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Parental education and better sleep in infants: a systematic review

Edukacja rodzicielska a poprawa jakości snu u niemowląt: przegląd systematyczny

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Abstract

The first year of the child's life can be overwhelming. One of the major problems faced by parents relates to the infant's crying and sleeping habits, potentially leading to exhaustion, with implications for their health. Information is crucial, so our aim was to assess the relevance and impact of parental education on children's sleep problems in the first year of life. To this end, we conducted a systematic review, using as keywords references to "parental education," "parenting," "sleep hygiene," "infant," and "newborn," looking for original articles published over the past 10 years in English and Portuguese. We found nine original articles. Results suggest that preventive intervention improves infants' sleep quality. Parental education programmes included infant sleep patterns, parental behaviour, and strategies facilitating self-soothing. Placing down the infant while still awake, and minimising parental responsiveness by active extinction and graduated extinction techniques, were shown to be the most successful strategies. Cognitive-behavioural interventions proved to improve both parents' and infants' symptoms. Incorporating formal parental education into children's sleeping pattern and parents' behaviours in children's health routines in regular medical practice is a cost-effective strategy for increasing the empowerment of families to deal with the problem.

Keywords: parental education, infant sleep, depression, fatigue, first year of life

Streszczenie

Pierwszy rok życia dziecka może być ogromnym wyzwaniem dla rodziców. Jednym z głównych problemów są nawyki niemowlęcia związane ze snem i płaczem. Mogą one prowadzić do wyczerpania, a w konsekwencji powodować niekorzystne skutki zdrowotne. Ponieważ kluczowe znaczenie ma informacja, w artykule przeprowadzono ocenę znaczenia i wpływu edukacji rodzicielskiej na problemy ze snem występujące u dzieci w pierwszym roku życia. W tym celu dokonano systematycznego przeglądu dostępnej literatury przedmiotu. Przy wyszukiwaniu oryginalnych prac opublikowanych w ciągu ostatnich 10 lat w języku angielskim i portugalskim zostały zastosowane następujące słowa kluczowe: „edukacja rodzicielska”, „rodzicielstwo”, „higiena snu”, „niemowlę” i „noworodek”. Wyszukiwanie ujawniło dziewięć oryginalnych publikacji. Wyniki tych prac wskazują, że interwencja o charakterze profilaktycznym podnosi jakość snu u niemowląt. Opisywane programy edukacji rodzicielskiej były ukierunkowane na kształtowanie prawidłowych nawyków snu u niemowląt, zachowania rodzicielskie i strategie ułatwiające samouspokojenie. Do najbardziej skutecznych metod należało układanie niemowlęcia do snu w stanie czuwania oraz minimalizowanie reakcji rodziców poprzez stosowanie technik aktywnego i stopniowego wygaszania. Wykazano, że interwencje poznawczo-behawioralne niwelują niekorzystne objawy zarówno u rodziców, jak i niemowląt. Włączenie formalnej edukacji rodzicielskiej w proces kształtowania prawidłowych nawyków snu u dzieci i zachowań rodziców w ramach rutynowych procedur pediatrycznej opieki zdrowotnej jest efektywną kosztowo strategią, dzięki której rodziny mogą lepiej radzić sobie z tym wyzwaniem.

Słowa kluczowe: edukacja rodzicielska, sen u niemowląt, depresja, zmęczenie, pierwszy rok życia

INTRODUCTION

Sleep problems, including difficulty falling asleep, frequent night awakenings, difficulty self-soothing, and crying, are reported by most parents as challenging in their transition to parenthood⁽¹⁾.

Inadequate sleep has a negative effect on infant behaviour as well as cognitive, physical and socioemotional development, leading to a diminished ability of emotional regulation⁽²⁾. Fatigue, poor sleep quality and distress are frequent findings. Parents report high levels of fatigue, with their poor sleep quality contributing to fatigue in the first 6 months of the child's life⁽³⁾.

Sleep problems are present in 30% of infants, depending on how parents define infants' sleep as a problem. Most commonly, parents identify infant night waking with crying beyond 6 months old as problematic⁽⁴⁾. Persistent sleep problems can also contribute to postnatal depression, parental distress, and poor general health, even in mothers without a history of depression⁽⁵⁾. Moreover, it was found that maternal fatigue at 12 months after birth predicted depression scores at 18 months⁽⁶⁾. Mothers with higher levels of depression-related symptoms reported more infant night waking and more maternal worries about adequately responding to their infants' needs at night⁽⁷⁾. Worries are related to cognitions about infant sleep, particularly doubts about managing the infant's sleep, difficulty with setting sleep limits, and anger at infants' demands around sleep⁽⁸⁾.

Studies on children's behavioural sleep problems have demonstrated the efficacy of behavioural interventions, with significant results that last 3 to 6 months after implementation⁽⁹⁾. In the USA, 14% of mothers experience postnatal depression⁽¹⁰⁾. Similarly, in Portugal, 12.4% of mothers have postnatal depression one week after birth, and 13.7% three months postpartum⁽¹¹⁾. These high rates of maternal depression interfere with the formation of secure mother-to-child attachment, and may cause harmful effects on the cognitive and emotional development of the child⁽¹²⁾.

The first year of life is a difficult period of adaptation. Parents need to learn how to deal with the infant's crying and sleeping, the two major problems described in the literature. They feel overwhelmed and frequently exhausted and stressed, with repercussions for their own sleep, mood, and marital satisfaction. These are the main reasons why they seek help with their family doctors, paediatricians and assistant nurses⁽¹³⁾. Providers must characterise exactly the infant's sleep quality, its physiology and development implications⁽¹⁴⁾.

Although 96% of American paediatricians consider it a crucial duty to provide information about infant sleep to parents, only 18% have formal education in this area⁽¹⁵⁾. Programmes aiming to prevent infant sleep problems focus on parental education about infant self-settling strategies, normal sleep/wake patterns, low stimulation during the night, and increasing the interval between waking and night feeds⁽¹⁶⁾. Implementing programmes on normal sleep

and crying patterns, and encouraging infants to self-soothe may reduce parental concern about infant sleep and crying problems⁽¹⁷⁾. However, parents are unsatisfied with counselling obtained from health providers, and they demand more information⁽¹⁸⁾ which is acceptable and realistic for practical purposes. However, the way parents perceive and manage behavioural intervention is not fully understood⁽¹⁹⁾.

The literature presents several behavioural strategies helping parents to improve infant sleep: positive routines; extinction; gradual or modified extinction, and the attachment parenting style. Positive routines involve placing the infant to sleep at consistent hours, and waking in the morning, establishing the infant's bed as the appropriate place to fall asleep and avoiding associations with behavioural patterns like being rocked, fed or having parents at their bed until they fall asleep. Extinction is a strategy whereby parents put their infant in bed to sleep in a defined schedule ignoring them until the next morning, without checking for potential harm. The method is based on removing reinforcement for the sleeping problem behaviour. Gradual extinction refers to ignoring infants in their bed for increased periods of time, according to their age, temperament of the child, and parents' judgement related to the tolerance of their baby to crying. Short interventions of 15 seconds to 1 minute are allowed, where parents may calm down their child. The aim is to promote the infant's ability to self-soothe and fall asleep alone⁽²⁰⁾. Extinction-based strategies have been used for half a century, since studies demonstrated that parental attention reinforced problematic behaviour, diminishing when parents stop attending the child at first demand⁽²¹⁾. However, recent studies do not support this technique, showing that the perception of abandoning of the child leads to a high level of anxiety in parents, and feelings of guilt. Consequently, gradual or modified extinction techniques were introduced to alleviate the guilty perception. Instead of a full extinction programme, parents are encouraged to attend to the child's crying after a predetermined period, increasing the intervals over time⁽¹⁾. Attachment parenting style is an alternative contrasting approach developed on the basis of principles of attachment theory. It consists in responding quickly and sensitively to the emotional and physical needs of the child in order to facilitate secure attachment⁽²²⁾.

There is a prompt need for sleep education programmes both in the community and in the primary care settings, as they offer a unique opportunity to improve insufficient sleep education, with better health and well-being⁽²³⁾. Working in this gap of parental information leads to increasing awareness, and creates formal and systematic knowledge to improve programme design, delivery and effectiveness. Improving sleep quality leads to better infant health, with lower costs for parents and for the health care system.

The aim of this review was to assess the impact of parental education on sleep problems in the first year of the child's life, establishing the relevance of this intervention.

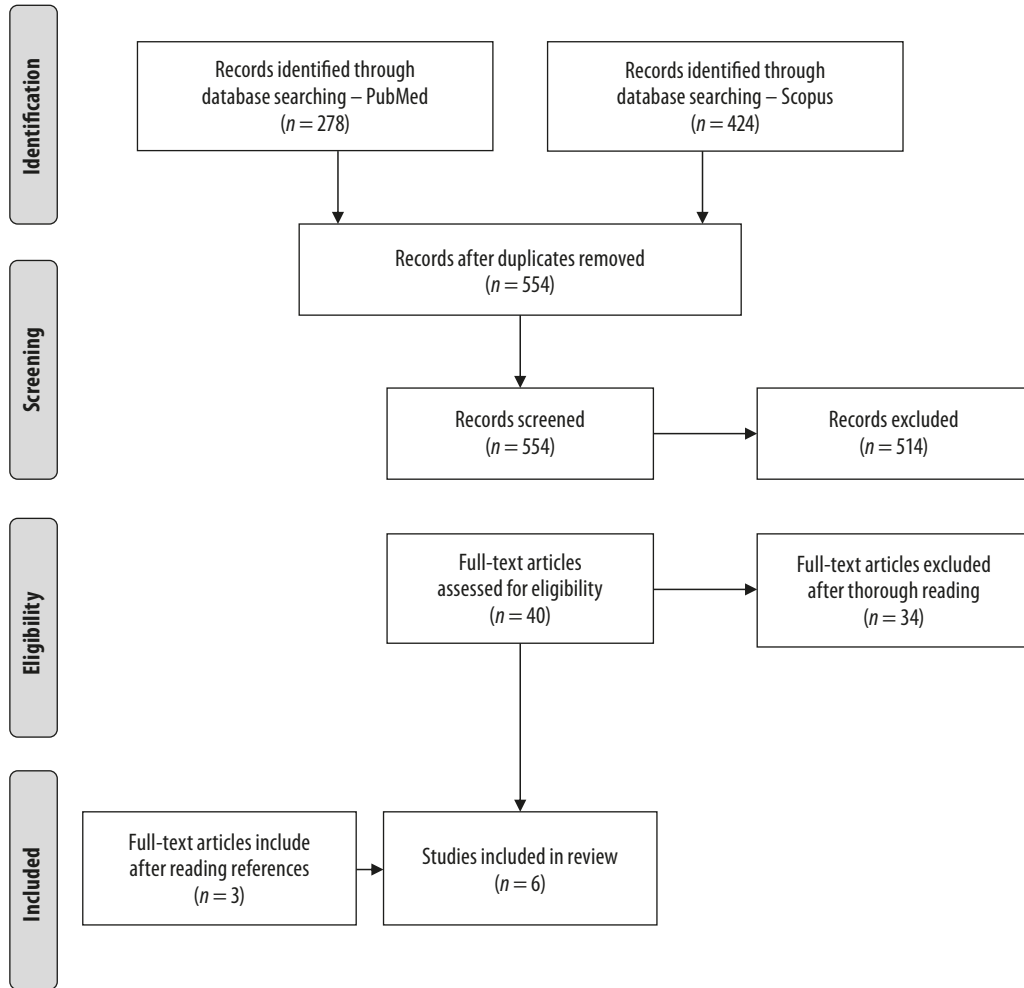


Fig. 1. Flowchart of inclusion and exclusion of studies according to the PRISMA guidelines⁽²⁴⁾

METHODS

The results of this systematic review are reported according to the PRISMA statement⁽²⁴⁾.

Search procedure

A search strategy was developed to identify studies related to parental education and sleep from birth until the age of 12 months. We searched the Medline via PubMed and Scopus, which includes Embase, for relevant articles published over the past 10 years, whose titles, abstracts or keywords included references to “parental education,” “parenting,” “sleep hygiene,” “infant,” and “newborn.” The search was limited to articles in English and Portuguese. Titles and abstracts were examined to obtain potentially relevant articles.

Exclusion criteria

We excluded non-original articles and those involving premature infants with organic causes of sleep disruption, development disability or special needs.

Study selection and data extraction

After the systematic search, we identified potentially eligible studies, and imported them into an Endnote® library. Duplicates were removed. Titles and abstracts were analysed for eligibility, and full-text articles were explored for potential inclusion. Appropriate data were extracted to an Excel base. Authors of potentially eligible studies were contacted when needed, and reference lists were examined for additional articles.

We identified a total of 702 papers (Fig. 1) in the first round. After analysing titles and abstracts, we selected 40 articles for full-text reading. The final results included six articles, plus three papers found in the lists of references. Unsuitable protocol methods, infant age, and unmatched aims with our objectives were the main reasons for the exclusion of articles.

Quality assessment

Quality was assessed with the Cochrane tool for assessing the risk of bias⁽²⁵⁾. It was used to rate each study as having “low,” “medium” or “high” risk of bias according to selection, performance, detection, attrition, and reporting bias.

RESULTS

Database results

The review included six articles from the search strategy, and three from the references' lists.

Study characteristics

The articles were published between 2006 and 2016. The majority of the studies ($n = 4$) were conducted in Canada^(2,8,17,26), two were conducted in the USA^(27,28), two in Australia^(29,30), and one in Japan⁽³¹⁾. Most of the trials analysed had one intervention group and one control group. The interventions were delivered orally (group presentation), in a written form (booklet), by video, chart completion, and telephone. Topics included normal infant sleep, bedtime routine, sleep location, behavioural techniques, setting limits, night waking, effects of inadequate sleep for infants and parents, importance of daytime routines, and negative sleep associations. The control groups received no information on infant sleep⁽³¹⁾, information about safety^(2,27) or usual care^(29,30). We found two qualitative studies about parental perceptions of advice received, and the effectiveness of behavioural interventions^(8,28). Globally, the nine studies included a total of 3,312 participants.

Outcomes measured

Primary outcomes described concerns associated with fewer prolonged bedtime routines (>45 min) and earlier bedtimes, ability to self-soothe, longer nocturnal sleep duration, and less parental reports of sleep severity problems. Secondary outcomes were related to the prevention of an increase in night waking, improvement in parental depression, fatigue, sleep and cognitions about infant sleep. After the intervention, parents changed their perspectives about sleep and parenting styles, using a framework for assisting sleep problems and adapting it to their reality. A reduction in undesirable maternal behaviours such as “feed or check diaper promptly,” and “hold and soothe immediately after night waking,” was also described.

Quality assessment of included studies

Tab. 1 shows the quality assessment chart according to the Cochrane tool. Globally, the studies included in this review presented a good quality evaluation, with low to moderate risk of bias.

Parental Education Programmes contribute to better sleep and improved parenting

Adachi et al. studied 99 mothers of infants who during their routine visit to the doctor received a booklet with information about positive sleep routines, and desirable and

undesirable parental behaviours to place the infant back to sleep after night waking. The aim was to promote the extinction of night waking, and reduce difficulties with settling to sleep. Desirable strategies included waiting for a short time without responding when the infant cries at night, and silently checking the bed and clothes of the infant. Undesirable behaviours included prompt feeding or immediate checking of the infant's diaper after crying as well as prompt holding and soothing. To encourage better sleep, the authors recommended increasing daytime play activities involving abundant visual and hearing stimulation, instituting a regular waking time and bedtime, avoidance of stimulating activities later in the evening, establishing a specific place to sleep at a specific time, setting a bedtime routine, and encouraging the infant to fall asleep alone. The intervention group presented with less undesirable behaviours, with a significant decrease of “feed or check diaper promptly” behaviour from 66.7% to 36.4%, and “hold and soothe immediately” behaviour from 22.7% to 10.6% versus an increase in the control group. On the other hand, there was a significant increase in desirable parental behaviours, such as “play with the infant or stimulate in the daytime,” “settle to sleep at the same place,” and “set regular bedtime and waking time.” Generally, the proportion of infants who showed “difficulty settling” decreased in both groups⁽³¹⁾.

Paul et al. conducted another study, with 270 participants recruited after the delivery from one maternity ward. The intervention group was contacted at home at 3/4, 16, 18 and 40 weeks, in order to gather information about the infants' behavioural states: drowsy, sleeping, fussy, and alert. The parents received appropriate materials by e-mail, including a video describing alternative soothing strategies, while the control group only received information about safety. One year after the delivery, the evaluation assessed the children's bedtime routine, sleep location and behaviour, night waking, and personalised sleep profile. After the intervention, more infants were given time to self-soothe to sleep (from 35% to 16%), making them more able to fall asleep alone, without parental intervention. Bedtime routines were reduced to less than 45 minutes before bed, the infants were less likely to be fed as the last activity of their bedtime routine, fewer infants felt asleep being held, and self-soothing to sleep increased at 16 and 40 weeks. The intervention group also showed an increase in nighttime sleep duration throughout the first year, disappearing after one-year evaluation, although they remained more likely to sleep the recommended 12 to 14 hours per day. The intervention also improved parents' behaviours, reducing feeding immediately before bedtime at 16 and 40 weeks, and using alternative strategies from picking up and holding/rocking their children for soothing to sleep at 40 weeks⁽²⁷⁾.

Another study assessed the effect of a sleep intervention comprising group teaching sessions with information about infants' patterns, negative sleep associations, unrealistic expectations about sleep, effects of sleep loss on infants and

Study	Selection bias	Performance bias	Detection bias	Attrition bias	Reporting bias
Adachi et al., 2009 ⁽³¹⁾ • Prospective cohort study, cluster sampling controls • Primary care setting Japan	A	B	B	A	A
Paul et al., 2016 ⁽²⁷⁾ • Randomised control trial • Home visit and health centre USA	A	B	B	A	A
Hall et al., 2015 ⁽²⁾ • Randomised control trial • Home visit and health centre Canada	B	B	B	A	A
Tse and Hall, 2008 ⁽¹⁷⁾ • Descriptive, exploratory study • Home visit Canada	B	A	A	A	A
Eisenberg et al., 2015 ⁽²⁸⁾ • Stratified 2-stage clustered design • Hospitals USA	B	A	A	A	A
Loutzenhiser et al., 2014 ⁽⁸⁾ • Internet based study Canada	B	B	A	A	A
Hall et al., 2006 ⁽²⁶⁾ • Quasi-experimental one group pre-test and post-test design study Canada	B	B	A	A	A
Hiscock et al., 2014 ⁽³⁰⁾ • Randomised control trial • Child centres Australia	A	A	B	B	A
Hiscock et al., 2007 ⁽²⁹⁾ • Cluster randomised trial • Maternal and child health centres Australia	A	A	B	A	A

Tab. 1. Quality assessment of included studies adapted from the Cochrane tool for assessing the risk of bias⁽²⁵⁾

parents, and strategies to reduce night waking. The parents were called by phone twice a week for two weeks. The intervention consisted in a strategy of controlled comforting, with 2 to 10 minutes taken to console the infant, and then leaving the room for incremental intervals of 2 minutes up to 10 minutes, aiming to promote infant self-settling. The control group was taught just about infant safety protection. The intervention group presented with fewer infant night-time awakenings, and reported less severe sleep problems (at 6 weeks, 4% in the intervention group compared to 14% among the controls). Furthermore, the parents showed significantly less fatigue, better sleep quality, and improvement of depressed mood. Also, doubts about managing infant sleep, comfort managing sleep and feeding, and comfort setting limits around infant sleep were found to have improved significantly⁽²⁾.

Eisenberg et al. interviewed 1,031 mothers to determine how they get information for caring of their babies. Twenty per cent did not get any advice from their doctors about sleep positioning, and more than 50% reported no advice

regarding sleep location. Advice provided by nurses was similar to that given by doctors, while advice from the family or the media was mentioned in 20 to 56% for all care practices. Inconsistent advice was found to be common⁽²⁸⁾. Loutzenhiser et al. evaluated a total of 411 parents. Almost half of them used gradual extinction techniques with their infants, starting before 6 months old in the majority of cases. However, the parents reported little success, as less than half of the children achieved any benefit in terms of night-waking, especially in the community-based population, compared to the clinical-setting population⁽⁸⁾. Parental cognitions regarding stress and support were significant predictors of success⁽²⁰⁾.

Hall et al. evaluated the effects of a sleep intervention in infants from 6 to 12 months old in a group of 39 families struggling with infants' sleep problems. The intervention consisted in providing information about infant sleep, and strategies to address sleep problems, during 2-hour classes for up to 6 couples, feeding-sleeping and controlled comforting chart completion, and bi-weekly telephone calls for

2 weeks. Teaching sessions covered the topics regarding normal infant sleep, negative sleep associations, bedtime routines, organised daytime schedules and naps, controlled comforting, and time available to the parents themselves. The assessment was carried out through questionnaires about the parental perceptions of depression, parental sleep quality, sleepiness and fatigue, cognitions about infant sleep problems, and marital adjustment. The authors described a meaningful enhancement in parents' wellbeing, depressed mood, fatigue, and sleep quality. They also found a reduction in parental anger about their infants' sleep, and an increase in their self-confidence as parents, both associated to more positive interactions with their children⁽²⁶⁾. Two years later, Tse and Hall reassessed 14 of the 35 families who attended the previous intervention, looking for parental perceptions of the specific sleep intervention and any burden associated with participation in the study. The parents mentioned that the information helped them realise the need to facilitate their babies to self-soothe, showing that good sleep behaviour and routines lead to a healthier and happier child. Most parents read extensively about sleep interventions and many theories about it, but their efforts failed to bring any results when they felt overwhelmed by their infants' cries. Using step-by-step guidelines helped the parents to "gain a framework to tackle sleep problems," such as controlled comforting, avoiding feeding to sleep, short naps and co-sleeping, delaying their reply to a partially awake baby or using progress notes to track a baby's pattern of activities. The parents also pointed out certain "unanticipated changes resulting from using the strategies in the study," related to the notion that they were "normal" parents, and their infants' problems were common and modifiable. Thus, they felt empowered for changing their parenting styles, using more routine-oriented schedules rather than a totally child-directed approach. Perseverance was the biggest challenge, as the parents were asked to refrain from using what they considered easier methods in dealing with crying babies, such as cuddling, rocking or breastfeeding to sleep. They identified difficulties attaching to routines, dealing with the effects on others, adapting the intervention to the baby's development, facing with family circumstances that interfered with the routines, and dealing with childcare providers who destabilise the intervention. Sleep-problem relapses happened with disruptions of routines, including illnesses, teething or vacations, and they could be very discouraging, bringing the fear of failing in the intervention or being judged. Finally, they mentioned "parents' support systems, expectations and inadvertent benefits of the study" describing varying needs for support. Some of them received help from family members, such as cooking or babysitting, while others got psychological support through phone calls or meetings with friends and family, helping to deal with the feeling of being emotionally isolated⁽¹⁷⁾. Hiscock et al. (2014) conducted a study with 781 infants born at 32 weeks or later in 42 well-child centres. Intervention families were mailed with a booklet and

a DVD containing information about normal infant sleep, crying patterns, settling techniques, medical causes of crying, and parent self-care. They also received a phone contact at 6–8 weeks, and participated in parent groups at 12 weeks. Both encouraged parents to discuss crying or sleeping problems, and develop problem-solving strategies. The control group received standard well-child care at health services. Intervention caregivers reported a slight reduction in depression symptoms between 4 and 6 months, and fewer symptoms at 6 months. They were less likely to attend night waking and more likely to change formulas to manage their infants' problems. Also, they had less doubts and difficulty setting limits, and less concerns about the safety of sleep. The authors reported a reduction of sleep problems in infants who wanted to eat frequently at night⁽³⁰⁾.

Hiscock et al. (2007) studied the impact of a community-delivered intervention targeting infant sleep problems on infants' sleep quality, maternal well-being, and costs to the healthcare system. They followed 328 mothers, between 4 and 12 months years old, implementing behavioural strategies delivered by maternal-child nurses versus usual care. The mothers could choose between 2 behavioural methods: controlled crying, where parents gradually increased the response time to their infant's crying, or camping out, consisting of being seated with the infant until they felt asleep, and gradually removing. The mothers were invited to write sleep diaries to facilitate the identification of sleep patterns and improvements, and to help with the settlement of further goals. The prevalence of infants' sleep problems and mothers' depression symptoms were lower in the intervention group both at 10 months and 12 months, with better quality of life and acceptable costs, slightly lower in the intervention group, though the difference was not significant⁽²⁹⁾.

DISCUSSION

We found few articles studying the relation between parental education and sleep problems in the first year of life in healthy children.

Our results suggest that active preventive intervention improves sleeping quality in infants, providing education about infant sleep patterns, parental behaviour, and strategies to facilitate self-soothing. The key to success relies in direct advice to place the infant in bed while still awake, and to minimise parental responsiveness, based on the efficacy of active extinction and graduated extinction techniques. Moreover, interventions lead to fewer doubts among parents about managing their infants' sleep problems. These findings support the relevance of introducing educational interventions in our preventive approach for infants' health follow-up despite some suggestions that this is a transient problem, self-extinguishing over time, as the neuronal and physiological maturation evolves^(1,9,16,19–21). Nevertheless, infants who received behavioural interventions presented more consistency in the improvement of sleeping quality^(9,32).

Our review shows that cognitive-behavioural interventions reduce the number of night awakenings and decrease the severity of sleeping problems as reported by parents, with an improvement in parents' symptoms of depression, fatigue, or sleeping pattern^(33,34), and better knowledge about infant sleep. Information can be delivered orally or in written forms, individually or in a group setting, and should be adapted to each case according to the provider's experience and the population profile⁽³⁵⁾. The distribution of written materials among parents has a positive correlation with sleep improvement⁽²³⁾, with the advantage of being available in the future, allowing further reviews when effectively needed.

The main strategies recommended to parents are to leave the infant in bed while still awake, allowing self-settlement, to reduce parental interaction to the minimum, to strengthen the difference between day-time and night-time, and to anticipate the feeding schedule for the end of the afternoon to increase feeding intervals at night.

Although the implementation of educational interventions, both during office visits and in structured group or community actions, is time consuming and consequently costs money, the investment may create value to parents and to the health care system, being ultimately cost-effective. Parents benefit from a better understanding of sleeping patterns of their children, promoting the establishment of their own night-time autonomy, with less worries and illness. Health services and providers benefit from that better perception of the health status, reducing the number of unnecessary visits, and promoting better satisfaction indexes. However, to be successful in teaching patients, providers must be trained in how to do it, which necessitates the introduction of educational programmes for this group as well⁽³⁶⁾. The need for formal education about sleep programmes is crucial for empowering health providers for the recognition and evaluation of sleep disturbances, choosing appropriate interventions, and providing effective support to families⁽²³⁾.

CONCLUSION

The systematic review provided evidence for the relevance of medical practice towards the improvement of parental education about infants' sleep problems. It reduces undesirable maternal behaviours, making the infant more likely to self-soothe, reducing the number of night awakenings, decreasing parental symptoms of depression, fatigue and sleeping disturbances, and improving parental cognitions about infant sleeping, in a cost-efficient manner.

Infants' health visits must incorporate questions about the sleeping pattern of children and their parents' behaviours, and counselling aimed at the introduction of strategies for improving perceived problems. Having pre-existing written forms, both in conventional paper and in electronic web-based forms, is a facilitator. Community or group interventions may be useful, as they facilitate the parenting process, and provide parents with important peer support.

Conflict of interest

The authors do not declare any financial or personal links with other persons or organisations that might adversely affect the content of the publication or claim any right to the publication.

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