treatment), was analyzed using

a questionnaire[a] containing the nine functions assessed in the OIDP. There were questions on whether everyday tasks were affected by the teeth: eating, brushing teeth, speaking, smiling, sleeping, working or studying, going out and doing sport. The responses were 0 = no impact and 1 = impact on one or more.

Need for a prosthesis was assessed by the professional examiner. The consumer goods taken into account were: television, fridge, stereo, microwave, telephone, mobile phone, washing machine, dishwasher, laptop and number of cars. The need for treatment was that reported by the interviewee.

Analysis of the initial data was carried out by distributing the independent variables according to the dependent variable, and the Rao & Scott[15] test was used to test the association between them. This test is specifically for complex samples and only tests the association between qualitative variables, without providing information as to whether the category has greater effect on the outcome.

To test the effect of the independent variables on the event, a multinomial logistic regression model was used according to the hierarchical model proposed by Victora et al[23] (1997). The hierarchical analysis follows the levels in which the four blocks of variables were organized as in the model shown in the Figure. Thus, this analysis had two stages: simple and multiple hierarchical.

The simple analysis verified whether there was an association between each independent variable and the outcome, with "dissatisfied" as the reference category of the dependent variable. At this stage, the odds ratio (OR) and the respective 95% confidence interval were calculated, and 5% was adopted as the level of significance.

Next, the multiple analysis was carried out. At this stage, within each level of the hierarchy, variables with $p < 0.25$ were tested in multiple models. At the end of the multiple analysis, variables with $p < 0.05$ were kept in the final model for each level and were considered factors of adjustment for the subsequent blocks.

The criterion was the hierarchical model and the inter-relationships between the various groups of factors. It is worth pointing out that the objective of adopting an a priori theoretical model meant that the modeling process was true to the relationships shown in the model. Thus, the simple exercise of finding associations between variables was renounced in favor of an explanatory focus directed at the theoretical – methodological framework of the study.

The analyses were carried out using the SPSS 13.0 software, considering the complex design of the sample. This adjustment was necessary as the sample in the SBBrasil 2010 was a cluster sample, and estimates which do not take into account the cluster organization of the sample tent to overestimate and lose accuracy.[10]

The SBBrasil 2010 Project followed the standard set by the Declaration of Helsinki and was approved by the National Research Ethics Council, record no. 15,498, on 7th January 2010.
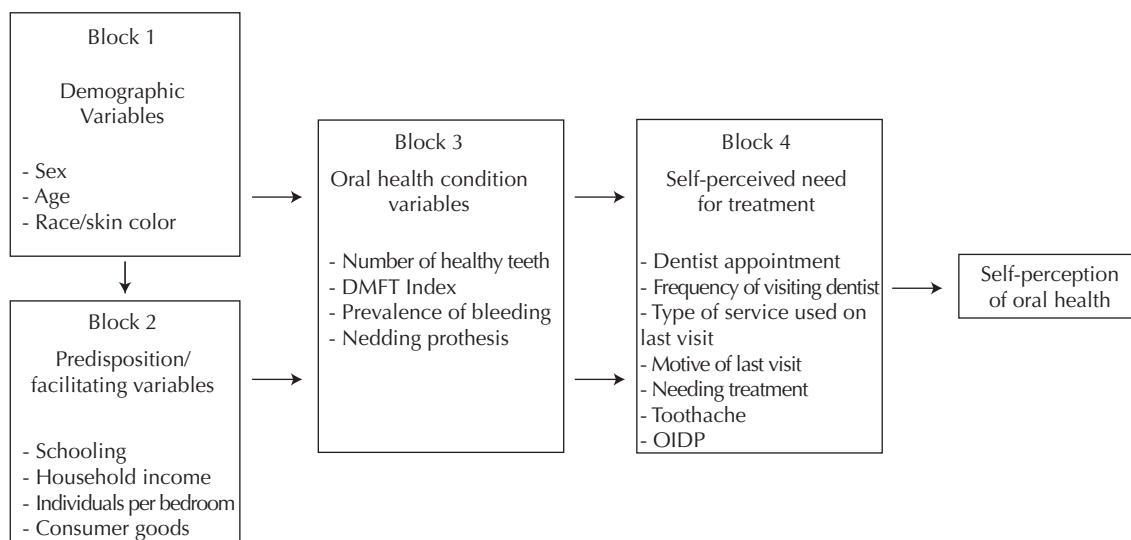
DMFT: Sum of teeth (T): D = Decayed (affected by caries and untreated); M = Missing (extracted due to caries); F = Filled (attacked by caries, but treated)
OIDP: *Oral Impacts on Daily Performances*.

Figure. Hierarchical model of the independent variables adapted from the explanatory model proposed Gift et al[6] (1998).

Table 1. Descriptive analysis of the rates of prevalence and respective confidence intervals for the evaluated responses according to block of variables analyzed. SBBrasil, 2010.

Variables	Sample	Satisfied		Neither satisfied Nor dissatisfied		Dissatisfied		Total
	%	%	95%CI	%	95%CI	%	95%CI	%
Block 1								
Sex								
Female	35.1	35.8	32.4;39.3	18.0	15.0;21.3	46.2	41.8;50.8	100.0
Male	64.9	40.2	35.3;45.2	17.0	14.2;20.3	42.8	37.9;47.8	100.0
Age (years)								
≤ 39	51.5	37.0	33.2;41.0	16.7	14.0;19.8	46.3	41.9;50.7	100.0
> 39	48.5	37.6	33.5;41.9	18.6	15.2;22.6	43.8	39.3;48.3	100.0
Skin color*								
Non-white	73.1	35.3	31.7;39.0	17.4	14.8;20.3	47.3	42.9;51.8	100.0
White	26.9	42.8	37.8;47.9	18.3	13.5;24.2	38.9	34.0;44.1	100.0
Block 2								
Schooling (years)*								
0-10	56.1	33.8	29.6;38.2	18.5	14.7;22.9	47.7	43.1;52.5	100.0
11-15	43.9	41.7	37.1;46.5	16.6	14.0;19.6	41.7	36.1;46.1	100.0
Household income*								
Below R$ 500.00	25.5	29.0	23.2;35.5	20.2	14.9;26.7	50.8	44.9;56.7	100.0
> R$ 500.00 and < R$ 2,500.00	64.4	37.4	33.8;41.2	16.3	13.7;19.4	46.3	40.2;50.6	100.0
> R$ 2,500.00	10.1	56.2	48.5;63.6	18.0	13.6;23.5	25.8	19.4;33.4	100.0
Individuals per bedroom*								
Above the median (> 1.5)	53.6	32.5	27.7;37.6	18.8	15.3;22.8	48.7	44.1;53.4	100.0
Below the median (≤ 1.5)	46.4	41.5	37.4;45.7	16.7	13.8;19.9	41.8	37.3;46.6	100.0
Number of consumer goods*								
Above the median (≤ 6)	56.2	32.5	29.1;36.0	18.8	15.7;22.5	48.7	44.6;52.8	100.0
Below the median (> 6)	43.8	43.6	38.7;48.6	16.0	13.1;19.4	40.4	35.5;45.6	100.0
Block 3								
Number of healthy teeth*								
Above the median (≤ 14)	52.9	33.8	30.4;37.3	15.6	12.5;19.4	50.6	45.9;55.2	100.0
Below the median (> 14)	47.1	40.9	36.2;45.8	19.9	16.6;23.5	39.2	34.7;44.0	100.0
DMFT index*								
Above the median (> 17)	45.5	34.7	31.3;38.2	15.4	12.2;19.3	49.9	45.3;54.5	100.0
Below the median (≤ 17)	54.5	39.2	34.8;43.9	19.5	16.4;22.8	41.3	36.9;45.9	100.0
Prevalence of bleeding*								
Yes	44.4	30.9	27.4;34.7	16.5	13.5;19.9	52.6	47.9;57.3	100.0
No	55.6	42.4	38.4;46.6	18.6	15.4;22.3	39.0	34.7;43.5	100.0
Needing prosthesis*								
Yes	78.9	31.2	28.2;34.4	18.5	15.8;21.6	50.3	46.3;54.2	100.0
No	21.1	55.3	48.5;61.9	13.1	9.6;17.6	31.6	25.3;38.8	100.0
Block 4								
Dentist appointment								
No	8.8	36.5	23.8;51.5	19.0	10.8;31.1	44.5	32.8;56.9	100.0
Yes	90.7	37.5	34.4;40.7	17.4	15.1;20.1	45.1	41.4;48.8	100.0
Frequency of visits to dentist*								
Less than one year	51.0	44.0	39.9;48.2	18.3	15.6;21.3	37.7	33.4;42.1	100.0
1 to 2 years	25.1	32.3	27.0;38.1	17.6	13.4;22.8	50.1	44.3;56.0	100.0
3 or more years	22.8	28.1	22.9;33.9	16.1	12.0;21.3	55.8	49.4;62.1	100.0

Continue

Continuation

Type of service used on most recent appointment*								
Public	41.3	33.1	29.1;37.3	17.5	13.6;22.2	49.4	44.2;54.6	100.0
Private	41.8	40.0	34.9;45.3	16.2	13.3;19.5	43.8	38.7;49.1	100.0
Health Care Plan	15.0	43.5	37.9;49.3	21.0	16.4;26.4	35.5	30.2;41.2	100.0
Other	1.5	30.1	15.4;50.4	15.3	4.7;39.7	54.6	32.7;74.7	100.0
Motive for most recent appointment *								
Checkup/prevention	20.2	54.1	47.1;61.0	17.7	13.1;23.5	28.2	22.5;34.6	100.0
Pain	12.2	24.5	18.3;32.0	15.9	11.0;22.4	59.6	51.9;66.9	100.0
Extraction	24.8	26.9	21.8;32.7	20.3	16.0;25.3	52.8	47.4;58.2	100.0
Treatment	40.4	39.3	35.1;43.6	16.1	13.1;19.7	44.6	39.5;49.8	100.0
Other	1.6	53.7	35.5;71.0	11.3	2.7;36.8	35.0	20.5;52.8	100.0
Needing treatment*								
Yes	79.0	28.4	25.6;31.3	19.1	16.3;22.3	52.5	48.7;56.2	100.0
No	18.8	73.4	66.9;79.0	11.2	7.9;15.5	15.4	11.6;20.4	100.0
Toothache*								
Yes	26.2	21.1	16.9;26.1	19.3	14.6;25.2	59.6	53.1;65.7	100.0
No	73.2	43.1	39.6;46.7	16.6	14.4;19.2	40.3	36.5;44.1	100.0
OIDP*								
OIDP ≥ 1	52.6	21.4	18.4;24.7	18.4	15.0;22.4	60.2	56.0;64.3	100.0
OIDP = 0	47.4	54.9	49.9;59.9	16.8	14.1;19.9	28.3	23.9;33.1	100.0

* p < 0.05 (Rao Scott test)
DMFT: Sum of teeth (T): D = Decayed (affected by caries and untreated); M = Missing (extracted due to caries); F = Filled (attacked by caries, but treated)
OIDP: Oral Impacts on Daily Performances

RESULTS

Of the 10,390 individuals in the study resident in the Northeast, 2,456 were aged between 35 and 44. Of these, 64.9% were female, 74.8% had an income below R$ 1,500.00 and 51.1% had fewer than nine years of schooling. Of the interviewees, 37.0% stated that they were satisfied (very satisfied + satisfied) with their oral health, 17.5% reported that they were neither satisfied nor dissatisfied and 44.7% said they were dissatisfied (dissatisfied + very dissatisfied).

Table 1 shows the descriptive analysis of the prevalence rates of responses for the question on self-perceived oral health, according to the selected independent variables. With regards demographic variables, only skin color had an association with the outcome (p < 0.05).

All of the variables concerning predisposition/facilitating were associated (p < 0.05) with self-perceived oral health; the highest dissatisfaction was observed among those on low incomes (50.8%) and 56.2% of those on higher incomes (over R$ 2,500.00) were satisfied.

Of the variables related to oral health conditions, the following had a statistical association with the outcome: dissatisfaction among those who had fewer than average

healthy teeth (50.6%), bleeding (52.6%) and those needing a prosthesis (50.3%).

Of the variables associated with self-perceived need for treatment, only dental consultations were not statistically associated; the other variables presented dissatisfaction according to: frequency of visiting the dentist (every three years or more 55.8%), type of dental services last used (public 49.4%), motive for most recent visit (pain 59.6%), need for treatment (52.5%), toothache (59.6%) and OIDP ≥ 1 (60.2%).

Table 2 shows the results of the simple analysis. Of the variables which were statistically significant, it was noted that in block 1, whites were more satisfied with their oral health than non-whites. In block 2, those who reported they were satisfied with their oral health had more years of schooling (11-15 years), income > R$ 2,500.00, lived in households with the number of individuals per bedroom below the mean (≤ 1.5) and had more than the mean number of consumer goods (>6). In Block 3, it was observed that those who were most satisfied had more healthy teeth, lower mean DMFT (decayed, missing, filled teeth), did not suffer bleeding and did not need a dental prosthesis. In block 4, those who were most satisfied with their oral health were those who had seen the dentist within the last

Table 2. Values for the unadjusted *odds ratio* and confidence intervals obtained from simple analysis for association between the variables in the hierarchical model and dissatisfaction with oral health. SBBrasil, 2010.

Variables	Satisfied		Neither satisfied nor dissatisfied		p-value
	OR	95%CI	OR	95%CI	
Block 1					
Sex					
Female	1	-	1	-	0.247
Male	1.213	0.941;1.564	1.025	0.780;1.347	
Age (years)					
≤ 39	1	-	1	-	0.497
> 39	1.074	0.866;1.332	1.178	0.889;1.560	
Skin color					
Non-white	1	-	1	-	0.016
White	1.476	1.133;1.922	1.276	0.849;1.917	
Block 2					
Schooling (years)					
0 a 10	1	-	1	-	0.043
11 a 15	1.415	1.064;1.882	1.035	0.732;1.464	
Household income					
Below R$ 500.00	1	-	1	-	< 0.001
> R$ 500.00 e < R$ 2,500.00	1.416	1.049;1.912	0.889	0.617;1.280	
> R$ 2,500.00	3.817	2.398;6.075	1.758	1.047;2.950	
Individuals per bedroom					
Above the median (> 1.5)	1	-	1	-	0.030
Below the median (≤ 1.5)	1.486	1.106;1.996	1.033	0.783;1.364	
Number of consumer goods					
Above the median (≤ 6)	1	-	1	-	
Below the median (> 6)	1.616	1.259;2.074	1.021	0.772;1.351	0.001
Block 3					
Number of healthy teeth					
Above the median (≤ 14)	1	-	1	-	< 0.001
Below the median (> 14)	1.561	1.245;1.957	1.632	1.193;2.233	
DMFT index*					
Above the median (> 17)	1	-	1	-	0.002
Below the median (≤ 17)	1.365	1.106;1.686	1.517	1.140;2.018	
Prevalence of bleeding					
Yes	1	-	1	-	< 0.001
No	1.855	1.464;2.350	1.527	1.115;2.091	
Needing prosthesis					
Yes	1	-	1	-	< 0.001
No	2.810	2.125;3.716	1.122	0.723;1.741	
Block 4					
Dentist appointment					
No	1	-	1	-	0.951
Yes	1.015	0.547;1.882	0.909	0.489;1.690	
Frequency of visits to dentist					
Less than one year	2.327	1.672;3.240	1.686	1.128;2.520	< 0.001
1 to 2 years	1.282	0.886;1.857	1.218	0.804;1.846	
3 or more years	1	-	1	-	

Continue

Continuation

Type of service used on most recent appointment					
Public	1	-	1	-	
Private	1.363	1.034;1.795	1.042	0.725;1.496	
Health Care Plan	1.832	1.311;2.561	1.672	1.083;2.583	0.016
Other	0.824	0.324;2.097	0.794	0.191;3.303	
Motive for most recent appointment					
Checkup/prevention	1	-	1	-	
Pain	0.214	0.130;0.351	0.422	0.229;0.779	
Extraction	0.265	0.172;0.410	0.609	0.391;0.948	< 0.001
Treatment	0.458	0.323;0.650	0.574	0.382;0.862	
Other	0.800	0.378;1.694	0.515	0.092;2.878	
Needing treatment					
Yes	1	-	1	-	< 0.001
No	8.763	6.042;12.710	1.977	1.284;3.042	
Toothache					
Yes	1	-	1	-	< 0.001
No	3.023	2.234;4.092	1.274	0.904;1.795	
OIDP					
OIDP ≥ 1	1	-	1	-	< 0.001
OIDP = 0	5.466	4.208;7.101	1.938	1.463;2.568	

DMFT: Sum of teeth (T): D = Decayed (affected by caries and untreated); M = Missing (extracted due to caries); F = Filled (attacked by caries, but treated)
OIDP: Oral Impacts on Daily Performances

year, whose most recent appointment had been through their health insurance, had other motives for their last appointment, who were not in need of treatment, did not suffer from toothache and had an OIDP value = 0.

In the multiple analysis (Table 3), it was observed that, after adjustment, the following variables were directly associated with self-perceived oral health: skin color, household income, number of consumer goods, number of healthy teeth, prevalence of bleeding, needing a prosthesis, OIDP, needing treatment, frequency of visiting the dentist and motive for most recent visit.

DISCUSSION

The prevalent self-perception of oral health was negative (44.7%) in the age group analyzed. The highest levels of dissatisfaction observed were strongly associated with variables related to conditions of predisposition/facilitating, to oral health conditions which the individuals presented during their examinations and those related to self-perceived need for treatment. Of the demographic variables, only skin color proved to be associated with dissatisfaction.

Thus, with regards to socioeconomic conditions (block 2 variables), the following were directly associated with dissatisfaction: low levels of schooling, low income,

poor housing (living in households with many people in the rooms) and having few consumer goods. It is known that each individual's socioeconomic aspects directly influence their oral health conditions, as such factors are associated with greater or lesser knowledge of healthy lifestyle habits and, consequently, recognizing greater or lesser need for orthodontic treatment. Moreover, they are conditions which directly influence the individual's way of life. Working and living conditions qualify, each in a different way, the way in which individuals think, feel and act with respect to their health.[1] Studies[1,7] show that low levels of schooling and income are related to a higher prevalence of negative impacts from oral health and that lower income is associated with level of education, the value placed on health, lifestyle and access to health care information.

Regarding the variables related to oral health conditions (block 3), all of them were observed to have an association with self-perceived oral health and that negative conditions – such as fewer healthy teeth, higher DMFT, bleeding and needing a prosthesis – were factors directly related to negative perception of oral health. These findings can be explained by the fact that such conditions, in addition to producing discomfort in the individuals, often compromise chewing and can also be responsible for producing negative self-perceptions of oral aesthetics, resulting in dissatisfaction when smiling and speaking.

Table 3. Values for the adjusted odds ratio and confidence intervals obtained by multi-nominal logistic regression analysis for association with self-perceived oral health and the four blocks of variables analyzed. SBBrasil, 2010.

Variable	Satisfied		Neither satisfied nor dissatisfied		p-value
	OR	95%CI	OR	95%CI	
Block 1[a]					
Skin color					0,016
Non-white	1	-	1	-	
White	1.476	1.133;1.922	1.276	0.849;1.917	
Block 2[b]					
Household income					< 0.001
Under R$ 500.00	1	-	1	-	
> R$500.00 and < R$2,500.00	1.271	0.925;1.747	0.885	0.602;1.302	
> R$ 2,500.00	2.956	1.844;4.740	1.697	0.908;3.171	
Number of consumer goods					0.077
Below the median (≤ 6)	1	-	1	-	
Above the median (> 6)	1.324	1.023;1.714	0.971	0.720;1.310	
Block 3[c]					
Number of healthy teeth					< 0.001
Below the median (≤ 14)	1	-	1	-	
Above the median (> 14)	1.689	1.332;2.141	1.897	1.335;2.697	
Prevalence of bleeding					0.004
Yes	1	-	1	-	
No	1.536	1.189;1.983	1.396	0.987;1.975	
Needing a prosthesis					< 0.001
Yes	1	-	1	-	
No	2.008	1.469;2.745	0.828	0.515;1.330	
Block 4[d]					
OIDP					< 0.001
OIDP ≥ 1	1	-	1	-	
OIDP = 0	4.385	3.215;5.982	1.963	1.396;2.762	
Needing treatment					< 0.001
Yes	1	-	1	-	
No	5.953	3.641;9.734	1.636	0.911;2.940	
Frequency of visits to dentist					0.001
Less than one year	1.866	1.279;2.721	1.539	0.974;2.433	
1 to 2 years	1.129	0.710;1.794	1.226	0.778;1.930	
3 or more years	1	-	1	-	
Motive for most recent appointment					0.009
Checkup/prevention	1	-	1	-	
Pain	0.410	0.232;0.724	0.528	0.272;1.027	
Extraction	0.443	0.284;0.693	0.702	0.414;1.191	
Treatment	0.580	0.392;0.859	0.568	0.373;0.865	
Other	1.131	0.472;2.713	0.704	0.113;4.378	

DMFT: Sum of teeth (T): D = Decayed (affected by caries and untreated); M = Missing (extracted due to caries); F = Filled (attacked by caries, but treated)
OIDP: Oral Impacts on Daily Performances
[a] Adjusted for Block 1 variables
[b] Adjusted for Block 1 and 2 variables
[c] Adjusted for Block 1, 2 and 3 variables
[d] Adjusted for Block 1, 2 3 and 4 variables

Haikal et al[8] (2011) also observed that, the lower the mean number of teeth and the higher the DMFT values, the more negative the self-perceived oral health.

Individuals needing dental prosthesis tend to evaluate the own oral health negatively. It can be seen that the need for prosthetic rehabilitation is a clinical situation which directly impacts on chewing, as well as on self-perception of smiling and often produces embarrassment when smiling and talking, as well as difficulties in interpersonal relationships. Thus, the results found here corroborate the findings of another study carried out in Brazil[4] which also found that needing a dental prosthesis is directly related to a negative self-perception of oral health.

The clinical conditions showed a strong association with negative self-perceived oral health. Other surveys[2,19,21] also report a link between perception of oral conditions and some clinical variables, although this association was relatively weak. These studies justify that finding as many of the diseases detected in the clinical examinations are asymptomatic and the individual is probably unaware of them. Moreover, studies[1,18] also show that the majority of individuals view their oral condition favorably, even when clinical conditions are dissatisfactory, probably as the clinical measurements of health used by professionals are relatively poor predictors of the individual's perception of their oral health.

Regarding the variables related to self-perceived need for treatment (block 4), having visited (or not) the dentist before the interview was not associated with self-perceived oral health. However, variables such as frequency of visits to the dentist, type of service used on the most recent visit, reason for most recent visit, need for treatment, toothache and OIDP were strongly related to the outcome. It was noted that longer intervals without visiting the dentist was most strongly associated with dissatisfaction, in other words, 55.8% of individuals who went to the dentist fewer than once in three years were dissatisfied with their oral health. This finding corroborates the results found in Matos & Lima-Costa[12] (2006), which used data from the SBBrasil 2003 and also reported that not visiting the dentist for three years or more was significant in increasing the chances of the adult self-evaluating their oral health as very bad.

It was observed that there was an association between the last visit to the dentist being to a public service and dissatisfaction with oral health. This finding is of great importance as it creates the need for greater reflection on how oral health public policies are being carried out in Brazil, especially in the Northeast where, historically, there has been less provision of orthodontic care to the population. Difficulties and delays in getting orthodontic care has direct repercussions on individuals' satisfaction with their oral health, as well as possibly aggravating existing problems. Camargo et al[5] (2009) also noted that those who sought care in public services reported less frequent use compared with those who used the private network, and that regular use is lower among those with lower levels of income and education. The stated that, although the public health care system – *Sistema Único de Saúde* played an important part in reducing inequalities (principle of equality), it seems that that function is not being developed. However, it is not possible to affirm whether this delay is due to difficulties in getting an orthodontic appointment or to lack of interest on the part of the interviewee in seeking an appointment. Therefore, more detailed studies of this aspect need to be undertaken. The fact that it is a cross-sectional study being analyzed effectively means that temporal causal relationships between the independent variables and the outcome in question cannot be established. Thus, dissatisfaction may precede or follow the type of service used.

In this study, pain and toothache were observed to be directly associated with dissatisfaction with oral health conditions, something that, in other studies[1,3,5,14] has also been observed as one of the factors which create dissatisfaction and lead individuals to seek orthodontic care. This should be highlighted, as it suggests that the interviewees' use of orthodontic services is often limited to emergencies. It is possible that there is not a culture of using orthodontic services for preventative purposes, which is a fairly negative aspect for the population's oral health. According to a study[14] in Araraquara, Southeastern Brazil, of the adult population aged 35 to 44, when seeking relief, little patient-dentist interaction is expected with regards information and advice and plaque control. Therefore, oral health care activities need to emphasize approaches which encourage the individual to value preventative actions and which enable a stronger link to be made between patients and orthodontic services and professionals, in the private or public network, so that they are more aware of healthy habits and the health-disease process. Needing treatment was also noted, by Soares et al[21] (2011) to be a factor strongly associated with self-perceived oral health.

It was observed that individuals who reported being dissatisfied with their oral health were those who had OIDP index scores ≥ 1. The high prevalence of impact on daily tasks in the population in question was also observed by Gomes & Abegg[7] (2007) in their study of adults in the same age group. The authors state that this is the age group with the highest prevalence of oral health conditions impacting on daily life and that this finding may be related to the increased presence of unmet need for treatment, due to this age groups difficulties in accessing treatment.

With regards to the demographic (block 1) variables analyzed, only skin color proved to be significantly associated with the outcome, as non-white individuals

were more dissatisfied with their oral health. Studies in the United States[5,13] report that whites have better perceived oral health than non-whites. However, a study[5] of the adult population in the city of Pelotas, RS, observed that the unadjusted effect of the skin color variable disappeared after controlling for this variables. Although studies[6,16] report that negative self-perceived oral health increases with age and that sex is also related to self-perceived oral health, no statistically significant association with these factors was found in this study.

Indeed, the results of the final hierarchical analysis model show that self-perceived oral health in adults in the Northeast is directly associated with a multi-dimensional structure of factors. The model proposed by Gift et al[6] (1998) functioned as a measuring stick in the modelling process, establishing relationships between the independent variables distal and proximal to the outcome. Moreover, it was observed that, after adjusting the variables in logistic regression, conditions such as: household income, number of healthy teeth, needing a prosthesis, higher OIDP index and needing treatment were those which most strongly affected the outcome ($p < 0.001$). The poor economic conditions associated with the poor clinical oral health conditions of the adult population in the Northeast has a great impact on the self-perceived oral health of these individuals, thus showing that public policies aimed at improving this notably disadvantaged population's quality of life need to be strengthened and possibly redirected.

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