ENCYCLOPEDIA
on Early Childhood
Development

Services and Programs Proven to be Effective in Managing Pediatric Sleep Disturbances and Disorders, and Their Impact on the Social and Emotional Development of Young Children

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March 2013, Éd. rév.

Introduction

During the preschool years dramatic changes take place in a typical child's sleep, while enormous changes in physical, linguistic, cognitive and social development occur which profoundly alter both waking activities and sleep regulation. Establishing sleep habits which meet a child's individual needs and are adapted to his culture and family circumstances is vital to individual and family well-being. Within a broad range of individual, familial and cultural

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variations[1] by the end of the preschool period a child who is a “good” sleeper will have a regular but not ritualized, emotionally and socially positive, pre-bed routine, free of resistance and coercion. The chid will be put to bed awake, without difficulty, by a variety of caregivers, and sleep independently wherever appropriate to family culture and circumstances. Sleep onset will be rapid both initially and after later wakings, without crying, calling-out or adult attention, unless he is ill or needs care, so that sleep is of age-appropriate duration and quality.[2,3,4]

Achieving this outcome requires continuous, dynamic, learned adjustments affecting every aspect of sleep and involving all parents, caregivers, siblings and other family members. This is influenced by child temperament; parental adjustment; resources and practices; maternal health and well-being, and family/community circumstances.[3] Careful assessment of family circumstances and environment and child development is necessary in diagnosing pediatric sleep disturbances (PSDs).[5,6] Sleep may be measured by parental diaries,[7] activity monitoring,[8] videosomonography[9] and clinic-based, multi-channel physiological recording (polysomnography).[10] Questionnaires for assessing children’s sleep have recently been comprehensively reviewed [11,12,13] and while the psychometric quality of many is poor there are a few that meet required standards.[11]

Subject

PSDs are a common reason for attending family health services[14,15] and may broadly be differentiated into a psycho-social group focussed on parent-child interaction, and a group (henceforth referred to as the bio-maturational group) in which atypical biological, especially neural, maturation appears to be critical.[16,17]

Psycho-social PSDs include:

1. Problems of bed resistance and sleep location. Children may resist/delay being prepared for and placed into bed (with tantrums, escape/avoidance, and demands for pre-bed rituals) and/or may sleep often in locations other than where parents desire (e.g., co-sleeping with parents or siblings) because the child moves or is moved from their own cot or bed to stop or prevent them crying and obtain sleep.
2. Problems of sleep-onset delay and recurrent night waking, where the infant or child needs parental attendance and attention to initially go to sleep or to resume sleep after later wakings.

3. Fears and anxieties associated with bedtime, night-time, and sleep.

Bio-maturational PSDs include:

1. Parasomnias, which are undesirable behaviour occurring during sleep or sleep wake transitions, including sleepwalking/talking, sleep terrors, and rhythmic movement disorders such as head banging and body rocking and also nocturnal enuresis (bedwetting), and
2. Circadian rhythm disorders, in which the individual's sleep-wake phases are not in synchrony with those of the family or community.

Psycho-social PSDs commonly co-occur, and may affect 15 – 35% of families.[18,19] Bio-maturational PSDs are much less common, chronically affecting 1- 3% of families,[20] but children with parasomnias often also exhibit psycho-social PSDs.[20] Little evidence links PSDs to family demographic variables, but more boys than girls may be affected by parasomnias.[21]

Obstructive sleep apnea and other breathing difficulties are primarily problems of airway functioning and respiratory control during sleep.[22] Any infant or child with symptoms of sleep apnea (noisy breathing and profuse sweating) or anoxia (lack of oxygen) needs urgent medical evaluation. Some infants experience episodes of anoxia (lack of oxygen) while asleep, often resulting in death in infants aged > 12 months (Sudden Infant Death Syndrome; SIDS). Risk of SIDS is reduced by placing infants on their back to sleep[23] and by breastfeeding, and avoiding exposure to cigarette smoke and co-sleeping.[24]

Problems

PSDs predict sleep disturbances and behavioural difficulties later in childhood[25,26,27] and potentially throughout life,[28,29] and sleep quality is linked to intellectual, emotional and social development.[30] If chronic or severe, PSDs are stressful for the child, siblings and parents, contributing to attachment difficulties, disruptions of learning, depression, family conflict and marital breakdown[15,26] and to overmedication with prescription and non-prescription drugs.[18]

Research Context

Considerable research has investigated the developmental neurophysiology of sleep from infancy onwards. Over the first months of life sleep is coordinated into a day-night pattern and

consolidated.[4,31] Cycles of rapid-eye-movement sleep (REM) and non-REM sleep shift from rapid cycling and 1:1distribution at birth to a 1:2 distribution at 8 months, and deep, non-REM sleep (associated with parasomnias) predominates early in sleep, while REM (associated with awakenings, dreams and nightmares) occurs more later.[21] Research into factors predictive of PSDs reveal associations with first-born status, colic, difficult infant temperament, maternal depression and insecure adult attachment, and diversity in parenting strategies.[3] There is more treatment research for psycho-social than for bio-maturational PSDs, and this has shifted from mostly case studies to well-controlled investigations. Some treatments have achieved empirically validated status as well-established, probably efficacious [i.e., effective] or promising[32,33,34,35,36] using criteria from Chambless and Hollon.[37]

Key Research Questions

Research has focussed on how to facilitate the development of infants' ability to self-soothe so that sleep initiation is under child- rather than other-related cues. Understanding the behavioural trap[2] by which parent-child interactions shape and maintain sleep disruptions has stimulated development of behavioural treatments and adaptations thereof, with concerns as to their effectiveness, acceptability, impact on attachment, adjustment and family well-being, and cultural appropriateness.

Recent Research Results

As noted above, family interventions for PSDs need to begin with careful functional assessment and analysis that considers the well-being of the whole family, not just the target child,[38,39] from a developmental perspective. Parent education, at about birth or later, on infant sleep management[40,41] and in regulating breastfeeding to optimize night sleep duration[42] facilitates sleep development and may prevent PSDs developing.[43]

Systematically structuring pre-bed routines using quiet, pleasant activities and praise for compliance (termed Positive Routines) reduces pre-bed tantrums and resistance.[44] Crying and calling out etc during initial settling time or following later night wakings is reduced or eliminated by a range of interventions [variously called Extinction, Graduated Extinction, and (Graduated) Planned Ignoring[34]]. All involve the immediate or progressive (graduated) delay/withdrawal of parental attention for sleep-disruptive behaviour, thereby (in principle) removing the reinforcer for the behaviour, a process termed behavioural extinction.[2] In older,

more verbal children, this withdrawal of attention can be supplemented by adding shaping and positive reinforcement (praise, tangible rewards) for achieving appropriate sleep[45,46] and/or by using strategies such as the Bedtime Pass[47] and Social Stories[48] (modelling combined with rewards). For infants over 6 months, modifying the withdrawal of adult attention by adding Parental Presence, in which the parent lies near the child but does not interact with them until the child goes to sleep[49,50] reduces distress to low levels, and is now regarded as best practice for children 6 to 24 months of age.[49] Positive Routines may be supplemented by adjusting bedtime later or earlier depending on sleep latency (Bedtime Fading) and by removal from bed and being kept awake when not sleeping (Response Cost).[51] Combining reducing doses of a sedative drug with planned ignoring also reduces distress,[52,53] but sedative drugs used alone have at best short-term effects.[33,54]

Parents need to be carefully prepared for any intervention, supported during it,[55] and warned of the possibility of both initial brief increases in the frequency or intensity of behaviour following the removal of reinforcers (post-extinction response bursts), which may exacerbate sleep disturbance briefly upon treatment initiation,[52] and the possibility of spontaneous recovery of PSD following illness or changes in routine.[55] Whether unmodified or modified, procedures involving withdrawing parental attention are largely non-stressful for parents and positive for the family[56,57,58,59] and, importantly, have no reported adverse effects on child well-being or development.[60,61] Night-time fears/anxieties are reduced by treatments involving relaxation, modelling coping, positive thoughts/imagery, and positive rewards for “bravery.”[62,63]

There is comparatively little controlled research into treatments for bio-maturational PSDs.[35] Scheduled awakenings, in which parents use baseline information to predict the time of a parasomnia event and wake the child 15-30 min beforehand has successfully treated sleepwalking and sleep terrors.[64] Waking (via a urine alarm) is also an effective treatment for nocturnal enuresis,[65,66] though this is generally used only for older children. Infants and children with chronic illness, disabilities and special needs may experience high rates of PSDs. There is little systematic research on treatment for such children[67] but considerable research interest is evident in recent systematic reviews.[68,69]

Conclusions

The neuro-development of sleep and its importance to development is relatively well-understood. PSDs are systematically described and diagnosed, and the psycho-social versus bio-maturational

distinction is well-established, however the causes of and risk-factors for PSDs are less well specified. Development of good sleep habits in the first year of life depends on the infant learning to self-soothe and on the parents avoiding inadvertently reinforcing sleep-disruptive behaviours. Teaching parents how to structure their bed-time and sleep-related interactions with their infant/child so that self-soothing occurs and sleep-disruptive behaviour is not reinforced may prevent as well as treat PSDs. These treatments may be tailored, by gradual adjustment of parental attention, parental presence, and/or brief use of sedatives, so as to reduce stress, apprehension and infant distress, with parental presence being most strongly recommended as contemporary best practice.[49] Effective interventions promote family well-being and do not adversely affect chid development. More research is needed into bio-maturational PSDs, into services for families facing chronic child illness and disabilities, and into cultural factors.

Implications

- Staff working in pediatric/family services settings need regular training in empirically-based best-practice for the both functional analysis and diagnosis and the treatment of PSDs.
- PSDs need to be understood and treated within an ecological perspective on the child and the family.
- Parental and staff expectations that interventions will be stressful or distressing, or that they will have long-term ill-effects on the child or the family, can be countered by substantial evidence to the contrary where well-designed and properly supported interventions are used.
- Untreated, chronic PSDs, especially if severe and/or disruptive have the potential for long-term negative consequences for the child and his/her family and should be treated promptly and effectively.
- While interventions (other than for children who are ill, disabled, or have special needs) are typically brief, parents need good preparation for and support during the critical time.
- Interventions which employ best-practice procedures should have relatively rapid positive effects and these should be maintained long-term. If positive effects are not observed reasonably rapidly procedures should be checked for fidelity to the implemented program.
- Research needs to focus on improving and extending preventive interventions; matching treatments to families; improving the range and quality of services for children who are ill, disabled, or have special needs; and assessing long-term impacts on the target child and

her/his family.

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