Behavioral sleep intervention for insomnia in children with neurodevelopmental issues

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ABSTRACT

Sleep issues, particularly insomnia, are common in children with Neurodevelopmental Disorders (NDD). It is still unknown whether behavioral sleep therapies designed for normally developing (TD) children are beneficial for children with NDD, or whether interventions must be tailored to each diagnostic category. The goal of this systematic review was to find commonalities, trends in outcomes, and the methodological quality of parent-delivered behavioral sleep interventions for children with NDD, specifically Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), Cerebral Palsy, and Fetal Alcohol Spectrum Disorder. Nine datasets were combed through. A total of 40 studies met the criteria for inclusion. The majority of the research was done on people with ASD and ADHD. The NDD pop-lations had a lot of sleep difficulties in common. Bedtime resistance, night waking, early morning awakening, and co-sleeping were the most commonly mentioned. Implementing appropriate sleep habits, reinforcing, graded extinction, and fading bedtime were the most common strategies. At least one behavioral treatment component was found to be beneficial in all investigations. The viability of establishing a trans diagnostic behavioral sleep intervention suitable for children with a variety of NDD, as well as the TD population, is suggested by similarities in both sleep difficulties reported and behavioral therapies adopted across NDD and TD populations.

Key Words: *Insomnia; Neurodevelopmental Disorders (NDD); Trans diagnostic therapy.*

PERSPECTIVE

Neurodevelopmental Disorders (NDD) are a collection of ailments that commonly appear during childhood and are caused by central nervous system developmental deficiencies that affect one or more areas of functioning. Social, intellectual, personal, and occupational functioning is all affected by NDDs [1]. Sleep issues are more common in children with NDD, and they may be more prone to the effects of inadequate sleep than their normally developing (TD) peers. Poor sleep is linked to a variety of daily effects, including cognitive impairments (e.g., memory and attention issues), lower academic performance, and more challenges with behavioral and emotional regulation, all of which are already impaired in children with NDD. Furthermore, insufficient sleep may lead to an increase in the NDD's symptom presentation [2].

Insomnia (difficulties falling asleep, remaining asleep, or getting up early in the morning) is the most prevalent sleep problem among children with NDD, with over 85 percent reporting that they match the criteria. Despite this similarity, NDDs as a group exhibit a wide range of symptoms and etiologies. To develop trans diagnostic therapy approaches, researchers want to see if similar therapies can be beneficial for common problems (like insomnia) across a variety of conditions with similar symptoms (e.g., atypical brain development). To meet this requirement, we focused this systematic review of the literature on four extremely prevalent NDD (specifically, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), Cerebral Palsy (CP), and Fetal Alcohol Spectrum Disorder (FASD). ADHD, ASD, CP, and FASD are all linked to higher rates of sleeplessness than the general population, despite their various symptoms and etiologies [2,3]. Bedtime resistance, anxiety, and sensory processing difficulties are more common in children with NDD, which make it difficult for them to fall asleep. Children with ADHD, ASD, CP, and FASD also experience delayed sleep onset, night waking, and restless sleep.

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There are no published clinical guidelines for managing sleep issues in children with NDD at this time. Guidelines for TD children, on the other hand, are frequently recommended for use with NDD populations. Several authors have advocated for the following treatment plan in both TD and NDD children: 1) give psychoeducation about "normal" sleep; 2) teach/implement healthy sleep habits; 3) adopt behavioral therapies and 4) begin pharmaceutical treatment. Even though pharmaceutical therapies are the last resort, many children, particularly those with NDD, are prescribed sleep aids. Furthermore, 12-year longitudinal research indicated that 81 percent of children with insomnia who were examined in an ambulatory setting were provided medication.

As of 2017, no sleep medicines for children have been approved by the US Food and Drug Administration. Medication should be recommended only if education and behavioral therapies have failed to achieve enough change or are not possible, according to pediatric sleep experts. Furthermore, parents believe that behavioral therapies are both preferred and beneficial to medicine [4].

Behavioral intervention is used less frequently than medicine, with only 20% of instances receiving this sort of treatment, according to studies. Evidence-based behavioral treatment is hampered by a variety of factors, including insufficient parental understanding and a lack of pediatric sleep training among health practitioners. When behavioral treatments are available, they are usually delivered through a regular service delivery model, which can be difficult for families to obtain due to ancillary expenditures like travel to specialty health clinics. Increasing parental knowledge and abilities, as well as training parents to use a variety of behavioral tactics with their children, is one strategy to overcome these barriers.

While there is a substantial body of research demonstrating the usefulness of behavioral therapies in TD children with insomnia, there is relatively little evidence in NDD children. The study of children with Down syndrome was the only one to include a six-month follow-up examination, and it indicated that behavioral sleep difficulties had improved. Meltzer and Mindell stated that more study testing the effectiveness of these therapies with children with NDD was needed due to the paucity of evidence.

Brown and colleagues did a study concentrating on the quality of nonpharmacological therapies for sleep disorders in children and adolescents with chronic health conditions, including NDD as well as diabetes, migraines, and obsessive-compulsive disorder. At least one participant with ADHD, ASD, or CP was included in 23 of the 31 trials. There were no people with FASD in any of the studies. All but one of the 31 trials found that intervention improved children's sleep, leading to the conclusion that behavioral intervention has promise. Brown and colleagues concluded that further rigorous, high-quality, large-scale investigations in this demographic are needed. This shows that sleep issues in children with NDD may respond to a trans diagnostic therapy strategy, in which the same basic therapeutic concepts are applied across illnesses without the intervention being tailored to each diagnosis.

The goal of this study was to conduct a comprehensive evaluation of the literature to identify and evaluate the efficacy of parent-delivered behavioral therapies for reducing sleep issues in children with NDD (specifically ADHD, ASD, CP, and FASD). This study will assess whether a trans diagnostic approach to addressing sleep disorders in NDD patients is possible [5].

Electronic databases such as Cochrane, EBSCOHost (both Cinahl and PsycInfo), Inform it, Ovid (both Embase and Medline), PubMed, and Scopus were used to find published research. The search technique centered on four semantic groupings, with the 'OR' Boolean operator concatenating terms inside each group and the 'AND' Boolean operator concatenating the four groups.

The target population was selected by the first group, the outcome variables were identified by the second group, behavioral treatments were identified by the third group, and the NDD population was identified by the fourth group. Search phrases were mapped to Medical Subject Headings whenever possible, and the search method was customized for each database searched. The complete search technique is described. In January 2017, the final search was completed. Additional research was discovered using pearling, which is manually searching the reference lists of included articles [6]. The authors of this review were contacted via email with a list of eligible papers to discover any missing literature.

The following criteria were used to determine whether or not a study should be included:

(1) At least one participant had ADHD, ASD, CP, or FASD; (2) the study sample was comprised of children and adolescents aged 18 years and up; (3) the study sample was comprised of children and adolescents aged 18 years and up; (4) the study sample was comprised of children and adolescents aged 18 years and up; (5) the study sample was comprised of children and adolescents aged 18 years

- At least one sleep variable was measured before and after
- There were behavioral interventions used
- The research was innovative, experimental, and published in peer-reviewed full-text publications
- It must be written in English or French

Because the goal of the current review was to evaluate behavioral interventions that are potentially accessible, studies were excluded if the primary goal was to test the efficacy of the medication and/or specialized equipment or if specialized or certification-based training was required to deliver the intervention and can be carried out by primary caregivers [7].

Duplicates were deleted from the initial search results, and the remaining studies were selected for inclusion based on the title and abstract. When studies met inclusion criteria, eligibility was questionable, or the abstract was unavailable, full-text papers were retrieved.

Methodological information about study design, sample characteristics, behavioral interventions applied, and outcome measures were all documented and reported for each study. To ensure completeness, two writers (GR and NA) extracted all data independently. A third author was consulted when the data gathered were inconsistent (PC).

To assess the studies' methodological quality, each of the included papers was assessed and a score was assigned using Downs and Black's quality index for randomized and nonrandomized studies. Two authors individually assessed each published paper (GR and NA). A third author was consulted to resolve any discrepancies in assigned scores (PC). A 26-item checklist with five subscales makes up the quality index: 1) external validity; 2) reporting; 3) bias in internal

validity; 4) confounding in internal validity; and 5) power. Except for one question in the reporting subscale, which is rated 0 to 2, and the single power item, which is scored 0 to 5, all items are scored 0 or 1. The entire maximum quality score was 32. The power subscale was not included in the quality index because the majority of studies in this study did not report statistical power, and many did not provide enough data to calculate power [8]. Thus, for this investigation, only 26 of the available 27 things were evaluated, yielding a maximum score of 27 points, with higher values indicating higher study quality. Studies employing this modified method have also been graded in previous papers. The power subscale was eliminated from Downs and Black's quality index. This quality index has shown great internal consistency (Kuder-Richardson 20: 0.89), test-retest (r = 0.88) and inter-rater (r = 0.75) reliability, and high correlations (r = 0.86–0.90) with other validated quality evaluation tools used in non-randomized research.

A total of 10,363 items were detected in the broad search, which was reduced to 5,602 articles following the removal of duplicates. Following title and abstract screening, 5,436 papers were eliminated, leaving 166 for full-text review. The French language was used in one of the 166 investigations. There were 33 studies left to be included in the final review after the full-text review.

The eight studies (20%) found in the search that tested behavioral sleep therapies with several NDD groups, each consisting of at least one participant diagnosed with ADHD, ASD, CP, or FASD, were placed in a general category within this review. The representation of the illnesses within this general group followed the current reviews findings, with 738 ASD people across the eight studies, 79 ADHD participants within two studies, five participants with CP in two studies, and no FASD participants. Of the eight investigations, four were RCTs, two were pre/post study designs, and two employed a single-subject design. This group of studies had a mean quality index value of 18.1 (SD=3.4;67 percent). Despite the wide range of illnesses described, there were commonalities in the subjects' sleep issues across the eight investigations. Bedtime resistance, night waking, early morning awakenings, and co-sleeping were the most common sleep difficulties reported and were most typically treated with a mix of psychoeducation, extinction, healthy sleep behaviors, and reinforcement. Subjective sleep questionnaires were used to assess sleep behavior, with parents reporting improved sleep behavior in each of the eight investigations after the behavioral intervention [9].

RCTs accounted for four of the eight studies in the general category, with sample sizes ranging from 26 to 66 people. Wiggs and Stores used a one-on-one intervention with six visits to family homes by a professional in their RCT, and families could choose whether or not to participate. For further information, please contact the research team at any time. Sleep had improved and was sustained at the two-month follow-up, according to subjective assessments. However, objective sleep behavior measurements utilizing actigraphy were unaffected. One RCT compared the effectiveness of a standard face-to-face intervention with that of an information booklet with consistent material delivered to parents to better understand the level of support required for these behavioral methods to be effective in an NDD population. Treatment outcomes were not significantly different across the two situations, and acceptance rates were similar (75 percent conventional versus 68 percent booklet). In five of the eight investigations, further support was offered throughout interventions in the form of follow-up phone calls [10].

Aron off et al. used a non-concurrent single-subject design to offer tailored Sensory Enrichment Therapy instructions to parents of over 1000 children with NDD through the internet every day for up to seven months. The treatment was trans diagnostic, intending to treat based on reported symptoms rather than a precise diagnosis. The study's primary goal was not to increase sleep, but sleep was mentioned as a symptom category that parents subjectively reported on, and it was found to improve statistically after treatment.

CONCLUSION

This is the only study we know of that looks at parent-delivered behavioral sleep therapies for children with a variety of NDD diagnoses. The findings show that behavioral sleep therapies can help those with NDD. However, the general methodological quality of existing research, as well as the scarcity of or lack of studies on specific NDD, makes it difficult to draw firm conclusions on the usefulness of these behavioral sleep therapies in ADHD, ASD, CP, and FASD. Despite this, there is evidence that a trans diagnostic behavioral sleep intervention suitable for children with a variety of NDDs could be developed.

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