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Oral health and nutritional status of semi-institutionalized persons with mental retardation in Brazil

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ABSTRACT

Association between oral health status and nutritional status was investigated in 200 semi-institutionalized persons with mental retardation aged 5–53 years, 45.5% female, in the cities of Florianópolis and São José, province of Santa Catarina, Brazil. In this cross-sectional study, clinical-odontological examination revealed a high percentage of individuals (68%) with heavily compromised dentition. The index of decayed, missing and filled deciduous and permanent teeth, which increased from 2.85 ± 2.87 in children to 20.5 ± 6.86 units in adults, was used to classify the individuals' oral health status. Anthropometric evaluation revealed the prevalence of suboptimal nutritional status in 52% of children and adolescents [22% underweight, 30% at risk of overweight or overweight], and in 60% of adults [7% underweight, 53% overweight or obese]. Significant association was found between unsatisfactory oral health status and overweight in children ($\chi^2 = 4.627$; $p = 0.031$). Findings evidenced the existence of a relationship between oral health status and nutritional status in persons with mental retardation.

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In 2001, the World Health Organization (WHO) published a report noting that 10% of the population from developing countries exhibited some type of disability (WHO, 2001). In Brazil, data on prevalence and assistance to this population reveal a prevalence of nearly 24.5 million people with mental and physical disabilities, which corresponds to 14.5% of the Brazilian population (Brazilian

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Institute of Geography and Statistics, 2004). Persons with mental retardation have poorer oral health than the general population (National Institute of Dental and Craniofacial Research, 2008). They require assistance from caregivers, engage in behavior that can adversely affect their oral health (such as lip biting and tongue thrusting), and present oral problems which affect systemic health (Davies, Bedi, & Scully, 2000; Pezzementi & Fisher, 2005). There is also evidence that, among those with an intellectual disability, many dental caries go untreated and extractions are more often used as a means of treatment than in the general population (Balogh, Ouellette-Kuntz, & Hunter, 2004; Stanfield, Scully, Davison, & Porter, 2003). Even though the widespread use of fluoride has dramatically reduced the prevalence of dental caries in many countries (Anderson, 1989; Rajic, Radionov, & Raji-Mestrovic, 2000; Souza, Bastos, & Peres, 2006), in Brazil the prevalence is still high (Antunes, Narvai, & Nugent, 2004; Antunes, Peres, Campos, & Waldman, 2006).

The occurrence of dental caries, one of many diseases which compromise oral health across the lifespan, requires interaction between host, microbiota, diet, and time (Sgan-Cohen, 2005), and involves a dynamic health-disease process (Sgan-Cohen & Mann, 2007). Nutrition issues play an especially important role in this situation, since inadequate dietary habits may contribute to a higher prevalence of caries and influence one's oral health status (Touger-Decker, Mobley, & American Dietetic Association [ADA], 2003, 2007; Touger-Decker, 2004). On the other hand, they may also affect growth and development, influencing the individual's nutritional status (WHO, 2003).

It is our opinion that this interaction should be investigated and understood, and due to lack of epidemiological data relating the prevalence of oral diseases to nutrition aspects in mentally challenged individuals, this study aimed to investigate the association between oral health status and nutritional status in semi-institutionalized persons with mental retardation from two Brazilian southern cities.

1. Method

1.1. Study design

This was a cross-sectional study. Collection of data was carried out over a 3-month period in 2005 at two Associations of People with Physical and Intellectual Disabilities in the cities of Florianópolis and São José, province of Santa Catarina, Brazil's South Region. The protocol was revised and approved by the Institutional Review Board (Ethics Committee of Federal University of Santa Catarina, protocol # 288/2004) and is in accordance with the [World Medical Association's Declaration of Helsinki \(2000\)](#). Variables studied were age, sex, oral health status, and nutritional status. Demographic and socioeconomic data were obtained from the institution's files. According to the purchase power and level of instruction of the family head, individuals were classified as pertaining to A (best condition), B, C, or D class (worse condition) ([Brazilian Association of Research Enterprises, 2003](#)).

1.2. Study population

Study population included all semi-institutionalized individuals (aged 5–53 years) attending Associations of People with Physical and Intellectual Disabilities in the cities of Florianópolis (303 individuals) and São José (124 individuals). Sampling procedure consisted of obtaining signed informed consent from parents or caretakers (95 individuals were not included). Persons with autism and physical disabilities (60 and 72 individuals, respectively) were also not included in sample. Finally, 200 people constituted the study's sample, 139 (69.5%) from Florianópolis and 61 (30.5%) from São José.

1.3. Oral health status evaluation

Clinical-odontological examination under natural light was conducted to detect the presence not only of dental caries (decay), but also of treated (filled) and extracted (missing) teeth as a consequence of caries (WHO, 1997). Codes, criteria, as well as biosafety standards recommended by WHO (1997) were applied, and data obtained were recorded on an odontogram. Oral health status was determined according to the number of decayed, missing and filled primary teeth (dmft index), and the number of decayed, missing and filled permanent teeth (DMFT index) (WHO, 1997).

Oral health of individuals with lightly compromised dentition (low dmft or DMFT scores) was classified as satisfactory, while those with heavily compromised dentition (high dmft or DMFT scores) were classified as having unsatisfactory oral health.

Reliability and validity of data were assessed by the kappa test associating DMFT index evaluations at two different moments ($k = 0.9129$, $p < 0.001$). The significance test revealed that the k value was significantly different from zero, what is recognized as an “optimal” association.

1.3.1. Categorization into age ranges

Participants were stratified into age groups, adapted from criteria proposed by WHO (1997), Brazilian Association of Odontology for Health Promotion (1993), and SB Brazil Project (Ministry of Health, 2004). Groups were divided as follows:

- Group I: 5 – 8 years old: age range of interest regarding oral disease levels in deciduous dentition.
- Group II: 8 – 12 years old: age range selected as control for global caries in children and adolescents.

Children’s oral health status was classified as satisfactory when they were caries-free (DMFT/dmft = 0), or unsatisfactory when they presented caries (DMFT/dmft > 0) (WHO, 1997).

- Group III: 12 – 20 years old: age range which allows follow-up of disease tendencies in adolescence.

Adolescents’ oral health status was classified as satisfactory when they had 100% of teeth in the mouth (Decayed teeth = 0), or unsatisfactory when there was absence of teeth (Decayed teeth > 0) (Brazilian Association of Odontology for Health Promotion, 1993; WHO, 1997).

- Group IV: 20 – years old: this age range is the standard group for oral health evaluation in adults. Classification of oral health status was done based on mean DMFT minus the standard deviation observed in the South region during the last national survey (Ministry of Health, 2004).

Adults’ oral condition was considered satisfactory if DMFT value was under 13, or unsatisfactory when DMFT was above 13 (WHO, 1997).

1.3.2. Fluoride levels

Fluoride concentration values in public supply water in Brazil’s South region must stay between 0.7 and 1.2 mg/L with temperatures varying from 10.0 to 32.5 °C, as established by the Province of Santa Catarina’s Health Agency (Health Agency, 2008).

1.4. Nutritional status evaluation

Anthropometric measurements were carried out according to standard techniques (WHO (1995), by trained personnel. Height and weight were measured with the individual barefoot and lightly dressed. Body weight was measured on a balance-beam platform scale (Marte[®] SM-160 with a portable platform, São Paulo, Brazil) to the nearest 50 g, with the individual standing in the center of the platform with body weight evenly distributed between both feet. Height was measured with a stadiometer (Alturaexata[®], Belo Horizonte, Minas Gerais, Brazil) to the nearest 0.001 m, with individual standing with heels joined together, weight distributed evenly on both feet, and head positioned so that the line of vision is perpendicular to the body. Arms hung freely by the sides, and head, back, buttocks, and heels were in contact with the vertical board. Body mass index (BMI; calculated as kg/m²) was used to classify nutritional status (WHO, 1995).

The nutritional status of adult individuals was classified according to WHO (1998) criteria as follows: underweight (BMI < 18.5 kg/m²), eutrophy (18.5 ≤ BMI < 25 kg/m²), overweight (25 ≤ BMI < 30 kg/m²) and obesity (BMI ≥ 30 kg/m²).

Children and adolescents’ nutritional status was classified according to age- and sex-specific BMI cut-off points: underweight (BMI < 5th percentile), eutrophic (5th ≤ BMI < 85th percentile), at risk for overweight (85th < BMI < 95th percentile), and overweight (≥95th percentile) (National Center for Health Statistic/Centers for Disease Control and Prevention [NCHS/CDC], 2000).

1.5. Statistics

Chi-square test was used to compare nutritional status and oral health status classifications. A significance value of 5% ($p < 0.05$) was adopted. The softwares Microsoft Excel[®], Office XP (Microsoft Corp, Redmond, WA) and Statistical Package for the Social Science[®] (SPSS Inc., 2006, Chicago, IL, USA) for Windows (version 14.0) were employed for data analysis.

2. Results

The age of individuals included in the study varied from 5 to 53 years, 45.5% were female and 54.5% were male. There was a high prevalence of low socioeconomic status, being 50% in class D, followed by 37% in class C and 11% and 2% in classes B and A, respectively.

Clinical examination to assess oral health status revealed an increase in the DMFT index with age (Table 1), with the mean dmft/DMFT index ranging from 2.85 ± 2.87 in Group I (5–8 years) to 20.5 ± 6.86 in Group IV (20+ years). Classification of the oral health status according to dmft and DMFT indexes verified that 68% of the individuals had heavily compromised dentition, and therefore, unsatisfactory oral health (Table 1).

Anthropometric evaluation identified the prevalence of suboptimal nutritional status in 52% of children and adolescents [22% underweight, 15% at risk of overweight, and 15% overweight], and in 60% of the adult population [7% underweight, 24% overweight, and 29% obesity], as observed in Table 2.

Statistically significant association ($p = 0.031$) between unsatisfactory oral health status (heavily compromised dentition) and nutritional status (overweight) was observed only in Groups I and II (Table 3). Statistically significant associations between oral health status and nutritional status were not found in Groups III and IV.

Table 1

Oral health status classified according to the number of decayed, missing and filled deciduous teeth (dmft), and decayed, missing and filled permanent teeth (DMFT) in semi-institutionalized persons with mental retardation in Florianópolis and São José, Brazil 2005.

Group (age range – years)	Oral health status			Total, n (%)
	dmft/DMFT ($X \pm S.D.$)	Satisfactory (lightly compromised dentition), n (%)	Unsatisfactory (heavily compromised dentition), n (%)	
Group I (5–8)	2.85 ± 2.87	DMFT/dmft = 0 12 (19)	DMFT/dmft > 0 15 (11)	27 (13.5)
Group II (8–12)	2.88 ± 2.29	10 (16)	17 (13)	27 (13.5)
Group III (12–20)	5.80 ± 3.76	Missing teeth = 0 17 (26)	Missing teeth > 0 29 (21)	46 (23.0)
Group IV (20+)	20.50 ± 6.86	DMFT up to 13 25 (39)	DMFT > 13 75 (55)	100 (50.0)
Total		64 (32)	136 (68)	200 (100.0)

Table 2

Body mass index (BMI) values, and classification of nutritional status of semi-institutionalized persons with mental retardation in Florianópolis and São José, Brazil 2005.

Nutritional status	Groups I and II (5–12)		Group III (12–20)		Nutritional status	Group IV (20+)	
	n	(%)	n	(%)		n	(%)
Underweight	12	(22)	02	(04)	Underweight	07	(07)
Normal weight	26	(48)	33	(71)	Normal weight	40	(40)
Risk of overweight	08	(15)	05	(12)	Overweight	24	(24)
Overweight	08	(15)	06	(13)	Obesity	29	(29)
Total	54	(100)	46	(100)	Total	100	(100)

Table 3

Distribution of the association values between oral health status and nutritional status of semi-institutionalized persons with mental retardation (Groups I and II) in Florianópolis and São José, Brazil 2005.

Oral health status and nutritional status	χ^2	<i>p</i> value	Association
Oral health status vs. underweight and others	0.067	0.796	No
Oral health status vs. eutrophic and others	1.781	0.182	No
Oral health status vs. risk of overweight and others	0.936	0.333	No
Oral health status vs. overweight and others	4.627	0.031*	Unsatisfactory oral health status was associated with overweight

* ($p < 0.05$) = significant difference.

3. Discussion

The findings presented here evidenced a situation of poor oral health status in a group of persons with mental retardation. Previous research conducted in Brazil had already reported that persons with mental retardation probably do not perform adequate oral hygiene, and that socioeconomic and cultural factors surrounding these individuals may also contribute to poor oral health (Duarte, 2005; Pannuti et al., 2003). International literature regarding the dental health of people with mental retardation has consistently reported more untreated dental disease, more extractions and fewer fillings than in the general population (Balogh et al., 2004; Stanfield et al., 2003; Turner, Sweeney, Kennedy, & Macpherson, 2008). Also, care provided by health centers to persons with mental retardation may be inadequate and limited, due to fragmentation of care and lack of parental guidance as to the need of integral care (Chapman, Scott, & Stanton-Chapman, 2008). People with special needs however, must be submitted to the same level of excellence in dental care healthy people are (Balogh et al., 2004; Hulland & Sigal, 2000).

Assessment of nutritional status in the studied population revealed a high prevalence of inadequate BMI values. It is recognized that persons with mental retardation are more susceptible to overweight than healthy individuals (Jackson & Thorbeck, 1982), and several characteristic aspects of this population have been indicated as possible causes to support this statement, including sedentary lifestyle, lack of nutritional education, inadequate diet, behavioral factors and personality (Fox & Rotatori, 1982; Stancliffe, Haiden, Larson, & Lakin, 2001). Although less common, malnutrition can also be observed among intellectually challenged people (Bukart, Fox, & Rotatori, 1985; Hove, 2004).

Food preferences and food intake, for obvious reasons, are also important in the determination of one's nutritional status, and are affected by socioeconomic condition (Moynhan & Bradbury, 2001; Papas, Palmer, Rounds, & Russel, 1998). As already mentioned, a great number of the studied individuals were of low socioeconomic level. Indeed, a peculiar situation observed in Brazil is the low purchasing power of persons with mental retardation, what could lead to the purchase of inadequate foods, dietary monotony and, to some extent, an altered nutritional status (Duarte, 2005).

In Groups I and II (5–12 years old), although a tendency towards overweight could be observed, the highest prevalence of underweight among the studied groups was found. In their study conducted in Spain with 128 children with mental retardation, Sánchez-Lastres, Eiris-Punal, Otero-Cepeda, Pavón-Belinchón, and Castro-Gago (2003) also found a high prevalence of malnutrition (33%). A longitudinal study conducted in the U.S. in 1982 by Jackson and Thorbeche concluded, however, that persons with mental retardation were more susceptible to develop obesity than people without mental disorders. This is in concordance with results obtained in Groups III and IV, where low prevalences of underweight were observed and high prevalences of overweight and obesity were found. In 2002, Raulino and Barros analyzed the prevalence of obesity in 91 persons aged 14–44 years with mental retardation in Brasília, Brazil. The prevalence for his population was 18%, while data from the general population revealed a prevalence of 8.3%.

The causes of obesity in persons with mental retardation are not fully understood. However, it has been increasingly observed in the general population. Studies conducted with healthy schoolchildren

indicate a fast increase in overweight and obesity levels (Dehghan, Akhtar-Danesh, & Merchant, 2005; Pinheiro, Freitas, & Corso, 2004), including the ones conducted in Santa Catarina, Brazil (Assis et al., 2005). According to the World Health Organization (1998), overweight and obesity currently constitute the main nutritional disorders with increasing prevalence in the world, with pandemic potential. These problems seem to be associated with new lifestyles, such as the current dietary habits and insufficient physical activity.

A few investigations conducted with American and European persons with mental retardation addressed body composition issues (Cronk et al., 1988; Fox & Rotatori, 1982). To our knowledge, such investigations in the Brazilian context are inexistent. This fact reveals the importance of future studies in order to characterize the nutritional status and problems that may be brought by sedentary lifestyle and obesity to these individuals.

Another relevant finding of this study was the analysis of the relationship between oral health status and nutritional status, which revealed statistically significant association between unsatisfactory oral health status and overweight in children. Similar findings were also reported in a study by Hong, Ahmed, McCuniff, Overman, and Mathew (2008) with 1507 children aged 2–6 years. Their study compared caries experience and body mass index (BMI) categories stratified by age and race characteristics, and found statistically significant association between caries and obesity only for the 60–72-month age group. Macek and Mitola (2006) hypothesized that age-specific BMI would be associated with increased dental caries prevalence and severity, but these associations were not found in their study which evaluated body measures data and oral health data from the 1999–2002 National Health and Nutrition Examination Survey in children 2–17 years old. Rather, overweight was found to be associated with lower geometric mean DMFT. Future studies should address which factors specific to overweight in children might be protective against dental caries in the permanent dentition.

There is a real need for integration between nutrition and dentistry fields in health promotion to enhance and maintain adequate nutrition for persons with mental retardation. Recognition and treatment of oral and nutritional problems are important aspects to improve the health status and quality of life of these individuals. Transversal studies, however, must be carefully considered when attributing nutrition changes to cause-effect phenomena. Prospective epidemiological studies must be conducted in order to elucidate this issue.

In summary, based on our results, it is possible to conclude that there is a relationship between the oral health status and the nutritional status of persons with mental retardation. The unsatisfactory oral health status presented statistically significant association with being overweight in the children studied.

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