

## Oral Health Impact Profile: need and use of dental prostheses among Northeast Brazilian independent-living elderly

Oral Health Impact Profile: uso e necessidade de próteses em idosos do nordeste do Brasil

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**Abstract** *This study aimed to explore the association between use and need of dental prostheses to the quality of life in elderly individuals in a Referral Center for Elderly Care in the northeastern of Brazil. A cross-sectional study was developed with 199 elderly of both sexes. Data were collected from clinical examinations (WHO criteria) and a questionnaire regarding socioeconomic status, Oral Health Impact Profile index (OHIP-14) by a single calibrated examiner with Kappa = 0.91. Data were analyzed using Mann-Whitney test, Poisson regression ( $p < 0,05$ ). The sample consisted of 84,9% women, mean age of 70.02 ( $sd \pm 6.50$ ) years. There was an independent association between quality of life and the covariates sex and need of dental prostheses. Men showed lower values of the score ( $PR = 0.734$ ,  $p = 0.011$ ) than women. Individuals without normative need for dental prostheses showed lower values of OHIP-14 ( $PR = 0.767$ ;  $p = 0.003$ ) than those in need.*

**Key words** *Quality of Life, Dental Prosthesis, Oral Health.*

**Resumo** *O objetivo desse estudo foi verificar a associação entre o uso e a necessidade de prótese dentária e qualidade de vida em idosos de um Centro de Referência de Atenção ao Idoso no Nordeste do Brasil. Um estudo transversal foi desenvolvido com a participação de 199 idosos de ambos os sexos. Os dados clínicos foram coletados conforme a Organização Mundial de Saúde, através de exames clínicos e questionário sobre dados socioeconômicos, índice Oral Health Impact Profile (OHIP-14), por um examinador previamente treinado ( $kappa=0,91$ ). Os dados foram analisados pelo Mann-Whitney, regressão de Poisson ( $p > 0,05$ ). A amostra consistiu de 84,9% de mulheres, com idade média de 70,02 ( $dp \pm 6,50$ ) anos. Houve associação independente entre a qualidade de vida e as covariáveis sexo e necessidade de prótese. Idosos do sexo masculino apresentaram menores valores do escore ( $RP=0,734$ ;  $p=0,011$ ) do que as mulheres. Indivíduos sem necessidade normativa de prótese dentária apresentaram menores valores do OHIP-14 ( $RP=0,767$ ;  $p=0,003$ ) do que aqueles com necessidade.*

**Palavras-chave** *Qualidade de vida, Prótese dentária, Saúde bucal.*

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## Introduction

Oral health conditions can impact the quality of life, such as functional, social and psychological aspects of elderly<sup>1,2</sup>. Sheiham<sup>3</sup> pointed out that oral health is not separated from the rest of the body. Pain and suffering from mouth problems affects eating, speaking, sleeping, quality of life and well-being. Thus, the association between clinical indicators and comprehensive patient self-reports about their mouth are important for oral health<sup>4</sup>.

Quality of life is defined as an individual construction, from a multidimensional and subjective concept, considering many factors related to the subject's life in its various dimensions: general physical, psychological and social well-being<sup>3</sup>. Studies showed that aspects including socio-economic status<sup>5</sup>, cultural background<sup>6</sup>, local of birth<sup>7</sup>, age<sup>7,8</sup>, gender<sup>9,10</sup>, clinical condition and personality<sup>5</sup> may also impact in Oral Health-Related quality of life (OHQoL).

One of the OHQoL measures is the Oral Health Impact Profile (OHIP)<sup>11</sup>. The OHIP-14 is a short-form measure, developed and validated by Slade<sup>12</sup>, that evaluates the impact of oral health on daily activities. Assessing the elderly's OHRQoL can improve health services and provide a measure outcome for health team and elderly families to improve the quality of care<sup>13</sup>. Recently, OHRQoL indicators are growing and the interest on their assessment is relatively new<sup>4</sup>.

Thus, it is important to consider socioeconomic inequalities and cultural diversity in Brazil, regarding habits and values as factors can directly influence the quality of life of the population. It is important to oral health professionals to understand and recognize the impact of dental prosthesis use and need on health quality. With this expanded knowledge, they will be able to recommend strategies and approaches in oral health that enable health promotion and disease prevention.

Therefore, given the importance of combining the assessment of OHRQoL, use and need dental prosthesis, socio-economic aspects and gender in a city of Northeast of Brazil, this study aimed to explore the associations between use and the need for dental prostheses to the quality of life in elderly individuals.

## Methods

The present investigation adhered to the STROBE statement for reporting cross-sectional studies<sup>14</sup>.

### Ethical Considerations

This study was approved by Brazilian Ethics Committee of the Federal University of Paraíba, Brazil in compliance with the ethical principles of the Helsinki Declaration. Volunteers were included in the study after being informed of the objectives of the study and signed term of free and informed consent. Participation was voluntary, free of charge and based on informed consent, which could be withdrawn at any stage of the study.

### Study Area

This study was conducted in João Pessoa/PB/Brazil, considered an industrialized city in north-eastern of Brazil. The City estimated population is around 800,738 inhabitants with a Human Development Index of 0.763.

The Referral Center for Elderly Care (RCEC) is the reference center for elderly health care in João Pessoa. The RCEC is unique for elderly individuals and was created in 2007. Activities developed are focused on the needs of older people with daily attendance from 50 to 80 people, all of them from João Pessoa/PB/Brazil neighborhoods.

Among the activities developed by the service, we highlight the groups: school postures, physical activity, living, memory stimulation, wellness - independence - independence, as well as specialized care (Angiology, Pharmaceutical Care, Cardiology, Endocrinology, Nursing, Physiotherapy, Geriatrics, Gynecology, Nephrology, Nutrition, Dentistry, Psychology, Rheumatology, Social Work, Speech Therapy), which consider the peculiarities of elderly and therefore are directed to the needs of this population group.

### Study Design and Sample

The study population comprises all RCEC users, who required secondary attention from March to June 2015. A cross sectional study was conducted, involving a randomly selected sample aged from 60 to 90 years old, both sexes, users of RCEC in Brazilian Northeastern region. The sample was randomly selected by the assignment of codes to each elderly. The estimated sample

size was with 199 participants. It is assumed that dental prosthesis use was 69%<sup>5</sup>, an alpha level of 0.05 (two-tailed test), confidence interval of 0.95, estimated design effect (DEFF) of 1, desired level absolute precision of 0.06, and power of 0.80.

### Eligibility criteria

The elderly were interviewed in the room before daily attendance, on different weekdays, to avoid biases related to procedures in a specific day. Everyone from 60 years old up could participate in the study. Individuals were invited to take part of it during their first appointment, when they fulfilled the inclusion criteria: to be able to understand and respond the instruments, however the exclusion criteria considered individuals with physical and/or mental disability and/or who did not completely fill out the questionnaire or refused to be examined.

### Pilot study

The examiner was trained and calibrated in a population with an equivalent age of the studied sample. Training consisted in theoretical and clinical phase. The first step involved a theoretical reading and discussion of OHIP-14 and the use and need prosthesis criteria according to World Health Organization (WHO)<sup>15</sup>, modified for use in Brazilian Epidemiological Surveys. The procedure included different dental prosthesis designs (removable partial denture, complete denture), the photographs analysis of dental prosthesis casts and WHO guidelines<sup>15</sup>. After this, the second phase was performed to assess the consistency of the clinical analysis. An experienced dentist (gold standard) trained on dentistry student using a sample of 20 elderly individuals, randomly selected who were not included in the main sample. The examiner's reliability was checked twice within a 2-week period and assessed by the Cohen's Kappa Coefficient. The reproducibility of diagnosis was determined by intra-rater reliability ( $k=0.91$ ). As the Kappa coefficients were very good, the examiner was considered capable to conduct the epidemiological study.

The Brazilian Portuguese version of OHIP-14, tested and validated by Oliveira and Nandanovsky<sup>16</sup> was used to assess the OHRQoL. The results of pilot study results also revealed no misunderstandings regarding the questionnaire methodology and comprehension of it.

### Questionnaire

Data collection comprises clinical examination interviews conducted in RCEC's offices. Participants were informed about study objectives and were asked to give signed informed consents. Questions were regarding sociodemographic and economic status age, sex (male and female), schooling ( $\leq$  or  $>$  8 years) and household income ( $\leq$  or  $>$  1 minimum wages – USD 243.96) and OHIP-14 questionnaire. The OHRQoL was measured by use of the shorted version of OHIP-14, which consists of 14 questions related to the problem in oral region collected in the seven domains: functional limitation, pain, discomfort, physical disability, psychological disability, social disability and handicap. The format of typical question was as follows: "how often during last 12 months have you had (impact item) because of problems with your teeth, mouth, or dentures?". Responses were made on Lickert-type scale (4="very often", 3="fairly often", 2="occasionally", 1="hardly ever", and 0="never"). For the analysis, the responses were coded from 0 (for a response of "never") to 4 (for a response of "very often")<sup>12</sup>. Higher scores indicate poor oral health-related quality of life.

### Clinical data collection

The clinical examinations of individuals were performed at office, dental prosthesis use and need were evaluated using the WHO criteria for oral health surveys<sup>15</sup>. Records were made for each jaw. Dental prosthesis were examined using natural light and gauze. The examiner used personal protective equipment.

Considering dental prosthesis use the following codes were considered: no prosthesis; fixed partial denture (FPD); more than on FPD; removable partial denture (RPD); both FPD and RPD; complete denture. The need for dental prosthesis was collected as: no need; need for on-unit prosthesis; need for multi-unit prosthesis; need for a combination of one- and/or multi-unit prosthesis; need for a complete denture. In the same way, the individual was recorded using the most severe condition observed.

### Statistical analysis

The dependent variable analyzed was OHIP values, which can vary from zero to 56. Higher values reflect poor oral health quality of life.

The data was organized into a database using the Statistical Package for the Social Sciences (SPSS) software program, version 18.0. Poisson regression models with robust variance were used to estimate unadjusted and adjusted prevalence rate ratios (PR) and corresponding confidence interval 95% (CI95%). Firstly, we carried out unadjusted Poisson regression models to estimate unadjusted PR (CI95%) and p values for each one of six covariates separately. In this first step, any covariate with a p value less than 0.25 was a candidate to be tested in the final adjusted Poisson regression model. Because the interest was focused on the independent effects of each covariate, all potential variables were included in the unadjusted model, which included sex, age, income, schooling, use of any type of dental prosthesis (yes, no); need to use any kind of dental prosthesis (yes, no).

Moreover, to verify the association between the use and the need for dental prosthesis and the domains of the OHIP-14, Mann-Whitney tests were carried out, considering  $p < 0.05$ .

## Results

The rate of response to the questionnaire was 100%. Participant's age ranged between 60 and 90 years old and the average age was 70.02 (SD 6.50) years old. Sample was composed mainly by females 84.9% (n= 169), with 1 minimum wage income 79.9% (n= 159) and  $\geq 8$  years of education 73.9% (n=147). Among 72.4% (n=144) patients were using upper dental prosthesis, 42.7% (n=85) lower dental prosthesis 27.6 % (n=54) need upper dental prosthesis and 56.8 % (n=113) need lower dental prosthesis.

Table 1, it was observed that individuals presenting need for dental prosthesis presents impact on OHRQoL compared with those that do not need dental prosthesis, especially psychological disability and psychological discomfort.

The Table 2 represents an independent association among quality of life and the covariates sex and need of prosthesis. Elderly men showed lower values of the score (PR = 0.734,  $p = 0.011$ ) than female. Individuals that do not need dental prosthesis had lower values of OHIP-14 (PR = 0.767;  $p = 0.003$ ) than those in need.

## Discussion

The results of this study suggest that oral health-related quality of life can be influenced by dental prosthesis need and by sex-based difference. It was observed that higher scores for females indicate poorer oral health-related quality of life.

It was also observed in females, which is consistent with findings from Kelly *et al.*<sup>17</sup> on a similar age group national sample in United Kingdom group studied by Mason *et al.*<sup>9</sup>, also reported that women generally reported poorer OHRQoL compared to men for each OHIP-14 measure.

The OHRQoL scores from men and women may be affected by subjective perceptions related to cultural factors as represented by place of birth, socioeconomic aspects in each historical time and historical experiences<sup>8,13</sup>.

The life course influences on OHRQoL also differed by sex and varied according to the frequency of impact. Some biological factors acting during adulthood, like the number of retained teeth for women, for men, some socioeconomic factors are more important like higher social class at birth and fewer lost teeth in adulthood tended to have the lowest total OHIP scores<sup>9</sup>.

Populations of this study belongs to a homogeneous group regarding socioeconomics aspects. In US, Sanders *et al.*<sup>18</sup> found in a group of socioeconomically disadvantaged and with limited access to dental care, poorer OHRQoL scores, results similar to the present study.

Results suggested that dental prosthesis needs, and consequently tooth loss, have independent effects on oral health related to quality of life. A previous study reported that patients that need dental prosthesis (both fixed and removable) were impaired in OHRQoL<sup>10</sup>.

In 2004, the Brazilian Government proposed the National Policy of Oral Health. Oral health care network has advanced with the institutionalization of the Policies and improvement in public oral health services in three levels: primary attention, secondary (dental Specialty Centers) and tertiary care<sup>19</sup>. The regional dental prosthesis laboratories provide support to oral health care network, since 2006<sup>20</sup>. The access to dental services has been increasing, however, it still a challenge.

Elderly in this study are from a generation that was not benefited with public oral health policies, such as water fluoridation, access to toothbrush and fluoride toothpastes, access to health education and public policies that ef-

**Table 1.** Comparison between OHIP-14 domains and use and need dental prosthesis reported for the sample of older people living in João Pessoa, Paraíba, Northeast of Brazil in 2015 (n=199).

OHIP-14 domains	Dental prosthesis		p value	Need dental prosthesis		p value
	With (mean±sd)	Without (mean±sd)		Need (mean±sd)	Don't need (mean±sd)	
Functional limitation	1.77 ±1.74	1.38 ±1.57	0.167	1.65 ±1.62	1.25 ±1.59	0.063
Physical pain	1.23 ±1.98	2.03 ±2.28	0.023	1.72 ±2.29	1.95 ±2.14	0.327
Psychological discomfort	2.08 ±2.93	1.19 ±2.28	0.042	1.82 ±2.80	0.87 ±1.85	0.017
Physical disability	1.52 ±2.02	2.09 ±2.14	0.074	2.09 ±2.29	1.72 ±1.84	0.400
Psychological disability	2.67 ±2.31	1.82 ±1.84	0.022	2.41 ±2.18	1.53 ±1.61	0.008
Social disability	0.75 ±1.23	0.78 ±1.09	0.596	0.86 ±1.22	1.64 ±1.94	0.359
Handicap	3.88 ±3.48	0.75 ±1.42	0.653	3.63 ±1.19	3.52 ±1.41	0.653

**Table 2.** Oral Health Impact 14 (OHIP-14) scores by socio-demographic factors and oral health status for the sample of older people living in João Pessoa, Paraíba, Northeast of Brazil in 2015 (n=199).

Variables	OHIP scores (mean ± sd)	Unadjusted Prevalence Rate Ratios (95% CI)	p value	Adjusted Prevalence Rate Ratios (95%CI)	p value
Sex					
Male (n=30)	10.8 ±6.3	0.805 (0.643-1.010)	0.061	0.734 (0.578-0.931)	0.011
Female (n=169)	13.4 ±8.1	1		1	
Age		0.987 (0.975-1.000)	0.045		
Family income					
Less than 1 minimum wage (n=10)	16.9 ±12.3	1.290 (0.795-2.094)	0.303		
1 minimum wage (n=159)	12.8 ±7.5	0.977 (0.770-1.241)	0.852		
More than 1 minimum wage (n=30)	13.1 ±8.2	1			
Formal scholarship					
Up to 8 years (n=147)	13.6 ±8.0	1.204 (0.985-1.477)	0.071		
More than 8 years (n=52)	11.3 ±7.4	1			
Use of dental prosthesis					
No (n=52)	13.9 ±8.1	1.090 (0.905-1.313)	0.364		
Yes (n=147)	12.7±7.8	1			
Need dental prosthesis					
No (n=83)	11.4 ±6.8	0.810 (0.685-0.957)	0.013	0.767 (0.646-0.911)	0.003
Yes (n=116)	14.1 ±8.4	1		1	

fectively contributed to the reduction of dental caries in Brazil during last decades<sup>19</sup>. Recently, there has been an improvement in the provision of public rehabilitation services<sup>19</sup>, at the end of 2015, there were 1770 Regional Dental Prosthesis

Laboratories (LRPD) and in the Northeast approximately 661 LRPD<sup>21</sup>.

Therefore, it is possible to note the increase in access to dental services in the last years, however, to meet the entire historical demand for health

care that the population needs is still a challenge for Brazil<sup>22</sup>. It was observed that more than half of the survey population need replacement of more than one tooth or need complete dentures and this has a reported oral impact. There is a demand for prosthetic rehabilitation and this impact OHRQoL.

Access to oral health services is a challenge for Brazil's public service managers, with a view to completeness and resolution. To do so, it should involve all levels of health care in order to comply with the principles of the National Unified Health System (SUS) reaffirmed in the National Oral Health Policy<sup>19,20</sup>.

The present study evaluated the impact of use and need of dental prosthesis on the OHIP-14 using the Brazilian Portuguese version. The age range (60 and up) included in the study was more extensive than that recommended by the WHO, on the other hand, represented an understudied population. Epidemiological studies showed aspects that should be considered in planning public policies, decision making and evaluation of services. This study showed that the dental prosthesis need influenced OHRQoL and this is an important tool for the local oral health managers to organize public services.

In general, the dimensions that most affected the OHRQoL of the elderly were the psychological inability and psychological disability, however, the handicap is a point that stands out in this research, because elderly with the need and use of prostheses declared to have a less satisfactory life due to teeth loss. This data demonstrates that individuals with dental rehabilitation perceive that the dental prosthesis does not completely resemble the function and appearance of natural teeth and that a long time is needed for the re-adaptation to the new appearance<sup>23</sup>.

Psychological inability and psychological disability are a point to be highlighted in this research because they emphasize that dental losses are directly conditioned to the feeling of humiliation, embarrassment, incompleteness and resignation that inhibits the individual from relaxing and being spontaneous in relation to their feelings, being an important point that impacts of OHRQoL<sup>22,24,25</sup>.

It is important recognize the limitations of the present study inherent to the cross-sectional design and the interviews may have been subjects to information bias. Other factors such as time of use, type and quality of dental prosthesis, could also be studied. Longitudinal studies are needed to clarify the relationship of causality and allow the establishment of oral health public policies aimed at the impact of oral health conditions on the elderly OHRQoL.

It is emphasized that this cross-sectional study does not have the power to make causal inference. This study was conducted with a representative sample that is included in the WHO guide for epidemiological survey, although it has a higher percentage of women, a RCEC to the city studied. A limitation was found in distributing this population among the categories of use of dental prosthesis. To enable statistical analysis, it was necessary to group the classification use and need of prosthesis in two categories.

## Conclusions

It was observed in this study independent association between quality of life and the normative need for dental care. Elderly males had lower adjusted Prevalence Rate Ratios values of prevalence than females. Individuals with no normative need for dental prosthesis had lower quality of life than those in need.

## Authors' contributions

MA Silva and FDS Forte conceived the study and participated in the draft, data analysis and writing of the manuscript. AUD Batista contributed in the data analysis and interpretation and writing of the manuscript. MH Abreu performed the statistical analysis and writing of the manuscript. All authors read and approved the final manuscript.

## Patient consent

All participants included in this study provided informed consent.

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