








## CONSUMPTION OF SUGARY FOODS AND QUALITY OF SLEEP IN THE FIRST YEAR OF LIFE: DATA FROM A BIRTH COHORT IN NORTHEASTERN BRAZIL

CONSUMO DE ALIMENTOS AÇUCARADOS E QUALIDADE DO SONO NO PRIMEIRO ANO DE VIDA: DADOS DE UMA COORTE DE NASCIMENTOS NO NORDESTE DO BRASIL

CONSUMO DE ALIMENTOS AZUCARADOS Y CALIDAD DEL SUEÑO EN EL PRIMER AÑO DE VIDA: DATOS DE UNA COHORTE DE NACIMIENTO EN EL NORESTE DE BRASIL

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### ABSTRACT

**Objective:** to investigate sleep duration (SD), frequency of night awakenings (NA) and consumption of sugary foods in the first year of life and to verify the association between consumption of these foods and poor sleep quality. **Methods:** the study population consisted of 179 children from a birth cohort in Rio Largo-AL. Mothers were asked about the regular supply of sugary foods (sugar/instant cereal flours with sugar/sweetened drinks/sweets) and sleep was investigated by the translated and validated Brief Infant Sleep Questionnaire. DS<12h and AN>2 were considered indicators of poor sleep quality. Pearson's chi-square and Fisher's exact tests were used to verify associations between sugary consumption and poor sleep quality at six and 12 months (p<0.05). **Results:** more than half of the children had SD<1 2h (60.3%) and about ¼ AN>2. Regular consumption of at least one of the sugary categories was verified among 50.6, 91.1 and 100% of children at three, six and 12 months of age, respectively. No associations were found between the consumption of these foods and indicators of poor sleep quality. **Conclusion:** sugary consumption and poor sleep quality were frequent in our study; however, no association was identified between the variables. More investigations are needed to elucidate how sleep and feeding are interrelated and mutually potentiate as determinants of infant growth and development.

**Keywords:** Sleep; Child; Sugars.

### RESUMO

**Objetivo:** investigar a duração do sono (DS), a frequência de despertares noturnos (DN) e o consumo de alimentos açucarados no primeiro ano de vida e verificar a associação entre o consumo desses alimentos e a má qualidade do sono. **Métodos:** a população do estudo foi composta de 179 crianças integrantes de uma coorte de nascimentos de Rio Largo-AL. As mães foram questionadas sobre a oferta regular de alimentos açucarados (açúcar/farinhas de cereais instantâneas com açúcar/bebidas açucaradas/doces) e o sono foi investigado pelo questionário traduzido e validado Brief Infant Sleep Questionnaire. Foram considerados indicadores de má qualidade do sono DS<12h e DN>2. Os testes de qui-quadrado de Pearson e exato de Fisher foram adotados para verificar associações entre o consumo de açucarados e a má qualidade do sono aos seis e 12 meses (p<0,05). **Resultados:** mais da metade das crianças apresentou DS<1 2h (60,3%) e cerca de ¼ DN>2. O consumo regular de pelo menos uma das categorias de açucarados foi verificado entre 50,6, 91,1 e 100% das crianças aos três, seis e 12 meses de idade, respectivamente. Não foram encontradas associações entre o consumo desses alimentos e os indicadores de má qualidade de sono. **Conclusão:** o consumo de açucarados e a má qualidade de sono foram frequentes em nosso estudo, no entanto, não se identificou associação entre as variáveis. Mais investigações são necessárias para elucidar como o sono e a alimentação se inter-relacionam e se potencializam mutuamente como fatores determinantes do crescimento e desenvolvimento de lactentes.

**Palavras-chave:** Sono; Crianças; Açúcares.

### RESUMEN

**Objetivo:** investigar la duración del sueño (DS), la frecuencia de despertares nocturnos (DN) y el consumo de alimentos azucarados en el primer año de vida y verificar la asociación entre el consumo de estos alimentos y la mala calidad del sueño. **Métodos:** La población de estudio consistió en 179 niños de una cohorte de nacimiento en Rio Largo-AL. Se preguntó a las madres sobre el suministro regular de alimentos azucarados (azúcar / harinas de cereales instantáneas con azúcar / bebidas endulzadas / dulces) y se investigó el sueño mediante el cuestionario traducido y validado BriefInfantSleepQuestionnaire. Fueron considerados indicadores de mala calidad del sueño DS <12h y DN> 2. Se utilizaron las pruebas de chi-cuadrado de Pearson y exacta de Fisher para verificar las asociaciones entre el consumo de azúcar y la mala calidad del sueño a los seis y 12 meses (p <0.05). **Resultados:** más de la mitad de los niños tenían DS <1 2 h (60,3%) y alrededor de ¼ DN> 2. Se verificó el consumo regular de al menos una de las categorías azucaradas entre el 50,6, el 91,1 y el 100% de los niños a los tres, seis y 12 meses de edad, respectivamente. No se encontraron asociaciones entre el consumo de estos alimentos y los indicadores de mala calidad del sueño. **Conclusión:** el consumo de azucarados y la mala calidad del sueño fueron frecuentes en nuestro estudio, sin embargo, no se identificó asociación entre las variables. Se necesita más investigación para dilucidar cómo el sueño y la alimentación se interrelacionan y se mejoran mutuamente como determinantes del crecimiento y desarrollo infantil.

**Palabras clave:** Sueño; Niños; Azúcares.

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## INTRODUCTION

In the first years of life, sleep is an important dynamic and physiological process for brain maturation and physical and cognitive development, a period in which sleep-wake regulation and sleep states evolve rapidly, with continuous maturation throughout infancy.<sup>1</sup>

Sleep problems such as difficulty initiating sleep, excessive night awakenings (NA) and short sleep duration (SD) affect 20 to 30% of children during the first three years of life. Longitudinal studies suggest that these problems may persist later in childhood and even into adolescence and adulthood.<sup>2</sup> Additionally, previous studies have shown that insufficient sleep quality and quantity in children and adolescents are associated with several medium and long-term negative consequences, including behavioral and cognitive performance or increased risk of overweight and obesity.<sup>1-6</sup>

Although environmental, biological, and social variables can interfere with sleep quality, the role of food has been widely investigated, especially the impact of consuming foods rich in sugar on the impairment of sleep quality.<sup>6-8</sup> A possible mechanism that explains this association is that sudden spikes and dips in blood glucose, due to a diet with a high glycemic index, can lead to reduced sleep quality. Postprandial hyperglycemia resulting from the high glycemic load of foods rich in sugar can lead to compensatory hyperinsulinemia, resulting in a sudden drop in plasma glucose, which consequently affects brain glucose, an event that culminates in triggering the autonomic counter-regulatory secretion of hormones, such as glucagon, cortisol, and adrenaline. Thus, despite the high concentration of blood sugar causing sleepiness, the counter-regulatory hormonal responses are antagonistic, that is, there is a negative influence on sleep quality.<sup>7</sup>

Despite the increasing number of investigations that support this hypothesis, the results remain controversial, and the robustness of the evidence is restricted to studies among schoolchildren, adolescents, and adults,<sup>7,8</sup> specific consensus and recommendations.

The first thousand days of life ('firstthousand-days'), counted from conception to two years of age, represent a fundamental period for child growth and full development. It is recognized that at this stage, adequate food and sleep contribute to the promotion of health and physical and mental potential, bringing benefits that are perpetuated throughout life.<sup>1,2,9</sup>

Therefore, the present study aimed to: a) investigate sleep duration, frequency of nocturnal awakenings and consumption of sugary foods in the first year of life; b) verify the association between the consumption of these foods and poor sleep quality, expressed by  $SD < 12h$  and  $NA > 2$ , of children belonging to a birth cohort in a city in Northeast Brazil.

## MATERIAL AND METHOD

### Study design and population

The data used for this work come from the birth cohort: 'SAND - Health, Food, Nutrition and Child Development: a cohort study', which aimed to analyze aspects related to health, food, nutrition, and development of children from birth until the first year of life. The research was approved by the Research Ethics Committee and all mothers signed an informed consent form.

The research was carried out in Rio Largo, the third largest municipality in the state of Alagoas, located 28 km from the capital, Maceió, and with a total population estimated at 75,120 inhabitants. The municipality was strategically selected for presenting characteristics similar to those of the state in the historical series referring to the Human Development Index (0.643/ Alagoas: 0.631). Furthermore, this similarity extends to the three dimensions of the index (income/longevity/education), recognized as important determinants of the health of communities.<sup>10</sup>

The recruitment of dyads was carried out through a consecutive non-probabilistic sampling process (for convenience), considering all children born with a >35 weeks gestational age in the only maternity hospital in the city between February and August 2017 as eligible.

The exclusion criteria for mothers were a) being a carrier of the human immunodeficiency virus (HIV/AIDS), due to the risk of vertical transmission of the virus through milk; b) have a mental disability or language disorders that could compromise communication; c) not be a resident of Rio Largo. For children, the criteria were: a) congenital malformations in the oral cavity, since they present additional difficulties in breastfeeding and require special attention when introducing food; b) and have a physical or mental disability, since the pattern of growth and development may present different behaviors.

The dyads were evaluated at birth (within 24 hours after delivery) and, subsequently, in follow-up home visits at three, six and 12 months of age, with data collected by teams of trained nutritionists and supervised by a field researcher. Of the total number of births that took place in this period (n=394), 109 dyads did not meet the eligibility criteria, 41 refused to participate in the research and one mother was identified with a language disorder that compromised communication, totaling 243 children at baseline.

'Follow-up losses' were considered when the mother-child pair was not located in two consecutive follow-up periods, when they moved to other cities or when mothers no longer had a regular bond/coexistence with their children, as in the case of donation. for adoption. Thus, at three months, 210 children participated in the research, at six months, 198 and at 12 months, 186 children. Given the purpose of our study to investigate sugary food consumption and sleep, our analyzes were conducted with 179 children who had complete data on these variables at six and 12 months of age.

### Assessment of Consumption of Sugary Foods

Children's food consumption was investigated during home visits at three, six and 12 months, using an instrument made up of a list of 70 foods and preparations, with mothers being asked about the regular supply of each item. The offer was considered regular at least twice on different days in the last two weeks prior to the interview, disregarding food offered sporadically.

For the purposes of this article, all homemade preparations and industrialized products that contain sugar in their composition were considered sugary foods, which were subdivided into four categories: a) sugar (white, crystal, demerara, brown, coconut; molasses, *rapadura*) ; b) instant cereal flours (thickeners) with sugar (ICF); c) sugar-sweetened beverages (SB) (soft drinks; powders for refreshment; juices, nectar, ready-to-eat refreshments); d) sweets (cookies and sweet biscuits, flavored yogurt and petit-tisse type, sweetened dairy drinks; candies, lollipops, chewing gum, chocolate, ice cream, gelatin, porridge prepared with ICF and/or sugar, homemade sweets with sugar); e) any of the foods (considering the consumption of at least one food from one of the four previous categories).<sup>11</sup>

### Sleep Assessment

Sleep information was obtained at six and 12 months from the validated and translated version into Brazilian Portuguese of the semi-structured Brief Infant Sleep Questionnaire (BISQ), which investigates habitual and last week sleep characteristics of the child, according to the mothers' reports.<sup>12</sup> The measures used in this article were: a) duration of night sleep (from 7 pm to 7 am); b) duration of daytime sleep (from 7 am to 7 pm); c) occurrence and frequency of night awakenings. Total sleep duration was represented by the sum of hours slept during the night and during the day.

### Data analysis

Within 24 hours after collection, data were double-entered and validated in Epi Info software (Version 3.5.4). Analyzes were performed using Stata/SE 15.1 software (StataCorp LP, CollegeStation, TX, USA).

For descriptive statistics, absolute (%) and relative frequencies, medians, and interquartile range (IQR) of the percentile [25 and 75] were calculated.

The socioeconomic classification of families was determined by the Brazilian Socioeconomic Classification Criteria of the Brazilian Association of Population Studies (ABEP), which classifies the family's economic situation into six categories (A, B1, B2, C1, C2, D-E), defined based on of purchasing power - based on the number of available goods -, monthly unemployed, availability of public services at the place of residence and the level of education of the head of the family, in which each of the strata represents an estimate of average family income.<sup>13</sup>

Total sleep duration <12 hours and number<sup>3</sup> of nocturnal awakenings >24 were considered as indicators of poor sleep quality. To verify the prevalence of indicators of poor sleep quality, according to the regular consumption of sugary foods at six and 12 months of age (yes or no), Pearson's chi-square test and Fisher's exact test were performed (variables with categories of n<5). Values of p<0.05 were considered statistically significant.

## RESULTS

Table 1 describes the socioeconomic and demographic, gestational, perinatal, and infant characteristics of the children in the birth cohort. There is a

predominance of children belonging to families in socioeconomic classes D-E (no family was classified in classes A1-B1) and daughters of mothers who declared themselves brown or black. As for schooling, 39.7% of the children's mothers had less than eight years of schooling and about 1/3 were under 19, most (59.7%) being multiparous.

The median total sleep time at six and 12 months was, respectively, 11.1 hours (IQR=9.6-13.0 hours) and 11.5 hours (IQR=10.0-13.0 hours), with a reduction in the median and IIQ of nocturnal awakenings from six to 12 months (Table 2).

Consumption of sugary food items at three, six and 12 months of age is shown in Figure 1. Regular consumption of at least 'some of the sugary foods' was found between 50.6 and 91.1% of children at three and

six months. months of age, respectively, and among all children at 12 months of age.

Figure 2 shows that, of the total number of children with short sleep duration (<12h) in the sixth month of life (60.3%), 60.2% remained in this category at 12 months. Among those who slept  $\geq 12$  hours, more than half (52.1%) had reduced sleep time at 12 months. And almost 1/4 of the children had nocturnal awakenings more than twice at six months, of which 53.5% remained at this frequency of awakenings.

Table 3 relates the indicators of poor sleep quality (DS<12h and NA>2) with the regular consumption of sugary foods. The association was statistically significant ( $p < 0.05$ ) only between sweets consumption and AN $\leq 2$  at six months. At 12 months, no association was found between the variables.

Table 1 - Socioeconomic and demographic, gestational, perinatal, and infant characteristics of children (n=179)

Characteristics <sup>1</sup>	n (%) <sup>*</sup>	Characteristics <sup>1</sup>	n (%) <sup>*</sup>
<b>Socioeconomic and Demographic</b>			
<b>Socioeconomic Classification<sup>a</sup></b>		<b>Maternal Education</b>	
B2/C1/C2	57 (31.8)	$\leq 8$ anos	71 (39.7)
D/E	122 (68.2)	$> 8$ anos	108 (60.3)
<b>Registration in CCTP<sup>b</sup></b>		<b>Lives with Spouse</b>	
No	115 (64.2)	No	26 (14.5)
Yes	64 (35.8)	Yes	153 (85.5)
<b>Maternal Skin Color</b>		<b>Maternal Age</b>	
White	64 (35.8)	$\leq 19$ years	55 (30.7)
Brown or black	115 (64.2)	$> 19$ years	124 (69.3)
<b>Gestational and Perinatal</b>			
<b>Parity</b>		<b>Prenatal</b>	
Primiparous	71 (40.3)	$< 6$ consultations	78 (43.8)
Multiparous	99 (59.7)	$\geq 6$ consultations	100 (56.2)
<b>Children</b>			
<b>Gender</b>		<b>Birth Weight</b>	
Male	87 (48.6)	$< 2500$ g	8 (4.5)
Female	92 (51.4)	$\geq 2500$ g	171 (95.5)

<sup>a</sup> Brazil Economic Classification Criteria (CCEB).

<sup>b</sup> CCTP: Conditional Cash Transfer Program.

<sup>1</sup> Variables collected at birth stage (up to 24h postpartum).

\* Sample sizes vary slightly/superficially due to lack of variable data.

Table 2 - Median and interquartile range of sleep variables studied in the first year of life (n=179)

Variables	6 months	12 months
	Median (IQR)	Median (IQR)
<b>Sleep duration (hours)</b>		
Total	11.1 (9.6-13.0)	11.5 (10.0-13.0)
Night	9.0 (8.0-10.0)	10.0 (8.5-11.0)
Day	2.0 (1.0-4.0)	2.0 (1.0-3.0)
<b>Night awakenings (n)</b>	<b>2.0 (1.0-2.0)</b>	<b>0.0 (0.0-1.0)</b>

IQR: interquartile range (25-75).

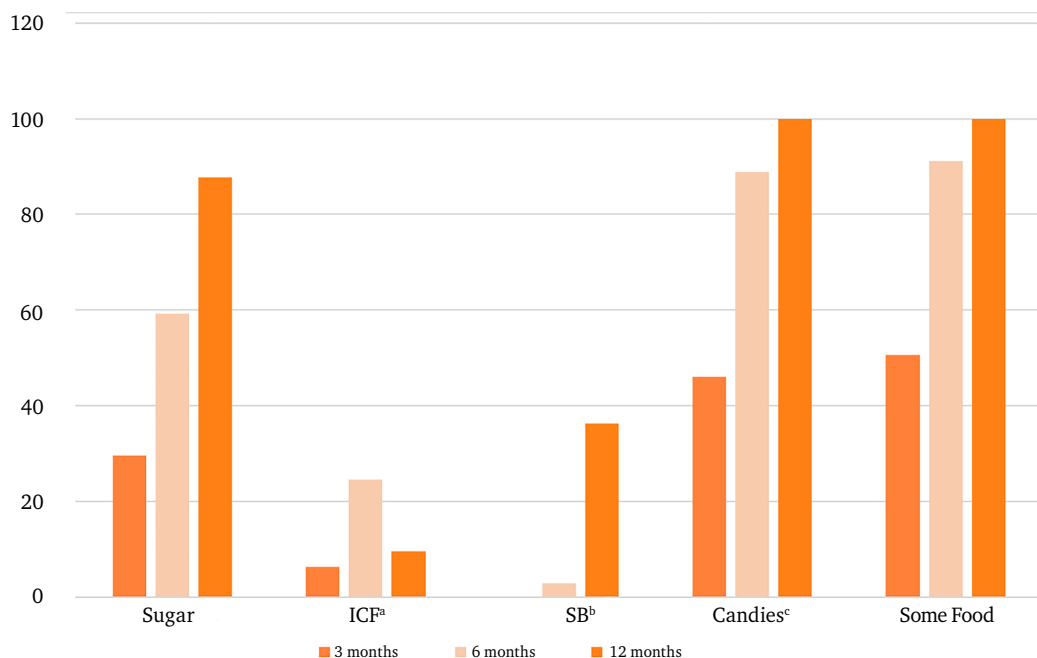


Figure 1 - Consumption of sugary foods (%) in the first year of life (n=179)

<sup>a</sup>Instant cereal flour with sugar.

<sup>b</sup>Soft drinks; powders for refreshment; juices, nectar, ready-to-eat refreshments.

<sup>c</sup>Sweet biscuits with and without filling; candies, lollipops, gum; petitsuisse; Ice cream; flavored dairy drink; gelatin; porridge; *munguzá*.

<sup>d</sup>Refers to the consumption of at least one of the items: sugar, ICF, sugary drinks and sweets.

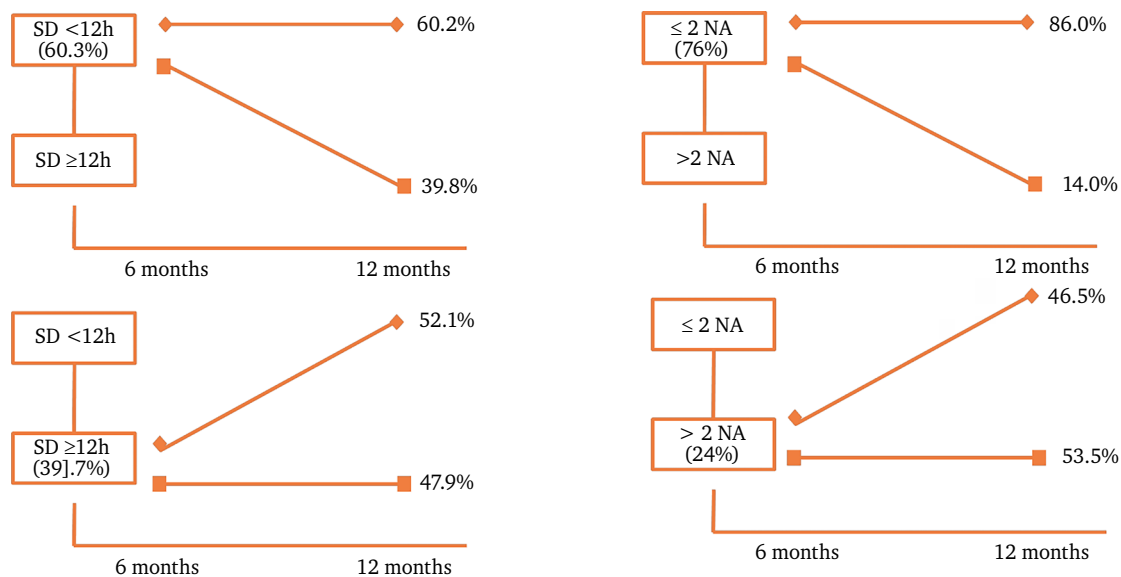


Figure 2 - Trajectory of sleep duration (SD) and night awakenings (NA) in the first year of life (n=179)

## DISCUSSION

This study investigated sleep duration, frequency of night awakenings and consumption of sugary foods in the first year of life, as well as analyzing the relationship between consumption of these foods and indicators of poor sleep quality at six and 12 months.

The contribution to the advancement of knowledge is highlighted, since, to our knowledge, this is the first study to investigate this association in the first year of life and to present data from a longitudinal investigation on sleep quality indicators among children. Brazilians in this age group. In addition, data from the first and only birth cohort in the state of Alagoas were used.

Table 3 - Prevalence of indicators of poor sleep quality according to the consumption of sugary foods in the first year of life (n=179)

Consumables	Prevalence of indicators of poor sleep quality n (%)					
	6 months			12 months		
	Sleep Duration < 12h	Night Awakenings > 2	Total	Sleep Duration < 12h	Night Awakenings > 2	Total
<b>Sugar</b>	<i>P</i> =0.344	<i>P</i> =0.380		<i>P</i> =0.480	<i>P</i> =0.653	
Yes	63 (63.2)	27 (21.7)	106 (59.2)	91 (58.0)	36 (23.0)	157 (87.7)
No	41 (56.2)	20 (27.4)	73 (40.8)	11 (50.0)	6 (27.3)	22 (12.3)
<b>ICF<sup>a</sup></b>	<i>P</i> =0.846	<i>P</i> =0.524		<i>P</i> =0.385	<i>P</i> =0.232	
Yes	26 (59.1)	9 (20.4)	44 (24.6)	8 (47.1)	2 (11.8)	17 (9.5)
No	82 (60.7)	34 (25.2)	135 (75.4)	94 (58.0)	40 (24.7)	162 (90.5)
<b>Sugary Drinks<sup>b</sup></b>	<i>P</i> =0.081	<i>P</i> =1.000		<i>P</i> =0.214	<i>P</i> =1.000	
Yes	1 (20.0)	1 (20.0)	5 (2.8)	33 (50.8)	15 (23.1)	65 (36.3)
No	107 (61.5)	42 (24.1)	174 (97.2)	69 (60.5)	27 (23.7)	114 (63.7)
<b>Candies<sup>c</sup></b>	<i>P</i> =0.974	<i>P</i> =0.020		-	-	
Yes	96 (60.4)	34 (21.4)	159 (88.8)	102 (57.0)	42 (23.5)	179 (100.0)
No	2 (60.0)	9 (45.0)	22 (11.2)	0 (0.0)	0 (0.0)	0 (0.0)
<b>Some of the Food<sup>d</sup></b>	<i>P</i> =1.000*	<i>P</i> =0.186		-	-	
Yes	98 (60.1)	37 (22.7)	163 (91.1)	102 (57.0)	42 (23.5)	179 (100.0)
No	10 (62.5)	6 (37.5)	16 (8.9)	0 (0.0)	0 (0.0)	0 (0.0)
<b>Total</b>	<b>108 (60.3)</b>	<b>43 (24.0)</b>		<b>102 (57.0)</b>	<b>42 (23.5)</b>	

\*p-value of Pearson's chi-square and Fisher's exact tests (variables with categories of n<5).

<sup>a</sup>ICF: Instant cereal flour with sugar.

<sup>b</sup>Soft drinks; powders for refreshment; juices, nectar, ready-to-eat refreshments.

<sup>c</sup>Sweet biscuits with and without filling; candies, lollipops, gum; petitsuisse; Ice cream; flavored dairy drink; gelatin; porridge; *munguzá*.

<sup>d</sup>Refers to consumption of at least one of the items: sugar, ICF, sugary drinks and sweets.

Our results showed that more than half of the children had short sleep duration (SD<12h) and ¼ excessive nocturnal awakenings (NA>2) during the first year of life. Furthermore, indicating that sleep habits tend to remain in the subsequent stages, it was found that, of the children who slept less than 12 hours and woke up more than twice at six months, about 60 and 50%, respectively, remained in this category at 12 months of age.

Although there are no national surveys or longitudinal investigations on sleep quality indicators in Brazil, data from a population-based cross-sectional study conducted in the five Brazilian regions (North, Northeast, Midwest, Southeast and South) with 350 children aged between zero and three years corroborate our findings. This study identified that the average duration of sleep was below or within the lower limit of the range of recommended values, with a prevalence of sleep problems of 20% among children aged zero to three years.<sup>14</sup>

It is worth mentioning that the occurrence of excessive awakenings is part of the list of indicators of poor sleep quality due to its interference in the sleep cycle, configured by REM sleep (with rapid eye movements)

and NREM (without rapid eye movements), which subdivides into four stages, with five to six cycles expected to be completed overnight. The importance of a complete night's sleep - without interruptions caused by awakenings - is justified by the specific physiological function that each stage plays in the body. Thus, when awakening occurs, the stage is interrupted and the cycle is not completed, compromising the proper organic functioning of energy repair, protein synthesis, physical growth from the synthesis of growth hormone, strengthening of the immune system and others. child neurodevelopment processes dependent on these sleep states.<sup>1,15</sup>

The short duration of sleep can culminate in a chronic state of sleep restriction and imply medium and long-term consequences, due to the impairment of cognitive performance, memory and learning (language), socio-emotional development and somatic growth.<sup>1,2,15</sup> In addition, sleep deprivation and poor quality of sleep can impact excessive weight gain, especially by mechanisms related to misalignment of the circadian system and consequent change in the homeostatic and hedonic regulation of food consumption, leptin and ghrelin hormones and the reduction of energy expenditure.<sup>16-18</sup>

In the present study, the high prevalence of consumption of sugary foods since the third month of age is added to sleep as a risk factor for excessive weight gain. During this period, more than half of the children already regularly consumed at least one of the analyzed foods, contrary to the recommendations aimed at children under two years of age, which emphasize the exclusive offer of breast milk up to six months and the exclusion of sugar, preparations or products containing sugar, as well as ultra-processed foods before the age of two.<sup>11</sup>

Such recommendation is justified because these foods contain, in addition to excess sugar, high levels of salt, fat and food additives, such as sweeteners, dyes and preservatives, which can lead, in the medium and long term, to the development of overweight, obesity and other chronic diseases, such as hypertension, heart disease, diabetes, in addition to contributing to chronic sleep-related problems.<sup>8,11</sup>

However, our findings corroborate the Atlas of Childhood Obesity in Brazil, in which there are data extracted from the Food and Nutrition Surveillance System, which showed that 32% of children (six to 23 months, n=184,163) had consumed sugary drinks and 49% ultra-processed foods on the day before the interview, with the prevalence of overweight and obesity, respectively, being 18.9 and 7.9%.<sup>19</sup>

Given the above, although our initial hypothesis was not confirmed, since no statistically significant differences were found between sugary consumption and indicators of poor sleep quality, our findings demonstrate the coexistence of two convincing risk factors for excess of weight and obesity. These conditions are part of the list of major public health problems, due to their epidemic increase in the last four decades<sup>20</sup> and their deleterious consequences, such as osteoarticular and respiratory problems and early markers of cardiovascular diseases.<sup>21</sup> The Unified Health System, due to the high economic burdens related to the treatment.<sup>22</sup> Furthermore, this result may have been influenced by the sample size and the fact that these foods are consumed by all or most children at 12 months, impacting the analysis of the groups.

### Strengths and limitations

This study has some strengths and limitations. First, the methodological rigor of the research and the fact that the interviews were carried out at fixed times (at three, six and 12 months after delivery) are emphasized in order to minimize variability between children.

Although sleep data is prone to maternal estimation errors and the most accurate information of sleep behavior can be obtained through objective measures such as actigraphy or polysomnography, there is evidence that the mother's reports are consistent with the mother's measurements. actigraphy for total sleep time. This is because the scale used (BISQ) is characterized as a psychometric, clinical, and ecological tool, with support for clinical and research purposes, widely used in international studies.<sup>23</sup>

However, there are limitations that must be considered. Given the complexity of mothers in accurately estimating the amount of food ingested by children, our study does not have quantitative data on food consumption. Another important aspect to consider is that the children studied represent a population from a vulnerable region of Brazil, therefore, the interpretations of the results should be considered with caution in populations with different socioeconomic characteristics. Finally, the sample size did not allow for a robust analysis, such as logistic regression.

## CONCLUSIONS

The results obtained in the present study showed a high prevalence of short sleep duration and excessive nocturnal awakenings among the population studied, in addition, all children consumed sugary foods before completing one year of age. The associations between consumption of sugary foods and indicators of poor sleep quality have not been confirmed.

Therefore, in the context of public health, we suggest the use of subjective tools to measure the quality of children's sleep in pediatric clinical practice and in routine primary care protocols, as a way of early diagnosing, monitoring, and treating sleep disorders. The inclusion of sleep-related variables in national child health surveys is also recommended. In addition, further investigations are needed to elucidate how sleep and feeding are interrelated and mutually potentiate as determinants of infant growth and development.

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