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Oral health conditions of institutionalized older adults and associated factors

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ABSTRACT

Introduction: The growth of the Brazilian older adult population has influenced the increased demand for institutionalization for this public, which usually has poor oral health conditions such as edentulism. **Objective:** To characterize the oral health conditions and verify the variables related to the edentulism of institutionalized older adults and verify the relation of the time of institutionalization with oral health. **Methods:** It was a cross-sectional study conducted with 512 institutionalized older adults in which the sociodemographic profile, general health conditions, and oral health care and conditions were evaluated by clinical exams, consultations of medical records, and structured questionnaires. The data were analyzed in the Statistical Package for Social Sciences using the Pearson Chi-square and Fisher's Exact tests and a logistic regression model using a 95% confidence level. **Results:** A high DMFT (29.4), high prevalence of complete edentulism (61.3%), high need for maxillary (73.6%), and mandibular oral rehabilitation (56.8%) were observed. Edentulism was associated with older age ($p<0.001$), lower schooling ($p<0.001$) and non-retirement ($p=0.031$). It was found that longer institutionalization time remained associated with edentulism even when adjusted by sociodemographic and general health variables ($p=0.013$). It was also associated with the absence of brushing ($p=0.024$) and a lower frequency of tooth, gum, and prosthesis brushing ($p<0.001$). **Conclusion:** It is suggested to establish oral health care routines within long-term institutions for the effective maintenance of oral health throughout the institutionalization time.

Keywords: aged; Homes for the Aged; oral health; mouth, edentulous.

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INTRODUCTION

As in many countries, Brazil's older population has grown exponentially, mainly due to declines in fertility rates, decreased mortality rates, and improved care technologies[1,2]. The increase in the longevity of its population and the consequent aging in the country[2] has generated a greater demand for attention and services for those individuals[3].

In addition to the growth of the older population, the demand for long-term care institutions (LTCI) for older adults also grows, significantly raising the need for health care for these institutionalized people[4] as consequence. This increase in demand for

institutions has also been caused by the reduction in the number of family caregivers and their difficulties in carrying out the care for these older adults in their home[1].

Aging is a natural process that develops throughout the life of human beings, often tooth loss is seen as a natural part of this process[2]. Besides the results of the latest national oral health survey conducted in Brazil showed the poor oral conditions found in the older adult population[5], this situation arrives from the model of care centered on extractions throughout the life course of the older adults that existed in the past and the lack of preventive public policies aiming at the older population in the country[1,2].

The literature has shown that the oral health condition of institutionalized older adults is notoriously precarious and worse than the non-institutionalized population[6-8], including in the Brazilian northeastern region where they have presented worsened conditions[3-5,9]. However, it is not yet clear what is the effect of institutionalization on the oral health of older people. The well-established relationship between oral disorders and their effects on the general health status of older adults makes it even more urgent to improve oral health care[10]. Nonetheless, new public policies capable of improving oral conditions in the institutionalized older population are still needed[2,3], but to create them, it is necessary to identify the determinants of the oral health status of such population and understand their needs[9]. However, there are no studies on oral health that are representative of the institutionalized elderly population in the city of Fortaleza, Brazil.

Thus, this study aimed to characterize the oral health conditions and to verify the variables related to the edentulism of institutionalized older adults, as well as to verify the relation of the time of institutionalization with oral health.

METHODS

The survey was a census with a quantitative cross-sectional approach. An epidemiological survey on oral health was carried out with older adults residing in LTCI in the city of Fortaleza, Ceará, Brazil. The 14 LTCI of the city were evaluated between April and June 2019.

The inclusion criteria were residents of the listed LTCI, older adults (aged 60 years or more), and being present in the LTCI during the period of the evaluations. The ones who were hospitalized or in palliative care during the data collection period and those in an aggressive state were excluded.

The data collection was performed by four examiners and four note-takers, who participated in a process of training and calibration carried out by consensus technique. The Kappa indexes obtained in the inter-examiner calibration were 0.80 and 1.00, and in the intra-examiner, they were 0.90 and 1.00, considered an excellent concordance.

Clinical examination and interviews with the older adults were conducted. The collection instrument was divided into sociodemographic aspects; general health evaluation; oral health care evaluation and oral clinical exams.

The older adults were assessed for their cognitive status by using the Pfeiffer Test[11], an instrument composed of ten questions whose scores range from 0 to 10, based on the number of errors. Such status was classified as undamaged intellectual function (0-2 errors), low cognitive impairment (3-4 errors), medium cognitive impairment (5-7 errors), and several cognitive impairments (8-10 errors). These aging people were considered oriented according to the number of errors presented and an adjustment made by their education level. Thus, it was considered disoriented the older adults with more than 5 errors, in the case of illiterate people, and with more than 4 errors, in the case of literate people. For the analysis, cognition was classified as undamaged intellectual function/low cognitive impairment and medium/several cognitive impairments.

Oral health care was evaluated through a seven-question questionnaire related to the care performed by the older adults or the caregiver. The hygienization of teeth, gums, and prostheses, as well as the removal of the prosthesis to sleep, were evaluated. Besides, there was the addition of three questions concerning the use of dental services.

The oral clinical examinations were performed using previously sterilized mouth mirrors and WHO periodontal probe (Hu-Friedy, Chicago, USA). The older adults were examined sitting in a clean environment and the examiners were provided with the same model of head lanterns.

The oral examination included the measurement of dental caries using the DMFT index (indicating the number of permanent teeth decayed, missing, and filled). The periodontal evaluation was based on the Community Periodontal Index (CPI) in those examined with at least two remaining teeth without extraction indication, considering index teeth. In the absence of one of them, the remaining sextant teeth were examined with the highest index recorded, and, in case of their absence, the sextant was recorded as excluded[5,12].

The edentulism was evaluated by oral and prosthesis examination in which the use and need for oral rehabilitation were observed and recorded, as well as which type of prosthesis was being used and in which arch. Also, evaluations regarding the presence of possible oral mucosa lesions were performed, recording their condition and location.

For data analysis, the following variables were considered to evaluate dental functionality: presence/absence of edentulism (total tooth loss), number of present functional teeth, number of present molars, presence of 2nd and 5th sextants, and presence of maxillary and mandibular shortened dental arch (SDA). These variables can assess the oral health condition of older adults with extensive tooth loss as well as the functionality of the remaining teeth.

The data were analyzed using the SPSS (Statistical Package for Social Sciences), version 22.0. Inferential and descriptive analysis was performed to characterize the sample according to the investigated dimensions, expressing absolute and relative frequencies of qualitative variables, as well as means and standard deviations of quantitative variables, through Pearson's chi-square or Fisher's exact tests using a 5% significance level. Then, logistic regression was performed to evaluate the adjusted model for edentulism in older people.

The research was approved by the Research Ethics Committee of the Universidade Federal do Ceará (UFC) under protocol number 3.009.576. This study was developed with the authorization of the LTCI participants and their aging residents (or, when "incapable", their legal guardians), who received clarifications regarding the research and gave consent for their participation by signing a Free and Informed Consent.

RESULTS

Out of the 579 aging residents in the 14, LTCI evaluated, 67 were excluded: 40 (59.7%) did not participate due to refusal, followed by 17 (25.4%) hospitalized or in palliative care, and 10 (14.9%) were not in the LTCI at the time of collection. Thus, 88.4% (512) of the institutionalized older population of the sample were examined. A sample power based on a normal approximation with continuity correction was found at 98.65%.

The mean age of the sample was 79.3±9.7 years, and 49.2% of the older adults were 80 years or more. The highest participation was among women (69.7%), Afro-descendants (50.2%), individuals with primary education (44.8%), and who had no health insurance plan (73.7%). Most of them received retirement pension or other benefit (83.5%) up to 1 minimum wage (79.8%), which, in most of the participants, was administered by the family (52.2%). The average length of stay in the LTCI was 6.1±8.1 years, the main reason for internment was the family decision (43.9%). 32.7% of the sample still had contact with their family and 89.8% of them receive visits from relatives at LTCI. The mean of caregivers by older adults was 10.3, with a minimum of 5 and a maximum of 24.

As for general health data, 62.3% of the sample have multimorbidities, while 63.5% use polypharmacy. Regarding cognitive status, the great majority presented several cognitive impairments (46.3%), whereas 21.7% presented undamaged intellectual function. Regarding mobility, 11.9% of the older adults were bedridden and most of them could walk without help (44.7%).

The mean value DMFT was 29.4±4.7, in which the component of missing teeth corresponded to a mean of 27.7±6.9 teeth. Regarding the roots, those people had about 2.1±3.9 exposed roots, of which 0.6±0.6 were decayed. For periodontal disease, it was found a mean of 0.6±1.2 sextants with calculus, 0.7±1.4 with gingival bleeding, 0.3±0.7 for shallow pockets, and 0.1±0.4 for deep pockets (Table 1).

Concerning the use of dental prostheses, 43.2% used a prosthesis in the maxillary arch and 21.9% used a prosthesis in the mandibular arch. But 73.6% of the older adults needed a maxillary complete denture and 66.2% needed a mandibular complete denture. As for dental functionality, only 5.5% of them had 20 teeth or more present in the mouth, 61.3% were edentulous, 92.6% had no 2nd and 5th sextants present, and 77.9% had no molars, and 93.6% had incomplete short dental arch present. Only 9% of the older adults had some type of oral lesion (Table 2).

Regarding oral health care, 87.5% reported brushing their teeth and gums; of these, 57.6% had the autonomy to do their brushing Among those who brushed their teeth and gums, 67.6% performed it two or more times a day. Concerning the hygienization of the prostheses, 72.5% of the ones who used them performed it by themselves, mostly twice a day and 52% of the older adults did not remove dental prostheses for sleeping (Table 3).

Regarding the use of dental services, 53.3% of the participants made their last visit to the dentist less than a year. The main, reason for the visit was for prevention, whereas 39.1% said they went to the dentist for the last time in the LTCI (Table 3).

Table 4 shows the results of the analysis of sociodemographic variables and their associations with edentulism. It was observed that edentulism was associated with lower education level (illiteracy), older adults with 80 years or above, longer institutionalization time, admission by abandonment/ mistreatment, absence of health plan insurance, receipt of retirement pension or other benefit of up to 1 minimum wage, retained/administered family retirement pension or by the LTCI.

The results of the logistic regression model of the variables associated with edentulism: Age of 80 years or above (PR=2.35); longer time of institutionalization (above 36 months) (PR=1.67);

Table 1: Mean, standard deviation, minimum and maximum conditions of caries and periodontal disease of institutionalized older adults. Fortaleza, Brazil, 2019.

	Mean/SD	Minimum	Maximum
DMFT Index	29.4±4.7	5.0	32.0
Number of missing teeth	27.7±6.9	4.9	32.0
Number of healthy teeth	2.2±4.1	0	21.0
Number of molars	0.7±1.6	0	8.0
Number of decayed roots	0.6±1.7	0	15.0
Number of exposed roots	2.1±3.9	0	26.0
Sextants with dental calculus	0.6±1.2	0	6.0
Sextants with bleeding on probing	0.7±1.4	0	6.0
Sextants with a shallow pocket	0.3±0.7	0	4.0
Sextants with deep pocket	0.1±0.4	0	4.0
Excluded sextant	5.1±1.6	0	6.0

DMFT: Decayed, Missing, and Filled Permanent Teeth; SD: Standard deviation.

lower level of schooling (illiterate /complete primary school) (PR=3.00), and absence of receiving retirement wage or other benefit (PR=1.87) were associated with total loss of teeth (Table 5). When the institutionalization time of the older adults was analyzed with the variables of oral health care, it was observed that a longer institutionalization time was associated with the absence of tooth and gum brushing (p=0.024) as well as a lower frequency of tooth and gum brushing (p<0.001).

DISCUSSION

A high rate of edentulism and low oral rehabilitation was found in this study, which indicates that the oral health situation of institutionalized older adults is worse than non-institutionalized ones in Brazil[5]. The mean DMFT found was 29.4, higher than the values mentioned in other similar studies conducted in developed countries, which ranged from 15.2 to 26.3[8,13-15]. Nevertheless, the mean found was equivalent to the one presented in similar studies in Brazil, ranging from 27.9 to 30.6[9,16-18], which shows a worse oral health status among institutionalized older adults in Brazil.

Moreover, this finding, added to the greater expression of the missing component in DMFT and a lower average of healthy teeth and molars present, can be seen as a reflection of the old reality in which oral health was not a priority in public health in our country[19] that market the life course of older adults.

Complete edentulism was detected in 61.3% of the participants, a value similar to that found in other regions of Brazil, which varies between 43.1-69.2%[1,19-21]. Thus, it can be seen that edentulism is still one of the major public health problems faced by the population studied and other similar populations in the country[1,19-21]. A large number of toothless people in the sample was also reflected in the evaluation of periodontal disease, in which an average of 5.1 excluded sextants were found, but most of the remaining sextants were affected by such disease in its various levels of progression.

Other indicators of dental functionality also showed worse conditions, mainly affected by the high percentage of edentulism, such as several participants with at least twenty functional teeth, with the presence of the 2nd or 5th complete sextant and shortened dental arch (SDA) in at least one arch. Furthermore, considering that the majority did not use any prosthesis, and needed oral rehabilitation, the rates related to oral rehabilitation were also

Table 2: Number and percentage of prosthetic condition, need for oral rehabilitation, dental functionality, and presence of oral lesions of institutionalized older adults. Fortaleza, Brazil, 2019.

	n	%
Use of maxillary prosthesis		
Absent	291	56.8
RPD/ Fixed prosthesis	39	7.6
Complete denture	182	35.6
Use of mandibular prosthesis		
Absent	400	78.1
RPD/ Fixed prosthesis	38	7.4
Complete denture	74	14.5
Need for maxillary oral rehabilitation		
No need	56	10.9
Partial oral rehabilitation	79	15.5
Complete oral rehabilitation	377	73.6
Need for mandibular oral rehabilitation		
No need	45	8.8
Partial oral rehabilitation	128	25.0
Complete oral rehabilitation	339	66.2
Oral lesions		
Absent	466	91.0
Present	46	9.0
Number of teeth		
Up to 19 teeth	484	94.5
20 teeth or more	28	5.5
Complete edentulous		
No	198	38.7
Yes	314	61.3
Presence of 2nd and 5th sextant		
Both absent	474	92.6
At least one present	38	7.4
Presence of molars		
None	309	77.9
At least one present	113	22.1
Presence of shortened dental arch		
Absent	478	93.4
Present in at least 1 arcade	34	6.6

RPD: removable partial denture

Table 3: Self-care in oral health and use of oral health services of institutionalized older adults. Fortaleza, Brazil, 2019.

	n	%
Performs brushing of teeth and gums		
Yes	448	87.5
Do not brush	64	12.5
Frequency of brushing teeth and gums		
1 time a day	145	32.4
2 times a day or more	303	67.6
Autonomy for sanitizing the prosthesis		
Yes	148	72.5
No	56	27.5
Frequency of sanitizing the prosthesis		
1 time a day	33	16.2
2 times a day or more	171	83.8
Removal of the prosthesis before sleeping		
Always / Sometimes	98	48.0
Never	106	52.0
Last dental appointment		
More than 1 year ago	147	46.5
Less than 1 year ago	169	53.5
Reason for last dental appointment		
Prevention	129	46.6
Need for Treatment	117	42.2
Pain	39	11.2
Type of dentist service		
Private	99	31.7
Public	91	29.2
Offered by LTCI	122	39.1

LTCI: Long-term care institutions for older people

Table 4: Sociodemographic characteristics and general health conditions according to edentulism of institutionalized older adults. Fortaleza, Brazil, 2019.

	Not complete edentulous		Complete Edentulous		P value	PR (95% CI)
	n	%	n	%		
Sex						
Male	62	40.0	93	60.0	0.684[a]	1.05 (0.83-1.32)
Female	136	38.1	221	61.9		
Race						
White	103	40.4	152	59.6	0.426[a]	0.91 (0.73-1.13)
Afro-descendant	95	37.0	162	63.0		
Schooling						
Illiterate	40	28.8	99	71.2		
Primary education	72	32.4	150	67.6	0.465[a]	0.88 (0.64-1.22)
High school/Graduation	82	61.2	52	38.8	<0.001[a]	0.47 (0.35-0.63)
Age						
Up to 79 years	124	47.7	136	52.3	<0.001[a]	1.62 (1.29-2.04)
80 years or older	74	29.4	178	70.6		
Time of institutionalization						
Up to 36 months	129	45.6	154	54.4	<0.001[a]	1.51 (1.19-1.91)
Above 36 months	69	30.1	160	69.9		
Reason for institutionalization						
Abandonment / Mistreatment	45	34.1	87	65.9		
Own Decision	70	46.1	82	53.9	0.041[a]	0.74 (0.55-0.99)
Family Decision	80	36.0	142	64.0	0.711[a]	0.94 (0.70-1.27)
Family contact						
Contactless	130	38.9	204	61.1	0.901	0.98 (0.78-1.27)
Stay in contact	64	39.5	98	60.5		
Type of family contact						
The old adult goes home	9	40.9	13	59.1		
The family goes to LTCI	113	37.8	186	62.2	0.771[a]	0.92 (0.54-1.55)
Telephone	8	66.7	4	33.3	0.151[b]	1.63 (0.85-3.09)
Health insurance plan						
Yes	65	49.2	67	50.8	0.005[a]	1.39 (1.12-1.74)
No	130	35.2	239	64.8		
Retirement pension						
Yes	174	40.9	251	59.1	0.034[a]	1.43 (1.00-2.04)
No	24	28.6	60	71.4		
Retirement pension amount						
Up to 1 minimum wage	120	37.2	203	62.8	<0.001[a]	0.63 (0.50-0.79)
Above 1 minimum wage	48	58.5	34	41.5		
Retirement pension administration						
Old adult	56	51.4	53	48.6		
Family	85	39.2	132	60.8	0.036[a]	1.31 (1.02-1.67)
LTCI	33	36.7	57	63.3	0.038[a]	1.40 (1.01-1.94)
Mobility						
Bedridden / wheelchair user	49	32.5	102	67.5	0.062[a]	1.27 (0.98-2.18)
Walking	149	41.3	212	58.7		
Cognitive State						
Undamaged function and low cognitive impairment	87	47.3	97	52.7	0.003[a]	1.39 (1.12-1.73)
Medium and severe cognitive impairment	111	33.8	217	66.2		
Polypharmacy						
Yes	69	36.9	118	63.1	0.532[a]	1.07 (0.85-1.35)
No	129	39.7	196	60.3		
Multimorbidity						
Yes	113	35.4	206	64.6	0.052[a]	1.24 (1.00-1.54)
No	85	44.0	108	56.0		

LTCI: Long-term care institutions for older people; PR: Prevalence ratios; CI: Confidence interval. Data compared by [a]chi-square test; [b]Fisher's exact test.

Table 5: Logistic regression analysis of edentulism according to sociodemographic characteristics and general health conditions of institutionalized older adults. Fortaleza, Brazil, 2019.

	P valuea	PR (95% CI)	P value*	PRa (95% CI)
Male sex	0.664	1.05 (0.83-1.32)	0.962	1.01 (0.65-1.52)
80 years or above	<0.001	1.62 (1.29-2.04)	<0.001	2.35 (1.55-3.55)
Longer time of institutionalization	<0.001	1.51 (1.19-1.91)	0.013	1.67 (1.11-2.52)
Lower level of schooling	<0.001	0.47 (0.35-0.63)	<0.001	3.00 (1.33-4.66)
Absence of retirement pension	0.034	1.43 (1.00-2.04)	0.031	1.87 (1.10-3.31)
Older adults able to walk	0.062	1.27 (0.98-2.18)	0.824	1.06 (0.59-1.91)
Most conserved cognitive state	0.003	1.39 (1.12-1.73)	0.373	0.81 (0.51-1.28)
Multimorbidities	0.052	1.24 (1.00-1.54)	0.114	1.11 (0.97-1.28)

PR: prevalence ratios; PRa: adjusted prevalence ratios; CI: Confidence interval; *Adjusted p-value. Data compared by [a]chi-square test

inadequate. The data are similar to the national values in which the prevalence of prosthesis use and need reached 78.2% and 68.7% respectively[5].

Thus, the absence of functional teeth in the oral cavity, as well as a high need for oral rehabilitation, have negative impacts on the masticatory and phonetic functions of older adults, altering their ability to feed and socialize, which directly affects the nutritional status and well-being of these population[22].

Moreover, the social functions of the mouth and its subjectivity such as eroticism, self-esteem, and social relationships, for example, have a direct influence on the quality of life of human beings[23]. Thus, it becomes necessary to maintain the oral health of these older adults, respecting the role that the mouth and teeth represent, not only as part of the human body but also as the symbolism of their socio-cultural insertion.

Even with the expansion of specialized dental and public health services in Brazil, such as the Dental Specialty Centers, which include oral rehabilitation[6,24], the evaluated population is not having access to this service. Thus, these rehabilitation actions offered by the public service do not seem to reach the institutionalized population adequately, making this group still present a high demand for oral rehabilitation consequently.

It was observed that more than half of the older adults went to the dentist in less than 1 year, most of them having as the main reason for the prevention and carried it out in the LTCI. It is believed that these findings are because one of the largest institutions evaluated is state-owned and provides dental care services. In addition, most of the LTCI evaluated receive extension groups of dentistry schools that perform oral health prevention actions with the residents.

Even so, many factors may have contributed to this difficulty in accessing oral health services in the population studied, for instance, difficulty perceiving the need for dental care by the older adult or by the LTCI[13,15] low levels of schooling and income[15,17], scarce availability of public oral health services or difficulty in access[17] and organizational difficulties such as lack of transportation of the older adults to the place of care[25]. Moreover, other authors suggest an association between sensitivity to pain and negative self-perception of oral health where individuals seek more dental services because of painful or uncomfortable experience[26], showing that those who do not attend the dentist present twice as much need for rehabilitation, history of disease and tooth loss[17]. Thus, these results found evidence of the demand for new actions and public policies of oral health that include the institutionalized older adults and can transform this reality.

As for the presence of oral lesions, some authors claim that angular cheilitis and stomatitis associated with the use of dental prostheses and poor oral hygiene habits are the most prevalent oral lesions in institutionalized older adults[27-29]. However, there was a low prevalence of oral lesions in the findings of the research, which was similar to others studies[20,30]. A possible explanation for this fact would be the lower percentage of older people in the sample who wear a prosthesis, which may be related to fewer cases of stomatitis.

When related to the sociodemographic characteristics of older adults, edentulism has been associated with aging, in line with the literature that states that tooth loss tends to progress with advancing age[17,31]. In addition, the relationship between poverty at any time in life and tooth loss has been proven[32]. However, one must take into account the cumulative effect of oral diseases over the years, and that edentulism should not be considered just a consequence of the aging process.

The results also showed that edentulism in the institutionalized older adults was associated with worse socioeconomic conditions, according to the literature[2,5,17,33], which could be minimized with better provision of resources and organization of dental services[2,32]. Thus, qualified oral health care actions to solve the main repressed demands of this population, such as the need for prosthetic rehabilitation, are still necessary.

Moreover, belonging to less favored social classes, with less schooling, income and lack of health plan insurance are some of the factors that are determinant in the decision of exodonty[33]. Thus, it is also necessary to emphasize the fact that tooth extraction has long been considered the only option in dental practice in Brazil, which has made this procedure to be considered the most viable solution for dental problems. Possibly, due to cultural remnants, the search for exodontia may still be a way out for individuals with less education and access to information. Moreover,

it is a lower-cost procedure than other conservative treatments in dentistry, which causes people with worse socioeconomic conditions to seek this type of assistance. This situation, when added to the difficulty of access these older adults have to public oral health services[2], where they could be performing more conservative procedures, may have aggravated this situation.

Association with higher rates of edentulism was also found with the longest time of institutionalization, other studies with institutionalized older adults also indicate a worsening of oral health conditions with the advance of institutionalization time[33,34]. The absence of teeth can often be interpreted as a more desirable situation because of the lack of intercurrence that dental problems can cause[4]; thus, it would possibly explain this situation, in which being without teeth would facilitate the care of these older adults in LTCI, especially those who are more care dependent.

Regarding oral health care, it was identified that a part of the sample did not perform any type of cleaning of teeth and gums. The large number of edentulous teeth in the sample may have influenced these findings, since their absence may have caused these older adults or their caregivers to view oral hygiene as something unnecessary. Another considerable part of this population also proved to be lacking the autonomy to perform oral hygiene. One of the explanations for this finding is the high rates of older adults with mobility and cognition problems found in the evaluated population. Several studies claim a positive and significant association between poor oral hygiene and oral health conditions with these and other limitations such as reduced functional capacity and Alzheimer's and Parkinson's diseases[3,16,25,35].

Although the design of this study does not allow us to establish whether edentulism occurred before institutionalization or if it was caused and aggravated by the internment. An association was observed between a longer period of institutionalization and the absence of tooth and gum brushing, as well as a lower frequency of such brushing. In addition to some factors already discussed, it is necessary to highlight the proven relationship between the process of institutionalization with the decrease in functional capacity[34,36,37] and autonomy[38,39] of older adults, which will have a direct influence on the care of their oral health. Thus, it is possible that, after the institutionalization and with its advancement, those individuals have lost the ability to care for themselves and, consequently, their oral health, leading to worse oral health conditions and greater edentulism.

Therefore, the role of the caregiver also deserves to be highlighted when it comes to oral health care for this population. Neglect with oral hygiene can also be pointed out by the absence of adequate care with the institutionalized older adults[40] as a result of not having sufficient knowledge, organization, and planning for the work[25] and time to perform it[1,25]. The presence of older adults with greater limitations, the various functions accumulated by caregivers, and the reduced staff in LTCI may be related to neglect of oral hygiene. Thus, institutionalization has a strong impact on the oral health conditions of these older adults, which is aggravated by the lack of adequate care in LTCI, leaving them at the mercy of oral problems that may worsen over time and impact their general health[6].

Even so, it was observed that most of the evaluated older adults had a higher frequency of brushing their teeth, gums, and prostheses. Nevertheless, despite these findings, one must be cautious about the proper performance of oral hygiene of these individuals. A study carried out in Poland found in its sample that 26% of older adults who performed hygiene independently at least twice a day; though insufficiently, which was also observed in almost half (45.8%) of the older adults who received help to perform this action[25]. Thus, it is still necessary not only to check the frequency of brushing in institutionalized older adults, but also to check its quality and, consequently, understand how oral hygiene impacts the oral health of these older adults.

Therefore, it is corroborated by some authors who point out that the improvement of oral health care provided by LTCI caregivers depends on the development of education and organization strategies to train them[16,25,35], as well as better working conditions and more time to perform oral care tasks[25]. Moreover, introducing a continuity of care and surveillance of these conditions may facilitate, when necessary, the dentist's intervention in the prevention of the main diseases that may affect these older adults[35], and contribute to controlling the influence that oral health diseases possibly cause on their general health[10,16].

As a limitation of this study, beyond cross-sectional design, there is the memory bias of the interviewees, however, the information was checked with the caregivers, as well as in the medical records when it was not possible to remember.

The results presented in this paper portray an irreversible and cumulative process, which is faced by the institutionalized older adults, in addition to indicating the invisibility of this population to dental services. The need to check the oral health care routine performed by caregivers in LTCI is pointed out. Thus, the results highlight the demand to develop and strengthen public policies that generate a reformulation of dental care provided to institutionalized older adults. So that the institutionalization time does not worsen the oral health of the sample.

A high level of edentulism associated with worse sociodemographic characteristics and longer institutionalization time was verified in the present study, highlighting the social fragility and poor oral health conditions of the older adults assessed. The findings reveal the need to establish oral health care routines within long-term institutions for older adults, aiming at the effective maintenance of oral health over time of institutionalization, as well as the development of better dental care for the institutionalized population, to improve their oral health condition and quality of life.

REFERENCES

1. Sá IPC, Almeida Júnior LR, Corvino MPF, Sá SPC. Condições de saúde bucal de idosos da instituição de longa permanência Lar Samaritano no município de São Gonçalo-RJ. Cienc Saude Coletiva. 2012;17(5):1259-65. https://doi.org/10.1590/S1413-81232012000500019

2. Maia LC, Costa SM, Martelli DRB, Caldeira AP. Edentulismo total em idosos: envelhecimento ou desigualdade social?. Rev Bioet. 2020;28(1):173-81. https://doi.org/10.1590/1983-80422020281380

3. Medeiros AKB, Barbosa FP, Piuvezam G, Carreiro AFP, Lima KC. Prevalence and factors associated with alterations of the temporomandibular joint in institutionalized elderly. Cienc Saude Coletiva. 2019;24(1):159-68. https://doi.org/10.1590/1413-81232018241.06132017

4. Costa MJF, Lins CAA, Macedo LPV, Sousa VPS, Duque JA, Souza MC. Clinical and self-perceived oral health assessment of elderly residents in urban, rural, and institutionalized communities. Clinics. 2019;74:e972. https://doi.org/10.6061/clinics/2019/e972

5. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Secretaria de Vigilância em Saúde. SB Brasil 2010: Pesquisa Nacional de Saúde Bucal: resultados principais. Brasília: Ministério da Saúde, 2012.

6. Souza EHA, Barbosa MBCB, Oliveira PAP, Espíndola J, Gonçalves KJ. Impacto da saúde bucal no cotidiano de idosos institucionalizados e não institucionalizados da cidade do Recife (PE, Brasil). Cienc Saude Coletiva. 2010;15(6):2955-64. https://doi.org/10.1590/S1413-81232010000600034

7. Costa EHM, Saintrain MVL, Vieira APGF. Autopercepção da condição de saúde bucal em idosos institucionalizados e não institucionalizados. Cienc Saude Coletiva. 2010;15(6):2925-30. https://doi.org/10.1590/s1413-81232010000600030

8. Kohli R, Sehgal HS, Nelson S, Schwarz E. Oral health needs, dental care utilization, and quality of life perceptions among Oregonian seniors. Spec Care Dent. 2017;37(2):85-92. https://doi.org/10.1111/scd.12221

9. Melo LA, Sousa MM, Medeiros AKB, Carreiro AFP, Lima KC. Fatores associados à autopercepção negativa da saúde bucal em idosos institucionalizados. Cienc Saude Coletiva. 2016;21(11):3339-46. https://doi.org/10.1590/1413-812320152111.08802015

10. Hong CHL, Aung MM, Kanagasabai K, Lim CA, Liang S, Tan KS. The association between oral health status and respiratory pathogen colonization with pneumonia risk in institutionalized adults. Int J Dent Hyg. 2018;16(2):e96-102. https://doi.org/10.1111/idh.12321

11. Pfeiffer E. A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. J Am Geriatr Soc. 1975;23(10):433-41. https://doi.org/10.1111/j.1532-5415.1975.tb00927.x

12. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Projeto SB 2010: condições de saúde bucal da população brasileira no ano 2010: manual do coordenador municipal. Brasília: Ministério da Saúde, 2009.

13. Cornejo M, Pérez G, Lima KC, Casals-Peidro E, Borrell C. Oral health-related quality of life in institutionalized elderly in (Spain) Barcelona. Med Oral Patol Oral Cir Bucal. 2013;18(2):285-92. https://doi.org/10.4317/medoral.18280

14. Zhang Q, Jing Q, Gerritsen AE, Witter DJ, Bronkhorst EM, Creugers NHJ. The dental status of an institutionalized elderly population of 60 years and over in Qingdao, China. Clin Oral Investig. 2016;20:1021-8. https://doi.org/10.1007/s00784-015-1581-6

15. Miremadi SR, Cosyn J, Janssens B, Bruyn H, Vanobbergen J, Visschere L. A pilot assessment tool of the need for oral health care and cost prediction in institutionalized elderly people. Int J Dent Hyg. 2017;15(4):306-12. https://doi.org/10.1111/idh.12222

16. Lopes MC, Oliveira VMB, Flório FM. Condição bucal, hábitos e necessidade de tratamento em idosos institucionalizados de Araras (SP, Brasil). Cienc Saude Coletiva. 2010;15(6):2949-54. https://doi.org/10.1590/S1413-81232010000600033

17. Piuvezam G, Lima KC. Factors associated with missing teeth in the Brazilian elderly institutionalised population. Gerodontology. 2013;30(2):141-9. https://doi.org/10.1111/j.1741-2358.2012.00655.x

18. Alcântara CM, Dias CA, Rodrigues SM, Reis FA. Estudo comparativo da condição de saúde bucal de idosos não institucionalizados de Governador Valadares-MG, com a meta proposta pela Organização Mundial de Saúde para 2010. Physis. 2011;21(3):1023-44. https://doi.org/10.1590/S0103-73312011000300014

19. Gaião LR, Almeida MEL, Heukelbach J. Perfil epidemiológico da cárie dentária, doença periodontal, uso e necessidade de prótese em idosos residentes em uma instituição na cidade de Fortaleza, Ceará. Rev Bras Epidemiol. 2005;8(3):316-23. https://doi.org/10.1590/S1415-790X2005000300013

20. Reis SCGB, Higino MASP, Melo HMD, Freire MCM. Condição de saúde bucal de idosos institucionalizados em Goiânia- GO, 2003. Rev Bras Epidemiol. 2005;8(1):67-73. https://doi.org/10.1590/S1415-790X2005000100008

21. Carneiro RMV, Silva DD, Sousa MLR, Wada RS. Saúde bucal de idosos institucionalizados, zona leste de São Paulo, Brasil, 1999. Cad Saude Publica. 2005;21(6):1709-16. https://doi.org/10.1590/S0102-311X2005000600018

22. Thomson WM. Epidemiology of oral health conditions in older people. Gerodontology. 2014;31(Suppl 1):9-16. https://doi.org/10.1111/ger.12085

23. Botazzo C. Sobre a bucalidade: notas para a pesquisa e contribuição ao debate. Cienc Saude Coletiva. 2006;11(1):7-17. https://doi.org/10.1590/S1413-81232006000100002

24. Brasil. Ministério da Saúde. Diretrizes da política nacional de saúde bucal. Brasília: Ministério da Saúde, 2004.

25. Gaszynska E, Szatko F, Godala M, Gaszynski T. Oral health status, Dental treatment needs, and barriers to dental care of elderly care home residents in Lodz, Poland. Clin Interv Aging. 2014;9:1637-44. https://doi.org/10.2147/CIA.S69790

26. Piuvezam G, Lima KC. Self-perceived oral health status in institutionalized elderly in Brazil. Arch Gerontol Geriatr. 2012;55(1):5-11. https://doi.org/10.1016/j.archger.2011.04.017

27. Simunkovic SK, Vucicevic Boras V, Panduric J, Alajbeg Zilic I. Oral health among institutionalised elderly in Zagreb, Croatia. Gerodontology. 2005;22(4):238-41. https://doi.org/10.1111/j.1741-2358.2005.00086.x

28. Rabiei M, Kasemnezhad E, Masoudi Rad H, Shakiba M, Pourkay H. Prevalence of oral and dental disorders in institutionalised elderly people in Rasht, Iran. Gerodontology. 2010;27(3):174-7. https://doi.org/10.1111/j.1741-2358.2009.00313.x

29. Peltola P, Vehkalahti MM, Wuolijoki-Saaristo K. Oral health and treatment needs of the long-term hospitalised elderly. Gerodontology. 2004;21(2):93-9. https://doi.org/10.1111/j.1741-2358.2004.00012.x

30. Bilder L, Yavnai N, Zini A. Oral health status among long-term hospitalized adults: a cross sectional study. Peer J. 2014;2:e423. https://doi.org/10.7717/peerj.423

31. Corchero AMI, Cepeda JRG. Oral Health in people over 64 years of age, institutionalized in Centres for the Aged in the Vigo Health District Spain, 2005. Med Oral Patol Oral Cir Bucal. 2008;13(8):e523-8.

32. Seerig LM, Nascimento GG, Peres MA, Horta BL, Demarco FF. Acúmulo de risco decorrente da pobreza e perda dentária aos 31 anos, coorte de nascidos vivos de 1982, Pelotas, Rio Grande do Sul, Brasil. Cad Saude Publica. 2020;36(8):e00167619. https://doi.org/10.1590/0102-311X00167619

33. Thorstensson H, Johansson B. Why do some people lose teeth across their lifespan whereas others retain a functional dentition into very old age? Gerodontology. 2010;27(1):19-25. https://doi.org/10.1111/j.1741-2358.2009.00297.x

34. Jerez-Roig J, Ferreira LMDM, Araújo JRT, Lima KC. Functional decline in nursing home residents: a prognostic study. PLoS One. 2017;12(5):e0177353. https://doi.org/10.1371/journal.pone.0177353

35. Chiesi F, Grazzini M, Innocenti M, Giammarco B, Simoncini E, Garamella G, et al. Older People Living in Nursing Homes: An Oral Health Screening Survey in Florence, Italy. Int J Environ Res Public Health. 2019;16(18):3492. https://doi.org/10.3390/ijerph16183492

36. Fluetti MT, Fhon JRS, Oliveira AP, Chiquito LMO, Marques S. The frailty syndrome in institutionalized elderly persons. Rev Bras Geriatr Gerontol. 2018;21(1):60-9. https://doi.org/10.1590/1981-22562018021.170098

37. Oliveira PH, Mattos IE. Prevalência e fatores associados à incapacidade funcional em idosos institucionalizados no Município de Cuiabá, Estado de Mato Grosso, Brasil, 2009-2010. Epidemiol Serv Saude. 2012;21(3):395-406. http://dx.doi.org/10.5123/S1679-49742012000300005

38. Cobo CMS. The influence of institutionalization on the perception of autonomy and quality of life in old people. Rev Esc Enferm. 2014;48(6):1011-17. http://dx.doi.org/10.1590/S0080-623420140000700008

39. Castro-Monteiro E, Forjaz MJ, Ayala A, Rodriguez-Blazquez C, Fernandez-Mayoralas G, Diaz-Redondo A, et al. Change and predictors of quality of life in institutionalized older adults with dementia. Qual Life Res. 2014;23(9):2595-601. http://dx.doi.org/10.1007/s11136-014-0706-8

40. Silva BLA, Bonini JA, Bringel FDA. Oral health status of institutionalized elderly in Araguaína/TO. Periodontia. 2015;25(1):7-13.