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DELETERIOUS ORAL HABITS:
RELATIONSHIP WITH THE Z-SCORE BOBY MASS INDEX AND ANXIETY IN CHILDREN

HABITOS ORAIS DELETERIOSOS:
RELAÇÃO COM O ÍNDICE DE MASSA CORPORAL E Z-SCORE DE ANSIEDADE EM CRIANÇAS

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ABSTRACT
Evaluate the relationship between the presence of deleterious oral habits, the Z-score of BMI and anxiety in scholars. Analytical cross-sectional study of 64 children from a Municipal Public School in the city of Santa Maria-RS from May to November 2013. It was verified anthropometry and applied a deleterious oral habit's questionnaire, for assessment of anxiety was used the The Revised Childrens Manifest Anxiety Scale (RCMAS). Data were analyzed in Stata10, was calculated the median and used Wilcoxon test, considering as significant $p<0.05$. Results: 59.4 % of the students were female, the BMI Z-score median was higher in boys and the RCMAS median score was higher in girls ($p<0.05$). The presence of the habit of biting objects and mouth/tongue/cheek were the ones which showed higher scores on the anxiety scale ($p<0.05$). The anxiety score was similar in relation to the nutritional status of the children. It was conclude that the Z-score of BMI is not associated with the presence of deleterious oral habits, but girls and students who have at least one deleterious oral habit and mainly the habit of biting objects and corner of the mouth/tongue/cheek have higher scores for anxiety.
Keywords: Habits. Body Mass Index. Anxiety. Children.

RESUMO
Avaliar a relação entre a presença de hábitos orais deletérios, pontuação Z-score do IMC e ansiedade em crianças em idade escolar. Estudo transversal analítico com 64 crianças de uma Escola Pública Municipal de Santa Maria-RS no período de maio a novembro de 2013. Foi verificada antropometria e aplicado questionário sobre hábitos orais deletérios, para avaliação de ansiedade aplicou-se Escala "O que penso e sinto" (OQPS). Os dados foram analisados em Stata10, foi calculada mediana e utilizado teste de Wilcoxon, considerando como significante $p <0,05$. Resultados: 59,4% dos alunos eram do sexo feminino, a mediana do Z-score do IMC foi maior nos meninos e o Z-score médio do OQPS foi maior nas meninas ($p <0,05$). A presença dos hábitos de morder objetos e boca / língua / bochecha foram os que apresentaram maiores escores na escala de ansiedade ($p <0,05$). O escore de ansiedade foi semelhante em relação ao estado nutricional das crianças. Concluiu-se que o Z-score do IMC não está associado à presença de hábitos orais deletérios, mas meninas e estudantes que têm pelo menos um hábito oral deletério e principalmente o hábito de morder objetos e canto da boca / língua / bochecha têm escores mais altos para a ansiedade.
Palavras-chave: Hábitos. Índice de massa corporal. Ansiedade. Crianças.

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1 INTRODUCTION

Anxiety is an emotional state with psychological and physiological components, which is part of the normal spectrum of human experiences (ANDRADE, 1998). This emotional state becomes pathological - considered disorder- when is disproportionate to the situation that triggers. Anxiety disorders are very common in both adults and children, with an estimated prevalence during the lifespan of 9% and 15% respectively (LEWIS, 1979; BERNSTEIN *et al*., 1996). Anxiety disorders constitute the largest group of mental health problems during childhood, one of the most important components of children's fears and anxiety are concerns (ANDRADE *et al*., 2002; STALLARD, 2010).

Oral habits usually settle for insecurities caused by emotional problems, simple addiction that will naturally overcome with time and lack of breastfeeding within the first months of life (MORESCA *et al*, 1994). The deployment of bad oral habits almost always comes up with more evidence in situations of distress and anxiety. Such behavior can be better explained by the first stage of psychosexual development of the child, ie, the oral phase, established by Freud (FREUD, 1973). Orality in this phase can be understood and divided into two parts: the first, in which suction takes satisfaction in sucking, and the second, in which there is pleasure in chewing and devouring, also called the "cannibalistic" part, which is manifested mainly in the period of the teeth appearance.

During the oral phase, mouth is a source of pleasure. Some people end up keeping focus of pleasure in the mouth, extending the oral pleasure for a lifetime. We can cite cases of deleterious oral habits, such as biting objects, biting nails, or even people who eat too much (ESCOBAR, 2012) .

When considering the possible influence of nutritional status on the development of deleterious oral habits, high rates of obese children and adolescents are found, what is a great concern among health professionals, since about two out of ten obese young people already are carriers of the metabolic syndrome (MS). Research indicates that in recent years there is an epidemic of inactivity and a higher consumption of foods with high energy density that explains the increase in this prevalence (FERNANDES, *et al*., 2006; PORTO, 2013).

The World Health Organization (WHO) points to obesity as an impressive and unacceptable impact factor and concerns the lives of children. Among the changes in our body, obesity is more difficult to understand and requires a multidisciplinary approach, as well as professionals working globally considering the problem (OMS, 2007).

Given the complexity of the possible relationship between anxiety and deleterious oral habits of children, the present study was carried out, aiming to analyze the relationship between the presence of deleterious oral habits, the Z-score of Body Mass Index (BMI), and anxiety in scholars.

2 METHODS

Cross-sectional study, conducted between May and November 2013, with a convenience sample of 64 students who underwent anthropometric assessment, answered a questionnaire about deleterious oral habits (RODRIGUES *et al*., 2004) and the questionnaire "What I think and feel" (RCMAS) (GORAYEB; GORAYEB, 2008). For children selection, a screening was performed in 217 pupils attending the 1st to 7th grade in a public elementary school located in Perpétuo Socorro neighborhood, Santa Maria city. From these, 2 were excluded due to special needs, 41 were outside the age criteria, 64 didn't answered the questionnaire about the deleterious oral habits and 46 didn't responded to the questionnaire "What I think and feel". Scholars of both sexes, aged between 8 and 12 years were

included, those with special needs (wheelchair users and those with skeletal malformation), observed during the verification of anthropometrics measures were excluded. A sample showed a confidence level of 95%, with a statistical power of 80% non-exposed relative risk of 2.0 for ratio of exposed 1: 1.

Advance authorization was requested from the Department of Education of the City of Santa Maria, the institution and parents or guardians. The variables were obtained from the school files (sex and age), through measurement of anthropometric variables (weight and height) and questionnaire answered by parents or representatives.

Evaluation of excess body weight was held through anthropometric parameters weight and height, calculating the Body Mass Index (BMI). Check the measurements of weight and height was performed in a standardized way, according Marfell-Jones *et al*. (2006). For the weight measurement a digital scale was used, where the scholar remained with minimal clothing, barefoot and without head props. To collect the stature children were standing on a wooden surface, with their back to the metric scale, parallel feet, ankles together and loose arms throughout the body. The BMI of each schoolar was transformed into Z-scores through the Anthro program, using as reference the proposed by the WHO for children 5-19 years old (ESCOBAR, 2012). The children was ranked as the thinness Z-score ≤-2, eutrophic when the Z-score >-2 and <+1 and overweight when the Z-score was ≥+1 (which included overweight Z-score ≥+1 and <+2 and obese Z-score ≥+2).

The questionnaire used for verifying the presence of deleterious oral habits was developed according to the protocol proposed by Rodrigues *et al.* (2004) which consists of 37 closed and objective questions about the child oral behavior, time of breastfeeding, complementary feeding and eating habits, presence and frequency of harmful oral habits (using pacifier, baby bottle use, nail biting, bruxism, clenching, teeth chatter, biting objects, biting the lips, wetting the lips, biting the corners of the mouth, tongue biting, biting the cheeks, suck the lips, chewing gum, chewing candy, support hand on chin, sleeping with hand over the face). For the answers was used a Likert scale with the options: never, sometimes, almost always and always.

When presenting the results from the questionnaire, responses were grouped as being "present" (for the deleterious oral habit), when the answer was: almost always and always, and "absent" if the answer was: sometimes and never. In addition, the items were grouped as follows: "the use of pacifiers / baby bottle", "bruxism / biting / teeth chatter", "biting the corner of the mouth / cheek / tongue", "hand on the face", "chewing gum / candy "and" bite / suck / wet lips." The variables "nail biting" and "biting objects" were maintained according to the protocol of collection.

For evaluating the manifestation of anxiety in the children was applied the Revised Children's Manifest Anxiety Scale (RCMAS), also known by its trade name: "What I think and Feel", translated and adapted to Portuguese by Gorayeb and Gorayeb (2008) with the title "O Que Penso e Sinto "(OQPS). The instrument is in an infant scale for self-application, comprising a total of 37 questions, 9 of the questions are a lie sub-scale and 28 concerns emotions and behaviors associated to the manifestation of anxiety in children. From this, 10 questions refer to the physiological anxiety, 11 to concerns/ hypersensitivity and 7 to social concerns/concentration. Responses are dichotomous, with "yes" or "no" according to the presence or absence of fact. A negative response does not score and each positive answer gets a point and thus for physiological anxiety is a maximum of 10 points, the concern/hypersensitivity 11 points, social concerns/ concentration 7 points and general anxiety 28 points. The higher the score greater the anxiety (REYNOLDS; RICHMOND, 1978; REYNOLDS; RICHMOND, 1985).

Children answered the questionnaire individually, in their own classrooms, and the psychologist researcher applied the instrument orally. The choice of reading aloud the instrument was given to believe that in this way the effectiveness of the instrument would be greater, since the questions in the questionnaire could be remedied at the time of reading. Avoiding a high rate of responses left blank because of understanding lack, as well as possible difficulties in reading by the children involved in the research.

Data were entered using Microsoft Excel 2007 program and then statistically analyzed using Stata software, version 10.0. To verify the normality of the variables it was used the Shapiro-Wilk test. The median, first and third quartile was calculated. To check the differences between the groups it was used the Pearson and Chi-square test and also the non-parametric Wilcoxon test. For all tests was adopted a significance level of 5% ($p < 0.05$).

This research was assessed by the Ethics Committee of the Federal University of Santa Maria (UFSM) and approved by the Protocol number 14626113.0.0000.5346. The parents and/or guardians of the children were informed about the purpose and methodology of the study and asked to sign the consent form, according to the resolution 466/2012 of the National Health Council.

3 RESULTS

About 50% of children in this study were 9 and 10 years old and 59,4% were female. The median Z-score BMI of boys was more deviated from the reference (1.34), with a tendency to obesity, than girls (0.65), but without significant differences. Regarding the median score of the RCMAS scale statistically significant difference was observed (p=0.004), when comparing girls, that had higher median score compared to boys. The median overall score of anxiety was higher in students who had at least one deleterious oral habit (table 1).

Table 1 - Demographic variables, median Z-score of BMI and RCMAS range of scholars

Variables	N (%)	Z-score of BMI md (1°/3°q)	RCMAS md (1°/3°q)
Sex			
Male	26 (40,6)	1,34 (-0,2/2,2)	8,0 (5,0/11,0)
Female	38 (59,4)	0,65 (-0,4/1,8)	12,5 (7,0/16,0)*
Age (years)			
8	14 (21,9)	1,55 (-0,5/2,1)	8,5 (7,0/14,0)
9	22 (34,4)	0,70 (-0,3/2,0)	11,5 (9,0/19,0)
10	18 (28,1)	0,89 (-0,5/2,3)	11,5 (5,0/13,0)
11	10 (15,6)	1,11 (0,3/1,3)	8,0 (6,0/11,0)
Deleterious oral habits (one at least)			
No	29 (45,3)	1,25 (-0,2/2,0)	7,0 (5,0/11,0)
Yes	35 (54,7)	0,98 (-0,4/1,8)	13,0 (8,0/17,0)**

N=frequency; md=median; RCMAS= "what I think and feel"; Wilcoxon test:*p=0,004; **p= 0,001.

The following deleterious oral habits were present in over 50% of the scholars: nail biting, bite/suck/wet lips, chewing gum/candy and put hand on face, ranging from 54.7 to 92.2%. The median Z-score of BMI was greater when there were habits of: use baby bottle/pacifier, biting objects, bite/suck/wet lips and put hand on the face, however, no statistically significant difference was observed. The median score in RCMAS scale was greater in the presence of each of the deleterious oral habits, except for the use of baby bottle/pacifier, in which the score remained the same (Table 2).

Table 2 also shows that the presence of the habit of biting objects and bite mouth corner/tongue/cheek was significantly greater in the median score of RCMAS scale when related to the absence of the habit ($p<0.05$). The median scores of RCMAS scale were lower when the habit of use bottle/pacifier and chewing gum/candy were present, for all the other habits the medians scores were higher in the presence of the habit, however, not statistically significant.

Table 2 - Frequency, median BMI Z-score and OQPS scale score relating to deleterious oral habits

Variables	N (%)	BMI Z score md (1°/3°q)	RCMAS md (1°/3°q)
Baby bottle/pacifier	59 (92,2)	0,99 (-0,2/2,0)	9,0 (6,0/14,0)
Absent	5 (7,8)	1,40 (-0,8/2,2)	9,0 (8,0/11,0)
Present			
Nail biting	26 (40,6)	1,13 (-0,5/2,0)	9,0 (7,0/13,0)
Absent	38 (59,4)	0,93 (-0,2/2,0)	10,5 (6,0/15,0)
Present			
Bruxism/ biting / teeth chatter	43 (63,2)	1,02 (-0,1/2,0)	9,0 (5,0/14,0)
Ausente	21 (32,8)	0,88 (-0,6/2,0)	12,0 (8,0/13,0)
Presente			
Biting objects	33 (51,6)	0,78 (-0,4/1,6)	9,0 (5,0/12,0)
Absent	31 (48,4)	1,32 (-0,2/2,2)	12,0 (7,0/17,0)*
Present			
Wet/suck/bite lips	29 (45,3)	0,88 (-0,4/2,2)	9,0 (7,0/13,0)
Absent	35 (54,7)	1,02 (-0,2/2,0)	11,0 (6,0/15,0)
Present			
Biting corner of the mouth/ tongue/ cheek			
Absent	42 (65,1)	1,22 (-0,3/2,2)	8,0 (5,0/13,0)
Present	22 (34,4)	0,82 (-0,2/1,6)	13,0 (9,0/15,0)**
Chewing gum/ candy			
Absent	5 (7,8)	1,04 (0,3/2,4)	8,0 (7,0/11,0)
Present	59 (92,2)	0,99 (-0,3/2,0)	9,0 (6,0/14,0)
Hand on the face			
Absent	15 (23,4)	0,76 (-0,3/1,4)	8,0 (3,0/13,0)
Present	49 (76,6)	1,25 (-0,2/2,1)	10,0 (7,0/14,0)

md=median; Wilcoxon test, p*=0,049; p**=0,047

The relationship between deleterious oral habits and the type of anxiety showed that hypersensitivity was greater in the presence of biting objects ($p = 0.03$) and bite corner of the mouth /tongue /cheek ($p = 0.019$), while for physiological anxiety was the presence of baby bottle/ pacifier, bruxism / push / knock teeth, biting objects and bite corner of mouth / tongue / cheek, but without significant difference (table 3).

Table 3 - Relationship between median score of the anxiety types assessed in RCMAS scale and deleterious oral habits

Variables	Anxiety		
	Physiological md (1°/3°q)	Hipersensibility md (1°/3°q)	Concentration md (1°/3°q)
Baby bottle/pacifier			
Absent	3,0 (2,0/5,0)	6,0 (3,0/7,0)	1,0 (0,0/4,0)
Present	6,0 (4,0/6,0)	4,0 (3,0/4,0)	1,0 (1,0/2,0)
Nail biting			
Absent	3,0 (2,0/5,0)	5,5 (4,0/6,0)	1,0 (0,0/2,0)
Present	3,0 (2,0/6,0)	5,0 (3,0/7,0)	2,0 (1,0/4,0)
Bruxism/ biting / teeth chatter			
Ausente	3,0 (2,0/6,0)	4,0(3,0/7,0)	1,0 (0,0/4,0)
Presente	4,0 (2,0/5,0)	6,0 (3,0/7,0)	2,0 (1,0/3,0)
Biting objects			
Absent	3,0 (2,0/4,0)	4,0 (3,0/6,0)	2,0 (0,0/2,0)
Present	4,0 (2,0/6,0)	6,0 (3,0/8,0)*	2,0 (1,0/4,0)
Wet/suck/bite lips			
Absent	3,0 (2,0/5,0)	4,0 (3,0/6,0)	1,0 (1,0/3,0)
Present	3,0 (2,0/6,0)	6,0 (3,0/7,0)	2,0 (0,0/4,0)
Biting corner of the mouth/ tongue/ cheek			
Absent	3,0 (2,0/5,0)	4,0 (3,0/6,0)	1,0 (0,0/3,0)
Present	4,0 (2,0/6,0)	6,0 (5,0/8,0)**	2,0 (1,0/2,0)
Chewing gum/ candy			
Absent	2,0 (2,0/6,0)	4,0 (4,0/6,0)	1,0 (1,0/1,0)
Present	3,0 (2,0/5,0)	5,0 (3,0/7,0)	1,0 (0,0/4,0)
Hand on the face			
Absent	3,0 (2,0/6,0)	4,0 (1,0/7,0)	1,0 (0,0/2,0)
Present	3,0 (2,0/5,0)	6,0 (3,0/7,0)	2,0 (1,0/4,0)

md=mediana; Wilcoxon test: *p=0,031; **p=0,019

4 DISCUSSION

In a day to day clinical care is frequent to hear references that the excess weight in childhood is related to anxiety and the presence of oral habits. However, the complexity involved in the presence of deleterious oral habits, its relationship with BMI and anxiety in scholars motivated this study mainly because there is a great lack of studies addressing the association between these variables. This shortage may even be one of the limitations of this study since the current literature contains few data to allow further discussion on the topic. Another limitation that should be taken into account in this study refers to the ability of elementary school students in responding to the anxiety scale.

The higher BMI Z-score median in males, not statistically significant, corroborates with a study led by Santos *et al.* (2008) which collected anthropometric information, sociodemographic and sedentary behaviors of 1.074 schoolchildren from 6 to10 years of age and did not observe statistically significant differences between the sexes. However, different studies contemplating the same age found prevalence of overweight among male students (SANTOS *et al*., 2008; CARNEVALLI *et al*., 2009).

Despite presenting higher BMI Z-score, boys were less anxious than girls with regard to the general sum of anxiety. The same finding has been noted in epidemiological studies that have identified that women are significantly more vulnerable to anxiety disorders than men - the ratio between

prevalence rates of two women for one man (KESSLER, 2003; SEEDAT *et al*., 2009). Such differences are, hypothetically, due to the combined effect of cultural variables related to women's role in society with specific neurotrophic hormone and risk of female biology, which probably begins in childhood, ie before the adult age (SEEDAT *et al*., 2009; VILELA, LAMOUNIER, 2001). Reinforcing this hypothesis, data from the Brazilian Institute of Geography and Statistics- IBGE (2000), points 24.9% of households with women as their leaders, stress brought by this accountability, coupled with the anxiety is reflected in different spheres of women everyday, resulting in the emergence of a detrimental style of life, with poor eating habits, sedentary lifestyle and body weight gain.

Regarding the prevalent presence of deleterious oral habits during childhood, especially those found among students in this study, as the habit of chewing gum/ candy and nail biting, these were also observed in other researches (RANIERI, *et al*.; 2007; GONELLA, 2012). The high prevalence of such habits among children in the age range studied could be explained by the fact that during individual maturation process when some sucking habits are removed they can be transferred to another or even, there is the possibility of association with other habits as nail biting. In addition, often a deleterious oral habit triggers another habit, which in turn worsens the first, forming a vicious circle which should be detected and stopped as soon as possible (CAVALCANTI *et al*., 2007).

No studies showing a direct relationship between deleterious oral habits and weight changes in children were found. But a study showed that the participation of deleterious habits can influence the mouth breather, ie, the patient does not breathe efficiently through the nose, keeping the mouth open, thus hampering food dynamics. When chewing and swallowing too fast to be able to then breathe again, ends up interfering in the masticatory process, leading to eating disorders in which children swallow almost without chewing, which can lead to obesity (CARNEVALLI *et al*., 2009).

The relationship between deleterious oral habits and the type of hypersensitivity showed that anxiety was greater in the presence of biting objects and bite corner of the mouth/ tongue/ cheek while for physiological anxiety was the presence of baby bottle/pacifier, bruxism /push /knock teeth, biting objects and bite corner of mouth / tongue / cheek, but without significant difference.

The schoolchildren showed higher physiological anxiety when they had the habit of bottle-feeding / pacifier, bruxism / push / knock teeth, biting objects and bite mouth corner / tongue / cheek and increased hypersensitivity in the presence of the habit of biting objects and bite corner of the mouth /tongue /cheek. With respect to the scores on the anxiety scale is important to note that a high score on the subscale of physiological anxiety simply suggests that participants have certain types of physiological responses that are normally experienced during anxiety. However, high scores on the scale of hypersensitivity suggests that the young internalizes much anxiety and may well become overwhelmed with trying to relieve it (REYNOL; RICHMOND, 1978).

One hypothesis for the development of habits of biting objects and bite the corner of mouth / tongue / cheek would be an early introduction to the use of the instrument for food that would be the spoon, which should be initiated only when the tongue protrusion reflex disappeared, around the fifth month of life. Moreover, another argument may be added that when the spoon is used early can be an abrupt halt one "cannibal" state of intense fusional movement of the child with the mother, so the needing of "biting something" remains in the child and may be relieved and expressed through the already mentioned biting habits (corner of mouth / tongue / cheek) (DELGADO; HALPEIN, 2005).

5 CONCLUSION

With the results of this study was not possible to infer that the presence of deleterious oral habits is directly related to BMI and anxiety. However, girls and students who have at least one deleterious oral habit, especially who have the habit of biting objects and biting the corner of the mouth / tongue / cheek have a higher score for anxiety. Thus, it reinforces the hypothesis that certain deleterious oral habits may be related to some fixation in the oral phase, since their presence shows a tendency to behaviors that take satisfaction and compensation of anxiety/ hypersensitivity through mechanisms used at that stage life.

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