



## Impact of Adverse Childhood Experiences (ACEs) on Sleep Health: A Scoping Review in Current Context

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### Abstract

**Introduction:** Sleep is critical for physical, mental, and emotional health (Duraccio et al., 2024). Sleep quality is a known marker of overall health. Adverse childhood experiences (ACE) have been documented to have long-term impacts on sleep (Wu et al., 2024) among children and adults (Olsen et al., 2024). ACEs refers to various forms of trauma, such as abuse, neglect, and household dysfunction, experienced before the age of 18 (Felitti et al., 1998). This systematic review investigated an effect of adverse childhood experiences (ACEs) on sleep health.

**Methods:** The objective was achieved by carefully organizing the results achieved through a range of present research. The systematic review study followed the protocol outlined by PRISMA. Due to time constraint a literature search was carried out on only one database i.e. Google Scholar published from 2024 onwards. The key terms used were “Adverse Childhood Experiences”, “Sleep Health”, “Trauma”, and “Sleep Quality”. The search strategy was executed under three phases: search, screening, and selection. Results were obtained through potentially relevant articles.

**Results:** The systematic review indicates that adverse childhood experiences (ACEs) are significantly associated with sleep quality (Sheffler et al., 2024; Zhang et al., 2024; Olsen et al., 2024; Qu et al., 2023), sleep duration (Covington et al., 2024; O’Neill et al., 2022), reduced daily steps, and REM sleep (Angeles, 2024), persistent insomnia (Wu et al., 2024), sleep disturbance (Ashour et al., 2024), overweight/obesity (Covington et al., 2024), less sleep (Sadikova et al., 2024), difficulty falling asleep and staying asleep, problematic sleep environments (i.e., place slept) and increased snoring, less sleep on weekends and increased social jet lag (Duraccio et al., 2024).

**Conclusion:** The findings underscore the critical need for addressing ACEs in interventions to improve sleep health, highlighting the importance of early detection and comprehensive therapeutic approaches to mitigate the long-term impacts on sleep.

**Keywords:** Adverse Childhood Experiences, Sleep Health, Trauma, Sleep Quality, Social jet lag.

### Introduction

Adverse childhood experiences, also referred to as childhood adversity on occasion, are unfavorable events that take place in the early years of a person’s life before they reach adulthood. These include events such as the divorce of parents, emotional and physical abuse, parent death, sexual abuse, and emotional and physical neglect (Song et al., 2024). It is widely accepted that a history of traumatic experiences or stressful events can significantly increase the risk of developing a number of psychological disorders (Anda et al., 2005). These incidents can have a significant impact on a person's physical and mental health, developmental trajectory, and general well-being. ACEs are often divided into three primary groups, i.e. Abuse, Neglect and Household Dysfunction.



Research has indicated that ACEs have a substantial effect on both immediate and long-term health outcomes. Childhood Maltreatment (CM) and Negative Life Events (NLEs) tend to be common terms used in place of ACEs. The studies included in this review also explore Positive Childhood Experiences (PCEs) and Benevolent Childhood Experiences (BCEs) and their impact on Sleep Health and the overall well-being of an individual. Various important approaches can be used to understand the impact of ACEs. According to a wealth of recent research, mental health symptoms are frequently associated with subgroups that have both high and low ACEs. While those with the high ACEs subgroup display more severe symptoms. In their investigation of sleep metrics, Duraccio et al. (2024) concluded that teenagers with ACEs had worsening sleep on a number of fronts. Increased snoring, uncomfortable sleeping conditions, and difficulty falling and staying asleep were among the many symptoms. Additionally, research articles showing the effect of various emotional triggers on sleep sensitivity were reviewed by Krizan et al. (2024). They demonstrated that eliciting negative emotions increased sleep-onset latency and occasionally also indicated shorter sleep duration.

Sleep is among the vital physiological functions of the human body. It is defined by times of inactivity and rest when the body and brain essentially heal. It affects many aspects of mental, emotional, and physical functioning and is very important for maintaining a person's overall health and well-being. The health of sleep is assessed using a variety of factors. These include the duration of sleep, sleep latency, the efficiency of sleep, sleep fragmentation, and sleep disturbances. Sleep deprivation has profound and long-lasting effects on one's physical and mental well-being. The lack of sleep tends to have a detrimental effect on cognitive abilities such as memory, attention, as well as decision-making. The risk of neurodegenerative diseases is increased by prolonged sleep deprivation. It also tends to impair one's overall cognitive function. Sleep disturbances have been linked to emotional dysregulation, which includes elevated stress, mood swings, and increased irritability. Anxiety and depression-related symptoms can worsen if you don't get enough sleep. As stated by Duraccio et al. (2024), sleep for teenagers with ACEs can essentially worsen on numerous fronts.

Chronic sleep deprivation has been found to be related to many health-related concerns. These can include impaired immune system function, obesity, diabetes, and cardiovascular disease. The lack of proper sleep significantly compromises the body's capacity to heal or preserve its physical health. In preadolescents, exposure to ACE is often associated with fewer daily steps, shorter total sleep duration, and less REM sleep, according to a dose-response association discovered by Angeles (2024). According to Cheng et al. (2024), older people with ACEs tend to be more likely than those without ACEs to have both short and extended sleep lengths, with childhood sexual abuse having a particularly noticeable impact on sleep. According to Oken et al. (2024), ACEs are associated with



women having lower-quality sleep in their middle years of life and having negative experiences as adults, predicting having relatively shorter sleep duration years later. Rasmussen et al., in 2023, discovered a dose-response link between an ACE score and higher levels of insomnia, worse sleep quality, and excessive daytime drowsiness.

## **Methods**

### **Aim**

This systematic review investigated the impact of adverse childhood experiences (ACEs) on the sleep health of individuals.

### **Data Collection**

The PRISMA criteria (Page et al., 2021) for Preferred Reporting Items for Systematic Reviews and Meta-Analyses were adhered to in this review study. The objective was achieved by carefully organizing the various results achieved through a range of present research. Due to time constraints, a literature search was carried out comprehensively on only one database, i.e. Google Scholar, published from 2024 onwards.

The search strategy was executed under three phases: search, screening, and selection. The key terms used were “Adverse Childhood Experiences”, “Sleep Health”, “Trauma”, and “Sleep Quality” to screen the research related to the impact of Adverse Childhood Experiences on Sleep Health.

Each potentially relevant article was effectively sorted into age groups: Children, adolescents, adults, old age, and common age. The articles were then screened based on factors such as Population (P)- children, adolescents, adults, and old; Intervention (I) - Adverse Childhood Experiences; Comparison (C) - None; and Outcome (O) - sleep health. It is also known as PICO criteria. Potentially relevant articles were further shortlisted for full-text analysis.

### **Study Selection Criteria**

The studies' inclusion criteria were:

- Articles that were written and published in English.
- The population's age categories were determined by applying Erik Erikson's Eight Stages of Psychosocial Development, which included the following: children under the age of 12, adolescents lying between the ages of 13 and 18, adults between the ages of 19 and 65, and those over the age of 65 (Legg and Lewis, 2023).

The studies' exclusion criteria included:

- Articles written in languages other than English.
- Qualitative research.
- Specific details regarding the age groupings in the sample are not provided by the studies.



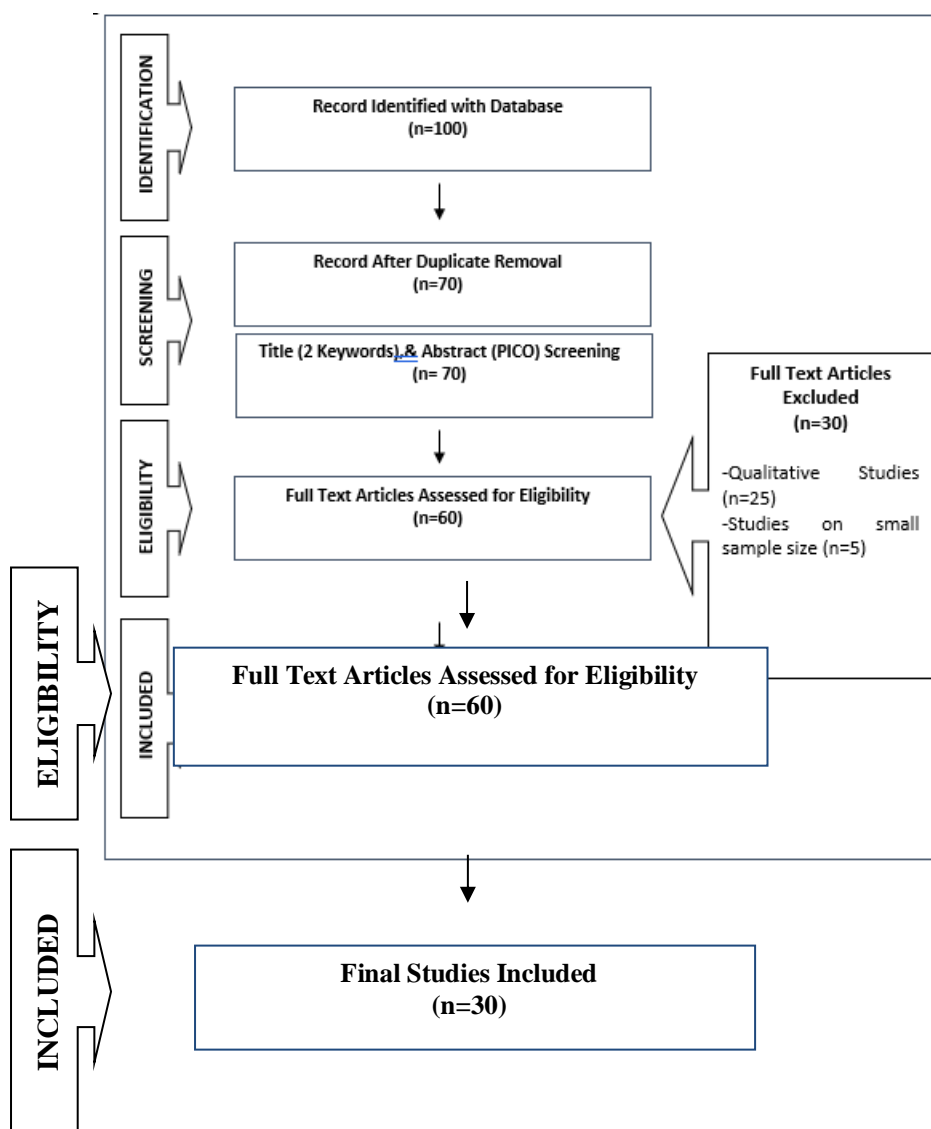
## Data Analysis

A data summary analysis was performed effectively based on the significant data that was gathered. Once the relevant studies were gathered, a data summary analysis was put to use. Data showing how negative childhood experiences affect sleep health was systematically separated and then organized into summary tables.

## Results

The systematic review process identified a total of 100 research articles through database searches. After removing the duplicates, 70 articles were screened based on title and abstract using the PICO criteria. A full-text review was then used to evaluate 60 articles. Of these, 30 were excluded for various reasons, including a small sample size, case histories, or qualitative studies. Ultimately, 30 studies were included in this systematic review as depicted in Figure 1.1.

Figure 1.1





Consequently, we acquired the findings related to impact of AC on sleep health for two groups namely children /adolescents and adult separately. The results are describing under these two groups are as follows:

### Children and Adolescents

Children and adolescents were the subject of 12 studies. Key findings indicate that ACEs are associated with overall well-being. Predisposition to psychiatric disorders, increased risk of NSSI, increased social jet lag, disrupted sleep patterns, night awakenings, and overall decreased sleep quality had all been observed. Additionally, attention is paid to how certain ACEs, like sexual abuse, affect people in different ways on an individual basis. These impacts are depicted in Table 1.1.

Table 1.1 Studies Highlighted the Impact of ACEs on Sleep

S. No.	First Author (Year)	Key Findings
1	Angeles (2024)	ACEs were found to have a dose-response relationship with decreased daily steps, total sleep duration, and REM sleep in preadolescents.
2	Covington et al. (2024)	<ul style="list-style-type: none"> <li>● 50 % had &gt; 1ACE</li> <li>● 37% slept &lt; 8–10 h/night</li> <li>● 14% had irregular sleep.</li> <li>● A significant interaction was observed between ACEs and sleep duration.</li> </ul>
3	Duraccio et al. (2024)	<ul style="list-style-type: none"> <li>● Exposure to ACEs was linked to trouble sleeping and remaining asleep.</li> <li>● Increased snoring and problematic sleep environments (i.e., where slept) were also linked to more ACEs.</li> <li>● There was some evidence linking ACEs to increased social jet lag (difference in sleep patterns between weekdays and weekends) and less sleep on the weekends.</li> </ul>
4	Sadikova et al. (2024)	<ul style="list-style-type: none"> <li>● Sleep deprivation tends to be more common in children who have experienced ACEs.</li> <li>● Children with resilient families were more likely to get increased sleep.</li> <li>● The association between sleep and negative childhood experiences was found to be weakened by family resilience.</li> </ul>



5	Lee et al. (2024)	<ul style="list-style-type: none"> <li>● Sleep issues in early childhood tend to be strongly linked to internalizing issues in middle childhood in children who have experienced early adversity.</li> <li>● Sleep disturbances may play quite a prominent role in the development of internalizing psychopathology in this population.</li> </ul>
6	Vasupanrajit et al. (2024)	<ul style="list-style-type: none"> <li>● The phenomenon of depression, which includes neuroticism, brooding, suicidal thoughts, and the intensity of anxiety, depression, and insomnia, tends to be influenced by intricate relationships between ACEs and NLEs.</li> <li>● The inhibition of cognitive interference may be affected by sexual abuse in conjunction with other ACEs and NLEs.</li> <li>● Sexual abuse has been statistically associated with a lifetime diagnosis of mental health conditions, including eating disorders, anxiety disorders, depression, posttraumatic stress disorder, sleep disorders, and suicide attempts.</li> </ul>
7	Fellman et al. (2024)	<ul style="list-style-type: none"> <li>● Both sleep disorders and traumatic experiences are prevalent in kids and teenagers.</li> <li>● There are physiological similarities between sleep-related problems and trauma reactions, which means they interact.</li> <li>● Sleep complaints should be specifically assessed as part of a trauma-informed mental health evaluation.</li> <li>● Trauma-informed treatments, including psychopharmacologic and psychological interventions, should specifically address any identified sleep issues for best results.</li> </ul>
8	Singh et al. (2024)	<ul style="list-style-type: none"> <li>● From childhood through early adulthood, minoritized racial/ethnic groups are probably more likely to experience insomnia and have more severe symptoms.</li> <li>● Persistent insomnia symptoms from childhood to early adulthood disproportionately affect members of minority racial/ethnic groups.</li> </ul>



9	Rong et al. (2024)	<ul style="list-style-type: none"> <li>For teenagers who reported sleep disturbance, cumulative CM and repetitive non-suicidal self-injury (NSSI) were found to be dose-response correlated.</li> <li>An elevated risk of NSSI was substantially linked to sleep disturbance.</li> <li>Sleep disturbance influenced the relationship between CM and NSSI.</li> </ul>
10	Xiang et al. (2024)	<ul style="list-style-type: none"> <li>A negative correlation between CM and sleep quality in adolescents was discovered.</li> <li>Perceived social support serves as a protective factor.</li> </ul>

### Adults

There were 18 studies that focused on adults. According to the review, ACEs are common and significantly linked to chronic insomnia, poor sleep quality, fragmented sleep, and sleep apnea, and shorter sleep duration. Additionally, it was discovered that individuals from low socioeconomic backgrounds and members of ethnic minorities tend to be more likely to suffer from serious physical and mental illnesses. It also explores the protective impact of PCEs and BCEs. These impacts are depicted in Table 1.2.

Table 1.2 Studies Highlighted the Impact of ACEs on Sleep

S. No.	First Author (Year)	Key Findings
1	Zhang et al. (2024)	<ul style="list-style-type: none"> <li>Poor sleep quality prevailed in 48.15% of older adults living in rural areas.</li> <li>Older women who were less educated, widowed, living alone, or suffering from chronic illnesses had lower sleep quality.</li> </ul>
2	Wu et al. (2024)	<ul style="list-style-type: none"> <li>29.22% of emerging adults reported persistent insomnia. ACE and PCE had opposing effects on chronic insomnia.</li> <li>PCE's protective effect on persistent insomnia was reduced in people who had four or more ACEs.</li> </ul>
3	Ashour et al. (2024)	<ul style="list-style-type: none"> <li>67.9% of participants in the study experienced at least one ACE.</li> <li>Four or more ACEs were reported by 25.4% of participants.</li> </ul>



		<ul style="list-style-type: none"> <li>• Sleep disturbance was found to be correlated with ACEs but inversely correlated with BCEs.</li> </ul>
4	Sheffler et al. (2024)	<ul style="list-style-type: none"> <li>• The association between chronic health conditions and ACEs was mediated by sleep quality.</li> </ul>
5	Coronado et al. (2024)	<ul style="list-style-type: none"> <li>• ACEs are often associated with poor health outcomes and behaviours, such as sleep disturbance and sleep-related impairment, in emerging adults who are at risk.</li> <li>• PCEs do not seem to mitigate the detrimental effects of ACEs on sleep disturbances or sleep-related impairments. However, they may have a positive impact in other areas, such as pain interference.</li> </ul>
6	Olsen et al. (2024)	<ul style="list-style-type: none"> <li>• There is a strong correlation between Puerto Rican young adults' sleep quality and their past ACEs.</li> <li>• Sleep disturbances and prospective ACEs did not significantly correlate.</li> <li>• Reducing sleep disorders may be possible by addressing ACEs that are reported in young adulthood.</li> </ul>
7	Razumov and University of Eastern Finland, Faculty of Health Sciences, School of Medicine (2024)	<ul style="list-style-type: none"> <li>• Long sleep duration and frequent sleep or sleep disruptions were significantly increased by two times when there was unhappiness in the childhood home.</li> <li>• A 70% increase in sleep duration was linked to a low socioeconomic status during childhood.</li> <li>• An unsupportive and inattentive family environment during childhood may contribute to sleep disorders later in life. It is potentially due to elevated stress levels from adverse childhood circumstances.</li> </ul>
8	Chen et al. (2024)	<ul style="list-style-type: none"> <li>• People who had CM at baseline were more likely to experience sleep issues at follow-up.</li> </ul>



		<ul style="list-style-type: none"> <li>• A key strategy for significantly lowering the risk of sleep issues in adults with a history of CM is to help them develop healthy coping mechanisms.</li> </ul>
9	Spitzer et al. (2024)	<ul style="list-style-type: none"> <li>• It was discovered that CM, especially physical neglect, was linked to sleep apnea.</li> <li>• Obesity and depression symptoms acted as a partial mediating factor.</li> </ul>
10	Rojo-Wissar et al. (2024)	<ul style="list-style-type: none"> <li>• It is possible that lower sleep quality contributes to correlations between CM and depressive symptoms during the first semester of college.</li> <li>• Targeting sleep in student health interventions on college campuses may also help with long-term socioeconomic and academic problems.</li> </ul>

## Discussion

Adverse Childhood Experiences (ACEs) and their effects on sleep health in children, adolescents, adults, and older adults were the focus of this systematic review. The results of the included studies offer a thorough summary of the ways in which early-life hardships can impact sleep patterns, quality, and general sleep health in a lasting way.

Numerous sleep disorders were found to be significantly correlated with ACEs, according to an analysis of studies that focused on children. Disrupted sleep patterns, such as trouble falling asleep, frequent night awakenings, and shorter sleep duration, were found to be more common in children who had experienced ACEs. These results fall in line with the literature that suggests early stress and trauma can dysregulate an individual's basic functioning. Duraccio et al. (2024) and Angeles (2024) found that ACEs were associated with poor sleep outcomes among older adults and reduced sleep metrics in preadolescents, respectively. This suggests that ACEs' effects on sleep are not limited to any one age group and can last a person's entire life (Lee et al., 2024; Chen et al., 2024). According to Covington et al. (2024), children who have experienced ACEs may have sleep disturbances that lead to behavioral and emotional problems, which may worsen sleep issues, thus creating a vicious cycle. To better understand the long-term trajectory of sleep disturbances in children with a history of ACEs and the potential buffering effects of early interventions with a trauma-informed lens, future research should concentrate on longitudinal studies (Fellman et al., 2024). The importance of



maintaining physical health is further supported by a notable study by Angeles (2024) that found a dose-response relationship between ACEs and decreased daily steps, total sleep duration, and REM sleep in preadolescents. According to another study by Covington et al. (2024), adolescents without ACEs had a 6% lower chance of being overweight or obese for every hour that their sleep duration increased. Duraccio et al. (2024) explained the intriguing phenomenon of social jet lag, which refers to different sleep patterns between weekdays and weekends. They also shed light on the relationship between snoring, problematic sleep environments (i.e., where one sleeps), and the presence of multiple ACEs.

Adolescence is a critical period for sleep regulation due to significant physiological, psychological, and social changes. According to the research, ACEs during this developmental stage may put people at risk for long-term sleep issues, which could impair their ability to think clearly, control their emotions, and perform well in school (Xiang et al., 2024). Covington et al. (2024) reported that among 24,100 adolescents, 50% had experienced at least one ACE, and those with ACEs were more likely to sleep less than the recommended hours. According to the literature, it is critical to address ACEs during adolescence by implementing focused interventions that support sound sleep patterns and mental health. Furthermore, given adolescents' increased susceptibility to sleep disturbances, it may be beneficial to include sleep health education in school-based programs. Many studies today tend to effectively highlight the roles of psychological factors like anxiety, stress, and coping mechanisms in the relationship between ACEs and sleep disturbances, such as those conducted by Ashour et al. (2024) and Sheffler et al. (2024). Sadikova et al. (2024) emphasized the significance of supportive environments and pointed out that resilient family dynamics can lessen these negative effects.

Research on adults and older adults showed that the effects of ACEs persist well into adulthood, showing up as shorter sleep duration, chronic insomnia, and fragmented sleep (Singh et al., 2024; Vasupanrajit et al., 2024; Wu et al., 2024). The persistence of sleep disturbances in adults with a history of ACEs is concerning, as poor sleep is a known risk factor for various physical and mental health conditions. Including cardiovascular disease, depression (Ashour et al., 2024) and anxiety (Zhang et al., 2024; Vasupanrajit et al., 2024). These findings tend to quite highlight the importance of incorporating trauma-informed care approaches in clinical settings to address sleep issues in adults with ACEs (Fellman et al., 2024). Furthermore, public health strategies for improving sleep health should consider the long-term effects of early adversity. According to Zhang et al.'s (2024) cross-sectional study, 48.15% of rural older adults have poor sleep quality. Factors such as gender, education level, widowhood, or living alone contribute to poorer sleep outcomes. Sleep disturbances in older adults with ACEs may worsen age-related declines in physical and cognitive functioning,



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adding to the risk of chronic health conditions and lowering the overall quality of their life.

A significant link exists between adverse childhood experiences (ACEs) and maladaptive metacognitive beliefs, with a clear dose-response relationship indicating that an increasing number of ACEs correlates with more intense maladaptive beliefs (Tomlinson et al., 2024). Tomlinson et al. also discovered that distinct ACE subgroups were associated with varying mental health symptoms in young adults, with the high ACEs subgroup exhibiting more severe symptoms than the low ACEs subgroup, supporting cumulative risk theories. Chaudhary et al. (2024) also showed that ACEs are a prominent risk factor for Internet Addiction (IA) in young adults in Delhi-NCR, India, especially if the individual has had four or more ACEs. Their results emphasize that although total exposure to ACEs predicts IA risk, particular experiences such as bullying and sexual abuse have a particularly significant impact. The relationship between emotions and sleep was further discussed by Krizan et al. (2024), who demonstrated that negative emotions—particularly stress—increased the latency of sleep onset and, in certain situations, decreased the length of sleep. The impact of sleep problems on nursing students' core self-evaluations was further highlighted by Ning et al. (2024), who found that expressive suppression mitigates the negative effects of sleep problems and that cognitive reappraisal and resilience partially mediate this relationship. Finally, Yang (2024) highlighted that struggles with emotion regulation and externalizing issues act as mediating pathways between adolescent sleep issues and childhood maltreatment (CM).

Sexual abuse was statistically linked to a lifetime diagnosis of psychiatric disorders such as anxiety disorder, depression, eating disorders, posttraumatic stress disorder, sleep disorders, and suicide attempts (Vasupanrajit et al., 2024). This also highlights the importance of investigating the impact of individual ACEs in order to develop more effective interventions. The findings of Olsen et al. (2024) and Duraccio et al. (2024) highlight that not all ACEs have the same effects and that the specific types of ACEs, as well as individual sociodemographic factors, have a significant impact on sleep quality. The varying effects observed in different cohort studies involving a range of populations clearly demonstrate this.

Further research is also needed to determine how mediating factors like coping strategies (Zhang et al., 2024; Chen et al., 2024), social support (Xiang et al., 2024), resilience (Sadikova et al., 2024), and BCEs/PCEs (Ashour et al., 2024; Coronado et al., 2024) can lessen the negative effects of ACEs on sleep. The goal to further deconstruct the intricate relationships between various ACE types, the function of PCEs, and the realted combined impact on sleep would aid in the development of trauma-informed interventions. Studies that follow these dynamics over time, like those by Lee et al. (2024) and Chen et al. (2024), are especially useful because they paint a more complete picture of causality and the long-term impacts of early adversities on sleep.



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## Limitations of the Study

Despite the review's strong conclusions, a number of limitations need to be noted. Initially, the majority of studies rely on self-reported measures of ACEs and sleep health, which could introduce subjectivity and recall bias into the data. Second, the ability to conduct a meta-analysis, which could have yielded more accurate estimates of the effect of ACEs on sleep, was restricted by the heterogeneity of study designs and the different definitions of sleep health parameters across different studies. Lastly, the review mainly discusses studies published from 2024 onwards. As a result, the exclusion of previous studies may have omitted important historical perspectives and data on the subject.

## Conclusion

The purpose of this systematic review was to better investigate the many impacts of Adverse Childhood Experiences (ACEs) on sleep health at various life stages. The reviewed studies found a strong link between ACEs and sleep disturbances among different age groups. Sleep disturbances include poor sleep quality, irregular sleep patterns, and an added risk of sleep disorders. These impacts appear to last throughout the lifespan, implying that the negative impact of childhood adversity continues into adolescence, adulthood, and even old age.

The findings highlight the numerous ways in which ACEs affect sleep health, including evidence of a dose-response relationship between the number of ACEs and the severity of sleep disruptions. The influence of ACEs on sleep is mediated by various psychological and physiological mechanisms, including anxiety, stress, and dysregulation of the HPA axis. The variability of these outcomes, which is determined by the type and number of ACEs as well as sociodemographic factors such as gender, emphasizes the importance of nuanced approaches when dealing with these consequences.

Importantly, this review emphasizes the importance of trauma-informed interventions that consider both the psychological consequences of ACEs and their impact on sleep quality. Further research is necessary to examine the protective factors that may act as a buffer against the long-term effects of ACEs on sleep, such as social support, resilient family dynamics, and positive childhood experiences (PCEs).

In conclusion, a comprehensive and integrated approach is required in both clinical practice and public health due to the widespread and enduring effects of ACEs on sleep health. The long-term effects of these early adversities could be considerably reduced by adjusting interventions to take into consideration the types and severity of ACEs as well as initiatives to increase family and community support. The mechanisms by which ACEs impact sleep should be further investigated in future studies, as should the effectiveness of focused interventions aimed at fostering psychological resilience and better sleep health throughout life.



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## Conflict of Interest

The authors declare no conflict of interest.

## Author Contribution

Conceptualisation: Munjal and Manglani; Methods: Munjal and Manglani; Data Collection: Munjal; Data analysis: Munjal and Manglani; Writing: Munjal and Manglani; Writing – review and editing: Manglani.; Guide: Manglani.

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