

## COMMENTARY

### Expanding our understanding of the impact of insomnia on early child development

Commentary on Bruni O, Melegari MG, Esposito A, et al. Executive functions in preschool children with chronic insomnia. *J Clin Sleep Med.* 2020;16(2):231–241. doi:10.5664/jcsm.8264

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The successes of the research community at identifying the adverse developmental and behavioral consequences of sleep problems in children, and the success in informing the public, means that parents will more frequently seek clinical care for their children's sleep not just because of the impact on their own sleep, which should not be underestimated, but also out of concern of the impact of poor sleep on the child's current behaviors and future development.<sup>1</sup> Our ability to understand the role of poor sleep across childhood on child outcomes will be vital to supporting families.

The interactions are certainly complex. The impact of short sleep durations may differ from the impact of sleep apnea which may also differ from the impact of behavioral sleep disruption on executive function (EF). In the current issue of the *Journal of Clinical Sleep Medicine*, Bruni et al present specific findings that add to our understanding of this interrelationship.<sup>2</sup>

To be sure, it is especially challenging to study causal relationships between sleep problems in younger children and later developmental outcomes. The results from this study, based on its design, also do not indicate causality. In truth, there are numerous ethical and practical challenges to longitudinal studies that include an experimental "sleep deprivation" arm for young children. We therefore need to extrapolate from available data to answer key questions about preventability, persistence or reversibility of poor sleep's impact on development.

The study in this issue of the *Journal of Clinical Sleep Medicine* finds that children's short sleep and sleep disturbance is associated with poorer EF, with standardized parent report questionnaires to concurrently assess both sleep quality and EF.

There have been studies which document short term, causal, decline in EF and attention following even modest sleep deprivation in children older than 7 years.<sup>3,4</sup> However, extending this train of research to younger children holds special challenges. For one thing, EF is developmental in nature and expression of the EFs change rapidly in young children. This means that EFs are harder to define, and harder to assess in younger ages. Adding to the challenge, the sleep requirement varies widely in this age range,<sup>5</sup> and measuring sleep durations across large populations of young children is difficult.

There has been prior work to suggest that difficulties with regulation of emotion and attention control persist into older childhood following early childhood sleep disruption.<sup>6</sup> Most importantly, since it is not possible to show that short sleep durations in early childhood caused the later challenges, it is not entirely possible to say whether improving sleep patterns in childhood will prevent future adverse developmental outcomes. Although it is likely that sleep-disordered breathing (SDB) affects child development differently than insufficient sleep, the neurocognitive impact of SDB does not fully reverse with treatment.<sup>7</sup>

When considering the parental contribution on children's sleep, it may be helpful to note that it is not at all unlikely that difficulties with EF may have a heritable component.<sup>8</sup> Within the study by Bruni et al there is support for a parental component to sleep challenges. The indication that the parents in the clinical group had more tendency to hold or rock the children to go to sleep, or feed them to go to sleep, supports that there is a parental component to insomnia in this cohort of children. In the context of EF having a heritable component, the parents of children with EF difficulties may also have their own difficulties in planning a bedtime routine, tolerating a crying child, regulating the transition into sleep for themselves, or tolerating wakefulness. As the authors note, this may be a source of bias in this study. However, this connection does open a window for helping both children and parents as both may be susceptible to the negative impacts of sleep deprivation on EF.

This study also begins to touch on the heterogeneity of the EFs, and the differentiation of the "hot" and "cool" EFs. The "hot" EFs may be more affected by sleep disturbance as these map more to behavioral dysregulation during the daytime. This study appears to support this, as the "hot" EF categories of emotional control and inhibitory self-control, as defined on the Behavior Rating Inventory of Executive Function (BRIEF) are more consistently affected by the presence of insomnia on the Sleep Disturbance Scale for Children (SDSC) or Nocturnal Sleep Duration on the Brief Infant Sleep Questionnaire (BISQ).

These preliminary studies form a basis for ongoing exploration of the complex interplay between sleep duration and quality in childhood and a wide range of functional outcomes. We seek a better understanding of the causal relationship between early sleep patterns and later development. Further studies of the longitudinal trajectory of children with sleep difficulties will help support that understanding. Study of children with sleep difficulties in the context of special developmental needs may help in an understanding of the contribution of individual neurology or genetics to this relationship. For today, the evidence continues to support our efforts in helping parents and caregivers of children with sleep difficulties find a better night of sleep for all.

## CITATION

Becker RE. Expanding our understanding of the impact of insomnia on early child development. *J Clin Sleep Med.* 2020; 16(2):165–166.

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## SUBMISSION & CORRESPONDENCE INFORMATION

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## DISCLOSURE STATEMENT

The author reports no conflicts of interest.