

RELATIONSHIP BETWEEN MATERNAL SLEEP QUALITY AND CHILD NUTRITIONAL STATUS

Lainy Ribeiro dos Santos¹; Yroan Paula Landim²; Marcia Caroline Nascimento Sá Ewerton Martins³

Fabírcia Silvana Sarmento dos Santos⁴; Leonardo Hunaldo dos Santos⁵; Marcelino Santos Neto⁶

Floriacy Stabnow Santos⁷; Ana Cristina Pereira de Jesus Costa⁸

Highlights: 1. There is no relationship between poor maternal sleep quality and child nutritional status. 2. Pittsburgh sleep quality index as an assistive technology.

PRE-PROOF

(as accepted)

This is a draft, unedited version of a manuscript that has been accepted for publication in the Revista Contexto & Saúde. As a service to our readers, we are making this initial version of the manuscript available as accepted. The article will still undergo review, formatting and approval by the authors before being published in its final form.

<http://dx.doi.org/10.21527/2176-7114.2024.48.14572>

How to cite:

dos Santos LR, Landim YP, Martins MCNSE, dos Santos FSS, dos Santos LH, Santos Neto M. et al. Relationship between maternal sleep quality and child nutritional status. Rev. Contexto & Saúde, 2024;24(48): e14572

¹ Federal University of Maranhão, Center for Social Sciences, Health and Technology – CCSST, Imperatriz/MA, Brazil.
<https://orcid.org/0000-0002-9447-8958>

² Federal University of Maranhão, Center for Social Sciences, Health and Technology – CCSST, Imperatriz/MA, Brazil.
<https://orcid.org/0000-0002-6973-098X>

³ Federal University of Maranhão, Center for Social Sciences, Health and Technology – CCSST, Imperatriz/MA, Brazil.
<https://orcid.org/0000-0001-5678-6047>

⁴ Federal University of Maranhão, Program in Health and Technology – PPGST, Imperatriz/MA, Brazil.
<https://orcid.org/0000-0001-8407-1073>

⁵ Federal University of Maranhão, Center for Social Sciences, Health and Technology – CCSST. Graduate Program in Health and Technology – PPGST, Imperatriz/MA, Brazil.
<https://orcid.org/0000-0003-2280-4643>

⁶ Federal University of Maranhão, Center for Social Sciences, Health and Technology – CCSST. Graduate Program in Health and Technology – PPGST, Imperatriz/MA, Brazil.
<https://orcid.org/0000-0002-6105-1886>

⁷ Federal University of Maranhão, Center for Social Sciences, Health and Technology – CCSST. Graduate Program in Health and Technology – PPGST, Imperatriz/MA, Brazil.
<https://orcid.org/0000-0001-7840-7642>

⁸ Federal University of Maranhão, Center for Social Sciences, Health and Technology – CCSST. Graduate Program in Health and Technology – PPGST, Imperatriz/MA, Brazil.
<https://orcid.org/0000-0002-7845-3072>

ABSTRACT

Objective: To analyze the relationship between maternal sleep quality and child nutritional status.

Methodology: Cross-sectional study carried out with mothers and children in a private pediatric institution in a municipality in Maranhão between March and December 2020. The mothers who participated were aged between 17 and 42 years old, while the children were aged between 6 and 24 months. The data collected included children's weight, height and body mass index, in addition to sociodemographic, perinatal and maternal sleep quality issues. The analysis used descriptive statistics and logistic regression models for associations between perinatal characteristics and child nutritional status in terms of maternal sleep quality. **Results:** It was found that 54.5% of the children were females, 80.6% aged between 6 and 24 months; 62.4% of mothers were married, with an average age of 29 years ($SD \pm 5.7287$). There was no significant association between child nutritional status and poor sleep quality ($p > 0.05$). **Conclusion:** In this study, we were unable to identify relationships between sleep and child nutrition. In other words, poor sleepers do not represent an increased risk of influencing inadequate infant nutritional status. **Implications for practice:** The use of the Pittsburgh Sleep Quality Index, as an assistance technology, helps to improve health care for mothers and their children, expanding the possibilities of resources for nursing work.

Keywords: Sleep. Women. Nutritional Status. Child. Nursing.

INTRODUCTION

Nutritional status is an important indicator of health conditions and is mainly determined by the socio-economic situation of families¹. In recent years, Brazil has been undergoing a nutritional change, with the number of overweight and obese children increasing and child malnutrition decreasing².

Children do not usually eat the recommended daily amount of essential nutrients, and this is a worrying situation, since the quality and quantity of food consumed by children affects their health throughout their lives. Childhood is seen as a stage of vulnerability to nutritional deficiencies and problems³.

Depleted nutritional status is reflected in the immune system; therefore, when faced with an infection, malnutrition is a facilitator of the spread of infections. An appropriate diet, rich in specific nutrients, can delay this degradation of immunity, reduce the occurrence of secondary

RELATIONSHIP BETWEEN MATERNAL SLEEP QUALITY AND CHILD NUTRITIONAL STATUS

infections and improve the therapeutic response⁴⁻⁵.

Between 2011 and 2013, there was a worldwide nutritional transition from 101 million underweight children under the age of five to 42 million overweight children in the same age group. Among the various causes of child mortality, one third is associated with malnutrition and the other portion with obesity^{1,6}.

In the last 16 years, the number of overweight children and adolescents aged between 5 and 19 has practically doubled, from one in ten to almost one in five⁷. Specifically in the state of Maranhão, a survey carried out in 2006 showed that 3.9% of children were diagnosed with malnutrition and 6.7% were diagnosed as overweight⁸.

Some studies show that contemporary society has suffered a reduction in the quality and quantity of sleep, due to the fact that people need to work or have leisure time⁹.

The daily activities carried out by women can suffer losses due to the poor use of their sleep, which generates unsatisfactory performance at work and quality of life, in addition to causing a strong social and economic impact¹⁰. Sleep is essential for maintaining human life, as it has a restorative function. Its deprivation can cause damage to the immune system, healing processes, as well as physical and/or mental health¹¹⁻¹².

Other aspects related to poor sleep quality in women, such as maternal demands, extra work at night, excessive daytime sleepiness, snoring, sleep apnea and insomnia also seem to increase the vulnerability of people who depend on their care, namely children¹³. Nevertheless, there are still no studies on the relationship between maternal sleep quality and child nutritional status¹⁴. This fact is worrying, as the modulation of maternal sleep may have repercussions on children's health in the future.

The mother's perception of her child's nutritional status is essential for early intervention and thus preventing possible nutritional disorders¹⁵⁻¹⁶. The difficulty in terms of recognizing nutritional status contributes to the increase in overweight children¹⁷.

Based on these considerations, we can see the importance of carrying out studies that investigate this relationship between the quality of mothers' sleep and the nutritional status of their children, since existing publications highlight associations focused on the presence of health problems or diseases specifically in the woman; therefore, it is believed that progress can be made in the investigative approach regarding the effects on children. Thus, the objective of this research is to analyze the relationship between maternal sleep quality and child nutritional status.

METHODOLOGY

This is a cross-sectional and descriptive-analytical study, carried out in a private pediatric institution in a city in the state of Maranhão.

Data collection started in March 2020, being interrupted in the same month, due to the new Coronavirus (COVID-19) pandemic. However, with the gradual opening of health establishments, the research carried out at the pediatric clinic was resumed in July and completed in December of the same year.

The target population involved the dyad (mother-child). In order to determine the sample size, a calculation was performed in the G* Power 3.1¹⁸ software, using a chi-square analysis, with 20% medium effect size, 0.85 or 85% power and significance level (α) equal to 0.05 or 5%. Accordingly, the calculation revealed that 225 children and 225 mothers should be studied, resulting in 450 participants.

To this end, convenience sampling was used, consecutively, where all mothers of eligible children were invited to participate in the research until the proposed size was reached. However, the final sample was not reached, due to the reduction in the flow of services in the field of study, caused by the health measures in force during the COVID-19 pandemic. Accordingly, the final sample consisted of 165 children and 165 mothers, totaling 330 participants.

The following sample eligibility criteria were used: mothers aged in the reproductive phase (10 to 49 years old), biological or adopted and who were accompanying their children at the time of the research; children aged between 6 months and 5 years, males and females, were included. Mothers who underwent psychotherapeutic monitoring and/or used sleep-inducing medications during the research period were excluded; the exclusion of children involved those with congenital malformations, genetic syndromes, endocrinopathies, cardiopathies, neuropathies, pneumopathies or nephropathies.

All steps of data collection were carried out by a single researcher, previously trained to familiarize herself with the instrument and ensure adequate quality in terms of verifying the measures. It should be noted that, due to the pandemic scenario, participants were informed about the need to respond to the questionnaire online, through the WhatsApp® application.

A single electronic instrument was used, which consisted of a closed questionnaire with objective questions, prepared using the Google forms tool, in order to obtain information from the mother-child binomial, namely: sociodemographic and anthropometric data and sleep quality. The mothers responded to the questions on the same day as the children's anthropometric assessment.

RELATIONSHIP BETWEEN MATERNAL SLEEP QUALITY AND CHILD NUTRITIONAL STATUS

In the first part of the instrument, the sociodemographic and perinatal assessment involved: child's information (name, age, sex, origin); mother's information (name, age, profession/occupation, education, marital status, family income); perinatal information (gestational age, weight and length of the baby at birth, risk during pregnancy).

The second part of the instrument included information about the child's current diet and anthropometric data (weight, length/height and BMI). Regarding anthropometry, Welmy® anthropometric scale/Balmak® pediatric scale and infantometer/stadiometer were used; in order to calculate BMI, an Elgin® calculator was used. When checking their weight, children under two years of age were accompanied by their mothers and were placed on the pediatric scale in the supine position, undressed. When measuring the weight of children over two years of age, they were dressed but barefoot. These children remained in an orthostatic position in the middle of the anthropometric scale platform.

The length of children under two years of age was checked by placing them in the supine position on a flat horizontal surface, with the head resting firmly on the end of the infantometer, neck straight, chin away from the chest, shoulders and back fully in contact with the surface, arms extended along the body or held over the belly, and the feet forming a 90° angle with the infantometer.

When measuring children over two years of age, they were positioned standing, with heels together, the back of the head (nape), back, buttocks and heels touching the vertical rod of the stadiometer, arms loose along the body with the palms of the hands facing the thighs and head positioned in the Frankfurt plane, which is an imaginary horizontal line that joins the lower outer part of the eye socket with the ear opening, forming a 90° angle with the cursor of the measuring device. In the case of children with hairstyles, headbands or barrettes in their hair, they were advised to remove them and try to leave their hair as loose as possible¹⁹.

In order to calculate BMI, the formula that divides weight (in kilograms) by height (in meters) squared was used. BMI was used as a reference for assessing children's nutritional status. The possible scores obtained when analyzing BMI x AGE are: ($> +3$ z scores: obesity); ($\leq +3$ and $\geq +2$ z-scores: overweight); ($\leq +2$ and $> +1$ z-scores: risk of overweight); ($\leq +1$ and ≥ -2 z-scores: adequate BMI); (< -2 and ≥ -3 z-scores: thinness); and (< -3 z scores: marked thinness)¹⁹. During the procedure for verifying the components of nutritional status and detecting them among children, the guidelines of the Brazilian Ministry of Health were adopted, which are described in the Child Health Handbook²⁰.

RELATIONSHIP BETWEEN MATERNAL SLEEP QUALITY AND CHILD NUTRITIONAL STATUS

The last part of the instrument was composed of the Pittsburgh Sleep Quality Index (PSQI), in order to assess the quality of maternal sleep in the last month, a version validated, translated and adapted to Brazilian standards as the *Índice de Qualidade do Sono de Pittsburgh*²¹.

The PSQI contains 19 self-report questions and five questions directed to the spouse or roommate. The last five questions are aimed only at clinical practice; therefore, they do not contribute to the total index score, which is why they were removed from the research. The 19 self-report questions are categorized into seven components, graded into scores from zero (no difficulty) to three (severe difficulty).

The components present in the PSQI are: C1 subjective sleep quality, C2 sleep latency, C3 sleep duration, C4 habitual sleep efficiency, C5 sleep changes, C6 use of sleep medications and C7 daytime sleep dysfunction.

The sum of the values attributed to the seven components varies from zero to twenty-one in the total questionnaire score, indicating that the higher the number, the worse the sleep quality. A total score greater than five indicates that the individual is experiencing major dysfunction in at least two components, or moderate dysfunction in at least three components. Mothers with scores higher than five points were classified as poor sleepers.

After verifying errors and inconsistencies, a descriptive analysis was carried out using absolute and relative frequencies for all sociodemographic variables, maternal sleep quality and child nutritional status.

In order to assess possible associations between perinatal characteristics and child nutritional status in relation to maternal sleep quality, binary logistic regression models were used²². Odds ratios (OR) were also estimated with 95% confidence intervals. All tests were performed using the IBM SPSS 24²³ program with 5% significance.

The research was approved by the Human Research Ethics Committee of the Federal University of Maranhão/UFMA, obtaining approval under Opinion nº 4.544.192.

RESULTS

The study sample consisted of 330 participants, distributed among 165 children and 165 mothers, who filled out the instrument and/or participated in all stages of the research. Among the children, there was a predominance of females (54.5%), aged between 6 and 24 months (80.6%), without siblings (58.8%), born in the municipality where the study took place (65.5%) and who did not attend daycare or nursery (87.3%). Regarding the type of birth and duration of

RELATIONSHIP BETWEEN MATERNAL SLEEP QUALITY AND CHILD NUTRITIONAL STATUS

breastfeeding, 84.2% were born via cesarean section and were breastfed for less than a year (88.5%). Of the breastfed children, 34.5% were supplemented with breastfeeding and 93.9% were not using food supplements.

Most mothers were married (62.4%), had higher education (69.7%), owned their own home (81.2%) and lived in urban areas (98.2%). The average age of these mothers was 29 years old ($SD \pm 5.7287$). In terms of help with children, 90.9% of mothers said they had some type of support network. Most participants had a monthly family income between five and nine minimum wages (32.1%), considered average purchasing power in Brazil. It should be noted that the value of the minimum wage in 2020 was R\$1,045.00.

The prevalence of poor maternal sleep quality was 74.5%, which made the event under study a common outcome. The nutritional status of most children presented adequate percentages, that is, weight, height and ideal BMI for their age, with z scores $\leq +1$ and ≥ -2 , assessed through the children's health records (Table 1).

Table 1. Descriptive analysis of the variables “maternal sleep quality” (n=165) and “child nutritional status” (n=165). Imperatriz-MA, Brazil, 2021.

Variable	n	%
Mother's sleep quality		
Good sleeper		
Poor sleeper	42	25.5
Child's nutritional status	123	74.5
Weight		
Adequate		
High	152	92.1
Low	12	7.3
Height	1	0.6
Adequate		
High	127	77.0
Low	26	15.8
Very low	11	6.7
BMI	1	0.6
Eutrophy	97	58.8
Thinness	25	15.2
Marked thinness	16	9.7
Risk of overweight	12	7.3
Overweight	10	6.1
Obesity	5	3.0

Source: own elaboration.

RELATIONSHIP BETWEEN MATERNAL SLEEP QUALITY AND CHILD NUTRITIONAL STATUS

With regard to the quality of maternal sleep, the analysis between the groups revealed that children born to poor sleepers had a higher percentage of normal weight than those born to good sleepers. The differences between good and poor sleepers and components of nutritional status do not represent clinically relevant proportional changes. It should be noted that most mothers who sleep poorly have children within the high height classification (Table 2).

Table 2. Characteristics of the components of child nutritional status (n=165) regarding maternal sleep quality (n=165). Imperatriz-MA, Brazil, 2021.

	GOOD SLEEPER		POOR SLEEPER	
	N	%	N	%
WEIGHT				
Adequate	37	24.3	115	75.7
High	4	33.3	8	66.7
Low	1	100.0	0	0.0
HEIGHT				
Adequate	37	29.1	90	70.9
High	3	11.5	23	88.5
Low	2	18.2	9	81.8
Very low	0	0.0	1	100.0
CURRENT BMI				
Eutrophy	23	23.7	74	76.3
Thinness	1	20.0	4	80.0
Marked thinness	3	30.0	7	70.0
Risk of overweight	10	40.0	15	60.0
Overweight	3	18.8	13	81.3
Obesity	2	16.7	10	83.3

Source: own elaboration.

Table 3 presents the magnitude of the associations found between the components of nutritional status and poor sleep quality. A binary logistic regression was performed to verify whether the independent variables referring to the children's nutritional characteristics (weight, height, BMI) were related in any way to the poor quality of maternal sleep. Thus, it was found that there was no gross and statistically significant association between child nutritional status and poor sleep quality. In other words, poor sleepers do not represent an increased risk of influencing inadequate child nutritional status.

RELATIONSHIP BETWEEN MATERNAL SLEEP QUALITY AND CHILD NUTRITIONAL STATUS

Table 3. Logistic regression analysis between components of child nutritional status and poor maternal sleep quality (n=123). Imperatriz-MA, Brazil, 2021.

	POOR SLEEPER n (%)	Odds ratio (95% CI)	p-value*
Breastfeeding time			
< 1 year	110 (75.3)	1.41 (0.50 – 3.98)	0.52
> 1 year	13 (68.4)	1.00	
Child's main caregiver			
Mother with help	114 (76.0)	1.00	
Mother without help	9 (60.0)	2.11 (0.70 – 6.33)	0.18
Child's diet			
EBF ⁺	4 (80.0%)	1.5 (0.69 – 3.29)	0.29
BF ⁺⁺ + formula milk	5 (83.3%)	1.6 (0.17 – 15.08)	0.67
Exclusive formula milk	2 (66.7%)	2.0 (0.22 – 18.05)	0.53
BF + other foods	45 (78.9%)	0.80 (0.07 – 9.26)	0.86
Other foods	67 (71.4%)	1.00	
Attend daycare or nursery			
Yes	15 (71.4%)	1.00	
No	108 (75.0%)	1.2 (0.43 – 3.32)	0.72
Use food supplement			
Yes	7 (70.0%)	1.00	
No	116 (74.8%)	1.2 (0.31 – 5.17)	0.73
Weight			
Adequate	115 (75.7%)	1.5 (0.44 – 5.45)	0.49
Low	0	**	**
High	8 (66.7%)	1.00	
Height			
Adequate	90 (70.9%)	1.00	
Low	9 (81.8%)	1.8 (0.38 – 8.97)	0.44
High	23 (88.5%)	3.1 (0.89 – 11.14)	0.075
Very low	1 (100.0%)	**	**
BMI			
Eutrophy	74 (76.3%)	1.00	
Thinness	4 (80.0%)	1.2 (0.39 – 5.98)	0.55
Marked thinness	7 (70.0%)	0.85 (0.24 – 2.94)	0.80
Obesity	10 (83.3%)	1.5 (0.31 – 7.61)	0.58
Risk of overweight	15 (60.0%)	0.46 (0.18 – 1.17)	0.10
Overweight	13 (81.3%)	1.3 (0.35 – 5.14)	0.66

* Wald chi-square.

** Presence of zero values that makes it impossible to calculate the odds ratio (OR). 95% CI: 95% confidence interval.

+ Exclusive breastfeeding.

++ Breastfeeding.

Source: own elaboration (2021).

DISCUSSION

The prevalence of altered infant nutritional status was low, while poor sleep quality was a common event among mothers. Regarding the quality of sleep, it can differ due to the natural difference between biological and chronological age. Restful sleep (slow waves) reduces with advancing biological age, and this process is more harmful when it occurs in younger people¹⁵.

More than half of the mothers participating in this research were poor sleepers. Nonetheless, in this study, an increase in the risk of developing worse nutritional status in children born to these women who sleep poorly was not found. It should also be noted that no investigation was found that analyzed this relationship between the quality of maternal sleep and child nutritional status.

According to a bibliographic survey in databases, few publications were found that were close to the purpose of this article. The few studies identified and analyzed highlighted the relationship between socioeconomic and health factors and child nutritional status. Accordingly, this research is unprecedented in terms of the influence of maternal sleep on the child nutritional status.

Despite this, the consulted studies are unanimous in terms of showing that qualitative and quantitative changes in sleep have epidemiological associations with numerous health problems, such as metabolic syndrome, diabetes, cardiovascular diseases and psychological alterations²⁴⁻²⁵.

The cycle that goes from pregnancy to the postpartum period causes several biopsychosocial changes in women's lives, which causes their sleep pattern to change. Studies have estimated that these sleep-related disorders harm up to 86% of postpartum women²⁶.

The results showed that most mothers who sleep poorly breastfed for less than a year. Breastfeeding is associated with decreased maternal sleep satisfaction, as many women stop breastfeeding due to the interference with sleep and the fact that they perform numerous tasks²⁴.

Breastfeeding has to be reconciled with the woman's other tasks, and as it is a task that extends throughout the night, it involves greater difficulties, which creates overload and physical exhaustion, causing them to breastfeed for less time²⁷.

The importance of the mother-child relationship, especially in the first years of life, is fundamental for the child to have a continuous emotional relationship to develop in a healthy way, including good nutrition. Harms in this relationship can trigger changes at cognitive, emotional and social levels with unprecedented repercussions for children's health¹³.

The need to return to work and the day-to-day routine makes mothers look for an alternative

RELATIONSHIP BETWEEN MATERNAL SLEEP QUALITY AND CHILD NUTRITIONAL STATUS

support network to care for their children, as it is a way for women to maintain a balance between family life and their professional career. The main caregivers involved in this process are close family members, maids or nannies and daycare workers²⁸. However, mothers are not always able to delay their return to work and, consequently, need to opt for alternative care for their children, even if they are still very young²⁹.

Because they do not have the support to look after their young children or even for financial reasons, many women end up being forced to quit their jobs or look for something that requires lower qualifications or reduced working hours, which can also have a direct impact on their children's nutritional status³⁰.

The relationship between maternal work and excess weight in children occurs mainly in people from developed countries; on the other hand, the relationship between maternal work and child nutritional deficit is more common in countries in South Asia and Africa⁸.

When analyzing the components of child nutritional status separately, none showed a statistically significant association with poor maternal sleep quality. It is worth noting that none of the consulted surveys investigated this specific influence on children. The results found from other studies refer to evidence related to women's health.

Currently, poor sleep quality in women is a global public health problem³¹. Thus, any care that promotes the maintenance of sleep will benefit health, preventing the emergence of diseases. Adequate sleep is, therefore, a primordial human need, as it prevents losses in cognitive performance, mood, daily activities, reduces fatigue and increases vigor. Poor sleep quality interferes with decision making, speed and accuracy of task performance and post-exercise recovery³².

With respect to child nutrition, offering food to children after six months of age has the function of complementing breast milk. From this period onwards, complementary feeding aims to meet children's nutritional needs³³. Complementary feeding is essential, as the quantity and composition of breast milk can no longer meet the child's nutritional needs after six months of age³⁴.

Thus, the data from the present investigation show that, despite the fact that mothers are sleeping poorly, the nutritional status of their children is developing well, with adequate weight, height and BMI. In view of this, there are numerous means that can influence the health and growth of children, among which healthy eating is the main factor that guarantees adequate growth, as it avoids excess weight and prevents possible nutritional deficiencies³⁵.

RELATIONSHIP BETWEEN MATERNAL SLEEP QUALITY AND CHILD NUTRITIONAL STATUS

Other investigations have shown that the increased prevalence of excess weight in childhood, as well as stunting, are public health problems and both are harmful to health, causing physical and cognitive damage that affects child development³⁶. Thus, although the present investigation did not show the influence of maternal sleep on child nutritional status, it is important to consider that a well-rested mother is able to care for her child and all those around her more calmly, harmoniously and skillfully.

In practice, in health institutions, nurses usually deal with issues related to human sleep, as observed in the nursing diagnoses “Readiness for enhanced sleep and sleep deprivation”, especially in adults³⁷. Accordingly, nurses can contribute to monitoring and assessing sleep quality, especially in the implementation of health education actions, aimed at improving sleep latency and duration, rest environment and substance use.

This work has limitations, as it is a single-center study, whose number of participants was relatively small, since the calculated sample was not included due to the COVID-19 pandemic. The results obtained from this investigation must be considered carefully, based on the findings of this research. Another issue is the fact that the study was carried out in a private health establishment, where it is possible to see that, even though mothers are declared poor sleepers, they have a support network, which can have a direct influence on how their babies are fed, who, consequently, have an adequate nutritional status.

Therefore, it is recommended that other investigations on the topic be implemented and in other contexts, replicated with mothers of children of other age groups, with a longitudinal or experimental design, in order to generate more robust evidence.

CONCLUSION AND IMPLICATIONS FOR PRACTICE

The study concluded that there is no relationship between poor maternal sleep quality and child nutritional status. Due to the fact that this is a cross-sectional study, causal relationships cannot be established. The investigation used a psychometric scale to assess the quality of mothers’ sleep, which, although equivalent, is less accurate compared to other analytical methods, such as actigraphy and polysomnography.

The use of the Pittsburg Sleep Quality Index, as an assistance technology, contributes to improving health care for mothers and their children, expanding the possibilities of resources for nursing activities in these populations, providing targeted attention, identifying distinct aspects

that can influence nutritional status and align interventions that address the main changes in the quality components of maternal sleep, thus providing more responsive assistance to their needs.

The limitation of the study is the fact that, as the data were self-reported by the mothers, it is not possible to guarantee accuracy in filling out and/or memory. Furthermore, the COVID-19 pandemic made it impossible to expand the sample, which may have directly contributed to the weak associations between the variables.

REFERENCES

- 1 Pereira IFS, Andrade LMB, Spyrides MHC, Lyra CO. Estado nutricional de menores de 5 anos de idade no Brasil: evidências da polarização epidemiológica nutricional. *Ciência & Saúde Coletiva*, [s.l.], v. 22, n. 10, p.3341-3352, out. 2017. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/1413-812320172210.25242016>.
- 2 Mendes Alves B, Souza Marques JV, Carvalho Parente C, Souza Marques MV, Nogueira Arcanjo FP, Gomes Cajazeiras K. Estado nutricional de menores de 5 anos de idade em sobral-ce. *Sanare* [Internet]. 31º de maio de 2019 [citado 18º de maio de 2023];18(1). Disponível em: <https://sanare.emnuvens.com.br/sanare/article/view/1305>
- 3 Lopes WC, Marques FK, Oliveira CF, Rodrigues JA, Silveira MF, Caldeira AP, Pinho LD. Alimentação de crianças nos primeiros dois anos de vida. *Rev Paul Pediatr* [Internet]. Jun 2018 [citado 18 maio 2023];36(2):164-70. Disponível em: <https://doi.org/10.1590/1984-0462/2018;36;2;00004>
- 4 Null, C, Stewart CP, Pickering AJ, Dentz HN, Arnold BF, Arnold CD, et al. Effects of water quality, sanitation, handwashing, and nutritional interventions on diarrhoea and child growth in rural Kenya: a cluster-randomised controlled trial. *The Lancet Global Health*, [S.L.], v. 6, n. 3, p. 316-329, mar. 2018. Elsevier BV. [http://dx.doi.org/10.1016/s2214-109x\(18\)30005-6](http://dx.doi.org/10.1016/s2214-109x(18)30005-6).
- 5 Biasebetti MBC, Rodrigues ID, Mazur CE. Relação do consumo de vitaminas e minerais com o sistema imunitário: uma breve revisão. *Visão Acadêmica*, Curitiba, v.19, n.1, Jan. - Mar./2018 - ISSN 1518-836. <http://dx.doi.org/10.5380/acd.v19i1.57737>.
- 6 Silveira VNC, Padilha LL, Frota MTBA. Desnutrição e fatores associados em crianças quilombolas menores de 60 meses em dois municípios do estado do Maranhão, Brasil. *Ciência & Saúde Coletiva*, [S.L.], v. 25, n. 7, p. 2583-2594, jul. 2020. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/1413-81232020257.21482018>.
- 7 Unicef – Situação mundial da infância 2019. Disponível em: ISBN: 978-92-806-4999-4.
- 8 Lopes AF, Frota MTBA, Leone C, Szarfarc SC. Perfil nutricional de crianças no estado do Maranhão. *Revista Brasileira de Epidemiologia*, [S.L.], v. 22, p. 1-12, 2019. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/1980-549720190008>.

- 09 Ribeiro HLS, Carvalho VP, Petruco ACM, Bersani-amado LE, Amaral WN, Júnior JPM et al. perfil clínico-epidemiológico da sonolência diurna excessiva quanto a sua avaliação por intermédio da aplicação de escalas subjetivas do sono: escala de sonolência de epworth e índice de qualidade do sono de pittsburgh. *Revista Uningá*, [S.L.], v. 57, n. 1, p. 39-50, 31 mar. 2020. Editora UNINGA. <http://dx.doi.org/10.46311/2318-0579.57.1.039-050>.
- 10 Barros MBA, Lima MG, Ceolim MF, Zancanella E, Cardoso TAMO. Quality of sleep, health and well-being in a population-based study. *Revista de Saúde Pública*, [S.L.], v. 53, p. 82-90, 27 set. 2019. Universidade de São Paulo, Agência USP de Gestão da Informação Acadêmica (AGUIA). <http://dx.doi.org/10.11606/s1518-8787.2019053001067>.
- 11 Biazim SK, Souza DA, Junior HC, Richards K, Valderramas S. Questionário de sono de Richards-Campbell e o questionário do sono em unidade de terapia intensiva: tradução para o português e adaptação transcultural para uso no Brasil. *J. bras. pneumol.* vol.46 no.4 São Paulo 2020 Epub 01 de junho de 2020. <https://doi.org/10.36416/1806-3756/e20180237>.
- 12 Lima AM, Rocha JSB, Reis VMCP, Silveira MF, Caldera AP, Freitas RF et al . Perda de qualidade do sono e fatores associados em mulheres climatéricas. *Ciência & Saúde Coletiva*, [s.l.], v. 24, n. 7, p. 2667-2678, jul. 2019. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/1413-81232018247.19522017>.
- 13 Costa FA. Mulher, Trabalho e Família: Os impactos do trabalho na subjetividade da mulher e em suas relações familiares. *Revista da Graduação em Psicologia da PUC Minas* v. 3, n. 6, jul./dez. 2018–ISSN 2448-0738. Disponível em <http://periodicos.pucminas.br/index.php/pretextos/article/view/15986>.
- 14 Hermes FN, Nunes EE, Melo CM, estado nutricional e hábitos alimentares em crianças: um estudo de revisão. *Rev Paul Pediatr* [Internet]. 2022 [citado 19jul 2023];40. Dispnível em: <https://doi.org/10.1590/1984-0462/2022/40/2020479>
- 15 Sullivan K. Morar com filhos pode significar menos sono para as mulheres, mas não para os homens. *American Academy of Neurology*. Embargado para liberação até 4 pm et, 26 de fevereiro de 2017. Disponível em <https://www.abstractsonline.com/pp8/#!/4046/>
- 16 Caetano Y. Grávidas que trabalham à noite têm mais complicações na gestação. Out 2019. Disponível em: <http://paineira.usp.br/aun/index.php>.
- 17 Gomes ER, Backes V. Percepção dos pais em relação ao estado nutricional dos seus filhos. *Saúde e Desenvolvimento Humano*, [S.L.], v. 6, n. 3, p. 39-44, 17 dez. 2018. Centro Universitario La Salle - UNILASALLE. <http://dx.doi.org/10.18316/sdh.v6i3.4731>.
- 18 Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral and biomedical sciences. *Behavior Research Methods*, 2007, 39, 175-191.
- 19 Tavares BM, Gigante DP, Ferreira HS, Melendez JGV, Anjos LA, Hasselmann MH et al. Manual de Avaliação Antropométrica do Estudo Nacional de Alimentação e Nutrição Infantil (ENANI). Rio de Janeiro, 2019.
- 20 Brasil. Caderneta da Criança: Menino – Passaporte da cidadania. 3ª edição. Brasília: Ministério

da Saúde, 2021

21 Bertolazi AN, Fagundes SC, Hoff, Dartora EG, Miozzo ICS, Barba MEF, Barreto SSM. Validation of the Brazilian Portuguese version of the Pittsburgh Sleep Quality Index. *Sleep Medicine*, [s.l.], v. 12, n. 1, p.70-75, jan. 2011. Elsevier BV. <http://dx.doi.org/10.1016/j.sleep.2010.04.020>.

22 Demaris A. "A Tutorial in Logistic Regression." *Journal of Marriage and Family*, 57, no. 4: 956-68, 1995.

23 IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.

24 Richter D, Kramer MD, Tang NKY, Downs HEM, Lemola S. Long-term effects of pregnancy and childbirth on sleep satisfaction and duration of first-time and experienced mothers and fathers. *Sleep*, [S.L.], v. 42, n. 4, p. 1-10, 14 jan. 2019. Oxford University Press (OUP). <http://dx.doi.org/10.1093/sleep/zsz015>.

25 Crittenden AN, Samson DR, Herlosky KN, Mabulla IA, Mabulla AZP, McKenna JJ. Infant co-sleeping patterns and maternal sleep quality among Hadza hunter-gatherers. *Sleep Health*, 4:527–534, 2018. <http://doi.org/10.1016/j.sleh.2018.10.005>.

26 Motta AJ, Lucchese R, Souza R, Machado BL, Júnior V de AG, Bertuol IHR, Leão GCS. Má qualidade do sono em mulheres no período puerperal: Má qualidade do sono em mulheres no período puerperal. *Braz. J. Desenvolver*. [Internet]. 28 de novembro de 2022 [citado em 18 de maio de 2023];8(11):75233-45. Disponível em: <https://ojs.brazilianjournals.com.br/ojs/index.php/BRJD/article/view/54695>

27 Sales C, Castanha A, Alessio R. Aleitamento materno: representações sociais de mães em um Distrito Sanitário da cidade do Recife. *Arquivos Brasileiros de Psicologia*; Rio de Janeiro, nº (1) Rio de Janeiro 2017. ISSN 1809-5267

28 Rangel TMS. Fatores que influenciam a carreira profissional da mulher após a maternidade. Universidade Federal do Rio de Janeiro, 2019. Disponível em: <https://pantheon.ufrj.br/handle/11422/12519>

29 Piccinini CA, Polli RG, Bertolini M, Martins GDF, Lopes RCS. Razões maternas para colocar ou não o bebê na creche. *Arq. bras. psicol.* vol.68 no.3 Rio de Janeiro dez. 2016. ISSN 1809-5267

30 Cardoso L. Metade das mulheres deixa o mercado de trabalho um ano após o início da licença maternidade. *Jornal Extra Online*, Rio de Janeiro, 08 mar.2018. Disponível em: <https://extra.globo.com/emprego/metade-das-mulheres-deixa-mercado-de-trabalho-umano-apos-inicio-da-licenca-maternidade-22458435.html>.

31 Lima AM, Rocha JS, Reis VM, Silveira MF, Caldeira AP, Freitas RF, Popoff DA. Perda de qualidade do sono e fatores associados em mulheres climatéricas. *Cienc Amp Saude Coletiva* [Internet]. Jul 2019 [citado 22 jul 20023]; 24 (7):2667-78. Disponível em: <https://doi.org/10.1590/1413-81232018247.195220177>

32 Troynikov O, Watson CG, Nawaz N. Sleep environments and sleep physiology: A review. *J*

Therm Biol. 2018; 78:192-203. doi:10.1016/j.jtherbio.2018.09.012.

33 Santos AS, Schmidt L, Deon RG. Introdução alimentar: práticas e fatores associados. Revista de Enfermagem | FW | v. 13 | n. 13 | p. 1-13 | 2017. Disponível em <http://revistas.fw.uri.br/index.php/revistadeenfermagem/article/view/2732/2559>. Acesso em 12 de agosto, 2021.

34 Lopes WC, Marques FKS, Oliveira CF, Rodrigues JA, Silveira MF, Caldeira AP et al. Alimentação de crianças nos primeiros dois anos de vida. Revista Paulista de Pediatria, [S.L.], v. 36, n. 2, p. 164-170, jun. 2018. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/1984-0462;2018;36;2;00004>.

35 Santos LSF, Silva SCM, Ramos EMLS. Perfil nutricional de crianças de uma escola em Belém, PA. Revista Brasileira Ciências da Saúde - Uscs, [S.L.], v. 15, n. 51, p. 1-10, 27 abr. 2017. USCS Universidade Municipal de Sao Caetano do Sul. <http://dx.doi.org/10.13037/ras.vol15n51.4279>.

36 Ramos CV, Dumith SC, César JA. Prevalence and factors associated with stunting and excess weight in children aged 0-5 years from the Brazilian semi-arid region. Jornal de Pediatria, [S.L.], v. 91, n. 2, p. 175-182, mar. 2015. Elsevier BV. <http://dx.doi.org/10.1016/j.jped.2014.07.005>.

37 Diagnósticos de enfermagem da NANDA-I: definições e classificação - 2021-2023. Porto Alegre: Artmed, 2021.

Submitted: May 31, 2023

Accepted: August 4, 2023

Published: March 11, 2024

Funding: Research funded by the Foundation for Research Support and Scientific and Technological Development of Maranhão (FAPEMA) and the Coordination for the Improvement of Higher Education Personnel - Brazil (CAPES) – Funding Code 001.

Acknowledgements: We thank the Babyclin clinic for providing the data.

Authors' contributions:

Conception and design of the study: Lainy Ribeiro dos Santos

Literature review: Yroan Paula Landim e Marcia Caroline Nascimento Sá Ewerton Martins

Data acquisition: Fabrícia Silvana Sarmiento dos Santos e Lainy Ribeiro dos Santos

RELATIONSHIP BETWEEN MATERNAL SLEEP QUALITY AND CHILD NUTRITIONAL STATUS

Data analysis and interpretation: Leonardo Hunaldo dos Santos

Preparation of the manuscript: Marcelino Santos Neto

Intellectual revision of the manuscript: Ana Cristina Pereira de Jesus Costa e Floriacy Stabnow Santos

All the authors have approved the final version of the text.

Conflict of interest: There is no conflict of interest.

Corresponding author:

Lainy Ribeiro dos Santos

Federal University of Maranhão, Center for Social Sciences, Health and Technology – CCSST

R. Urbano Santos, S/N - Centro, Imperatriz - MA, Brasil. CEP 65900-000

E-mail: lainy.ribeirosts@gmail.com

EDITORS:

Associate Editor: Dr. Giuseppe Potrick Stefani

Editor-in-Chief: Dr. Adriane Cristina Bernat Kolankiewicz

This is an open access article distributed under the terms of the Creative Commons license.

