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Interventions Available to Manage Infant/Child Sleep Problems

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Introduction

Childhood *sleeplessness,* in its many forms, clearly constitutes a major concern for parents (and therefore for health-care practitioners). Inadequate, disrupted, poor-quality, non-restful and at times elusive sleep is one of the most common complaints raised by parents to pediatricians and pediatric practitioners. In contrast,the relationship betweeninsufficient or disturbed sleepand the many manifestations of *sleepiness* is less frequently recognized by parents, but is nonetheless a major contributor to mood, behaviour, academic and health problems in childhood. The following presentation details the impact of sleep problems on children and families, the types of behavioural interventions available and future directions for research and clinical care.

Subject

A number of studies have examined the prevalence of parent- and child-reported sleep complaints in large samples of children, utilizing broad-based parent-report sleep surveys to assess for a variety of sleep problems, ranging from bedtime resistance to prolonged night

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wakings to parasomnias (e.g. sleepwalking or talking). Overall, approximately 25% of all children experience some type of sleep problem at some point during childhood, ranging from short-term difficulties in falling asleep and night wakings to sleepwalking, night terror and enuresis (bedwetting). Specific studies have reported an overall prevalence of a variety of parent-reported sleep problems ranging from 25 to 50% in pre-school-aged samples[1,2] to 37% in a community sample of four-to-10-year-olds.[3]

Furthermore, although many sleep problems in infants and children are transient and self-limited in nature, certain intrinsic and extrinsic risk factors (e.g. difficult temperament, chronic illness, neurodevelopmental delays, maternal depression, family stress) may predispose a given child to develop a more chronic sleep disturbance. A number of studies have also documented the persistence of infant sleep problems into early childhood.[4,5]

Any discussion of the significance of pediatric sleep must underscore the importance of the relationships between sleep problems and mood, performance and behaviour. A wealth of empirical evidence from several lines of research clearly indicates that children experience significant daytime sleepiness as a result of inadequate or disturbed sleep, and that significant performance impairments and mood dysfunction are associated with such daytime sleepiness.[6-10] For example, mood problems in children with sleep disturbances are virtually universal, particularly exacerbation of negative mood and, equally importantly, a decrease in positive mood or affect. Regulation of mood, or the use of cognitive strategies to modulate and guide emotions, also appears to be affected by sleep quality and quantity; thus, chronic poor sleep during critical periods of development of affective regulation may have long-term consequences on emotional health. Children's behavioural responses to sleepiness, although highly variable, may be broadly described as manifestations of dysregulation of arousal, impairment of attention, and failure to inhibit inappropriate behavioural responses (poor impulse control). Higher-level cognitive functions regulated by the prefrontal cortex, such as cognitive flexibility and the ability to reason and think abstractly, appear to be particularly sensitive to the effects of disturbed or insufficient sleep. Finally, health outcomes of inadequate sleep include potential deleterious effects on the cardiovascular, immune and various metabolic systems, including glucose metabolism and endocrine function.

Vulnerable populations, such as children who are at high risk for developmental and behavioural problems due to poverty, parental substance abuse and mental illness, or violence in the home, may be even more likely to experience "double jeopardy" as a result of sleep problems. In other

words, not only are these children at higher risk for *developing* sleep problems as a result of such conditions as chaotic home environments, chronic medical issues like iron deficiency anemia, and neglect, they are also less likely to be *diagnosed* with sleep problems because of limited access to health-care services and likely to suffer more serious *consequences* from those sleep problems than their less vulnerable peers. Children with co-morbid medical, psychiatric and developmental disorders are also at higher risk for both occurrence of and consequences from sleep problems.

Finally, sleep problems in children are also a significant source of distress for families, and may be one of the primary reasons for caregiver stress in families with children who have chronic medical illnesses or severe neurodevelopment delays. Furthermore, the impact of childhood sleep problems is intensified by their direct relationship to the quality and quantity of parents' sleep, particularly if disrupted sleep results in daytime fatigue and mood disturbances, and leads to a decreased level of effective parenting.

Problems

It should be emphasized that it is often a challenge to arrive at an operational definition of "problematic sleep" in children. The range of sleep behaviours that may be considered "normal" or "pathologic" is wide and the definitions often highly subjective. It should be kept in mind that for clinical populations, the description of the sleep problem is often quite subjective and highly dependent on parents' awareness of, expectations for, tolerance of and interpretation of the sleep behaviours.

In addition, it is also important to consider the cultural and family context within which sleep behaviours in children occur. For example, co-sleeping of infants and parents is a common and accepted practice in many ethnic groups, both in their countries of origin and in the United States. Therefore, the developmental goal of independent "self-soothing" in infants at bedtime and after night wakings, although clearly associated in a number of studies with fewer subsequent sleep problems in young children, may not be shared by all families.

Research Context

In general, behavioural treatment strategies for sleep problems in young children target difficulty in settling at bedtime and/or night wakings.Recognizing the need to standardize definitions for these presenting complaints, the International Classification of Sleep Disorders

has operationalized clinically significant bedtime resistance, sleep onset delay and night wakings for infants and toddlers, setting forth specific criteria for several sleep disorders that present as settling difficulties and problematic night wakings. These include Sleep Onset Association Disorder (SOAD) and Limit Setting Sleep Disorder (LSSD).In SOAD,the child learns to fall asleep only under certain conditions or associations, such as being rocked or fed, and does not develop the ability to self-soothe. During the night, a child who experiences the type of brief arousal that normally occurs at the end of a sleep cycle (every 90 to 120 minutes) or awakens for other reasons is not able to get back to sleep without those same conditions being present. LSSDis, by contrast,a disorder most common in children preschool-aged and older, characterized by difficulties falling asleep and bedtime resistance (“curtain calls”), rather than night wakings. The prolonged sleep onset delay results in inadequate sleep duration. Most commonly, this disorder develops from a parent’s inability or unwillingness to set consistent bedtime rules and enforce a regular bedtime, often exacerbated by the child’s oppositional behaviour.

Key Research Questions

Most of the studies regarding interventions for sleep problems in young children have focused on short-term behavioural interventions carried out by parents in the home setting; therefore, the presence of confounding variables is often a challenge. Researchers have taken a number of approaches to the issue of defining a “sleep problem” in these studies. Some use *a priori* definitions of disturbed or poor sleep (e.g. waking for longer than 30 minutes more than three times a week), while others have relied on comparison to “normative” populations or have based the definition of sleep problems on what the parent subjectively identifies as problematic. Although some studies have attempted to utilize more “objective” measures of sleep quality and quantity (e.g. actigraphy, videography), most have relied on more subjective parental reports of improvement.

Recent Research Results

There is now a solid body of literature regarding empirically-based non-pharmacologic treatment of bedtime problems and night wakings in infants, toddlers and preschoolers.[11-42] These treatments are based on basic behavioural principles that reduce or eliminate some behaviours (e.g. crying) and reinforce others (appropriate bedtime behaviours). These general strategies include ignoring, differential reinforcement, shaping and behavioural chaining.

Although applications of these basic behavioral principles require tailoring for children, they are similar to empirically-based behavioural treatments for adult insomnia, such as sleep restriction and stimulus control.[43] Specific behavioural treatments for bedtime problems and night wakings in infants and young children that have adequate empirical support include the following: (1) extinction (unmodified standard; graduated; with parental presence); (2) scheduled awakenings; (3) positive routines +/- response cost; (4) bedtime fading; (5) positive reinforcement; and (6) parent education. The level of empirical support for these behavioural interventions has been assessed in the psychology literature using the Chambless criteria, which were developed in order to conduct a systematic assessment of the efficacy of specific treatments.[44] Under this rubric, a given treatment technique is evaluated as well-established if there are adequate, well-designed studies by at least two investigators; treatments may also be classified as probably efficacious or as promising interventions if they have met less rigorous criteria. There is currently evidence to support extinction and parent education as well-established, graduated extinction and scheduled awakenings as probably efficacious, and positive routines as a promising intervention. There have been a number of methodologies employed in studies that have examined the efficacy of these behavioural treatments, including multiple baseline, within-subject, between-group and ABAB designs. A variety of subjective and objective assessment measures have been used in these studies, including parent report, sleep diary, actigraphy, audiotape, and videotapes. Finally, outcome measures utilized have included: child sleep variables (bedtime resistance, night wakings); child daytime mood and behaviour variables; and parent sleep and behavioural variables (mood, marital satisfaction).

Conclusions

There is a solid body of literature supporting empirically-based non-pharmacologic treatment of bedtime problems and night wakings in infants, toddlers and preschoolers. Numerous studies have been conducted employing behavioural strategies that lend significant support to the development of evidence-based practice parameters for these common sleep problems. These studies have utilized a breadth of empirical designs and a variety of subjective and objective outcome measures across multiple domains. Not only is there compelling evidence to support the efficacy of a number of specific non-pharmacologic treatments for bedtime and night-waking problems, but studies have also demonstrated that these strategies are often superior to pharmacologic treatments and more acceptable to parents and practitioners. Behavioural sleep management strategies have the further advantage of potentially generalizing to the

management of other daytime behavioural issues.

Implications

Given the prevalence and potential impact of sleep problems in children, as well as the consequent stress on families and economic consequences,[45,46] it is imperative that effective behavioural interventions continue to be developed and empirically tested. In addition, a number of other important variables that affect the type, relative prevalence, chronicity and severity of sleep problems must be taken into consideration when designing and implementing these interventions:

- child variables – e.g. temperament and behavioural style, individual variations in circadian preference, cognitive and language delays;
- parental variables – e.g. discipline styles, parents' education level and knowledge of child development; and
- environmental variables – e.g. physical environment, family composition and lifestyle issues.

The need to develop strategies aimed at *prevention* of sleep problems, especially in young children, emphasizes the importance of education for both parents and providers. Furthermore, early detection of sleep problems in children necessitates the development of *systems* for age-appropriate screening and surveillance of pediatric populations.

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