

A Systematic Review of the Relationship Between Physical Activity and Sleep in Children With and Without Developmental Disabilities

Alice Northcutt, Danielle Carabello, Emily Munn, and Melissa Pangelinan

Physical activity (PA) and sleep are critically important for physical and mental health. However, only 40% of middle schoolers and 30% of high schoolers achieve recommended nightly sleep hours¹. Moreover, only 26.1% of adolescents meet recommended PA Guidelines¹. The problem of achieving recommended PA and sleep is exacerbated for youth with developmental disabilities, creating even greater physical and mental health disparities². However, a systematic investigation of the achievement of PA and sleep recommendations in youth with and without developmental disabilities has not been conducted. Further, the relationship between PA and sleep has not been systematically examined. Thus, the present study aimed to systematically and critically review the literature related to PA and sleep in youth with and without disabilities.

A systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. PubMed (MEDLINE), Academic Search Premier, APA PsycArticles, and SPORTDiscus were queried using the following search strategy: (child* OR youth OR teen*) AND (physical activit*) AND (sleep*). Studies were excluded based on the following criteria: if articles did not record sleep or physical activity, they were the incorrect population, they were not in English, or they examined cancer/ asthma/ or sleep apnea. The search was limited to articles published between October 2019 and August 2020.

A total of 349 abstracts were obtained and after removing all duplicates, the titles and abstracts of 197 articles were reviewed. A total of 91 articles were excluded based on the title/abstract review; 106 articles underwent full text review. A total of 24 articles did not meet inclusion following full text review. A total of 82 studies were included in the subsequent data extraction and analysis.

Various assessment tools were used to quantify PA and sleep, including accelerometers, parent or self-report data, surveys, and semi-structured interviews with parents. Because of the variability in measuring PA and sleep, we were unable to conduct a meta-analysis. Thirty-three percent of the studies included data from the United States or Canada. Of the 82 articles, only nine included youth with developmental disabilities. Most of the studies included a large age span, with only a few including the early childhood and middle childhood age range.

With respect to the primary aims, less than half of the studies reported that at least 50% of their sample met PA or sleep recommendations. Meeting PA recommendations was less likely in studies with individuals with disabilities, those with a large age range, and those with typically developing older children and teenagers. Meeting sleep recommendations was less likely for studies of youth with disabilities and those with typically developing infants, older children, and teenagers. It was not possible with the present studies to directly evaluate the relationship between PA and sleep.

Additional studies are needed to objectively measure the relationship between PA and sleep. More studies with objective measures are also needed in youth with developmental disabilities as well as young children. However, the lack of studies of youth with disabilities and young children may be due to compliance issues with objective measures (e.g., wearing accelerometers).

Statement of Research Advisor

Alice (Ali) Northcutt is an undergraduate research fellow (2020-2021) in the Pediatric Movement and Physical Activity Lab. Ali was involved in stages of this substantial undertaking. Ali developed the ability to critically evaluate research literature, extract relevant

data, create summaries of study findings, and interpret study results. She presented her results at the Student Research Symposium at Auburn University as well as the annual meeting of the North American Society for Psychology of Sport and Physical Activity.

-Melissa Pangelinan, School of Kinesiology

References

¹Centers for Disease Control and Prevention. (2020). Sleep in middle and high school students. CDC Healthy Schools. <https://www.cdc.gov/healthyschools/features/students-sleep.htm>

²Warburton, D.E.R., Nicol, C.W., & Bredin, S.S.D. (2006). Health benefits of physical activity: The evidence. *Canadian Medical Association Journal*, 174 (6), 801-809.