Factors Related to the Sleep Duration of 3-Month-Old Infants

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Abstract

Objective To identify the factors related to sleep duration in 3-month-old infants.

Materials and Methods From 2021 to 2023, we conducted a cross-sectional study in the city of Araraquara, Brazil, involving 140 mothers and their respective 3-month-old infants. Maternal socioeconomic, demographic, obstetric, and nutritional characteristics, as well as nutritional and morbidity characteristics of the respective infants, were evaluated. Sleep duration was determined by the Brief Infant Sleep Questionnaire (BISQ). Multivariate linear regression analysis was used to assess the associations of maternal, newborn, and infant factors with sleep duration at three months.

Results The nighttime sleep duration of the infants was of 9 hours. There were negative associations between nighttime sleep duration and prone sleep position ($p = 0.011$), falling asleep between 8:30 PM and 11:00 PM ($p = 0.032$), falling asleep after 11:00 PM ($p < 0.001$), respiratory infection ($p = 0.011$), dermatitis ($p = 0.002$), and the presence of children under 9 years of age in the household ($p = 0.013$).

Discussion In the present study, factors such as infant morbidity, the presence of other children in the household, and sleeping habits were associated with a decrease in sleep duration in 3-month-old infants. Therefore, we emphasize the importance of early diagnosis of morbidity in the first months of life and of promoting healthy habits such as regulating the time to go to sleep, providing an adequate sleep environment, and other practices that help improve the quality and duration of sleep.

Keywords
- sleep duration
- infants
- sleep
- morbidity

Introduction

Sleep is an important biological process for life. In infancy, good quality sleep promotes the well-being of the infants and the family, and it is essential for physical, cognitive, and psychosocial health, helping the learning, the growth, and the development of the infant.[1,2]

In early infancy, it is important for children to sleep the recommended amount of hours. The United States National Sleep Foundation (NSF)[3] recommends that infants from 0 to 3 months of age have 14 to 17 hours of sleep, infants from 4 to 11 months of age have 12 to 15 hours of sleep, and children from 1 to 2 years of age have 11 to 14 hours of sleep.

The duration and the quality of sleep during infancy can be influenced by various risk factors, such as biological characteristics of the infant (low length and/or low birth weight and organic disorders), temperamental characteristics (restless, irritable, or sensitive infant), environmental

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characteristics (urban or rural household), sociodemographic characteristics (level of schooling of the parents, culture, race, and family structure), habits and parental behaviors (interventions of parents in the entire sleep process of infants), and maternal mental health.[4,5]

Healthy sleeping habits are important for the self-regulation of infant sleep, reducing the frequency of waking up during the night, promoting longer sleep duration, and providing benefits for the whole family. Healthy sleep practices include having a regular time to go to sleep, sleeping in a calm environment (without adults and preferably without other children in the room), sleeping in the absence of light or electronic devices, and putting the infant in comfortable positions.[6]

Most studies[7–9] that evaluate factors related to sleep duration are from developed countries, and few of them[9–12] report a comprehensive set of maternal, newborn, and early infancy characteristics.

The objective of the present study was to evaluate several maternal and infant factors related to the duration of sleep in 3-month-old infants in a developing country.

Materials and Methods

Research Design and Participants

We conducted a cross-sectional study, which investigated factors related to the sleep duration of 140 infants at 3 months of age, as part of a larger study called the "Araraquara Cohort Study." Data collection took place from July 2021 to January 2023. The study was approved by the Ethics Committee for Research in Human Beings of the School of Public Health at the Universidade de São Paulo (CAEE: 59787216.2.0000.5421, number 1.885.874).

The study considered socioeconomic, demographic, environmental, obstetric, and maternal psychological well-being factors, as well as factors related to newborns and infants. The included data considered maternal age, race (white and non-white), marital status (with or without a partner), years of schooling, monthly per capita income, number of people and children in the household, number of sons and daughters, presence of smokers at home, and maternal psychological well being collected through the General Health Questionnaire (GHQ). The GHQ is based on scores obtained from the pregnant women's responses and classified as follows: no mental disturbance (scores from 0 to 3) and mental disturbance (scores > 4).[13]

The data obtained from the newborns included sex, gestational age (in weeks), birth weight (in kg) and length (in cm). Afterwards, they were classified according to their weight for gestational age as: small for gestational age (SGA), appropriate for gestational age (AGA), and large for gestational age (LGA), based on the curve of the International Fetal and Newborn Growth Consortium for the 21st Century (INTERGROWTH-21st) project.[14]

In the present study, data on anthropometry (weight, length), nutritional status based on the body mass index for age (BMI/A), morbidity (diarrhea, dermatitis, and respiratory infections), and breastfeeding practices (exclusive and non-exclusive) were collected during the follow-up visit after three months by the project team.

To assess infant sleep, the Brief Infant Sleep Questionnaire (BISQ) was administered during the follow-up visit after three months. The NSF recommendations were used as a reference for the duration of infant sleep, which suggest that infants from 0 to 3 months of age should sleep between 14 and 17 hours. The BISQ is a tool developed by Sadeh[15] to screen for sleep disorders in children aged 0 to 3 years, and it has been translated to Portuguese and validated in Brazil.[16] This questionnaire consists of 11 questions related to both nighttime and daytime sleep. These questions include: where the infant sleeps, sleep position, number of nighttime awakenings, time awake during the night, time to fall asleep at night, how the infant falls asleep, time to go to bed, and whether the caregiver considers the infant's sleep to be a problem.

Statistical Analysis

For data analysis, we used the Statistical Package for the Social Sciences (SPSS or Windows, SPSS Inc., Chicago, IL, United States) software, version 13.1. The quantitative variables were presented as means or medians with standard deviation (SD) or minimum and maximum values, while the qualitative variables were presented as absolute and relative frequencies. The Pearson and Spearman correlation coefficients were employed to assess associations regarding the dependent variable (sleep duration) and the continuous independent variables. The non-parametric Mann-Whitney test was used to evaluate the association involving the dependent variable and the categorical independent variables with two groups, while the Kruskal-Wallis test was used to assess associations of the dependent variable with the categorical independent variables with three or more groups.

Univariate analyses were performed to test the associations regarding the dependent variable, sleep duration, and all independent variables investigated in the present study. Variables with $p < 0.20$ were selected for the multivariate linear regression model. Collinearity testing was also performed, with a significance level of 5% ($p < 0.05$) and a 95% confidence interval (95%CI). The variables maternal age and race, number of children in the household under 9 years of age, dermatitis, respiratory infection, sleep position, and time to go to bed were analyzed categorically, while the time taken to fall asleep was analyzed as a continuous variable. In the final model of the multivariate linear regression analysis, using forward selection, only variables with $p < 0.05$ were considered as significant.

Results

►**Table 1** shows the socioeconomic, demographic, environmental, and obstetric characteristics of the pregnant women, as well as characteristics regarding anthropometry, morbidity, feeding, and sleeping habits of the newborns and 3-month-old infants. Most women (57.9%) were aged between 20 and 30 years, non-white (52.9%), and without a partner

Table 1 Maternal, newborn, and 3-month-old infant characteristics ($n = 140$).

	n(%)	Mean(±SD)	Median(minimum–maximum)
Maternal variables			
Age (in years)		28.56(±5.47)	
20–30	81(57.9)		
> 30	59(42.1)		
Race			
White	66(44.1)		
Non-White	74(52.9)		
Marital status			
With partner	66(44.1)		
Without partner	74(52.9)		
Monthly per capita income (in R$)*			870.83(125–5.800)
Years of schooling			
5–8	12(8.5)		
9–11	58(41.4)		
≥ 12	70(50.0)		
Number of people in the household			
1–3	95(67.8)		
≥ 4	45(32.1)		
Children in the household < 9 years old			
0	69(49.3)		
≥ 1	71(50.7)		
GHQ score			
0–3	97(69.3)		
≥ 4	43(30.7)		
Presence of smokers in the household			
Yes	19(13.6)		
No	121(86.4)		
Number of sons and daughters			
0	64(45.7)		
1	46(32.9)		
≥ 2	30(21.4)		
Variables of the newborns			
Sex			
Female	76(54.3)		
Male	64(45.7)		
Gestational age (in days)		274.37(± 9.52)	
Birth weight (in kg)		3.25(± 0.46)	
Birth length (in cm)			49(43–54)
Weight for gestational age classification			
SGA	6(4.3)		
AGA	120(85.7)		
LGA	14(10)		
Variables of the infants at 3 months			

(*Continued*)

Table 1 (*Continued*)

Weight (in kg)		6.07(± 0.75)	
Length (in cm)		60.08(± 2.34)	
Classification (BMI/A)			
Normal	123(87.9)		
Overweight	17(12.1)		
Morbidity			
Diarrhea			
Yes	12(8.6)		
No	128(91.4)		
Dermatitis			
Yes	20(14.3)		
No	120(85.7)		
Respiratory infection			
Yes	20(14.3)		
No	120(85.7)		
Type of breastfeeding**			
Exclusive	71(50.7)		
Non-exclusive	69(49.2)		
Sleeping habits			
Bedtime routine			
Crib in a separate room	9(6.4)		
Crib/stroller in parents' room	73(52.1)		
In parents' bed	58(41.4)		
Sleep position			
Prone	18(12.9)		
Side	41(29.3)		
Supine	81(57.9)		
Nighttime sleep duration (in minutes)			540(300–780)
Daytime sleep duration (in minutes)			180(0–780)
Nighttime awakenings			
0	30(21.4)		
1	43(30.7)		
≥ 2	67(47.9)		
Time spent awake during the night (in minutes)			20(0–240)
Time taken to fall asleep at night (in minutes)			15(0–180)
How to fall asleep			
Being fed	86(61.4)		
Being rocked or held	27(19.3)		
Alone in bed	27(19.3)		
Time to go to bed			
< 8:30 pm	37(26.4)		
8:30 pm–11:00 pm	70(50)		
≥11:00 pm	33(23.6)		

Abbreviations: AGA: appropriate for gestational age; BMI/A, body mass index for age; GHQ, General Health Questionnaire; LGA, large for gestational age; SD, standard deviation; SGA, small for gestational age.
Notes: *R$5.27 = US$1. **Non-exclusive breastfeeding: predominant breastfeeding, breastfeeding, not breastfeeding.

(52.9%). The monthly per capita income was of R$ 870.83 (roughly US$ 165.25), and half of the women had 12 or more years of schooling. Regarding family structure and environmental factors, the number of people per household ranged mostly from 1 to 3 (67.8%), and 50.7% of the households showed the presence of children under 9 years of age. The scores of the GHQ ranged from 0 to 3 for 69.3% of the pregnant women, indicating no mental disorders. Most households (86.4%) did not have the presence of smokers, and 45.7% of the women did not have any children. Most of the newborns were female (54.3%) and had on average 39 weeks (274 days) at birth. Almost 86% were born AGA, and had mean birth weight and length of 3.25 kg and 49 cm respectively. At 3 months, 87.9% of the infants were classified as having normal BMI/A z-scores. The most reported morbidities at the follow-up visit after 3 months were diarrhea (8.6%), dermatitis and respiratory infection, both with a prevalence of 14.3%. Regarding breastfeeding, 50.7% were exclusively breastfed.

In terms of sleeping habits, when the infants went to bed, 52.1% slept in a crib or stroller in their parents' room, while 41.4% slept in their parents' bed. Most infants (57.9%) slept on the prone position, the nighttime sleep duration was of around 9 hours (540 minutes), and daytime sleep was of approximately 3 hours. Almost 48% of the infants woke more than 2 times during the night, remaining awake for $\sim$ 20 minutes before falling asleep again. Most infants (61.4%) were being fed before falling asleep and 50% of the infants went to bed between 8:30 PM and 11:00 PM (►**Table 1**).

In the univariate regression analysis, the following variables were selected: age ($p = 0.004$) and race of the mother ($p = 0.176$), number of children in the household under 9 years of age ($p = 0.191$), presence of dermatitis ($p = 0.124$), and respiratory infection in infants at 3 months ($p = 0.017$), based on the Mann-Whitney test. Sleep position ($p = 0.006$) and time to go to bed ($p < 0.001$) were found to be significant using the Kruskal-Wallis test. The time taken to fall asleep approached significance ($p = 0.062$) based on the Pearson and Spearman correlations.

The final model of the multivariate regression presented in ►**Table 2** and demonstrated by boxplot graphs in ►**Fig. 1** shows that sleep in the prone position ($p = 0.011$) compared with sleep in the supine position decreases the average sleep duration by 55 minutes. Infants who went to bed between 8:30 PM and 11 PM ($p = 0.032$) had a shorter sleep duration (-36 minutes) compared with those who went to bed before 8:30 PM. Going to bed after 11 PM ($p < 0.001$) reduced the sleep duration by $\sim$ 2 hours for these infants. Infants who had morbidities such as respiratory infection ($p = 0.011$) and dermatitis ($p = 0.002$) had shorter sleep duration compared with infants without such morbidities. Living with other children who were under 9 years o age also led to a decrease in sleep duration by $\sim$ 34 minutes.

Table 2 Multivariate linear regression model to evaluate the associations between sleep duration of infants at 3 months and maternal and infant characteristics.

Factors	Unadjusted beta (95% confidence interval)	*p*-value	Adjusted beta (95% confidence interval)	*p*-value
Sleep position				
Prone	−53.834(−102.905 to −4.763)	0.032	−55.685(−98.169 to −13.201)	**0.011**
Side	6.231(−30.458 to 42;920)	0.738	11.157(−19.979 to 42.294)	0.480
Supine	Reference		Reference	
Time to go to bed				
8:30 pm–11:00 pm	19.571(−13.672 to −52.815)	0.246	−36.245(−69.347 to −3.143)	**0.032**
$\geq$ 11:00 pm	−106.250(−141.305 to −71.196)	< 0.001	−140.697(−179.468 to −101.927)	< **0.001**
< 8:30 pm	Reference		Reference	
Respiratory infection				
Yes	−51.172(−104.884 to −11,448)	0.015	−51.172 (−90.494 to −11.851)	**0.011**
No	Reference		Reference	
Dermatitis				
Yes	−39.500(−86.767 to 7.767)	0.101	−64.014(−103.493 to −24.534)	**0.002**
No	Reference		Reference	
Children in the household < 9 years old				
$\geq$ 1	−34.330(−63.347 to 2,68)	0.071	−34.800(−62.049 to −7.551)	**0.013**
0	Reference		Reference	
$R^2 = 0.384$; adjusted $R^2 = 0.356$				

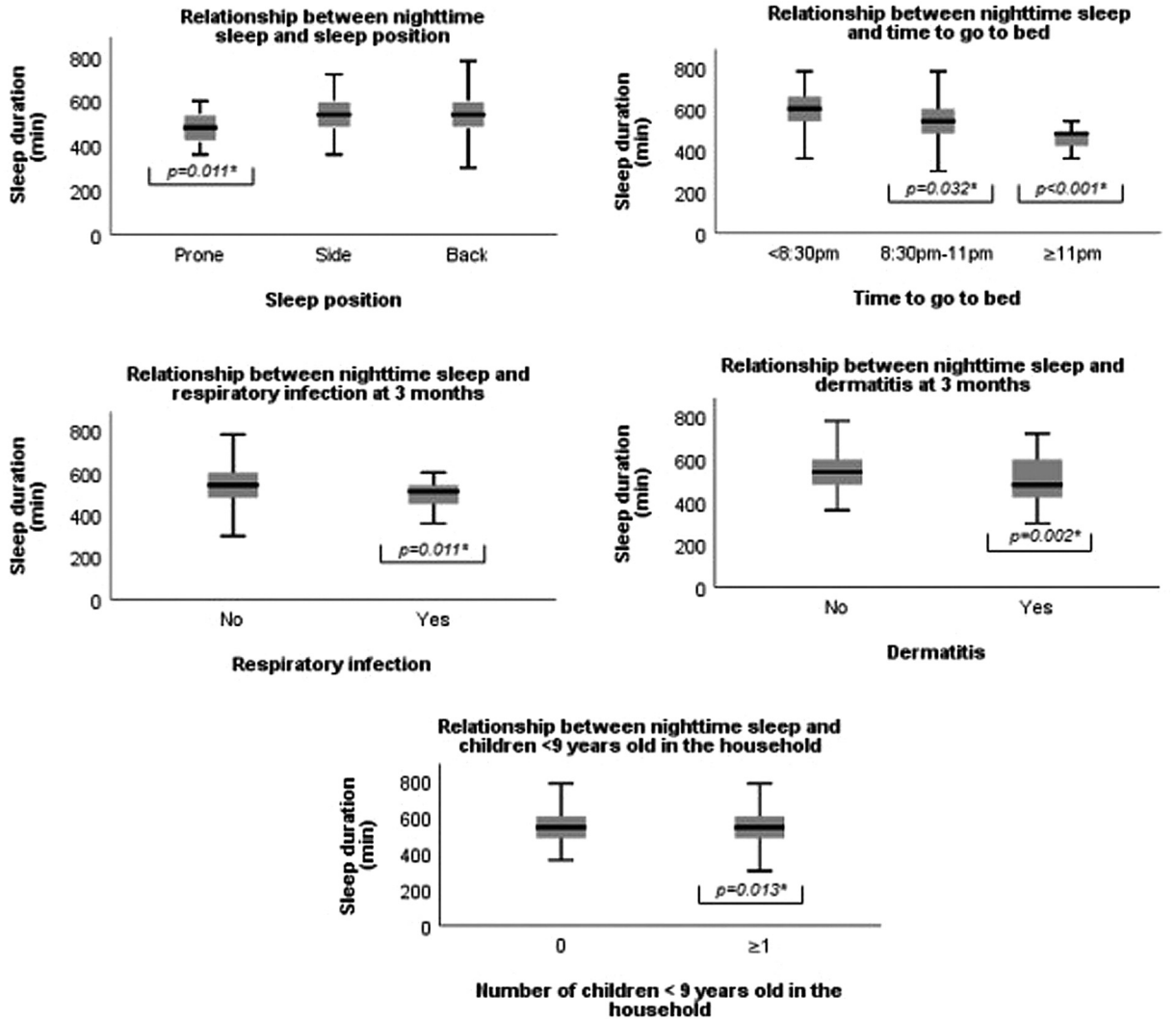

Fig. 1 Relationship regarding the sleep duration of infants at 3 months and factors that were significant according to the multivariate linear regression model, presented using boxplot graphs ($^*p < 0.05$).

Discussion

The infants included in the present study slept for a median duration of 9 hours (540 minutes), with a nighttime sleep duration below the ideal range of 14 to 17 hours, as recommended by the NSF.[3] The daytime sleep duration of the infants was of $\sim$ 3 hours. These results are similar to those of the study by Bruni et al.,[10] which investigated the sleep duration of 704 infants in the first year of life and reported that, at 3 months, the nighttime sleep duration was of 565 minutes, $\sim$ 9 hours and 24 minutes, and the daytime sleep duration was of 3 hours. Sadeh et al.,[17] in a study with 5,006 infants aged 3 to 5 months, also reported that the infants slept for $\sim$ 9 hours at night and 3 to 4 hours during the day.

In the present study, in terms of sleeping habits, the supine position was the predominant sleep position (57.9%), similar to the study by Sadeh et al.[17] with infants aged 0 to 8 months. The regression model revealed that sleep in the prone position decreased sleep duration. Review studies[18,19] recommend placing the baby in the supine position rather than the prone position. Sleep in the supine position is associated with longer nighttime sleep duration and is not associated with an increased risk of aspiration of vomit, while sleep in the prone position is associated with an increased risk of asphyxia and poorer sleep quality.[18]

Other review studies[20,21] involving newborns and infants have shown that the supine position was protective against sudden infant death syndrome (SIDS), while the prone and side positions are stressful for the baby. Since babies under 6 months of age have immature respiratory muscles, the prone position increases the diaphragm's workload, resulting in decreased cerebral oxygenation, reduced cardiac output, decreased oxygen saturation, and ventilation.[20,21]

The time to go to sleep was also an important factor. Going to bed after 8:30 PM reduced sleep duration by 36 minutes, and going to bed after 11:00 PM decreased sleep by 2 hours. Half of the infants included in the present study went to bed between 8:30 PM and 11:00 PM. Some

articles[7,10,17,18,22,23] recommend going to bed before 8:30 PM, while others suggest before 9:00 PM. However, it is important not to exceed 9:00 PM.[23]

It is worth noting that the time to go to bed is influenced by various factors such as the parents' knowledge of healthy sleep practices, cultural differences, household routines, the presence of other children in the room, children's activities before going to bed, and others.[7,8,10]

Another factor associated with decreased sleep duration was the presence of morbidity, such as respiratory infection and dermatitis. The presence of these morbidities reduced infants' sleep duration by $\sim$ 1 hour. Halal et al.[24] found that the morbidities that most influenced the sleep of infants aged 0 to 2 years were conditions such as gastroesophageal reflux, allergies, colic, and acute infections. Dogan et al.[25] and Shani-Adir et al.[26] demonstrated in their studies with children aged 3 to 36 months and older than 3 years respectively, that children with atopic dermatitis, due to itching and discomfort, had shorter sleep duration, woke more frequently during the night, stayed awake for longer periods, and took longer to fall asleep, compared with children without atopic dermatitis.

As far as we know, there are no studies that have found an association between respiratory infection and sleep duration. This relationship may be a consequence of restlessness during sleep and daytime sleepiness.

In the present study, we observed that infants who lived in households with other children under the age of 9 years had shorter sleep duration. This factor has also been reported in other studies,[9,27] showing that infants who share a room or even a bed with siblings may have a disrupted sleep routine, wake more frequently, and may have suboptimal sleep duration.

Conclusion

There are several factors related to the sleep duration of infants at 3 months of age. Our results showed that morbidities such as respiratory infection and dermatitis, living in households with other children, sleeping in the prone position, and sleeping after 8:30 PM decreased the nighttime sleep duration of children.

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Conflict of Interests
The authors have no conflict of interests to declare.

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References

1 Valle L, Valle E, Reimão R. Sono e aprendizagem. Rev.Psicopedagogia. 2009;80(26):286–290
2 Aldabal L, Bahammam AS. Metabolic, endocrine, and immune consequences of sleep deprivation. Open Respir Med J 2011; 5:31–43
3 Hirshkowitz M, Whiton K, Albert SM, et al. National Sleep Foundation's updated sleep duration recommendations: final report. Sleep Health 2015;1(04):233–243
4 Sadeh A, Tikotzky L, Scher A. Parenting and infant sleep. Sleep Med Rev 2010;14(02):89–96
5 Barbeau DY, Weiss MD. Sleep disturbances in newborns. Children (Basel) 2017;4(10):1–16
6 Bathory E, Tomopoulos S. Sleep regulation, physiology and development, sleep duration and patterns, and sleep hygiene in infants, toddlers, and preschool-age children. Curr Probl Pediatr Adolesc Health Care 2017;47(02):29–42
7 Ash T, Taveras EM, Redline S, Haneuse S, Quante M, Davison K. Contextual and parenting factors contribute to shorter sleep among hispanic/latinx compared to non-hispanic white infants. Ann Behav Med 2021;55(05):424–435
8 McDonald L, Wardle J, Llewellyn CH, van Jaarsveld CH, Fisher A. Predictors of shorter sleep in early childhood. Sleep Med 2014;15 (05):536–540
9 Touchette E, Petit D, Paquet J, et al. Factors associated with fragmented sleep at night across early childhood. Arch Pediatr Adolesc Med 2005;159(03):242–249
10 Bruni O, Baumgartner E, Sette S, et al. Longitudinal study of sleep behavior in normal infants during the first year of life. J Clin Sleep Med 2014;10(10):1119–1127
11 Sette S, Baumgartner E, Ferri R, Bruni O. Predictors of sleep disturbances in the first year of life: a longitudinal study. Sleep Med 2017;36:78–85
12 Tsai SY, Lee CC, Tsai HY, Tung YC. Bedtime routines and objectively assessed sleep in infants. J Adv Nurs 2022;78(01):154–164
13 Mari JJ, Williams P. A comparison of the validity of two psychiatric screening questionnaires (GHQ-12 and SRQ-20) in Brazil, using Relative Operating Characteristic (ROC) analysis. Psychol Med 1985;15(03):651–659
14 Villar J, Cheikh Ismail L, Victora CG, et al; International Fetal and Newborn Growth Consortium for the 21st Century (INTERGROWTH-21st) International standards for newborn weight,

length, and head circumference by gestational age and sex: the Newborn Cross-Sectional Study of the INTERGROWTH-21st Project. Lancet 2014;384(9946):857–868
15 Sadeh A. A brief screening questionnaire for infant sleep problems: validation and findings for an Internet sample. Pediatrics 2004;113(06):e570–e577
16 Nunes ML, Kampff JLPR, Sadeh A. BISQ questionnaire for infant sleep assessment: translation into brazilian portuguese. Sleep Sci 2012;5(03):89–91
17 Sadeh A, Mindell JA, Luedtke K, Wiegand B. Sleep and sleep ecology in the first 3 years: a web-based study. J Sleep Res 2009;18(01):60–73
18 Gilbert R, Salanti G, Harden M, See S. Infant sleeping position and the sudden infant death syndrome: systematic review of observational studies and historical review of recommendations from 1940 to 2002. Int J Epidemiol 2005;34(04):874–887
19 Mindell JA, Sadeh A, Wiegand B, How TH, Goh DYT. Cross-cultural differences in infant and toddler sleep. Sleep Med 2010;11(03): 274–280
20 Priyadarshi M, Balachander B, Sankar MJ. Effect of sleep position in term healthy newborns on sudden infant death syndrome and other infant outcomes: A systematic review. J Glob Health 2022; 12(12001):12001
21 Prado LBFP, et al. Síndrome da Morte Súbita do Lactente. Departamento Científico de Medicina do Sono- Sociedade Brasileira de Pediatria; 2018. 10 p. v. 4
22 Owens JA, Jones C, Nash R. Caregivers' knowledge, behavior, and attitudes regarding healthy sleep in young children. J Clin Sleep Med 2011;7(04):345–350
23 Mindell JA, Meltzer LJ, Carskadon MA, Chervin RD. Developmental aspects of sleep hygiene: findings from the 2004 National Sleep Foundation Sleep in America Poll. Sleep Med 2009;10(07): 771–779
24 Halal CS, Nunes ML. Distúrbios do sono na infância. Residência Pediátrica. 2018;1:86–92
25 Dogan DG, Canaloglu SK, Kivilcim M, Kum YE, Topal E Catal F. Sleep patterns of young children with newly diagnosed atopic dermatitis. Postepy Dermatol Alergol 2017;34(02): 143–147
26 Shani-Adir A, Rozenman D, Kessel A, Engel-Yeger B. The relationship between sensory hypersensitivity and sleep quality of children with atopic dermatitis. Pediatr Dermatol 2009;26(02): 143–149
27 Touchette E, Petit D, Tremblay RE, Montplaisir JY. Risk factors and consequences of early childhood dyssomnias: New perspectives. Sleep Med Rev 2009;13(05):355–361

