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Drawanz Hartwig, Andréia; Moreira Ferreira, Lydia; dos Santos Costa, Francine; Gonzalez Cademartori, Mariana; Leão Goettems, Marília; Rocha Schardosim, Lisandrea

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Original Article

Experience of Dental Caries and Use of Continuous Medication in Children with Neuropsychomotor Disorders

Andréia Drawanz Hartwig[1], Lydia Moreira Ferreira[2], Francine dos Santos Costa[1], Mariana Gonzalez Cademartori[1], Marília Leão Goettems[3], Lisandrea Rocha Schardosim[3]

[1]PhD Student, Federal University of Pelotas, Pelotas, RS, Brazil.
[2]Graduate Program in Dentistry, Federal University of Pelotas, Pelotas, RS, Brazil.
[3]Professor, Federal University of Pelotas, Pelotas, RS, Brazil.

Author to whom correspondence should be addressed: Lisandrea Rocha Schardosim, Rua Gonçalves Chaves, n° 457, Centro, Pelotas, RS, Brasil. 96015-560. Phone: (53)3222-6690, Ramal 124. E-mail: lisandrears@hotmail.com.

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Abstract

Objective: To identify the relation between the use of continuous medication by children with neuropsychomotor disorders and the development of the dental caries disease. **Material and Methods:** The data were obtained from medical and dental records of children, who were assisted in an extension project of the Dentistry School of the Federal University of Pelotas. Socio-economic variables, the disability diagnosis, the type and frequency of the continuous medication, and the dental caries experience registered in the dental record were collected. The data were evaluated by double typing, analyzed by descriptive statistics, and the associations were tested by the Qui-squared, Fisher exact, Mann-Whitney, and Kruskal-Wallis tests. The Stata Statistical Software, version 12.0, was utilized considering the level of significance of 5%. **Results:** 119 records were evaluated, and the results were distributed by age bracket due to the high age range. Undoubtedly, the cerebral palsy was the most prevalent (33.9%). From the total of the children, 68.8% were using continuous medication, and the majority (56%) uses medication there are more than 24 months. The anticonvulsants were the most used medications (33.8%), and 96.5% of the children used medication during the nocturnal period. Half of the utilized medications presented sucrose in its composition. **Conclusion:** A statistically significant association between the use of continuous medication, containing sucrose, and the dental caries experience were not observed, what suggests that other risk factors contribute to the disease installation.

Keywords: Dental caries; People with disability; Oral hygiene.

Introduction

The society has been preparing itself overtime to qualify the assistance of individual with special needs. According to the last official input of Brazil, about 23.9% of the Brazilian population (45.6 million people) present some form of visual, auditory, motor, or mental disability, and this condition, when evaluated by age-group, affects 7.5% of the children aging from 0-14 years old [1]. The children with special needs are, in their majority, dependent of their caretakers to accomplish their daily life activities. Concerning to oral health, this tends to interfere directly in the oral hygiene conditions, either due to difficulties related to the procedures, by the lack of capacitation of the caretakers, and by the lack or insufficiency in the instructions of professionals in the dental field [2].

Oral diseases, as dental caries and periodontal disease, can become present in face of the lack of appropriated care with the oral hygiene [3]. Beyond that, the dental caries is considered a public health problem that can be strongly associated to a negative impact in the life quality of the child [4]. Studies have showed that the occurrence of the dental caries disease in patients with special needs (SNP) assumes significance [5], and that its prevalence can vary from 26.3% to 96.4% [6,7], according to the area and population studied, where this variability in the prevalence of the disease can happen due to the studies methodological variation. Beyond that, the high prevalence can be associated to specific factors as the socio-economic condition, limitation caused by the disability, difficulty of the caretakers in the performance and maintenance of the oral hygiene, frequent and regular consume of food high in sucrose, and use of continuous medication [8,9].

Individuals with neuropsychomotor disorders use medications as anticonvulsants and antispasmodics, antipsychotics, antidepressants and antiepileptics, during long periods [10]. The literature reports that the use of medications in a continuous way can imply in systemic alterations that generate oral manifestations, as gingival hyperplasia, stomatitis, xerostomia, and pigmentations; and many other drugs used also present sucrose in its formulation, increasing the risk to the development of the dental caries disease [11]. Knowing that individuals with special needs are susceptible to develop dental caries disease, this study had as its aim to identify the relation between the use of continuous medication by children with neuropsychomotor disorders and the dental caries disease.

Material and Methods

This transversal study was approved by the Ethics Committee in Research of the Dentistry School of the Federal University of Pelotas (FO/UFPEL) under the protocol number 143/2010.

The data were obtained from medical and dental records of children with neuropsychomotor disorders aging until 12 years old, assisted in the Extension Project named "Welcoming Special Smiles", from the FO/UFPEL, between March 2006 and December 2011. The project consists in dental clinic assistance and preventive activities performed by undergraduate and postgraduate students, in the Children's Clinic at the FO/UFPEL and at the dental office of a Rehabilitation

Center in the city of Pelotas (RS). The children, who did not have at least one erupted tooth, as well as records with absence of relevant information to the study, were excluded.

Previously to the collection of the data, it was performed a pilot study with 15 medical and dental records, with the purpose of adapt the collection form. From the dental record were collected the socio-economic variables (family income and maternal level of education), diagnosis of the disability, type and frequency of continuous medication, and dental caries experience. The dmft and DMFT index values were collected from the last odontogram registered in the record, according to the criteria of the World Health Organization [12]. The presence of white spot lesion in the dental caries was collected from the register taken in the dental record. The consultation on the medical record was performed to confirm the disability diagnosis and the medication period of use. The presence of sucrose in the medication was determined after consulting the medication leaflet and the Dictionary of Pharmaceutical Specialties [13].

In order to obtain the dental caries dichotomous variable experience (present/absent), the carious/obturated components with higher values than zero, and the presence of dental caries white spot lesion were considered. The dmft index was added to the DMFT index in children with mixed-dentition to calculate the dmft / DMFT. Aiming to evaluate the effect of the continuous medication use with the occurrence of dental caries, children who used the medication for more than 6 months were evaluated.

The data were evaluated by double typing, analyzed by descriptive statistics, and the associations were tested by the Qui-squared, Fisher Exact, Mann-Whitney, and Kruskal-Wallis tests. The Stata Statistical Software, version 12.0, was utilized considering the level of significance of 5%. The results were distributed by age bracket due to the high age range.

Results

From the 173 SNP assisted by the Extension Project during the evaluation period, 119 fulfill the criteria of inclusion in this study. The sample characterization is presented in Table 1. Undoubtedly, the cerebral palsy was the most prevalent (33.9%), followed by Down syndrome (26.3%), and the intellectual disability (10.2%). Twenty-nine children (29.6%) presented other disabilities, as well as West syndrome, Williams syndrome, autism, and cerebral atrophy.

Also in Table 1 it is possible to observe the sample distribution by age bracket, according to the continuous medication use. From the total of children, 68.8% were using continuous medication, and their majority (56%) was using medication for more than 24 months. The anticonvulsants were the most used medication (33.8%) and almost every child was using medication during the nocturnal period. Half (50%) of the used medications presented sucrose in their composition. A statistically significant association between the use of continuous medication, containing sucrose, and the dental caries experience was not observed (p=0.291).

Table 1. Sample distribution according to sociodemographic characteristics, disability and use of continuous medication. Pelotas, RS, Brazil, 2012.

Variables	Age			
	7 months a 3 years n (%)	3 a 5years n (%)	5 a 12 years n (%)	total n (%)
Sex (n=119)	31 (26.1)	25 (21.0)	63 (52.9)	119 (100.0)
Male	16 (23.9)	11 (16.4)	40 (59.7)	67 (56.3)
Female	15 (28.9)	14 (26.9)	23 (44.2)	52 (43.7)
Monthly Familial Income (n=119)	22 (27.5)	21 (26.2)	37 (46.3)	80* (100.0)
Up to 1.499 R$	17 (24.3)	18 (26.7)	35 (50.0)	70 (87.5)
More than 1.500 R$	5 (50.0)	3 (30.0)	2 (20.0)	10 (12.5)
Familial Structure (n=119)	31 (27.0)	23 (20.0)	61 (53.0)	115* (100.0)
Nuclear	19 (28.3)	14 (21.0)	34 (50.7)	67 (58.3)
Reconstituted	-	-	4 (100.0)	4 (3.5)
Only one responsible	9 (24.3)	8 (21.6)	20 (54.1)	37 (32.2)
Others	3 (42.9)	1 (14.2)	3 (42.9)	7 (6.0)
Caregiver Education (n=119)	23 (26.7)	19 (22.1)	44 (51.2)	86* (100.0)
Elementary School	9 (19.6)	4 (18.7)	33 (71.7)	46 (53.5)
High school	6 (27.3)	10 (45.4)	6 (27.3)	22 (25.5)
Higher education	8 (44.4)	5 (27.8)	5 (27.8)	18 (21.0)
Disability (n=119)	30 (25.4)	25 (21.2)	63 (53.4)	118* (100.0)
Cerebral palsy	10 (15.0)	12 (30.0)	18 (45.0)	40 (33.9)
Down's Syndrome	9 (29.0)	4 (12.9)	18 (58.1)	31 (26.3)
Intellectual disability	-	-	12 (100.0)	12 (10.2)
Multiple	1 (16.7)	3 (50.0)	2 (33.3)	6 (5.0)
Medication Use (n=119)	28 (25.0)	25 (22.3)	59 (52.7)	112* (100.0)
Yes	19 (24.7)	18 (23.4)	40 (51.9)	77 (68.8)
No	9 (25.7)	7 (20.0)	19 (54.3)	35 (31.3)
How long does the medication (n=77)	13 (26.0)	11 (22.0)	26 (52.0)	50* (100.0)
From 0 to 6 months	3 (42.9)	1 (14.3)	3 (42.9)	7 (14.0)
6 to 12 months	3 (60.0)	1 (20.0)	1 (20.0)	5 (10.0)
12 to 24 months	4 (40.0)	3 (30.0)	3 (30.0)	10 (20.0)
More than 24 months	3 (10.7)	6 (21.4)	19 (67.9)	28 (56.0)
Medication type used (n=77)	19 (24.7)	18 (23.4)	40 (51.9)	77 (100.0)
Anticonvulsant	9 (34.6)	10 (38.5)	7 (26.9)	26 (33.8)
Diuretic	3 (100.0)	-	-	3 (3.9)
Muscle relaxant	-	1 (50.0)	1 (50.0)	2 (2.6)
Neuroleptic	1 (12.5)	-	7 (87.5)	8 (10.4)
Combination of drugs	6 (18.2)	5 (151)	22 (66.7)	33 (4.,9)
Others	-	2 (40.0)	3 (60.0)	5 (6.4)
Nigth Medication (n=77)	18 (31.6)	13 (22.8)	26 (45,6)	57 (100,0)
Yes	18 (32.7)	12 (21.8)	25 (45,5)	55 (96,5)
No	-	2 (100.0)	-	2 (3,5)
Use of medication with sucrose (n=77)	18 (24.3)	17 (23.0)	39 (52,7)	74 (100,0)
Yes	8 (21.6)	5 (13.5)	24 (64,9)	37 (50,0)
No	10 (27.0)	12 (32.4)	15 (40,6)	37 (50,0)

* There was loss of information

The distribution of the studied variables according to the dental caries experience and the dmft/DMFT, the standard deviation, and the maximum and minimum value are described in table 2. It was observed that there is statistically significant association between the positive experience of

dental caries and the family income of less than 1,500 real (p=0.037), and between dmft/DMFT average and low education of the caretaker (p=0.05).

Table 2. Association between independent variables and caries experience, dmft / DMFT, standard deviation, maximum and minimum values. Pelotas, RS, Brazil, 2012.

Variables	Present n (%)	p-value	Caries experience dmft/DMFT [a,b]	p-value	Sd	Min.	Max.
Monthly Familial Income	51 (63.8)	**0.037**[d]		0.291[f]			
Up to 1.499 R$	48 (94.1)		3.27		4.15	0	18
More than a 1.500 R$	3 (5.9)		1.50		1.85	0	5
Caregiver Education	54 (62.7)	0.318[c]		**0.050**[f]			
Elementary School	32 (59.3)		3.89		4.56	0	18
High school	13 (24.1)		2.36		3.21	0	10
Higher education	9 (16.6)		1.83		2.54	0	8
Medication Use	75 (70.0)	0.291[c]		0.686[e]			
Yes	54 (72.0)		3.33		4.26	0	20
No	21 (28.0)		3,00		4.05	0	18
How long does the medication	43 (86.0)	0.311[d]		0.293[f]			
From 0 to 6 months	2 (40.0)		2.0		2.82	0	6
6 to 12 months	4 (40.0)		2.1		3.98	0	11
12 to 24 months	18 (64.3)		3.92		4.80	0	20
Medication type used	54 (70.1)	0.549[d]		0.293[f]			
Anticonvulsant	16 (29.6)		1.80		2.80	0	11
Diuretic	1 (1.9)		2.00		2.00	0	4
Muscle relaxant	2 (3.8)		0.5		0.70	0	1
Neuroleptic	6 (11.1)		2.87		3.44	0	9
Combination of drugs	25 (46.3)		4.15		4.53	0	20
Others	4 (7.4)		2.80		3.11	0	7
Nigth Medication*	38 (66.7)	0.596[d]		0.765[e]			
Yes	36 (94.7)		2.98		4.07	0	17
No	2 (5.3)		4.00		5.65	0	8
Use of medication with sucrose	53 (71.6)	0.797[c]		0.282[e]			
Yes	27 (50.9)		4.02		4.81	0	20
No	26 (49.1)		2.72		3.64	0	17
Has been to the dentist	76 (63.8)	**0.002**[c]		**0.001**[e]			
Yes	41 (53.9)		4.40		4.70	0	20
No	35 (46.1)		2.18		3.43	0	18
Difficulty to oral hygiene	57 (47.9)	0.829[c]		0.789[e]			
Yes	36 (63.2)		3.78		4.52	0	20
No	21 (36.8)		3.19		3,17	0	10
Total	70 (58.8)		3.20		4.14	0	20

dmft / DMFT = dmft + DMFT; dmft / DMFT calculated from 119 children; cStatistical test chi-square; dStatistical Test Fisher's Exact; eMann-Whitney statistical Test; fStatistical Test Kruskal-Wallis.* Considering only the children who used continuous medication more than 6 months. R$ Brazilian Real.

The dmft/DMFT average in children aging until 36 months, between 37 and 60 months, and those over 61 months old was of 1.03, 1.87, and 4.93, respectively. The overall average was of 3.22, and the carious component obtained the highest value among the dmft/DMFT components in

all age brackets, reaching, thus, a total average of 3.05. The dental caries prevalence among children who used continuous medication for more than 6 months was of 58.8%. The relation of the medications used by children, according to medical group, generic name, commercial name, presence of sucrose, and adverse effects in the oral cavity is described in Chart 1.

Chart 1. Medications used by children with neuropsychomotor disabilities according drug group, generic name, trade name, the presence of sucrose on composition and adverse effects in the oral cavity.

Drug Group	Generic Name	Comercial Name	Sucrose	Adverse effects in the oral cavity *
Anticonvulsant	Fenobarbital	Gardenal®	Absent	Xerostomia; gingival hyperplasia; erythema multiforme; pemphigus
Anticonvulsant	Ácido Valpróico	Depakene®	Present	Xerostomia; gingival hyperplasia; lichenoid eruptions
Anticonvulsant	Carbamazepina	Tegretol®	Absent	Xerostomia; tardive dyskinesia; stomatitis; ageusia, dysgeusia and hypogeusia; erythema multiforme; lichenoid eruptions
Anticonvulsant	Clobazam	Urbanil®	Absent	Xerostomia
Anticonvulsant	Lamotrigina	Lamictal®	Absent	Sialorrhea; ulceration and necrosis
Anticonvulsant	Clonazepan	Rivotril®	Absent	Xerostomia; burning mouth syndrome
Anticonvulsant	Fenitoína	Epelin®	Present	Xerostomia; gingival hyperplasia; erythema multiforme; oral pigmentation; ageusia, dysgeusia and hypogeusia; lichenoid eruptions; ulceration and necrosis
Anticonvulsant	Topiramato	Amato®	Absent	Xerostomia; gingival hyperplasia
Antipsychotic	Cloridrato de Clorpromazina	Amplictil®	Present	Xerostomia
Antipsychotic	Haloperidol	Haldol®	Present	Xerostomia; tardive dyskinesia
Antipsychotic	Periciazina	Neuleptil®	Present	Xerostomia
Antiemetic	Cloridrato de Ranitidina	Label®	Absent	There were no reported
Antiemetic	Domperidona	Motillium®	Absent	There were no reported
Antidepressive	Cloridrato de Fluoxetina	Prozac®	Absent	Tardive dyskinesia; ageusia, dysgeusia and hypogeusia; ulceration and necrosis
Antidepressive	Imipramina	Tofranil®	Absent	Xerostomia; ageusia, hipogeusia e disgeusia; ulceração e necrose
Antidepressive	Metilfenidato	Ritalina®	Absent	There were no reported
Antipsicotic	Risperidona	Risperidal®	Absent	Sialorrhea; tardive dyskinesia; ageusia, and dysgeusia hypogeusia; erythema multiforme
Diuretic	Furosemida	Lasix®	Absent	Xerostomia; erupções liquenóides
Hormone	Levotiroxina or T4	Puran t4®	Absent	There were no reported
Muscle relaxant	Lioresal	Baclofen®	Absent	Ageusia, dysgeusia and hypogeusia

* Source: Dictionary of Pharmaceutical Specialties (DEF 2012) and instructions for use of medicines.

Discussion

The dmft/DMFT index average in children with neuropsychomotor disability verified in this study was of 3.2 (sd 4.14). The carious component obtained the highest value in the index in all age brackets, with a total average of 3.05 teeth attacked by caries. This result is similar to another study found in the literature [14] that compared the DMFT of children with special needs without disability, verifying a major DMFT in children from the first group. The comparison between children with and without special needs reflects the difficulty of this specific clientele to maintain

good rates of oral health, as well as it reveals the difficulty of finding prevalence studies about dental caries in this population.

The difficulty of performing and maintaining a satisfactory oral hygiene in SNP can justify the high presence of the carious component in this group. A study that evaluated the oral health conditions of patients with special needs showed [15] high index of DMFT in children, and the reported difficulties to accomplish the dental assistance demonstrate the necessity and importance of implementing strategies in public policies with attention to this group of individuals. Once education activities, by means of promotion and prevention in oral health, to these patients, with special attention to their caretakers, would enable the minor necessity of procedures performed in a dental clinic or hospital environment under general anesthesia [2].

The anticonvulsant was the most used medication in patients with cerebral palsy, followed by the antipsychotic, in patients with Down syndrome, and the association of antipsychotic and antidepressant, in individuals with intellectual disability. This prevalence is in accordance with findings in other studies [10].

In the studied population, 68.8% of the children were using continuous medication, and this result corroborates to other studies [16]. The majority of the evaluated patients in this study used medication for a period longer than 24 months, and 50.9% of the medications contained some concentration of sucrose in their composition.

The pediatric medications, in their majority, contain high levels of sucrose; therefore, it is necessary to be aware of prolonged and frequent ingesting because they are associated to the risk of developing dental caries [17]. However, a statistically significant association between the use of continuous medication, containing sucrose, and the presence of dental caries was not observed, although 72% of the children with dental caries experience used continuous medication.

This result corroborates with the findings from other studies found in the literature [18, 19]. However, a study that compared two groups of children identified that those who chronically used oral medication presented higher index of DMFT and dmft, when compared to children who did no use medication [20]. Beyond that, it was identified that the severity progresses as far as the time of medication using increases. To authors, the chance of using medication associated to the increasing of dental caries risk is very low, when compared with other risk factors as oral hygiene, access to fluoride, and food habits.

The medicaments were administered with a higher frequency during the nocturnal period. When they were used at night, without oral hygiene performing after the use, the risk of developing carious lesions increases, because, during this period, a significant reduction of the salivary flow occurs [21]. The drugs commonly used in the treatment of some disorders cause hyposalivation, what can take, in the same manner, to an increase of the dental caries experience [21]. In this same study [22], the authors concluded that, independently of the reduction detection or not of the salivary flow, all patients that used chronic medications must receive major dental care, including

oral hygiene instruction to children and their caretakers, dietary advice, and topical application of fluoride.

Also, a statistically significant association between family income and education of the caretaker with the presence of dental caries was observed, which were similar to results found in a study performed in Norway and Russia with children in school age [23]. Beyond that, the literature states that the education level of the caretaker is directly associated to the family socio-economic status [24]. The education level can reflect the capacity of comprehension and acquisition of healthy habits, and the possibility of a better social insertion [25]. This idea corroborates with the findings of a regional study performed in Brazil, [26] which observed that the children whose mothers had less than 8 years of study and low family income were more inclined to the higher occurrence of dental caries, reflecting directly in the health of their children.

The difficulties found during the collection of the data from the patients forms was a study limitation, because many times there were absence of important information or incorrect registers of it in the records, which ended in a reduced final sample. However, since it is a survey performed by a special school with great reference in the city of Pelotas, the findings of this study may be near to oral heath reality of the individuals with the same condition.

Conclusion

This study demonstrated that the consume of continuous medication is not the only casual factor to the presence of dental caries among the studied population, suggesting that other risk factors contribute to the occurrence of the disease. The deficient oral hygiene, and the difficulty in performing and maintaining the dental assistance of the SNP may be associated to a major prevalence of the disease, highlighting the necessity of inserting health public policies, seeking the education and motivation of the patients with special needs and their caretakers.

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