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INFLUENCE OF ALZHEIMER'S DISEASE ON THE ORAL HEALTH CONDITION AND QUALITY OF LIFE OF ELDERLY INDIVIDUALS

Alexandre Franco Miranda[1,2,3*], Tatiane Maciel de Carvalho[4], Isabelle Patriciá Freitas Soares Chariglione[1,5], Eduardo Barbosa Coelho[6], Erica Negrini Lia[7] and Soraya Coelho Leal[7]

[1]Postgraduate Program Stricto Sensu in Gerontology; and [2]Department of Dentistry for Special Patients, Geriatric and Hospital Dentistry, Catholic University of Brasilia, Brazil
[3]Hospital Sírio-Libanês, Brasilia, Brazil
[4]Department of Temporomandibular Dysfunction and Orofacial Pain; and Dentistry for Special Patients, Faculty of Dentistry - ICESP, Brasília, Brazil
[5]Institute of Psychology, Department of School and Developmental Psychology, University of Brasilia, Brazil
[6]Faculty of Medicine (FMRP), University of São Paulo, Brazil
[7]Faculty of Dentistry and Postgraduate Program Stricto Sensu in Dentistry, University of Brasilia, Brazil

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****Corresponding author:***
Alexandre Franco Miranda

ABSTRACT

Aim: Evaluating the influence of Alzheimer's Disease (AD) on oral health and perception about quality of life by elderly individuals. **Methods:** The DMFT index was used to assess the oral health. The OHIP-14 questionnaire (Oral Health Impact Profile-14) was adopted to evaluate oral health-associated quality of life of elderly individuals with (WAD) and without (WoAD) AD diagnostics. Data were analyzed through Mann-Whitney test; the correlation between DMFT index and OHIP-14 was assessed through Spearman's test. **Results:** Both groups presented poor oral health; however, the DMFT median was significantly higher in the WoAD group [28.0 (24.5 – 28.0)] than in the WAD group [21.0 (16.0 – 28.0)] ($p<0.05$). The OHIP-14 index recorded low and similar results in the WoAD [7 (4.5-15)] and WAD groups [6.0(4.0-9.0)] and lack of correlation in the DMFT index of both groups. Oral health did not have negative impact on the quality of life of elderly individuals in both groups. **Conclusion:** DA did not influence oral health-associated quality of life. Despite the evidence of poor oral health in both groups, results have shown lack of self-perception about buccal issues by elderlies.

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INTRODUCTION

Population aging is a global phenomenon deriving from increased life expectancy associated with lower birth rates.These low birth ratesaccount for the need of improving public policies and of paying closer attention on the health of elderlies, as well as on professional qualification to assist this population in a dignifying and ethical manner (Lima-Costa et al., 2018; Tramujas Vasconcellos Neumann, 2018; Veras, 2018). Physiological changes and functional limitations result from the aging process. These limitations are capable of having important impact on the health condition and quality of life, since they increase the vulnerability to diseases (Tramujas Vasconcellos Neumann, 2018). The prevention of certain diseases somehowincreases longevity, such as dementia syndromes, with emphasis on Alzheimer's Disease (AD). Therefore, elderlies, and women, are more often affected by these syndromes, given the fact that they present features associated with illiteracy and low income (Fagundes, 2011). Memory impairment and losses related to the impairment of at least one cognitive function (language, gnosias, praxis or executive functions) influence individuals' social, professional and family performance, as well as represent decline in functioning patterns before neurocognitive impairments caused

by dementia frameworks. These factors have straight consequence to the quality of life of elderly individuals (Barbe, 2018). Oral health can also influence the quality of life of elderly individuals, since issues resulting from it can cause discomfort, pain, mastication functioning worsening and nutrition loss. Besides, it concerns psychological and social aspects (Cardoso, 2016). Decline in oral health conditions is evident in dementia patients, mainly in patients with Alzheimer's Disease, since oral hygiene limitations and the constant use of hyposalivant drugs make it harder understanding and accepting dental treatment (Ming et al., 2019; Marchini, 2019; Kang, 2019). The use of hyposalivant drugs favors the occurrence of caries, periodontal disease and dry mouth feeling. Several instruments were developed and assessed to evaluate the perception about oral health-associated quality of life. Among them, one finds the OHIP questionnaire (Oral Health Impact Profile) and its reduced version (OHIP-40), which are often used due to the fact that both versions were validated to Portuguese language (Brazil). The validation allows greater applicability and acceptance (Oliveira, 2005). The questionnaire makes it possible assessing the physical, psychological and social domains, as well as quantifying individuals' perception about impacts resulting from oral issues that have straight influence on quality of life (Zucoloto, 2014). A study carried out with elderlies showed the good internal consistency of OHIP-14 (alpha-Cronbach = 0.78). Its results have evidenced proper correlation between its domains and oral health perception (Alvarenga, 2011). The scientific literature available about AD impacts (dementia) on oral health lacks information about oral health-associated quality of life of individuals presenting the aforementioned conditions. Accordingly, the aim of the present study was to assess the impact of dementia (AD) on patients' oral health conditions and whether the presence of AD changes the quality of life measured through the instrument known as OHIP-14.

METHODS

Cross-sectional observational study of the case-control type carried out at the Medical Center for Elderly of University Hospital of Brasilia, Brazil as part of the Continuous Action Extension Project, which is in place since 2004. The present study lasted 9 months. Research activities started after the study was approved by the Research Ethics Committee (REC) of the Medical School (MS) of University of Brasilia, Brazil under protocol n. 043/2008 (research project in place since 2008, it is associated with the extension and continuous action program, which focuseson clinical, teaching and research aims). All ethical considerations in force were followed, as well as the rules in the Declaration of Helsinki.

Casuistry: The total of 40 elderly patients, in the age group 60 – 85 years, were included in the study after they signed the free and informed consent form. Twenty-five (25) elderlies composed the control group – without dementia (WoD) - and 15 ones composed the group of patients diagnosed with light-type AD dementia (WD). Inclusion criteria included: being in the age group 60 years, or older; agreeing in participating in the study, not having dementia diagnostic (control) or having light dementia diagnosed by the team of geriatricians based on criteria adopted by *Diagnostic and Statistical Manual* (DSM IV)[13]and *National Institute of Neurological and Communicative Disorders and Stroke-Alzheimer's Disease and Related Disorders Association* (NINCDS-ADRDA) (Guerrero, 2016). Exclusion criteria were: elderly diagnosed with dementia features (Alzheimer's Disease) at moderate and severe stage (they were little collaborative and did not engage to activities focused on assessing oral health conditions), who were subjected to cancer treatment (chemotherapy and radiotherapy) to treat neoplasms in the head and neck regions. Patients in the WD group were recruited in the Outpatient Center of General Geriatrics of the Medical Center for Elderlies of the University Hospital. Patients with AD were recruited in the Dementia Outpatient Center of the same reference center.

Oral Health condition assessment: All elderly patients were subjected to physical intra-buccal soft tissue and teeth examination carried out by a single trained and calibrated dental surgeon. The examinations were based on the methodology recommended by the World Health Organization - WHO. Examinations were conducted with the patient positioned in dental chair, under artificial lighting. Examination was carried out with the aid of an oral mirror and exploring probe; this procedure is in compliance with all biosafety and patient protection standards. Visual inspections of the semi-mucosa, internal labial mucosa, cheek mucosa, hard and soft palates, and of the tongue (ventral, dorsal and lateral borders) were carried out. The number of teeth in the buccal cavity of elderlies was recorded and categorized as with caries, teeth loss (extracted or recommended for extraction) and restored teeth based on the sum of number of teeth (teeth with caries, lost and extracted teeth, and teeth recommended for extraction and restoration) – DMFT index. Patients were asked about their frequency of daily oral hygiene and their answers were recorded.

Assessment of oral health impact on quality of life: The Portuguese version (Brazil) of the OHIP-14 index[10]was individually applied to elderly patients without AD (dementia) diagnostics and to caregivers of elderly patients with light AD through one-on-one interviews. Interviews had followed ethical and legal rules in force. OHIP-14 comprises 14 questions grouped into 7 domains, such as: functional limitations, pain, psychological discomfort; physical, psychological and social disabilities; and social disadvantages (Silva, 2015). Participants answered each question based on the frequency of its occurrence. Each answer was scored based on a 5-point Likert scale: never (0), rarely (1), sometimes (2), systematically (3) and always (4) (Couto, 2018). The recorded final score resulted from the sum of all scores; scores have shown that the worse the quality of life related to oral health, the higher the reached score.

Statistical analysis: The statistical analysis was carried out in the *GraphPad Prism*software, version 6.0 (*GraphPad Software*, *La Jolla California*, *USA*). Normal-distribution data were expressed as mean and standard deviation (SD). Non-parametric distribution data were expressed as median and 25%-75% interval range. Qualitative data were analyzed through Fischer's exact test. Student's t test or Mann-Whitney test were used to compare the groups. Spearman's test was used to assess the correlation between the CPO-D and OHIP-14 indices; p values <0.05 were considered statistically significant.

RESULTS

Descriptions of volunteers included in the study are shown in Table 1. The prevalence of buccal injuries was similar in the assessed groups (with and without AD diagnostics).

Table 1 – Socio-demographic, oral health and buccal hygiene features of elderlies with and without Alzheimer's Disease diagnostic.

	Without Alzheimer's Disease (n= 25)	WithAlzheimer's Disease (n= 15)
	n (%)	n (%)
Sex		
Male	09 (36)	5 (33.3)
Female	16 (64)	10 (66.7)
Mean age (years)	72±6	73±5
Monthly family income (SM)a		
□2	11 (84.6)	2 (15.4)
2 a 5	12 (70.6)	5 (29.4)
□5	2 (20)	8 (80)
Buccal injuries		
Candidiasis	2 (8)	3 (20)
Hyperplasia	7 (28)	3 (20)
Traumaticulcer	1 (4)	1 (6.7)
Angular cheilitis	7 (28)	5 (33.3)
None	11 (44)	6 (40)
Prosthetics use (PTb or PPRc)	19 (76)	11 (73,3)
Daily frequency of oral hygiene		
none	1 (4)	1 (6,7)
1X	3 (12)	3 (20)
2x	9 (36)	6 (40)
3x or more	12 (48)	5 (30)

a- Minimum wage / b-Total prosthetics / c- Removable Partial Prosthetics

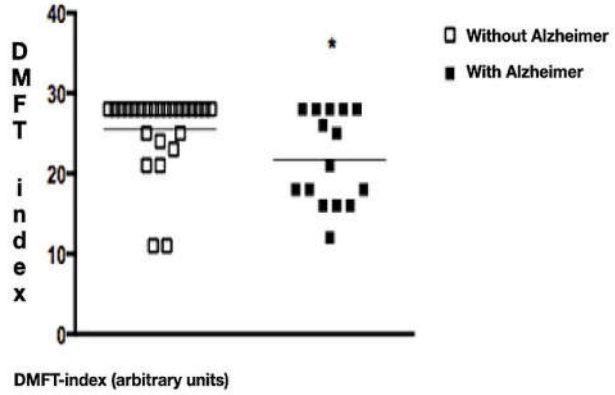

Figure 1 –DMFT index distribution based on the groups with and without dementia (Alzheimer's Disease). The line depicts the median value. *P=0.02.

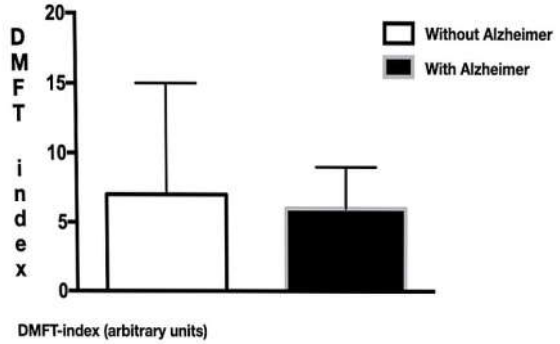

Figure 2 –OHIP values recorded for groups without Alzheimer's Disease (white bar) vs. groups with Alzheimer's Disease (black bar). P=0.33, values expressed as median and interquartile range (25% - 75%).

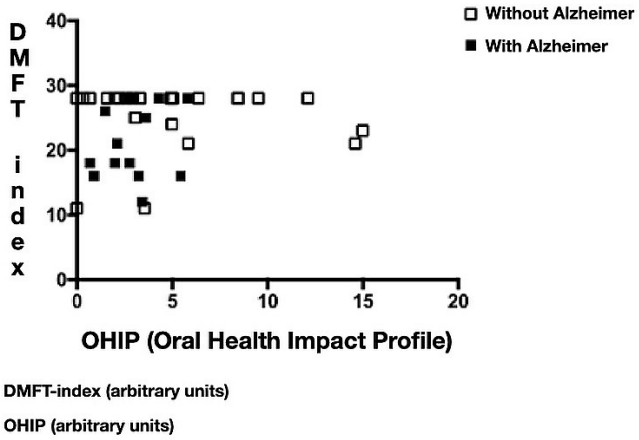

Figure 3 – Lack of correlation between DMFT and OHIP-14 indices. Open squares represent patients without Alzheimer's Disease (dementia) and closed squares represent patients with Alzheimer's Disease (dementia). P = 0.59, Spearman's test.

There was greater prevalence of oral candidiasis in patients with dementia (light AD), although there were no statistically significant differences between groups. Figure 1 - depicts the DMFT index, which was significantly higher in the WAD group [28.0(24.5 – 28.0) vs. [21.0 (16.0 – 28.0)], median and 25%-75% interval range, p<0.05].

The number of lost teeth was the greatest responsible for the high CPO-D index values in both groups. This outcome highlights the high prevalence of edentulism. The mean number of restored teeth was larger in the light AD group, whereas the mean number of extracted teeth, or with recommendation for extraction, was larger in the group

without dementia (Table 2). The OHIP-14 index was low and similar betweenWoAD [7 (4.5-15) and WD [6.0(4.0-9.0), p = 0.33] groups (Figure 2). There was no correlation between DMFT and OHIP-14 in the assessed groups (Figure 3).

Table 2 - Mean number of teeth with caries (c), lost teeth (P), restored teeth (O) and mean DMFT in elderly with (WAD) and without (WoAD) Alzheimer

	Without Alzheimer's Disease - WoAD (n=25)	With Alzheimer's Disease - WAD (n=15)
Teeth with caries	0,52	0.8
Lost teeth	24	16.33
Restored teeth	0.56	4.6
Mean DMFT	25.48	21.73

DISCUSSION

According to the current results, despite the clinically proven oral health deficit; none of the groups (with and without AD diagnostic) showed bad perception about quality of life. Therefore, the presence of light AD did not change the perception about quality of life associated with oral health. High edentulism prevalence, in both assessed groups, was the main cause of high DMFT values. These findings reflect the results recorded in the last epidemiological study on oral health carried out in Brazil in 2010. This study showed mean DMFT of the population in the age group 65-74 years of 27.53 years; lack of teeth was the major component in the index (World Health Organization, 2013). Accordingly, the current Brazilian elderly population remains fully and partially toothless. In other words, lack of teeth identified in the present study can result from multiple causes, among them: lack of proper oral hygiene; hard time accessing a dental surgeon; lack of financial resources by most elderlies; constant actions focused on teeth extraction; low effectiveness of preventive actions and public and assistance policies overall focused on elderlies' oral health promotion.

However, the group without AD diagnostics presented more extracted and lesser restored teeth. The opposite situation happened in the group with AD diagnostics, which showed less extracted and more restored teeth. Assumingly, the recorded results evidenced the existence of difference between socioeconomic levelsin the assessed groups, because the study site is the reference for diagnostic, mainly for AD. The study site also assists high- and low-income and schooling patients. Volunteers in this group had more access to dental treatment, differently from volunteers in the group without AD diagnostic. In opposition to the present findings, some studies have shown worse oral health conditions based on DMFT index, visible plate index, buccal hygiene index and on the prevalence of dental prosthetics use by elderlies with AD or with cognitive impairment in comparison to elderlies without AD or without cognitive impairment (Kang, 2019; Peres, 2010). However, although DMFT values in these studies were different, they were high either for elderlies with or without AD (Kang, 2019; Peres, 2010). Our findings are in compliance with Brazilian studies that have shown positive self-perception about oral heath, or about the under-dimensioning of buccal issues in elderly individuals with and without dementia (AD), despite the high DMFT indices and the high prevalence of edentulism (Kang, 2019; Peres, 2010). The qualitative analysis showed symptoms' underestimation, lack of hope and resignation with limitations imposed by precarious oral health. All these outcomes are the natural consequence of aging, which is not seen as an irreversible issue (Cardoso, 2016). Data in the current study showed lack of correlation between the DMFT and OHIP-14 indices, either in patients with light AD or in the control. This finding reinforces the study hypothesis. The current scenario of elderlies' oral health in Brazil also made it possible stating that lack of perception about the impact of bad oral health on quality of life is the outcome of a resignation culture.According to this culture, individuals peacefully accept and get used to live with issues caused by lack of oral health, such as edentulism, resorption of the alveolar ridge, progressive lack of adaptation and comfort in using prosthetics on the arches. Consequently, they live with reduced mastication and nutrition effectiveness, as well as with associated buccal injuries. Besides the aforementioned physical and biological aspects, subjective and personal aspects can be linked to individual looks, self-esteem and speech impairments. Social relationships can be affected by non-satisfactory oral health conditions; however, they depend on personal judgements and seem to be more correlated to quality of life (Ribeiro, 2012).

Overall, the evaluation of elderly patients themselves about their oral health associated with quality of life is different from the opinion of health professionals, which is substantiated by the objective assessment of the issue in question. Furthermore, in historical terms, oral health has not been related to general health by most health professionals and patients, assumingly due to lack of specific knowledge and interdisciplinary associations. Buccal cavity and its specificities cannot be understood as a structure aside from the rest of the organism, or lesser important when it comes to impacts on quality of life. A study carried out with institutionalized elderlies showed that factors related to general health, mainly to depression and self-perception about health as a whole, are associated with worse quality of life linked to oral health, edentulism and to the need of prosthetic rehabilitation (Echeverria, 2019). The questionnaire of quality of life associated with oral health (OHIP-14) applied to caregivers of individuals in the AD group, rather than to their relatives, can be considered a study limitation. The credited specific strategy based on a gerontological context and on care given to elderlies allowed finding correct and accurate answers concerning oral health conditions and the perception about quality of life, because these are the professionals mostly dedicated to assist elderlies with ADon a daily basis.

CONCLUSION

The presence of dementia (AD) did not influence quality of life related to oral health of the assessed patients. The oral health condition of the clinically assessed elderlies was considered bad in both groups and its impact on quality of life was considered small. These findings highlight the likely lack of self-perception about the existence of buccal issues.

Author Contribution

Study concept and design: Miranda, Lia, and Leal. Analysis and interpretation of data: All authors. Drafting of the manuscript: All authors. Critical revision of the manuscript for important intellectual content: All authors. Statistical analysis: Coelho. Evaluation of patients: Miranda. Study supervision: Miranda and Leal.

Conflict of interest: The authors declare that they have no conflict of interest.

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