

research will be needed to understand the effects of poor sleeping in motor development and compare them with Manacero and Nunes.<sup>2</sup> A wide range of factors has to be kept in mind to obtain reliable and comparable results in further studies. Increasing knowledge in this area could promote risk prevention and minimize long-term outcomes through the implementation of strategies such as maternal voice, parents' attachment, and Skin-to-Skin contact sleep.

## Conflicts of interest

The authors declare no conflict of interest.

## References

1. World Health Organization. Born too soon: the global action report on preterm birth. Geneva, [cited 2021 Mar 10]. Available from <https://apps.who.int/iris/handle/10665/44864>.
2. Manacero S, Nunes ML. Longitudinal study of sleep behavior and motor development in low-birth-weight preterm children from infancy to preschool years: sleep behavior and motor development. *J Pediatr (Rio J)*. 2021;97:44–51.
3. Boonzaaijer M, Suir I, Mollema J, Nuysink J, Volman M, Jongmans M. Factors associated with gross motor development from birth to independent walking: a systematic review of longitudinal research. *Child Care Health Dev*. 2020(Nov). <https://doi.org/10.1111/cch.12830>. Online ahead of print.

4. De Beritto T. Newborn Sleep: patterns, Interventions, and Outcomes. *Pediatr Ann*. 2020;40:82–7.
5. Shellhaas RA, Burns JW, Barks JDE, Hassan F, Chervin RD. Maternal voice and infant sleep in the neonatal intensive care unit. *Pediatrics*. 2019;144:e20190288.
6. Deng Q, Li Q, Wang H, Sun H, Xu X. Early father-infant skin-to-skin contact and its effect on the neurodevelopmental outcomes of moderately preterm infants in China: study protocol for a randomized controlled trial. *Trials*. 2018;19:1–11.

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## Reply to Letter to the Editor - Association between sleep behavior and motor development in preterm infants



Dear Editor,

We appreciate the interest in our article “Longitudinal study of sleep behavior and motor development in low-birth-weight preterm children from infancy to preschool years”<sup>1</sup> and your comments.<sup>2</sup> Our primary goal was to assess longitudinally whether sleep characteristics of low-birth-weight preterm infants would affect motor development during infancy and preschool years. However, Bota and collaborators have raised an important point: that there is a prominent time gap between 12 months and 4-5 years. We agree that a more exhaustive assessment throughout time would have provided more information on the preterm infants' evolution and, thus, allowed for a more solid conclusion, but, unfortunately, we lacked the resources to investigate these outcomes beyond the three-time points described in the study (at 6 months of corrected age, at 12 months of corrected age, and at 4-5 years of chronological age).

Previous authors<sup>3</sup> have advanced our understanding of the relationship between sleep position and motor development delay by reporting that supine position was associated with delayed gross motor development at 4 and 6 months and prone position was correlated with proper gross motor

development at 4 to 10 months, but no association was established for the supine and prone positions at 12-36 months and at 11-17 months, respectively. We originally intended, as a secondary objective, to compare the findings of preterm infants with those of an age-matched control group of children born at term. However, our controls (born at term) were recruited only at 4-5 years of age, and we did not have access to their birth records to compare their data at birth with those of preterm infants—for this reason, such a comparison was not included in the study. Nevertheless, at 4-5 years of chronological age, in analyses adjusted for age, parents' level of education, and family income, sleep characteristics, and motor development were similar in preterm (n = 36) and full-term (n = 31) children. Future studies should recruit controls at birth to allow proper comparison between case and control groups over time.

Indeed, the mean gestational age in our study was 30.7 (SD, 2.4) weeks, corresponding to very preterm (28 to < 32 weeks) and moderate preterm (32 to < 37 weeks) infants according to the WHO classification,<sup>4</sup> but data was analyzed using corrected age at the 12 months evaluation.

Finally, we agree that more studies are necessary to evaluate the impact of the NICU environment and early mother-child interaction across life on infants' sleep patterns. We have recently published data in a larger cohort (2,222 mothers and infants) where we observed that mothers in the depressed group were more likely to report disturbed sleep in their children, however, objective data from actigraphy did not replicate this finding. Probably maternal depression may affect the mother's impression of her infant's sleep.<sup>5</sup> We acknowledge that our study has limitations as expressed in the discussion, as we have not accessed mothers' behavior.

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## References

1. Manacero S, Nunes ML. Longitudinal study of sleep behavior and motor development in low-birth-weight preterm children from infancy to preschool years. *J Pediatr (Rio J)*. 2021;97:44–51.
2. Bota LA, Alcaide E, García CG. Association between sleep behavior and motor development in preterm infants. *J Pediatr (Rio J)*. 10.1016/j.jped.2021.04.006
3. Boonzaaijer M, Suir I, Mollema J, Nuysink J, Volman M, Jongmans M. Factors associated with gross motor development from birth to independent walking: A systematic review of longitudinal research. *Child Care Health Dev*. 2020. <https://doi.org/10.1111/cch.12830>. Nov 17. doi:Online ahead of print.
4. World Health Organization. Born too soon: the global action report on preterm birth. World Health Organization; 2012, [Cited 2021 May 10]. Available from: <https://apps.who.int/iris/handle/10665/44864>.
5. Halal CS, Basani DG, Santos IS, Tovo-Rodrigues L, Del-Ponte B, Silveira MF, et al. Maternal perinatal depression and infant sleep

problems at 1 year of age: Subjective and actigraphy data from a population-based birth cohort study. *J Sleep Res*. 2021;30:e13047.

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