



Assessment of oral hygiene in mentally disabled children

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Abstract

Objective: To identify factors associated with the quality of oral hygiene in children with mental disabilities.

Methods: A cross-sectional study was conducted with a sample of 181 mentally disabled children aged three to 12 years and their mothers. The study was conducted in two public hospitals of medical care for special children in the city of Rio de Janeiro, southeastern Brazil. The children were examined on the quality of oral hygiene and presence of caries lesions. The examiner was previously calibrated and were obtained kappa values of 0.90 to 0.87 for tooth decay and oral hygiene. The mothers answered a questionnaire addressing individual characteristics, behavioral and medical history of children. The study was approved by the Ethics Committee of UFMG. Data were analyzed using the chi-square test and multivariate logistic regression, considered to be a significant 90.0%.

Results: Most of the children had mild intellectual disability (56.4%) and 43.6% had moderate mental disability. The quality of oral hygiene was considered adequate in 84.0% of children. A total of 172 mothers said that her son's teeth were brushed daily (95.0%). Among them, the majority reported difficulties in this task (53.0%). Those children diagnosed with mild intellectual disability {OR=2.82 [90% CI (1.15 to 6.86)]} and the absence of decay {OR=7.68 [90% CI (3.03 to 19.45)]} were more likely they belong to the group of children identified with an adequate oral hygiene.

Conclusion: The quality of oral hygiene was associated with tooth decay and the degree of mental disability of children.

Key words: Oral hygiene; Mentally disabled persons; Disabled persons; Disabled children; Mother-child relations

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Avaliação da higiene bucal de crianças com deficiência mental

Resumo

Objetivo: Identificar os fatores associados à qualidade da higiene bucal em crianças com deficiência mental.

Métodos: Foi realizado um estudo transversal com uma amostra de 181 crianças com deficiência mental na faixa etária de três a 12 anos e suas mães. O estudo foi conduzido em duas unidades públicas de atendimento médico para crianças especiais na cidade do Rio de Janeiro, sudeste do Brasil. As crianças foram examinadas quanto à qualidade da higiene bucal e à presença de lesão de cárie dentária. A examinadora foi previamente calibrada e foram obtidos valores kappa de 0,90 para cárie dentária e 0,87 para a higiene bucal. As mães responderam um questionário abordando as características individuais, comportamentais e história médica das crianças. Este estudo foi aprovado pelo Comitê de Ética em Pesquisa da UFMG. Os dados foram analisados por meio do teste Qui-Quadrado e Regressão logística multivariada, considerado-se uma significância de 90,0%.

Resultados: A maioria das crianças possuía deficiência mental leve (56,4%) e 43,6% tinham deficiência mental moderada. A qualidade da higiene bucal foi considerada adequada em 84,0% das crianças. Um total de 172 mães afirmou que os dentes do filho eram escovados diariamente (95,0%). Dentre elas, a maioria relatou dificuldades nesta tarefa (53,0%). Aquelas crianças diagnosticadas com deficiência mental leve {OR=2,82[90% IC (1,15-6,86)]} e ausência de cárie {OR=7,68 [90% IC (3,03-19,45)]} apresentaram maior chance de pertencerem ao grupo de crianças identificadas com uma higiene bucal adequada.

Conclusão: A qualidade da higiene bucal foi associada com a cárie dentária e com o grau de deficiência mental das crianças.

Palavras-chave: Higiene bucal; Pessoas com deficiência mental; Pessoas com deficiência; Crianças com deficiência; Relações mãe-filho

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Introduction

The development of caries and periodontal disease is no different in children with disability and those without disability. The main factor in relation to the prevalence of these diseases in mentally disabled children is the inadequate removal of dental plaque normally found in this population group [1-3].

The removal of dental plaque is a skill that can be mastered only when an individual has the dexterity to use a toothbrush. The brushing of teeth often requires effective movements [2]. However, the physical and mental limitations present in many mentally disabled individuals make the efficient brushing or flossing of teeth difficult or impossible [1-4]. According to the authors, the difficulties in performing this task are associated with alterations in intraoral sensibility, unwanted and/or involuntary physical movements, oral pathological reflexes and spasticity in masticatory muscles, residual food and a lack of awareness of the objective of the activity.

As a result, in many cases, care of the oral cavity of the mentally disabled child is the responsibility of a caregiver or family member [5-6]. However, the daily brushing of teeth is still seen as low priority compared with the other personal care tasks of those responsible for children with mental disability [2-3,7].

Therefore, the aim of the present study was to identify factors associated with the oral hygiene of children with mild and moderate mental disability.

Methods

Data was collected by means of a questionnaire administered in interview form to mothers, and a clinical examination of oral hygiene and dental caries in children with mild and moderate mental disability. The Human Research Ethics Committee of the Federal University of Minas Gerais approved the study (process n^o ETIC n.04570203000-09).

Sampling

A cross-sectional study was carried out of 181 mothers and children with mild and moderate mental disability aged between three and 12 years from the pediatric care units of two institutions for individuals with special

needs in Rio de Janeiro, in the southeast of Brazil. Locations was chosen in order to gather a convenience, or in other words non-random, sample. Individuals who form part of a non-random sample are selected by a value judgment and not by questions of statistical randomness, and such groups are therefore comprised of more accessible individuals [8].

Possible participants were invited to take part in the study while waiting for appointments in the abovementioned institutions. An explanation of the study, together with term of informed consent, was provided individually to mothers. Those that agreed to participate were invited into a consulting room to complete the questionnaire and for an oral examination of the child to be carried out.

The instruments

The questionnaire addressed aspects related to age (mother/child), gender, oral hygiene habits and maternal education. Information about the type of mental disability was obtained from the medical records of the child. The results of the examination of the child were recorded using a clinical record [9].

The Simplified Oral Hygiene Index (OHI-S) was used to evaluate oral hygiene [10-12]. For index classification, each surface received a code from zero to three for plaque and dental calculus. In cases of deciduous dentition (where there was an absence of incisors and permanent molars), the deciduous incisor and the second deciduous molar were evaluated [11]. The final result of the OHI-S was obtained from the sum of the codes of the teeth divided by the total number of teeth examined (Table 1). When identified as "satisfactory" or "regular", oral hygiene was considered "adequate" and when diagnosed as "deficient" or "poor" it was classified as "inadequate".

The criteria for diagnosis of carious lesions were based on World Health Organization [13] recommendations: 1) healthy crown (no evidence of carious lesion either treated or otherwise); 2) healthy crown (presence of carious lesion in a fôssula/fissure or a smooth dental surface).

The clinical exam of each child took place after the completion of the questionnaire by the mother. It was performed under artificial illumination (Petzl Zoom head lamp, Petzl America[®], Clearfield, UT, USA) and an appropriate individual cross infection protection equipment

Table 1. Diagnostic criteria and codes used in OHI-S.

Dental plaque criteria	Code	Dental calculus criteria	Code
Absence of dental plaque	0	Absence of dental calculus	0
Little dental plaque, less than 1/3 of dental surface covered	1	Little dental calculus, less than 1/3 of dental surface covered	1
Dental plaque covering more than 1/3 and less than 2/3 of dental surface	2	Dental calculus covering more than 1/3 and less than 2/3 of dental surface	2
Dental plaque covering more than 2/3 of dental surface	3	Dental calculus covering more than 2/3 of dental surface	3
Tooth index and substitute absent	X	Tooth index and substitute absent	X

1) 0 to 1 (Satisfactory); 2) 1.1 to 2 (Regular); 3) 2.1 to 3 (Deficient); 4) >3.1 (Poor).

had been used by the examiner. Disposable mouth mirrors (PRISMA[®], São Paulo, Brazil) and gauze were packed and sterilized in sufficient quantities for each day of work. The exams were conducted by a researcher (ACO). Calibration and a pilot study were carried out prior to the main study.

This calibration included a theoretical discussion regarding the diagnosis of dental caries, training with slides and the clinical exam of the participants [13-14]. To determine intraexaminer agreement, 25 children mentally disabled were examined and reexamined after a 10-day interval. These individuals were from a nongovernmental organization that offers care to handicapped children in the city of Rio de Janeiro, and did not participate in the main study. Intraexaminer diagnostic agreement was considered very good. The following kappa values were achieved: 0.90 for caries, and 0.87 for OHI-S [14].

The pilot study was then carried out with 20 pairs of mothers and children with mental disability treated at a maternal/children's hospital in Rio de Janeiro. These individuals also did not participate in the main study. This step aimed to test the method and data collection instruments, confirming the validity of the methodology.

Data analysis

The data was analyzed using the Statistical Package for Social Sciences (SPSS for Windows, version 18.0, SPSS Inc, Chicago, IL, USA). Univariate analysis was carried out first. The chi-square test was used to determine the relationships between the dependent variable (oral hygiene) and the independent variables (type of disability, age, sex, age and education of the mother, mother's habit of brushing the teeth of the child) ($p < 0.10$). Multiple logistic regression analysis was carried out to identify the independent impact of each variable. The independent variables were included in a decreasing logistic model in accordance with their statistical significance ($P < 0.25$; backward stepwise procedure) or clinical-epidemiological importance [15].

Results

The sample included 181 mothers and children with mental disability. Of these 56.4% were diagnosed with mild mental disability ($n=102$) and 43.6% with moderate mental disability ($n=79$). The average age was 6.2 years (± 3.0) for the children, and 36.4 years (± 9.3) for the mothers. The majority of children were boys (54.7% / $n=99$). Approximately 53.0% of the mothers reported having eight years or more of schooling.

Oral hygiene was considered adequate in 84.0% of the children examined ($n=152$) and inadequate in 16.0% of cases ($n=29$). Most mothers stated that they brushed the teeth of their child on a daily basis (95.0% / $n=172$). A total of 96 mothers said that they had difficulties in performing this task (53.0%). Figure 1 shows that the majority of mothers stated that the difficulty has been caused by the child not allowed to open his mouth (73.0%).

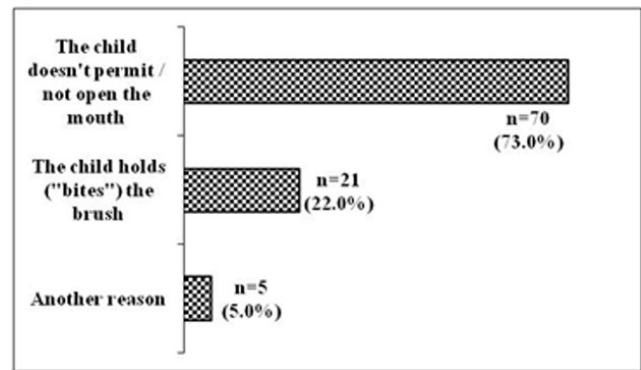


Figure 1. Percentage distribution of mothers in relation to motives justifying difficulty in brushing the teeth of mentally handicapped child ($n=96$).

Bivariate analysis showed a statistical association between oral hygiene and the type of mental disability of the child ($p < 0.07$). The majority of children with mild mental disability had adequate oral hygiene (88.2%). A significant association was also found between the oral hygiene of mentally disabled children and the prevalence of dental caries ($p < 0.001$) (Table 2). Among children without caries, the great majority had adequate oral hygiene (92.5%).

Table 3 shows results obtained through multiple regression logistic analysis. Following adjustment of the stepwise backward model, the following variables were found to be associated with oral hygiene: type of mental disability (mild) and dental caries (absence). Children with mild mental disability had a 2.8 times greater chance of having adequate oral hygiene. Those children without dental caries had a 7.6 times greater chance of having adequate oral hygiene.

Discussion

Undoubtedly, the control of dental plaque in individuals with mental disability and motor limitations is a major discussion point, and requires considerable dedication on the part of caregivers and family members to provide assistance with, or carry out, dental hygiene tasks for such individuals.

The term disabled should not be considered to mean an incapability to improve dental health. The importance of measures to reduce plaque accumulation and dental caries, as well as to conserve and preserve tooth structure, is undeniable. This data can be used to better understand the status of oral hygiene in this population group, and to develop preventive programs for individuals at risk, such as teaching the necessity of controlling dental plaque, encouraging the habit of brushing teeth, use of toothpastes and dental floss. As the result of being required to deal with a variety of medical problems that generally involve mentally disabled children, many parents with such a child tend to overlook questions related to the prevention of dental disease in these individuals.

Table 2. Distribution of the sample according the oral hygiene of mentally handicapped child and associated factors (n=181).

Independents Variables	Oral Hygiene				P value	Odds rattoo crude (CI)
	Adequate n (%)	Inadequate n (%)	Total n (100.0%)			
CHILDREN						
Mental disability						
Mild	90 (88.2)	12 (11.8)	102	0.07*	2.05 (0.91-4.60)	
Moderate	62 (78.5)	17 (21.5)	79			
Age (years)						
3-6	89 (85.6)	15 (14.4)	104	0.49	1.31 (0.59-2.92)	
7-12	63 (81.8)	14 (18.2)	77			
Sex						
Male	85 (85.9)	14 (14.1)	99	0.44	1.35 (0.61-3.01)	
Female	67 (81.7)	15 (18.3)	82			
Dental caries						
Absent	111 (92.5)	9 (7.5)	120	< 0.001*	6.01 (2.53-14.28)	
Present	41 (67.2)	20 (32.8)	61			
MOTHERS						
Age (years)						
36 or more	82 (85.4)	14 (14.6)	96	0.57	1.25 (0.56-2.78)	
< 36	70 (82.4)	15 (17.6)	85			
Education (years)						
8 or more	84 (86.6)	13 (13.4)	97	0.30	1.52 (0.68-3.37)	
< 8	68 (81.0)	16 (19.0)	84			
Habit of brushing the teeth of the child						
Present	145 (84.3)	27 (15.7)	172	0.63	1.53 (0.30-7.78)	
Absent	7 (77.8)	2 (22.2)	9			

CI: confidence intervals.

* Chi-square test (p<0.10).

Table 3. Multiple logistic regression models explaining the oral hygiene of mentally handicapped child (n=181).

Independents Variables	P value*	Odds ratio adjusted	CI
Model A (Enter)			
Mental disability (Mild)	0.02	3.33	1.19-9.27
Age (3-6 years)	0.21	1.82	0.70-4.70
Mother's habit of brushing the teeth of the child (Present)	0.18	3.55	0.53-23.56
Maternal education (8 years or more)	0.94	1.03	0.40-2.62
Age of mothers (36 years or more)	0.94	1.03	0.37-2.83
Dental caries (Absence)	0.00	7.77	2.99-20.14
Model B (Backward Stepwise)			
Mental disability (Mild)	0.02	2.82	1.15-6.86
Dental caries (Absence)	0.00	7.68	3.03-19.45

CI: confidence intervals.

* 10% significance level.

Most children with mental disabilities have physical difficulties in performing activities of daily living, such as bathing, dressing, brushing teeth, eating and ambulation. The presence of inadequate oral hygiene in many individuals with mental disabilities can be partially explained by limited personal skills or technical difficulties, such as an inability to perform correct movements with a toothbrush [5]. According Subasi et al. [16], the efficient brushing of teeth requires

coordinated muscular movements and motor strength of the upper extremities.

The data shows that, even with adaptative difficulties and a dependence on others for regular brushing to be performed, the majority of mentally disabled children had adequate oral hygiene. This may be attributed to the fact that the great majority of these children relied on the help of their mothers during the brushing of teeth. Similar results were

obtained in a study carried out in Nigeria by Oredugba [5]. Those children aged between 6 and 10 years with Down syndrome (DS) and those without DS had improved oral hygiene, without there being any difference between the groups. According to the author, this may be due to the assistance and monitoring of brushing by parents/guardians. In the group comprising older individuals (age range from 11 to 20 years), it is probable that parent/guardian supervision is reduced, resulting in poorer oral hygiene developing with age. A study implemented in Hong Kong with 72 preschool children with cerebral palsy and 72 preschool children from preschools as the control group, found that the gingival health of the children with cerebral palsy was poorer than that of children from preschools [17]. According to the authors, this may be related to the poor neuromuscular control of children, preventing them from being able to maintain good oral hygiene (especially for older children).

The high number of mothers that brushed the teeth of their child on a daily basis (95.0%) confirmed the habit of parents/guardians in carrying out daily oral hygiene of their children [5]. Parents/guardians have an important role in the health-care habits of children and adolescents with mental disability [16]. Oredugba [5] found that levels of oral hygiene are higher when parents are responsible for the brushing of the teeth of their child. However, dental health declines over time. A number of authors identified the role of the mother in the care of the child.

The mother is central to the care of a disabled child, being responsible for the prevention of oral disease in the child, particularly with reference to dietary habits and oral hygiene [6,16,18]. A study implemented in Turkey with 35 children with cerebral palsy and their mothers found that most of the mothers of children with cerebral palsy were not aware of the importance of oral hygiene both for themselves and for their children [16]. The direct participation of the mother is often necessary and sometimes irreplaceable, particularly in the case of a child who is totally dependent on his or her mother for activities of daily living [6].

As expected, the majority of mothers related difficulty in carrying out the brushing of the teeth of their child (53.0%), with the main difficulty being that the child would not allow his or her mouth to be opened. This most likely occurs as a result of the lack of comprehension of the child of the necessity of the activity, given the young age of the majority of the population examined, and the fact that they are mentally disabled. Additionally, many mothers or caregivers are not advised of the best method and approach to use in caring for the oral hygiene of a mentally disabled child, such as the best position in which to place the child at the time of oral hygiene.

It is also important to be sure that the family or caregiver of mentally disabled individuals is educated in proper home care. Good home care is important for the prevention of oral disease in mentally disabled individuals, especially carious and periodontal diseases. This can be difficult to achieve due to intellectual impairment and decreased manual dexterity. The use of dental floss may be difficult, and instruction in

the use of a floss holder may be helpful. The appearance of new mechanical tooth brushing and flossing in the market may also be useful. According to Pilcher the parents/guardians must be aware of the importance of proper daily home care as mentally handicapped children may be resistant to oral hygiene [19].

As with bivariate analysis, oral hygiene was strongly associated with the type of mental disability and dental caries using the multivariate model. Those children with mild mental disability who were free of dental caries had a greater chance of having adequate oral hygiene. It is probable that the fact that the type of mental disability of the children investigated is associated with oral hygiene is related to the manual dexterity and conscience of the child in relation to the brushing of teeth. Normally those children with mild mental disability who require the assistance of their mothers for the removal of dental plaque are better behaved and more cooperative during the activity. Similar results were found in India [20]. According to the authors, Intelligence Quotient (IQ) level influenced the quality of oral hygiene of 171 mentally disabled children and adolescents.

While dental caries is a multi-factorial disease, it is known that the illness is strongly associated with the quantity of dental plaque accumulated in the oral cavity, as confirmed by a number of authors [1-3]. A study developed in Turkey with 136 children and young people with disabilities showed that, in every 3 individuals examined, there was a marked accumulation of dental plaque, as dental caries are strongly associated with poor oral hygiene [21]. According to the authors, the frequency of dental caries among these individuals was 84.6%.

Oral hygiene is still seen as a low priority for caregivers of disabled individuals, compared with other necessary personal care [6]. As a result, effective interaction between different areas of institutionalized care is essential. With better communication and exchange of information between health care professionals, the mentally disabled child will be observed from an overall perspective, which will contribute greatly to his or her development and well-being.

All health professionals involved in the care of a mentally disabled child should share responsibility for the prevention of oral disease. Many disabled children spend a great deal of time in health care institutions, where they receive pedagogical, rehabilitative, medical and dental care. Therefore, the professionals that operate in these institutions have considerable degrees of interaction and coexistence with the children and their relatives/guardians, making a holistic, care-orientated approach to the individual essential.

The present study has some limitations that must be recognized. A weakness of cross-sectional studies is the difficulty in establishing causal relationships from a cross-section over time [22]. Moreover, oral hygiene habits were obtained from the reports of the mothers; as the data was not collected directly, it is subject to information and memory bias. Caution should be taken in order not to influence the respondents, and avoid bias when interpreting the results [23]. Since dental caries were diagnosed by visual

exam alone, the prevalence of interproximal caries may be underestimated. However, the use of the WHO criteria for the diagnosis of caries without X-rays made it possible to obtain a sample with an epidemiological nature, while avoiding the use of complex, costly exams. In Brazil, it is difficult to obtain a representative sample of mentally disabled individuals as there is no governmental database that registers all these individuals. Therefore, the choice was made to use a convenience sample to identify important aspects related to the oral hygiene of this population [22]. Although the children were classified according to type of mental disability (mild/moderate), the degree of motor impairment in each child was not considered in the study as this information was not registered in medical reports.

The mentally disabled children had various degrees of dependence on their parents and caregivers for the performance of oral hygiene tasks. Those responsible should teach, where possible, the child to brush his or her own teeth, at the child's own pace, with patience, tolerance and a willingness to repeat the process many times. This task, even though difficult, is useful as it makes the individual more independent. However, for dependent and partially dependent individuals, the caregiver is required to perform tasks related to oral health, as the child is unable to brush his or her teeth alone.

In summary, the results of this study support the hypothesis that the individuals with mental disability and those without dental caries are more likely to have adequate oral hygiene. The important association found between the variables suggests that further studies are needed to investigate common factors between these conditions. Such knowledge could enable the creation of common preventive actions, thereby reducing the cost and increasing the effectiveness of oral health care programs for this population group.

Conclusion

Most children with mental disabilities were identified with an adequate oral hygiene. The quality of oral hygiene was associated with the absence of dental caries and with the degree of mental deficiency of children.

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