

REVIEW ARTICLE

Infant sleep disturbance: Description of a problem behaviour process

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Clinicians are commonly consulted by parents of infants aged 6–24 months about infant sleep disturbance (ISD). Considerable research over the last two decades has contributed to our knowledge of ISD but has failed to lead to a comprehensive aetiological explanation. This research is reviewed and identifies: (i) individual factors associated with sleep disturbance; (ii) interactive mechanisms linking these associated factors; and (iii) the relationship between learning and infant sleep disturbance. The findings of this research are incorporated into models describing proximal factors involved in the three processes considered important in the development of sleep disturbance: (i) the development of sleep self-initiation at around 3 months of age; (ii) the development of primary sleep disturbance by 6 months of age; and (iii) the development of secondary sleep disturbance later in the first or second year. Description of the influence that proximal factors have on sleep disturbance, organized in these three models, is the most appropriate way of presenting this complex material for the clinician. Changing these proximal factors is important in both prevention and management.

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Clinicians who work with families and their infant children, aged 6–24 months, are regularly confronted with distressed parents wanting help to manage night awakening or settling problems. These are prevalent and troublesome problems in that they affect 15 to 35% of infants [1–5]. They are also associated with maternal malaise, parental sleep disturbance, later child behaviour problems and possible disruptions in the parent–child relationship [2,3,6–13]. They may also result in infants being sedated, usually ineffectively, and often over protracted periods of time [14]. The clinician's role varies and may range from giving information, to providing preventive advice or support through an intervention. Success in these roles depends on an understanding of the processes which lead parents and child to the clinician.

The past 20 years have yielded a wealth of research and comment on infant sleep disturbance (ISD). This research ranges from an exploration of cultural context [15,16] to a behaviour analysis [17] and a close consideration of the topography

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of infant state organization in the first few months of life [18,19]. Such a diverse body of literature needs structure in order to integrate it. We have developed models of the proximal factors involved in each of the three processes that we suggest are involved in the development of the problem behaviours. These models integrate the most salient factors and give the clinician an informed base from which to assess families and choose an appropriate intervention.

The developmental and learning processes which link the factors associated with sleep disturbance are complex and require systemic explanations. To this end we present models which describe sleep disturbance developing during three separate processes. First, the infant must learn to self-initiate sleep without the presence of the parent (sleep self-initiation). Second, the 6-month-old infant may have failed to settle throughout the night by the modal age at which consistent, all-night sleep occurs (primary sleep disturbance) [1,20]. Finally, the infant may negotiate both of these challenges but develop unsettled sleep later (secondary sleep disturbance). This may occur after an illness or other disruption of family circumstances, or if the infant develops sleep-schedule problems and parental demands for duration of sleep are unreasonable.

As a basis to these models we first review the relevant literature which: (i) presents factors associated with sleep disturbance, namely the maturation of sleep-state organization, individual characteristics of the infant and parent behaviour; (ii) describes the interactive mechanisms linking individual associated factors in the development of ISD; and (iii) describes the relationships between learning processes and infant sleep behaviour. This will clarify the complex and differential role of proximal factors at different points in the problem behaviour process. Of course, the interaction of these factors is accompanied by differential cultural expectations as well. Although some cross-cultural researchers argue that the concept of sleep disturbance reflects unreasonable expectations about infants within Western societies, consideration of this literature is beyond the scope of this review. We assume that parents who culturally accept sleep disturbance do not present to the clinic for help. We also assume that the clinician will explore the problem without imposing values which the parents do not share [21,22].

Associated factors

The development of sleep-state organization

Infant sleep changes over the first months of life to follow a diurnal rhythm, with sleep lasting for a long unbroken period at night [23–26]. Similarly, sleep states change from being equally distributed between REM (active) and NREM (quiet) sleep at birth to one third REM and two thirds NREM by 8 months of age [27]. REM sleep in infants occurs in regular sleep cycles throughout the night, increasing in the latter part of the night as the child becomes older, to approximate the pattern typical of adult sleep.

The process by which REM sleep decreases over the first 2 years has implications for the understanding of ISD. The majority of infants wake during REM episodes [1]. As REM sleep habitually precedes awakening in this age group [26] infants are vulnerable to waking regularly. Ferber [26,28] describes two types of night arousals. During a “partial” arousal (usually from NREM) the infant, seemingly, is not aware he or she is awake and sleep resumes without intervention. Where the arousal is

Practice Points: 1**Associated factors**

There is proportionally more REM in infant sleep than in adult sleep. REM is often associated with complete arousals. Sleep-disturbed infants signal during these arousals and need aid to resume sleep.

Sleep-disturbed infants tend to sleep less, cry more, have consistent sleep disturbance, difficulty self-soothing and a more difficult temperament.

Parents of sleep-disturbed infants tend to use more varied and stimulating management techniques. Mothers of sleep-disturbed infants may be depressed and have an insecure adult attachment style.

The relationship between peri-natal adversity and sleep disturbance is inconclusive. Other organic factors such as chronic ear infections, reflux and allergies must be considered but are unlikely to be the cause of sleep disturbance in an otherwise well child.

Colic (excessive fussiness) is an important prodromal factor in primary sleep disturbance but its nature is unclear.

“complete” (from REM or NREM) signalling occurs and the night waking infant has difficulty returning to sleep without intervention. We believe that this occurs unless the infant has learnt the requisite sleep self-initiation skills.

A sleep-disturbed infant is one who is unable to settle back to sleep without the parents being aware of the awakening. Because of this, Ferber and Boyle [29] emphasize that night waking is a problem of sleep initiation and re-initiation rather than of sleep maintenance. Night wakings are in fact awakenings that are accompanied by crying, calling out or some other means of attracting adults’ attention (signalling).

Individual characteristics of the infant

Sleep-disturbed infants sleep less than other infants [2,5,20]; are likely to have had sleep disturbance at an earlier age, that is to have sleep disturbance that has been relatively consistent [2,5,8,9,12,20]; and are less able to self-soothe using an attachment object [2,30,31]. The sleep-disturbed child has an increased chance of having being born first [3], of having had colic [8,32,33] and of evidencing certain of the behavioural and temperamental features usually associated with infants of difficult temperament [34–36]. These features include high activity scores [37–39], increased levels of crying [12,40,41], low malleability and rhythmicity scores, high irritability scores [3], and low scores for adaptability and mood [13].

Parental characteristics and practices

Parents of sleep-disturbed infants are more likely to use a wide variety of management techniques with their infants [20,37] and to choose different management techniques from the parents of non-sleep-disturbed infants [2,42]. These techniques include putting

their infants to bed asleep [30]; staying with them as they fall asleep [5,43]; taking their child into their own bed [2,3,9,13]; feeding their child during the night [13,20]; and using stimulating bed-time rituals [12,44].

Mothers of sleep-disturbed infants tend to have higher levels of malaise or depression [3,11,13,45] and have high rates of insecure adult attachment [7]. That is, these mothers' recollections and evaluations of their early childhood relationships and experiences were rated as "insecure" according to criteria devised by Main and Goldwyn [46].

Organic factors

Evidence for an association between perinatal complications and later sleep disturbance is contradictory [3,8,20,37,40]. Premature, low birthweight and physically at-risk babies have some differences in their sleep topography, but links with later sleep patterns have not been established.

There is some research evidence for an association between arousals and proximal esophageal reflux in infants [47] and between milk intolerance and sleeplessness in some infants [48]. Although organic factors such as chronic ear infections must be eliminated [49], most of these infants respond successfully to changes in sleep routine and behavioural approaches, indicating that illness is infrequently the ongoing cause of sleep disturbance [48]. The status of colic (excessive fussiness in a very young infant) as an organic condition is unclear [32], although there is considerable literature describing its presence as a prodromal factor in ISD.

Interactive mechanisms

Practice Points: 2

Interactive mechanisms

Infant sleep patterns result from the infant acting upon the environment as well as being acted upon in turn.

The environment affects sleep-state organization. It is likely that parental ambivalence and overstimulation may contribute directly to the development of ISD.

Parents' prior experiences, lack of clear cultural expectations, insecure adult attachment, and negative affect exacerbates this process with infants' responses contributing to the development of their parents' behaviour in turn.

Common developmental occurrences such as excessive crying, separation anxiety and the development of autonomy may be accompanied by sleep disruptions and may elicit parental responses which maintain the problem.

The associated factors described above do not influence sleep patterns in a linear manner. Recent literature describes more complicated relationships between developmental, infant and parental variables. These occur in the context of other contiguous, dynamic developmental processes where the infant acts upon the environment as well

as being acted upon in turn. Environmental events affect the maturation of sleep-state organization. For example, circadian entrainment seems to be due more to environmental time cues (Zeitgebers) than to neurological maturation [50]. More central to ISD, there is a growing and consistent body of evidence that suggests sleep-state organization proceeds more rapidly under conditions of low and co-ordinated stimulation. Much of this research looks at differing styles of care with predominantly pre-term infants but suggests that co-ordinated, and low-stimulating or rhythmic care, results in better defined sleep and alert states, more quiet sleep and less fussing and crying [51–54]. This implies that parents may influence their infant's sleep-state development profoundly if they are overstimulating. For example, Weissbluth [55] describes how stimulating over-attentiveness by parents may inadvertently deprive the infant of the opportunity to learn how to fall asleep unassisted. In addition, it is well documented that the excessively stimulated neonate can enter sleep as a way of avoiding overstimulation [56,57]. This outcome may inadvertently reward parents for using excessively stimulating rituals with an already overstimulated child [57].

It is likely that parents' tendency to overstimulate results from stress and self-doubt associated with negative affect and insecure parental attachment, augmented in some cases by parenting a temperamentally difficult child. This overstimulation may involve such features as vigilant monitoring of the infant; a low threshold for detecting and a low latency of response to infants' signals; and parental responses characterized by high intensity, long duration and much diversity. The stimulating quality of the parental response may also be exacerbated by parental ambivalence and inconsistency. An anxious, overly-assiduous parent may alternate between engaged parenting and parental withdrawal precipitated by fatigue and anger, depression or self-doubt [58]. Aspects of this parenting style have been described in mothers of sleep-disturbed infants by Guedeny and Kriesler [59] and within the related literature of maternal response to excessive infant crying. Most studies report an intensification of maternal response which has also been associated, under some circumstances, with maternal withdrawal [58,60].

It is, then, likely that parents of sleep-disturbed infants will display, at different times, both withdrawal from and overstimulation of their infants in response to stressful crying at night. This variation in adult behaviour is consistent with the description of maternal behaviours associated with one category of insecure adult attachment characterized, in part, by ambivalence (preoccupied attachment) and with the ambivalence observed in some parents attempting sleep programmes described by France *et al.* [22]. Ambivalence in behaviour or beliefs about handling sleep problems may also explain differences in cross-cultural studies which report a low perception of sleep problems in societies with clear cultural expectations of infant sleep and associated parental behaviour [15,61]. This finding appears to hold regardless of whether these societies engage in intensively nurturing night-time practices or in regulated practices which require the child to spend much of the night alone. The higher perception of sleep problems evident in some Western societies, therefore, may reflect parental ambivalence about expectations of their child and about appropriate management techniques.

Ambivalent or overstimulating parenting may also affect the infant adversely in other ways. Sleep-disturbed infants develop higher rates of behaviour problems than other children [3,9]. Reducing sleep disturbance results in positive contiguous changes in both infant, maternal and relationship variables [11,62–65].

In turn, infant behaviour itself affects the amount of stimulation the child receives,

making temperamentally difficult babies vulnerable to developing ISD, and vulnerable to overly stimulating parenting, because of their own difficulties in establishing regularity of bodily functions and their tendency to cry more than other infants [66–69]. Similarly, one recent study suggested that it may be easier for Japanese mothers to co-sleep with their infants because of the well regulated temperament of Japanese infants, which was measured at birth [16]. Conversely, Sadeh *et al.* [34] make the excellent point that the behaviours associated with difficult temperament may be the result of sleep disturbance rather than the cause of it. Finally, other significant developmental events which are likely to have a bearing on the development of sleep patterns occur during the first 2 years of life. Excessive fussiness (colic) in the first 3 months is related to sleep disruptions [32] and is likely to lead to parental anxiety and over-vigilance. The development of the attachment relationship and the peak, at 9 months, of separation anxiety, results in persistent proximity-seeking on the part of the infant. This may interact with ambivalent or overly stimulating parenting and result in the frequent development of secondary sleep disturbance at around this age. Similarly, the development of autonomy late in the second year could exacerbate the bed refusal and “curtain calls” which are a feature of bed-time for sleep-disturbed toddlers [70].

Sleep and learning

Practice Points: 3

Sleep and learning

Sleep acts as a reinforcer thereby increasing the occurrence of behaviours preceding it. Parents and infant can inadvertently increase the association between sleep and a complex chain of inappropriate stimuli involving stimulating parental presence and infant crying.

A coercive behaviour trap occurs where both the infant and the parents act to avoid the respective aversive events of infant distress (parents) and falling asleep in unfamiliar circumstances (infant).

Attempts to change result in a temporary increase in aversive events, further avoidance of change and inadvertent exacerbation of the sleep problem.

The role of the associated factors in the development of sleep disturbance can also be clarified by applying learning principles [17]. Blampied and France [17] start from the premise that sleep is a biological process that incorporates some behavioural components. Sleep is a reinforcer to both infant and parent and as such will increase the likelihood of the behaviour which precedes it. In the case of an infant with normal sleep, the infant will be reinforced for behavioural quietude and the parents for providing appropriate proximal cues (discriminative stimuli) for sleep onset such as regular time cues, a simple and non-stimulating bed-time routine, a quiet time to allow sleep onset to occur, and the association of sleep onset with the cot. During night awakenings this infant will be reinforced by sleep resumption for engaging in self-soothing behaviours, and the parents will be reinforced for providing attention which is of a nature and intensity to remain non-reinforcing to the infant. Evidence from behavioural programmes which allow some

parental night-time intervention [65,71] is that parental attention does not act as a reinforcer for signalling if it merely serves to check the infant without intense intervention such as removal from the cot or feeding.

In the case of the sleep-disturbed infant, the infant will be reinforced for signalling with a number of consequences including both parental stimulation and the eventual onset of sleep. These reinforcers are included in a complex chain of behaviour involving increasingly intensive crying and increasingly intensive parenting. This infant's parents will be reinforced for providing inappropriate proximal cues for sleep onset involving increasingly intensive stimulation such as rocking and feeding. Sleep will be associated with stimulating parental presence and these same setting events will be required to ensure sleep reinitiation during night awakenings. In addition, the sleep-disturbed infant will be continually reinforced for behaviour such as crying which competes with falling asleep.

Competing behaviour in both the child's and the parents' repertoires is under powerful reinforcement operating within what is known as a behaviour trap, specifically a "coercion trap" [72]. Within this trap both the child and parents act to avoid aversive stimuli. The parents act to avoid their infant's distressed behaviour and the infant acts to avoid the unfamiliar, distress-evoking circumstances which accompany falling asleep alone.

Parents' ambivalent and occasional attempts to withdraw reinforcement of bed-time demands, and signalling during sleep-onset delay or night waking will result, initially, in an increase in crying and other distress behaviour known as the "post-extinction response burst" (PERB) [73,74]. This result, unfortunately, is likely to increase the parents' avoidance behaviour and consequently strengthen the coercion trap, as the resumption of attention intermittently reinforces the infant's crying at a more intensive level, rendering it more resistant to change.

Integrating the literature

The clinician needs to understand the mechanisms underlying a clinical problem in order to make an effective intervention. In the case of infant sleep disturbance this involves the integration of a relatively unwieldy body of information and the identification of the proximal factors influencing the development of the sleep disturbance during each of the three processes we believe are involved in the development of the problem behaviour. This section presents models that integrate findings from the literature on sleep-state development, infant and parental variables, developmental context and learning theory. These variables are considered at the point where each has a proximal effect by describing the development of different aspects of sleep disturbance and the different stages of infancy when they typically occur. These stages are: (i) the development of sleep initiation problems during the first 3 months of life; (ii) the establishment of primary sleep disturbance by 6 months of age; and (iii) the establishment of secondary sleep disturbance later during the first or second year.

Model one: The first 3 months of life

Constitutional and environmental vulnerability

As discussed above some infants may be vulnerable to developing sleep disturbance through being born with a particular physiological (i.e., sleep-state organization) and

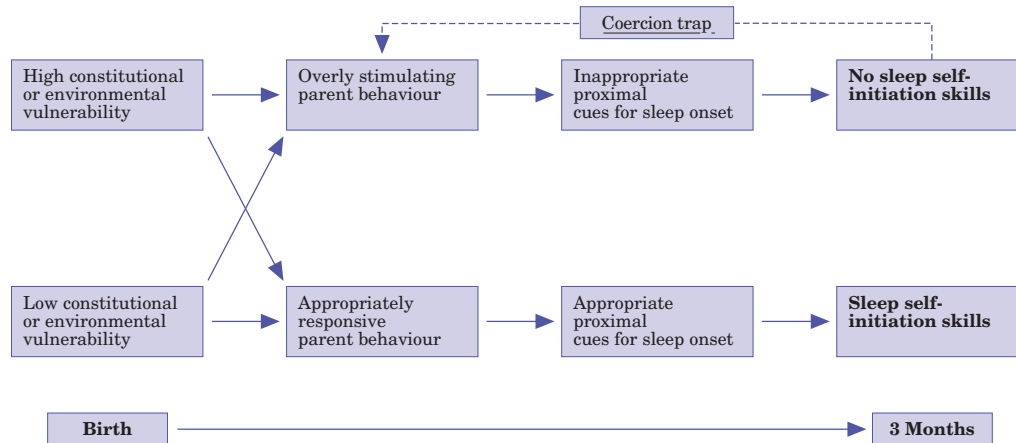


Figure 1 The establishment of sleep initiation problems during the first 3 months of life.

constitutional endowment (i.e., difficult temperament). These factors in turn influence parental behaviour as Seymour *et al.* [69] suggested, so that the proximal factors of crying, irritability, low malleability, low adaptability, negative mood, poor state regulation and low levels of self-soothing behaviour may be handled in an overly stimulating manner by concerned parents. Certain parental characteristics established prior to the infant's birth lay the foundation for later parental behaviour which is the major environmental contributor to infant sleep disturbance. The parents' proximal response to their infant's temperamental and behavioural characteristics will be influenced by many factors. These include their own experiences of being parented; their attitudes to, experiences of and beliefs about parenting; their own personalities and psychopathologies (such as malaise or depression); and their response to stressful life events.

Parental practices

These infant and parental vulnerabilities will result in the parents developing, during the first 3 months of their infant's life, certain styles of interaction with their infant. These styles may be characterized as being either overly stimulating or appropriately responsive. If they are overly stimulating then their proximal responses include diverse management techniques; stimulating rituals; a low threshold for detecting, a low latency of response to, and intensive responses to infant distress; as well as techniques which block the establishment of self-soothing behaviours such as putting the infant to bed asleep; being present when the infant falls asleep; and co-sleeping.

The vulnerabilities are independent but additive so that families most at risk are those where both infant and parental factors are adverse. Presence of only one class of adverse factors reduces but does not eliminate the risk of ISD so that, for example, temperamentally "easy" babies may still develop ISD because their parents, for reasons independent of their infant's temperament, develop an overly stimulating parenting style. The family's experience of colic or other recurrent source of infant distress, such as ear infections or allergies, also renders the family vulnerable to the development

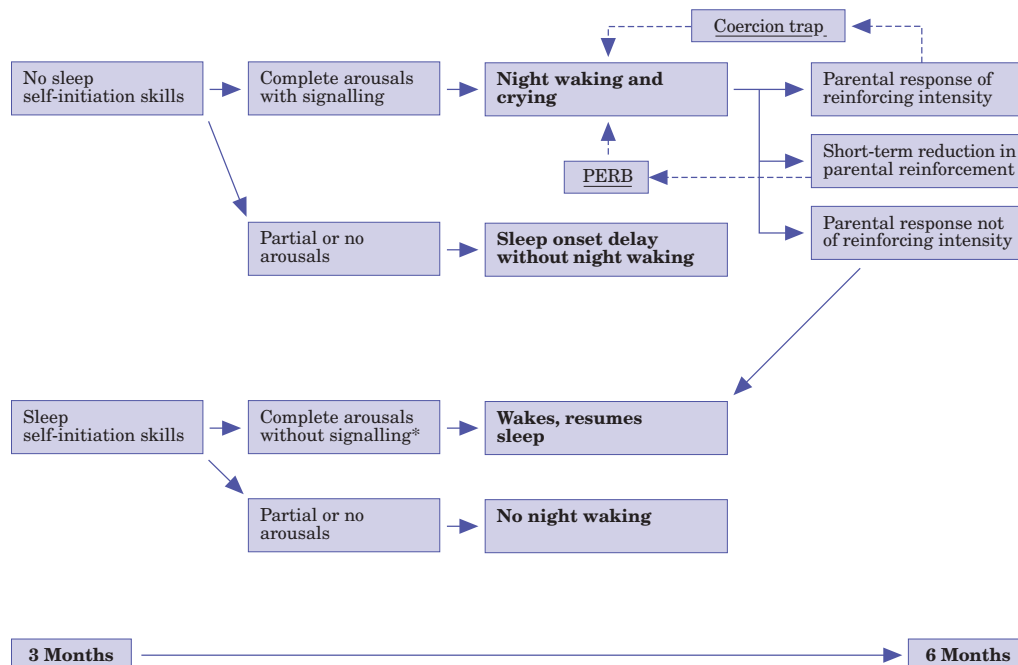
of ISD because of the contingencies such disorders set up for the permanent development of a more stimulating parenting style.

Proximal cues for sleep onset

The parents either establish appropriate proximal cues for sleep onset (such as placing the infant in the cot awake), leading to initiation of sleep without undue delay, or inappropriate proximal cues for sleep onset (such as rocking the infant to sleep) leading to delays in sleep initiation. This delay may be filled by crying and fussing which gains parental attention which often includes feeding or rocking, thereby strengthening these sleep incompatible behaviours and the coercion trap. Appropriate or inappropriate stimuli controlling sleep are probably established by approximately 3 months of age and are one determinant of whether the infant settles to sleep during the night at this stage or exhibits primary ISD.

Sleep self-initiation skills

The outcome of these interactions during the first 3 months will be an infant who approaches the model age for settling through the night either with or without the skills of sleep self-initiation.



* In a few cases, infants will discriminate parent-initiated settling at bed-time from the conditions prevailing when waking occurs with the parent absent during the night. This results in appropriate bed-time settling but signalling during the night during complete arousals. This provides another entry-point into the coercion trap.

Figure 2 The development of primary infant sleep disturbance.

Model two: Primary infant sleep disturbance

Night-time arousals

As the infant's physiological need for regular feeding throughout the night decreases the infant's sleep becomes organized into clear and predictable sleep cycles. The nature of these cycles can influence whether the infant's sleep is characterized by partial arousals and a long unbroken sleep at night, or by complete arousals and a pattern of frequent waking and crying. The quality of these arousals may depend upon proximal factors such as whether sleep state organization has developed with clear state transitions and with sufficient periods of consolidated sleep. This will result from both infant and parental factors.

If the infant does not waken fully, night-waking will not develop at this point. The infant will sleep through the night, although he or she may exhibit sleep-onset delay if sleep self-initiation has not been established prior to 3 months. If night-time arousals are complete, the infant will wake completely and may cry depending, at least in part, on whether he or she is able to re-initiate sleep without parental attention. In this manner lack of sleep self-initiation becomes a proximal factor in the development of primary sleep disturbance.

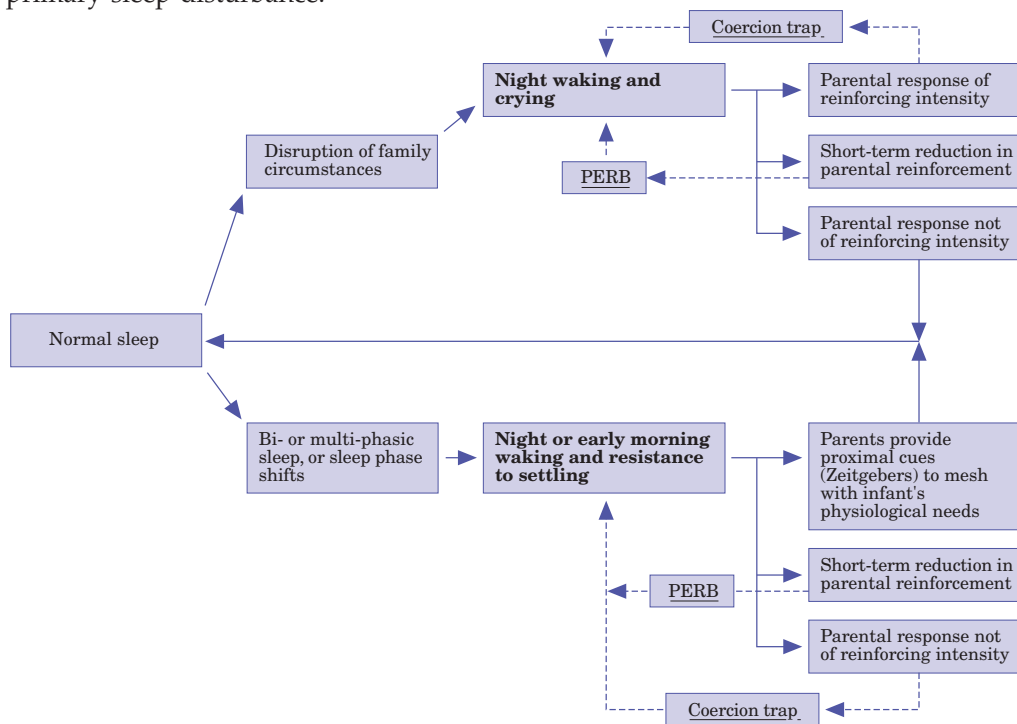


Figure 3 The development of secondary infant sleep disturbance.

Parental response

Once crying upon awakening occurs, it will continue if the ensuing parental attention is sufficiently intense to be reinforcing, creating the coercion trap. If attention for night

crying is not reinforcing, crying will decline to a low frequency. Changes which decrease the reinforcing intensity of the parental response may result in a PERB and in intermittent reinforcement of waking and crying. This will further strengthen the coercion trap and will be unsuccessful in resolving the problem. It is possible that the quality of night-time arousals may change if parents change their response, but this is yet to be established.

Model three: Secondary sleep disturbance

Disruptions in family circumstances

Many infants who had settled to regular sleep by 6 months revert to waking and crying later in their first or second year. It is often the case that this secondary sleep disturbance is precipitated by a disruptive event such as child or parent illness, birth of a sibling, family holiday or a move of house. Whether this is a transient response to a changed environment, or becomes established as chronic sleep disturbance, is determined by the parents' response to its development.

Parental response

Events such as those described above are typically associated with a period of intense parental response and may, on their own, disrupt the stimulus control of sleep onset, disrupt sleep patterns, lower the threshold for distress and crying and potentiate the salience and reinforcing value of parental attention. When it coincides with the developmental period in which separation anxiety is at its maximum the capacity of parental attention to positively reinforce night crying is even further enhanced, making the family more than normally vulnerable to entering the coercion trap. Alternatively, if parents resume responding to their child at non-reinforcing intensity this may prevent or minimize the development of ISD. The situation may be further complicated by partial arousals from NREM sleep which may occasionally occur in older infants. These arousals may be accompanied by crying and may result in parents awakening an otherwise deeply sleeping child thereby providing an alternative entry point into the coercion trap.

Sleep-schedule problems

Even when parents have established clear proximal cues for the onset of infant sleep, the infant may develop a sleep-schedule problem including biphasic or multiphasic sleep and sleep phase shifts [75]. These may result from parental misuse of proximal cues if expectations for the duration of infant sleep are unreasonable, or from development of sleep-state organization which includes protracted daytime naps.

Parental response to the ensuing bed-time struggles, night, or early morning wakefulness will provide another entry point to the behaviour trap but decreased parental response will not result in resumption of normal sleep patterns. The infant does not need to sleep so he or she will resist the resumption of sleep. Parents instead need to

change the infant's sleep times and use the proximal cues for sleep onset as Zeitgebers which mesh with the infant's physiological need for sleep.

Conclusion and clinical implications

Infant sleep disturbance is complex and transactional. The models presented here have implications for both prevention and treatment and readily allow the formulation of research questions.

The clinician must gather information on the history of the sleep disturbance; eliminate organic factors and developmental problems; and refer parents for psychological therapy when attachment and relationship problems or parental psychopathology are present. If the primary problem is sleep disturbance, information should be given to the parents to achieve an understanding of the problem and to allow them to decide what changes they wish to make. This information may include discussion of the nature of sleep, the role of infant characteristics and parental behaviour, and the nature of coercion traps. Ambivalent and overly cautious parents will benefit from involvement in a community parent education programme which emphasizes child management skills [76].

Parents with infants under 6 months of age who wish to prevent sleep problems should facilitate the establishment of sleep self-initiation. This involves establishing diurnal cues, and a simple, identifiable bed-time routine; ensuring that the infant falls asleep in the cot; and providing night-time care which meets nutritional and security needs without being overly intrusive or stimulating. Primary care strategies for older infants involve decreasing parental attention at sleep onset and during night awakenings. In both of these situations parents will need to tolerate brief periods of crying in order to give the infant an opportunity to learn to self-soothe. Interventions involving protracted periods of crying need to be carefully structured and monitored [22] and are not appropriate for infants under 6 months of age. If necessary, supervision of a behaviour management programme [22,77] can be undertaken with infants older than 6 months presenting with both primary and secondary sleep disturbance. There are a variety of empirically validated programmes available [78] and parents should be allowed to choose among these as their compliance is likely to be better if they do. Clinicians and parents must be aware of the PERB and that an initial response to the programme may be followed by a temporary recovery of night waking. Parents who have unsuccessfully attempted programmes in the past, or whose child evidences conditioned fear of the cot or conditioned vomiting, should be referred to an experienced behavioural psychologist for assistance with a tailored programme.

Practice Points: 4

Clinical implications

- Be alert to negative affect in parents and refer mood and relationship difficulties for psychological therapy. Ambivalent and overly cautious parents will benefit from involvement in a parent education programme.
- Providing information to parents is important and may include discussion of the nature of sleep, the role of infant characteristics and parental behaviour, and the nature of contingency and behaviour traps.

- Primary prevention for infants under 6 months involves creating conditions for the establishment of sleep self-initiation. Parents of older infants need to systematically decrease the intensity of their interventions at bed-time and through the night.
- Although primary prevention will involve parents tolerating brief periods of crying, interventions which involve protracted periods of crying need to be carefully structured and monitored.
- Parental involvement in the choice of a programme will enhance compliance. Difficult cases should be referred for specialist intervention.

Research Agenda

- Longitudinal studies employing direct behavioural observation from birth will help clarify the roles of infant temperament and parental beliefs and behaviour in the development of infant sleep patterns.
- Several intervention strategies have been established. Determining which intervention is best for which child and which parent is a rich area for further investigation.
- The feedback effects on infant sleep-state organization of parents changing their night-time responses to their infants are unknown.

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