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THE ROLE OF SLEEP IN INFANT AND EARLY CHILDHOOD COGNITIVE DEVELOPMENT: A SCOPING REVIEW

Peran Tidur Pada Bayi dan Balita Terhadap Perkembangan Kognitifnya: Scoping Review

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ABSTRAK

Tidur adalah periode terjadinya perubahan aktivitas otak, berkurangnya aktivitas sensorik dan daya tanggap terhadap rangsangan eksternal. Penelitian telah membuktikan banyaknya manfaat tidur bayi dan balita terhadap perkembangan kognitif serta dampaknya pada anak usia sekolah. Bayi yang memiliki pengaturan tidur yang baik diyakini memberikan dampak positif pada kemampuan kognitif. Sebaliknya, gangguan tidur pada masa kanak-kanak berhubungan dengan volume otak yang lebih kecil. Bukti dalam 20 tahun terakhir menunjukkan bahwa tidur sangat penting untuk perkembangan sistem sensorik pada janin dan bayi, menjaga plastisitas otak, penciptaan memori dan pembelajaran jangka Panjang. Oleh karena itu, scoping review ini bertujuan mengidentifikasi bukti yang tersedia tentang peran tidur pada bayi dan balita terhadap perkembangan kognitifnya. Pencarian sistematis dilakukan di PubMED, ScienceDirect, SCOPUS, The Lancet, dan Oxford Academic Journal dengan menggunakan istilah dan kata kunci yang telah ditentukan. Artikel yang dijadikan rujukan adalah artikel yang publish pada 10 tahun terakhir, berbahasa inggris, merupakan artikel penelitian, dan dapat diakses, sedangkan artikel yang berupa buku, tesis, surat, review dikecualikan. Dari hasil seleksi diperoleh total akhir 7 artikel untuk di review. Hasilnya, tidur memiliki banyak manfaat bagi perkembangan kognitif bayi dan balita yakni mereka dengan tidur yang cukup memiliki kemampuan memperhatikan, memproses, dan berkomunikasi dengan lebih baik dibandingkan mereka yang tidak cukup tidur. Diperlukan adanya penelitian lebih lanjut mengingat keterbatasan dari sebuah tinjauan sistematis yakni rentan terhadap bias dalam seleksi artikel dan heterogenitas statistik.

***Kata kunci**: balita, bayi, kognitif, tidur*

ABSTRACT

Sleep is a period characterized by changes in brain activity, a decrease in sensory activity, and responsiveness to external stimuli. Research has proven the numerous benefits of infant and toddler sleep on cognitive development and its impact on school-aged children. Infants with good sleep regulation are believed to have a positive impact on cognitive abilities. Conversely, sleep disorders in childhood are associated with smaller brain volumes. Evidence over the last 20 years shows that sleep is crucial for the development of the sensory system in fetuses and infants, the preservation of brain plasticity, the creation of memories, and long-term learning. Therefore, this scoping revies aimed to identifies available evidence on the role of sleep in infants and toddlers towards their cognitive development. A systematic search was conducted in PubMED, ScienceDirect, SCOPUS, The Lancet, and Oxford Academic Journal using predetermined terms and keywords. The referenced articles are those published in the last 10 years, written in English, research articles, and accessible. Articles in the form of books, theses, letters, and reviews were excluded. From the selection results, a total of 7 articles were obtained for review. The results indicate that sleep has numerous benefits

for the cognitive development of infants and toddlers; those with sufficient sleep have better attention, processing, and communication abilities compared to those who do not get enough sleep. Further research is needed considering the limitations of a systematic review, which is prone to bias in article selection and statistical heterogenity.

Keywords: childhood, cognitive, infant, sleep

INTRODUCTION

Sleep is a basic human need, both physically and mentally [1]. For infants, sleep is a highly influential factor in their development [2]. Sukmawati, et al (2020) in Putri, et al (2022) stated that sleep is crucial for babies because about 75% of growth and development hormones are produced while the infant is sleeping [3]. These hormones are produced three times more during sleep than when awake [4]. These hormones are important for cell renewal, immune system, cognition, behavior regulation, and many other functions [5].

Sleep disorders and frequent awakenings at night have a high prevalence in children, with a percentage 20% - 30% in infants, toddlers, and preschoolers [6]. WHO data in 2020 shows that sleep disorders affect more than hundreds of millions of children, impacting their development year by year [3]. More than 10% of children in Indonesia suffer from sleep disorders [7] and about 44.2% of them frequently wake up at night [8]. In the case of infant sleep disorders, it is estimated that 25% of sleep disorders occur in infants aged 1-6 months. According to the research by Rohmawati & Dewi involving 285 infants, it was found that 51.3% of infants experienced sleep disturbances, with 42% of infants having less than 9 hours of sleep and waking up more than 3 times per night for durations exceeding 1 hour [9].

Research shows that infants with short nighttime sleep and poor nighttime sleep tend unable to integrate their sleep cycles until the age of 2–3 years old [10]. Infants who sleep shortly at night are five times more likely to be hyperactive [11]. This indicates that the more sleep disorders an infant has, the more likely it is to affect cognitive functions (learning, memory, decision-making), mood regulation (flat affect), attention and behavior (aggressive and hyperactive), health (immune and metabolic functions), and overall quality of life [6]. This condition is because sleep plays a dynamic role in brain development. Active sleep facilitates neural processes such as synapse formation and pruning by providing endogenous stimulation to the brain [12].

In fact, in the first two years of life, infants spend more than half of their lives sleeping. The first year of life is a period for the development and consolidation of sleep, with rapid changes in sleep-wake patterns, especially in the first 6 months [13]. During this period, the brain experiences a growth spurt, reaching 90% of its adult size [14]. Evidence over the last 20 years shows that sleep is crucial for the development of the sensory system in fetuses and infants, the preservation of brain plasticity, the creation of memories, and long-term learning.

Evidence of the benefits of nighttime sleep has also been extensively developed. Some evidence shows that longer sleep at night can help infants perform problem-solving tasks better, and sleeping a few hours after learning something new can consolidate non-verbal declarative memory at ages 6 and 12 months [13]. Other literature reviews examine the general benefits of sleep for babies and toddlers. Therefore, this scoping review specifically identifies the available evidence regarding the role and benefits of sleep on the cognitive development of infants and toddlers. This review facilitates researchers and healthcare practitioners in finding a clear framework as a reference for educating parents on the importance of sleep for babies and toddlers based on the assessment results from various literature.

METHODS

This article present a scoping review conducted following a systematic review process to meet the derived writing objectives derived from several pieces of research literature that have been published in various databases. This scoping review was created following the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).

1. Determining the Research Question

The strategy for searching literature employs the the PEO (Population, Exposure, Outcome) model. This framework is used to determine the keywords from the main topic to be reviewed based on the research question, "How does sleep affect the cognitive development of infants and toddlers?".

Table 1. PEO Framework

Population	Exposure	Outcome
Infant	*Sleep*	*The Role*
Baby		*Function*
early childhood		*Benefit*

Table 1 showed the terms used to facilitate the literature search, which have been adjusted according to the research questions.

2. Identification of Relevant Literature Sources

The databases used in this article are PubMed, ScienceDirect, SCOPUS, The Lancet, and Oxford Academic Journal. The keywords generated in the PEO Framework are used in the article search on these databases. Subsequently, the discovered articles are further filtered according to specified inclusion and exclusion criteria. Articles that meet the inclusion criteria are referenced, while those that do not meet the criteria will be excluded. The criteria for reference articles presented in Table 2 below.

Table 2. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
1. Published in the last ten years (2014-2024)	1. Published more than the last ten years
2. In English language	2. Books, theses, letters, theses,*review*
3. Research articles	3. Not fully accessible
4. Open access	

Table 2 showed the criteria for articles to be used in this systematic review.

3. Literature Selection

The literature search was conducted by entering keywords and selecting based on pre-established inclusion and exclusion criteria. The search results obtained through PubMed yielded 40 articles, Science Direct 16 articles, SCOPUS 331 articles, The Lancet 25 articles, and Oxford Academic Journal 22 articles. The literature selection process across several databases is presented in the Figure 1.

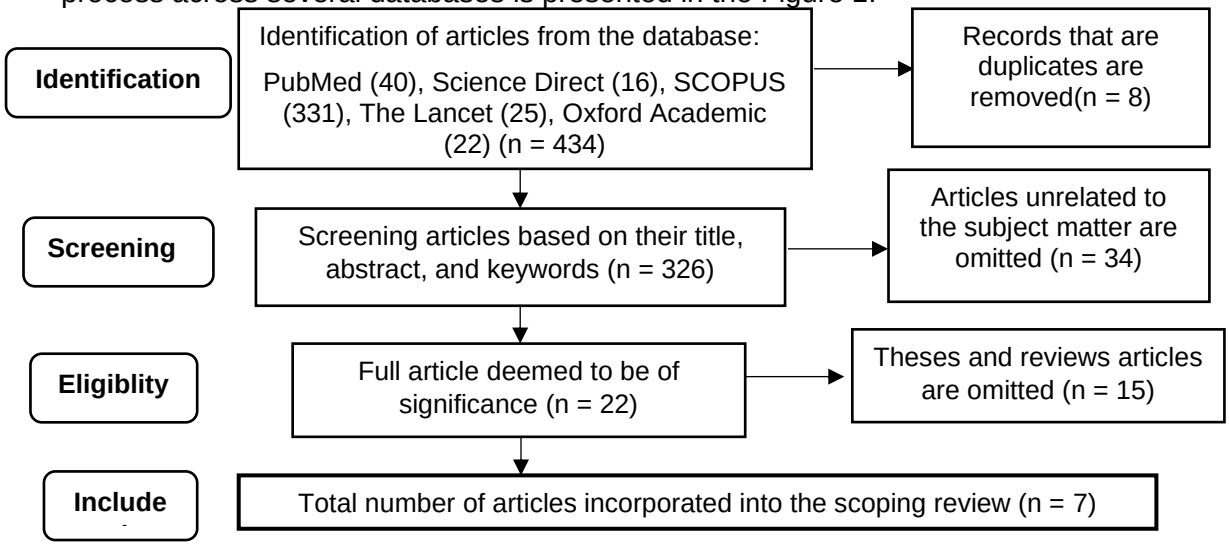

Figure 1. PRISMA Flowchart

RESULT

The initial search of the database yielded 434 articles. Articles not written in English, published more than 10 years ago, not fully accessible, and duplicates were removed, resulting in 326 articles. Next, we excluded articles that were theses, editorials, letters to the editor, commentaries, opinion articles, narrative reviews, and other review articles, leaving 74 articles. These articles were thoroughly identified based on their titles, abstracts, and keywords, reducing the number to 22 articles. The remaining articles were reviewed based on their full texts, and 7 suitable articles were identified and included in our review (Table 3).

Table 3. Data Extraction Result

No	Author(s)/Year/ Title/Country	Purpose	Design and Method	Result
1	Giulia Pecora *et al*. (2022) / Italia "*Infant Sleep and Development: Concurrent and Longitudinal Relations During the First 8 Months of Life*"	Investigating the simultaneous and the connection between sleep patterns and cognitive development in infants over time.	A retrospective cohort design, gathering information from 156 infants at the ages of 4 and 5 months to obtain insights into infant temperament and maternal behaviors that may affect sleep quality, including the nighttime use of pacifiers, sharing a bed, and solely breastfeeding.	The study indicate that daytime and nighttime sleep have different relationships with developmental milestones of infants at 4 and 8 months of age, but there is no strong longitudional relationship. Sleep is associated with communicative skills, especially language comprehension. Moreover, infants who sleep more during the day at the age of 8 months have higher scores on the DP-3 cognitive development scale. Daytime sleep plays an important role in both mental function and language mastery.
2	Wanqi Sun, MD, MPh *et al.* (2018) / Tiongkok "*A Community-Based Study of Sleep and Cognitive Development in Infants and Toddlers*"	Investigating how common nighttime awakenings are and their association, while also looking into how sleep relates to cognitive growth in a group of infants and toddlers from the community.	Cross-sectional study design with stratified random sampling technique. Assessments were conducted on 590 infants and 512 toddlers from eight Chinese provinces to evaluate their sleep quality and cognitive growth. Information regarding sleep length and occurrences of waking up at night was gathered through the Brief Infant Sleep Questionnaire. Cognitive development evaluations were carried out by experienced pediatricians using the Bayley Scales of Infant Development.	In infants, the rates of not waking at night, waking once, twice, and three or more times per night were found to be 6.8%, 20.2%, 33.2%, and 39.3%, respectively. For toddlers, these rates were 25.8%, 34.6%, 23.8%, and 15.8%, respectively. The occurrence of nighttime awakenings was generally linked to being younger, having mothers with lower education levels, and being breastfed. When adjusting for possible influencing factors, infants waking twice a night showed significantly higher scores on the Mental Development Index (MDI) compared to those who

				didn't wake up. Conversely, toddlers waking three or more times a night had significantly lower MDI scores than those waking less frequently. The total amount of sleep did not show a correlation with developmental indices in either infants or toddlers.
3	Denise Werchan *et al.* (2021) / New York "*A Daytime Nap Combined with Nighttime Sleep Promotes Learning in Toddlers*"	Examining whether a nap after learning can promote the generalization of learning after a nighttime sleep period in toddlers.	An experimental study involving all children in each test session. Children assigned to the "nap" group engaged in a learning activity roughly an hour prior to their scheduled nap time and underwent testing 2 hours afterwards. In contrast, the "no nap" group took part in a learning session at a time they usually stay awake, approximately 4 hours post-training, and their evaluation occurred 24 hours later.	- Children who took a nap following their learning session demonstrated improved ability to generalize the information 24 hours later in comparison to those who did not nap. - When toddlers nap in addition to their overnight sleep, it aids in the retention of recently acquired information and leads to a postponed improvement in their ability to generalize.
4	Klara Horvath *et al.* (2017) / USA "*Memory in 3-Month-Old Infants Benefits from a Short Nap*"	Exploring the impact of napping on the memory retention of infants aged 3 months.	An experimental study employing with two groups, where infants were allocated to either the "awake" or the "nap" group. Infants in the "awake" group visited the laboratory after their usual nap time, while those in the "nap" group arrived prior to their scheduled nap time.	These findings indicate that without a brief sleep period, infants have difficulty retaining memories of newly encountered faces. Additionally, it was discovered that sleep plays a crucial role in enhancing memory consolidation starting from a very young age.
5	Lokhandwala and Spencer *et al.* (2021) / USA "*Slow Wave Sleep in Naps Supports Episodic Memories in Early Childhood*"	- Investigating whether the benefits of napping that depend on spindles can be generalized to other declarative memory tasks. - Determining whether sleep spindles. During NREM2 contribute broadly to the process of consolidation of	An experimental study, parents were provided with an educational package that contained a questionnaire along with instructions for the usage and maintenance of an Actiwatch. Each child was equipped with an Actiwatch. The experimental sessions took place in a sleep laboratory. Participants were randomly assigned to start with either the nap condition or the awake condition. The alternating conditions occurred approximately 1 week later.	In a new storybook task, it was found that the performance of children (N = 22, average age = 51.23) was better after napping compared to performance after an equivalent period of wakefulness. Additionally, if learning occurred after a nap, performance improvements were observed the next day. The enhancement in performance post-nap was linked to the duration of slow-wave sleep experienced during the nap. This implies that slow-wave

		declarative memory in early childhood.		sleep periods in naps could aid in reinforcing episodic memory during early childhood.
6	Gentaro Taga *et al.* (2018) / Japan *"Developmental Changes in Cortical Sensory Processing During Wakefulness and Sleep*"	Clarifying the relationship between sensory processing and neurovascular and metabolic functions.	A cross-sectional study with a different age range, consisting of 91 healthy full-term infants with a birth weight >2500 grams. Participants were recruited through the local Basic Resident Register and had no known neurobehavioral disorders according to their parents. The infants in this study were observed during naptime. The infants were observed in 5 conditions: 1 while awake and 4 while asleep. Initially, the infants were held by a researcher and waited until they fell asleep. As soon as the infants began to sleep, optical probes were attached to their heads in a soundproof and dimly lit room for measurement.	The results indicate that behavioral states have a fundamental impact on cortical sensory processing: (1) sensory processing while awake occurs in more localized regions, (2) auditory processing is active during both wakefulness and sleep, (3) visual processing develops inhibitory mechanisms during sleep, and (4) these phenomena primarily reflect neural development rather than vascular and metabolic development.
7	Carolin Konrad *et al.* (2017) / Australia *"Sleep-Dependent Selective Imitation In Infant"*	To investigate whether napping after learning plays a role in selective memory consolidation in infants.	An experimental study involving 48 full-term infants aged 15 months and 48 full-term infants aged 24 months, who were randomly assigned to napping, non-napping, or baseline control conditions. Infants in the napping condition had to sleep for at least 30 uninterrupted minutes within 4 hours after learning. Infants in the non-napping condition were allowed to sleep for up to 29 uninterrupted minutes within 4 hours after learning. Testing times for the napping condition were scheduled just before the infants were naturally scheduled to nap, while testing times for the non-napping condition were scheduled immediately after the infants usually woke up from their nap.	Infants who stayed awake after learning produced sequences of actions that started with irrelevant actions followed by relevant actions during testing. In contrast, infants who slept immediately after learning did not show a regular memory pattern. This suggests that sleep might help infants selectively "discard" less useful or relevant aspects of their learning experiences for the future.

DISCUSSION

The obtained articles discuss the role of sleep on infants and toddlers on cognitive development. The subtopics covered in each article consist of two articles discussing the relationship between sleep and cognitive maturation during infancy and toddlerhood three articles discussing the role of napping after learning and one article discussing non-REM sleep spindles.

1. Sleep and Language Development

Sleep is a period during which there is a change in brain activity, reduced sensory activity, and responsiveness to external stimuli [12]. Research has demonstrated the numerous benefits of sleep for infants and toddlers on cognitive development and its impact on school-aged children. Cognitive abilities in infancy include several aspects, one of which is language learning [15]. Language mastery in infants develops alongside the rapid changes in their circadian system during the first year of life. Without adequate sleep, this development can be delayed [16]. This is because sleep plays a critical role in cognitive development that can be explained through two mechanisms: poor sleep consolidation can hinder the memory process, and sleep acts as a low-level regulatory system, thus having an organizing effect compared to higher-level systems involved in cognition [11].

Infants with good sleep habits will have long-term impacts on their physical, mental, and emotional health throughout their lives. This is crucial for cell and tissue renewal, immunity, cognition, behavioral regulation, and many other functions [5]. Taga's (2018) study found that infants' sensory channels remain active during sleep. The large amplitude of auditory responses observed during sleep indicates that sensory processing is active in young infants. The role of hearing during sleep plays a highly functional role in infants' language acquisition [17].

Pecora et al. (2022) and Sun MD (2018) found that sleep in infants is closely related to cognitive abilities, particularly language acquisition [18]. Klara Horvath and Plunkett's (2016) research discovered a significant positive relationship between language development and sleep efficiency, where infants with fewer sleep disturbances tended to have a larger receptive vocabulary. Additionally, concerning production, both sleep efficiency and the amount of daytime sleep were significant predictors, both positively associated with the size of the expressive vocabulary in infants. It was found that infants who slept more during the day had a higher estimated rate of growth in receptive vocabulary [19]. This condition is linked to the baby's memory system, particularly the smaller capacity and potential vulnerability to disruptions in short-term hippocampal storage. Therefore, efficient daytime sleep is required to consolidate newly acquired information[20].

Similar research by Gomez *et al*. (2011) found that 15-month-old infants who napped for 30 minutes after a language learning session were able to abstract the grammatical relationships of the words learned in the next test session, which occurred 4 hours after learning. In contrast, infants who did not nap showed no consistency and were unable to learn the abstract inter-language relationships presented in the learning session [21]. This is because sleep accelerates chemical substrates and nervous system function, such as synaptic formation by providing endogenous stimulation to the brain [15].

A longitudinal study on twins to assess the relationship between sleep-wake consolidation at ages 8, 18, and 30 months on language abilities at 18, 30, and 60 months. The findings suggest that inadequate sleep consolidation in the first two years can pose a risk to language acquisition in later childhood [22]. This condition is explained by the sleep spindle activity in infants involved in the generalization of new word meanings. Infant sleep spindles correlate with the integration of specific word meanings into general word meanings. Sleep spindles are considered to enhance plasticity in the neocortex by inducing short-term and long-term synaptic potentials. The crucial role of sleep spindles during infancy is to gather recent memories and incorporate new knowledge into the neocortical memory structure. The infant brain during sleep will

consolidate memories of newly learned word meanings in a proper way, enabling the infant to integrate these words while awake [23].

Sleep involves a consolidation process that emerges through the production, strengthening, and integration of neural connections from interaction; sleep plays a crucial role in language learning [24]. Well-regulated sleep influences infants' ability to attend to, process, and communicate with others [25]. Current research supports that optimal sleep is associated with the enhancement of social and symbolic aspects of infant language skill development. Findings from Hernandez-Reif and Gungordu (2022) discovered a relationship between infant sleep behavior at 8 months old and higher cognitive and language skills at 14 months old [15].

Based on the above exposition, the author assumes that during sleep, sensory activities in infants and toddlers remain active, and the brain's memory storage system also functions. This influences language acquisition in infants and toddlers because the infant brain stores many vocabulary words even during sleep, especially if sleep occurs after a learning process. Infants and toddlers with good sleep patterns master more vocabulary compared to those with sleep disorders. Therefore, they have better language development.

2. Sleep and Memory

Sleep plays a role in boosting cognitive abilities, notably in memory enhancement and performance in particular tasks or learning scenarios. Numerous studies have investigated the influence of sleep after the learning process and the impact of lack of sleep before learning on the memory tasks learned [26]. Most research states that sleep significantly affects the memory process, both in human and animal studies [27],[28],[29]. Horvath et al. (2017) showed that 3-month-old infants require a nap to recognize cartoon faces introduced about 1.5 – 2 hours after the first exposure [28]. Another study on infants aged 29 - 36 months who took a nap right after learning and underwent testing 24 hours later exhibited significantly improved performance compared to those who stayed awake until their nighttime sleep and were also tested 24 hours later, and in comparison to children who napped post-learning but were tested 4 hours after waking up from their nap [27]. Data on children aged 36 – 71 months showed that sleep before learning has a long-term effect on memory retention, children demonstrated improved performance approximately 24 hours after learning if they took a nap, as opposed to staying awake during their usual nap time. Moreover, sleeping through the night does not counteract the negative effects on memory consolidation caused by skipping naps [29]. Napping is also believed to play a role in selective memory consolidation in infant samples. This is evidenced by Konrad et al. (2018), who found that infants who slept immediately after learning did not show a regular memory pattern, suggesting that sleep helps infants selectively "discard" less useful aspects of their learning experiences for the future [30].

Babies spend nearly half of their nighttime sleep in Rapid Eye Movement (REM) sleep [31]. REM sleep is considered a time for the brain to assimilate images by replaying them during dreams. About 80% of vivid dream memories occur after waking from this stage. This is why REM sleep is considered important for memory consolidation [32].

Several pieces of evidence suggest that extended nighttime sleep can enhance problem-solving abilities in infants. Additionally, taking naps shortly after acquiring new information can strengthen nonverbal declarative memory when they are 6 and 12 months of age [13]. Similarly, napping has been proven to enhance memory in infants aged three months. This is likely due to two factors. Initially, the ability of infants to hold

information temporarily could be limited, necessitating more regular sleep intervals to avoid overload and disruption by clearing or renewing these memory caches. Moreover, the process of solidifying memories might be slower or less effective in infants while awake, compared to older children and adults who have the capacity to retain memories for extended periods, possibly due to their ability to consolidate memories without sleep or because of their larger memory storage capacity [28].

In a recent review evaluating the benefits of sleep behavior during the process of memory consolidation and generalization of declarative, procedural, and emotional memory, it was found that sleep aids in the consolidation of most memories and generalization, especially in infants and young children [33]. A study demonstrating the benefits of sleep for learning in infancy, where 15-month-old children were accustomed to a constructed language with a particular grammatical framework, followed by a language test at 4 and 24 hours later, found that infants who slept within four hours after learning exhibited a preference for the grammatical structure introduced in the initial test, in contrast to those who remained awake during this period, who did not demonstrate any advancement in language skills [34]. Similarly, studies on 6 and 12-month-old children, within four hours post-learning, infants who took a nap of at least 30 minutes between the learning phase and the test phase displayed greater knowledge of the targeted actions than the control group, which had not witnessed the actions. Twenty-four hours after learning, the napping group that took naps outperformed the control group, which stayed awake following the learning session. Thus, this indicates the benefits of napping in long-term memory [35] [36].

Findings by Mason et al (2021) provide evidence that insufficient napping at 9 months of age adversely affects infant memory retention, as well as reducing other benefits of napping. When infants napped, a correlation was found between sleep wave active (SWA) and positive memory changes in the afternoon. However, the opposite effect was found when infants were prevented from napping, with SWA significantly predicting negative memory performance. Although the average SWA in awake conditions during napping was not higher compared to SWA in sleeping conditions, it is possible that for each infant, SWA in awake conditions more reflects the level of sleep pressure, namely the accumulation due to missing naps, compared to in sleeping or resting conditions [33].

The multitude of benefits infants and toddlers derive from the sleep process underscores the importance of ensuring that infants have good sleep quality. This is a call to action for parents. Parents play a crucial role in nurturing sleep development in young children. Many parents report sleep timing and night waking issues in their babies [37]. If left unaddressed, these issues can persist into preschool age, posing significant risks to later developmental outcomes such as lower cognitive performance [38]. WHO recommendations for improving infant sleep quality include engaging in moderate physical activity during the day [39]. Additionally, several studies have shown that appropriate nutrition positively impacts infant sleep quality, reducing nighttime wake-ups [40][41]. Furthermore, in efforts to enhance health and address sleep issues, the American Academy of Pediatrics (AAP) recommends that parents start implementing good sleep hygiene, with a supportive sleep environment and bedtime routines during infancy and throughout childhood [42].

This scoping review has several limitations to consider. The articles included in this review do not sufficiently explore other benefits of sleep on the development of infants and toddlers, such as the benefits of sleep on motor development. Additionally, scoping reviews are highly susceptible to selection bias and statistical heterogeneity, necessitating further research to address these limitations.

CONCLUSION

The entirety of the articles utilized in this scoping review demonstrates that sleep offers numerous benefits for the cognitive development of infants and toddlers. Infants and toddlers will have the ability to attend to, process, and communicate more efficiently compared to those who do not get enough sleep, be it daytime or nighttime sleep. Additionally, sleep in infants also enhances memory function and cognitive performance in certain learning tasks. Moreover, through sleep, infants and toddlers can discard useless learning experience memories for the future. Therefore, several efforts can be made to provide good sleep quality for infants, including encouraging moderate-intensity physical activity during the day, providing healthy nutrition, and implementing good sleep hygiene.

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