

Sleep Disorders in Adolescents and Their Impact on Mental Health: A Literature Review

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Abstract: Adolescent development is a critical period marked by intensive neurobiological maturation, particularly in the prefrontal cortex and limbic system. Concurrently, sleep architecture undergoes physiological changes, making sleep quality inherently fragile and increasing vulnerability to chronic sleep deprivation. This narrative literature review aims to comprehensively examine adolescent brain maturation, sleep characteristics, the bidirectional relationship between sleep disruption and psychiatric disorders, as well as therapeutic interventions. Based on a review of literature published between 2016 and 2026 retrieved from databases such as PubMed, ScienceDirect, and Google Scholar, sleep deprivation and irregular sleep patterns (social jetlag) are significantly associated with structural brain alterations. These include reduced grey matter volume in the prefrontal cortex, amygdala, and hippocampus, along with disrupted fronto-limbic functional connectivity. Such neurostructural changes impair emotional regulation, executive function, and impulse control. Clinically, sleep disturbances-particularly insomnia-act as bidirectional risk factors and transdiagnostic markers for anxiety, depression, substance abuse, and heightened suicidality in adolescents. Non-pharmacological interventions, specifically Cognitive Behavioral Therapy for Insomnia (CBT-I), demonstrate high efficacy in restoring sleep continuity while simultaneously mitigating psychiatric symptoms. In conclusion, sleep is a clinically relevant marker of adolescent well-being and a modifiable target for early intervention and prevention of adolescent mental health disorders.

Keywords: Adolescent sleep; Brain development; Insomnia; Mental health; Neurobiology.

Introduction

Rapid biological, psychological, and neurocognitive changes occur during adolescence, a crucial developmental stage. Significant brain development takes place at this stage, especially in the limbic system and prefrontal cortex, thanks to mechanisms including myelination and synaptic pruning. These changes support the development of emotion regulation, executive function, decision-making, and higher-order cognitive processes, while also contributing to vulnerability to mental health problems (Wright & Kutcher, 2016; Lapidaire et al., 2021). Additionally, adolescence is a critical time for the development of mental illnesses. According to Caspi et al. (2020), the peak age of onset was roughly 14.5 years, with 34.6% of people with any mental condition experiencing onset by age 14,

48.4% by age 18, and 62.5% by age 25. These results emphasize that adolescence is a critical time for discovering characteristics associated with mental health that can be changed.

One such element is sleep, which is crucial for brain growth, memory consolidation, emotional control, and neuronal repair. Sleep disturbances involving duration, timing, regularity, or quality may therefore be relevant to adolescent cognitive and psychological development (Tarokh & Guitierrez Herrera, 2025). Teenagers between the ages of 13 and 18 should typically get 8 to 10 hours of sleep per 24 hours, according to the American Academy of Sleep Medicine (Paruthi et al., 2016). However, insufficient or irregular sleep throughout adolescence may be caused by developmental changes in circadian timing, early school schedules, academic pressures, and social activities (Tarokh &

Guitierrez Herrera, 2025).

Sleep problems have also been documented among Indonesian adolescents. Using the Pittsburgh Sleep Quality Index (PSQI), Asrullah et al. (2025) documented differences in psychological well-being and sleep quality among Indonesian teenagers between the ages of 10 and 19, including a subgroup with poor sleep quality and a high risk of depression. Additionally, Zendrato et al. (2025) noted that male and female teenagers had different levels of insufficient sleep. However, rather than being extrapolated as estimates that are nationally representative, these results should be viewed in light of the study population's characteristics. Thus, age-specific studies using validated sleep measures remain important for understanding adolescent sleep problems in Indonesia.

Previous research has demonstrated associations between insufficient or disturbed sleep and neurocognitive, psychological, and behavioral outcomes. Inadequate sleep was linked to variations in neurocognitive function, brain structure, and mental health outcomes over a two-year period, according to the Adolescent Brain Cognitive Development Study (Yang et al., 2022). Because this study was observational, the findings indicate longitudinal associations rather than direct causation. Sleep timing and regularity may also be important. Variations in brain structure and psychological or behavioral effects have been linked to social jet lag and irregular sleep habits (Lapidaire et al., 2021). There may be a reciprocal association between sleep and mental wellness.

Mental health issues can also interfere with sleep, and insufficient sleep has been linked to psychiatric symptoms like depression and anxiety (Meyer & Lee, 2019; Roberts & Doing, 2016). Insomnia symptoms have similarly been associated with depression, anxiety, risky behaviors, and other psychiatric outcomes in adolescents (Zambotti, 2019; Scott et al., 2021; Uccella et al., 2023). Furthermore, Alvaro et al. (2017), in a study of 10,123 adolescents aged 13–18 years, found significant associations between difficulties initiating or maintaining sleep and suicidal ideation and suicide plans after adjustment for psychiatric disorders and other covariates. These findings indicate that sleep disturbances are relevant to adolescent mental health, although the available evidence does not necessarily establish a causal relationship.

Despite the growing evidence, findings on sleep duration, quality, timing, regularity, insomnia, and their relationships with different mental health outcomes remain dispersed across studies.

Therefore, this literature review aims to examine the relationship between sleep disturbances and adolescent mental health by integrating evidence on brain maturation, sleep characteristics, psychiatric outcomes, potential neurobiological mechanisms, and intervention approaches. This review is expected to provide a concise evidence base for understanding sleep as an important and potentially modifiable factor in adolescent mental health.

Materials and Methods

This study employed a *narrative literature review* to synthesize evidence on sleep disorders and mental health among adolescents. The review question was: What evidence exists regarding adolescent sleep disorders, their association with mental health outcomes, underlying mechanisms, and relevant interventions?

Literature searches were conducted in PubMed/MEDLINE, Scopus, ScienceDirect, and Google Scholar, with the final search conducted in July 2026. JAMA Network, *The Lancet*, and PLOS ONE were searched as supplementary journal sources. The search covered publications from 2016–2026 in English or Indonesian. The main search strategy combined controlled vocabulary and free-text terms: (*adolescent OR teenager OR youth**) AND (*sleep disorder* OR insomnia OR "sleep quality" OR "sleep duration" OR "sleep disturbance"**) AND (*"mental health" OR depression OR anxiety OR suicid* OR "psychiatric disorder"**) AND (*"brain development" OR neurobiolog* OR "brain maturation"*)*. Relevant MeSH terms were applied in PubMed, with database-specific syntax adapted accordingly.

Eligible studies included original research, systematic reviews, longitudinal studies, and meta-analyses involving adolescents aged 10–19 years and examining sleep characteristics or disorders in relation to mental health. Editorials, conference abstracts, non-peer-reviewed sources, studies unrelated to the review topic, and articles without accessible full texts were excluded. References published before 2016 were retained only when they provided seminal or foundational concepts not adequately replaced by newer evidence. At least 80% of the main synthesis references comprised peer-reviewed journal articles from reputable sources.

Retrieved records were exported, duplicates removed, and subsequently screened by title and abstract, followed by full-text

assessment using the predefined criteria. The number of records identified, duplicates removed, full texts assessed, included studies, and reasons for exclusion were documented in the review process. Methodological quality was appraised descriptively based on study design, sample characteristics, validity of measurement instruments, and consistency of findings. Evidence was then synthesized narratively according to sleep characteristics, mental health outcomes, neurobiological mechanisms, and intervention approaches. The principal studies were summarized in an evidence summary table containing author/year, study design, population, sleep variables, mental health outcomes, and main findings (Sukhera, 2022).

The chosen literature was then used as the foundation for discussions about the development of the adolescent brain and the importance of sleep, the effects of sleep deprivation on the structure of the brain, the neurophysiology of sleep, the characteristics and needs of sleep in adolescents, the categorization of sleep disorders, and the reciprocal relationship between sleep and mental health. Furthermore, short-term and long-term mechanisms, the role of REM sleep in emotional memory processing and emotion regulation, transdiagnostic and neurophysiological perspectives, insomnia and psychiatric disorders, and treatments and interventions for sleep disorders were all examined in the literature.

Thus, the *narrative literature review* method in this paper was used to identify, examine, compare, and synthesize various relevant sources of literature to obtain a comprehensive overview of sleep disorders among adolescents and their impact on mental health. This approach is also consistent with the objectives of the paper, namely to analyze the structural effects of sleep disorders on brain development, identify the bidirectional relationship between sleep disorders and increased risk of mental disorders, explain the role of neurophysiological indicators such as *Slow Wave Activity* (SWA) and *sleep spindles*, and identify the effectiveness of several therapies for sleep disorders.

Result and Discussion

Adolescent Brain Maturation and the Role of Sleep

Neurobiological Processes of the Adolescent Brain

Adolescence is a unique developmental phase because it encompasses the development of all body organs, including the brain. Significant brain development begins during the postnatal period and continues into adulthood. Each brain structure exhibits a different pattern of change, including differences in the areas that predominantly develop during adolescence compared with earlier stages of life. As individuals age, structural changes in the brain also involve various underlying mechanisms.

Several important changes occur during adolescence, including *synaptic pruning*, an increase in white matter, and cortical thinning. White matter is the area of the brain that promotes communication between various brain regions, whereas *synaptic pruning* is the term used to describe the removal or deletion of excessive neural connections. Cortical thinning refers to changes in the outer layer of the brain, which is composed of gray matter. Long-term structural changes occur primarily in the frontal and temporal cortices. These two areas play important roles in establishing the basis for behavioral changes during adolescence (Wright & Kutcher, 2016).

Synaptic pruning primarily occurs during adolescent development and plays an important role in the formation of neural networks involving complex circuits within the cerebral cortex. This process increases the efficiency of neural networks. Frequently used neural connections undergo myelination, making them stronger and more efficient in transmitting signals, whereas rarely used connections are eliminated through the process of pruning. This concept is known as “*use it or lose it*.” As individuals mature, brain activity becomes more focused or focal rather than being diffusely distributed.

In addition, an increase in white matter occurs, followed by the myelination of axons, which allows neural signal transmission to occur more rapidly. Brain regions that undergo prominent changes include the frontal and parietal cortices, brainstem, and amygdala. The dorsolateral prefrontal cortex reaches its peak gray matter volume during the early twenties. This region plays an important role in the regulation of complex behaviors and emotions, as well as cognitive functions, including complex problem-solving. Meanwhile, the brainstem and amygdala continue to show increases in white matter until approximately 31 years of age. These changes help explain the relationship between emotional regulation during adolescence and

changes in the amount of brain tissue within these regions (Wright & Kutcher, 2016).

Impact of Sleep Deprivation on Adolescent Brain Structure

The impact of sleep deprivation on brain development has been demonstrated in the longitudinal *Adolescent Brain Cognitive Development* (ABCD) Study. This study employed a longitudinal observational design with *propensity score matching* (PSM) analysis involving 8,323 children. Assessments were conducted at baseline and during a two-year follow-up using *Magnetic Resonance Imaging* (MRI) to evaluate brain structure, as well as to assess behavioral, cognitive, and mental health parameters and resting-state functional brain connectivity.

The ABCD Study provides transitional evidence relevant to early adolescent development. Among children aged 9–10 years at baseline, insufficient sleep was associated with differences in neurocognitive performance, mental health, behavior, and brain structure and connectivity over two years, including alterations involving cortico-basal ganglia and anterior temporal regions (Yang *et al.*, 2022). These differences were also associated with lower cognitive performance and greater depressive symptoms. Because the participants were younger than the predefined 10–19-year-old population at baseline and the study was observational, these findings are considered complementary evidence on the transition toward adolescence rather than direct evidence of causal effects in adolescents.

The anterior temporal lobe, which is crucial for memory consolidation and cognitive function,

is similarly impacted by sleep deprivation. Delayed maturation of the temporal lobe in adolescents due to sleep deprivation may reduce cognitive abilities and interfere with the process of memory consolidation. In addition, the study demonstrated a reduction in gray matter volume across 12 brain regions (Yang *et al.*, 2022).

Irregular sleep patterns are also associated with changes in brain structure. A study involving 101 adolescents aged 16 years used the *Strengths and Difficulties Questionnaire* (SDQ) and MRI examinations and identified *social jet lag*, namely delayed wake-up and bedtime schedules on weekends compared with school days, as well as *sleep debt* resulting from shorter sleep duration on school days. Reduced gray matter volume in the right hippocampus, bilateral amygdala, and *medial prefrontal cortex* (mPFC) was linked to these inconsistent sleep patterns. The mPFC is crucial for controlling emotions and impulses.

Sleep Neurophysiology

Several neurophysiological changes occur during adolescent sleep. One of the most prominent changes is an approximately 40% decline in slow-wave activity (SWA), reflecting reduced low-frequency EEG power during sleep and accompanying cortical maturation (Goldstone *et al.*, 2019). Sleep spindle characteristics also change with age, with spindle amplitude and duration generally decreasing, while spindle density increases during early adolescence and reaches a peak at approximately 15 years of age (Goldstone *et al.*, 2019; Ricci *et al.*, 2021). These changes are considered markers of ongoing thalamocortical and cortical maturation during adolescence.

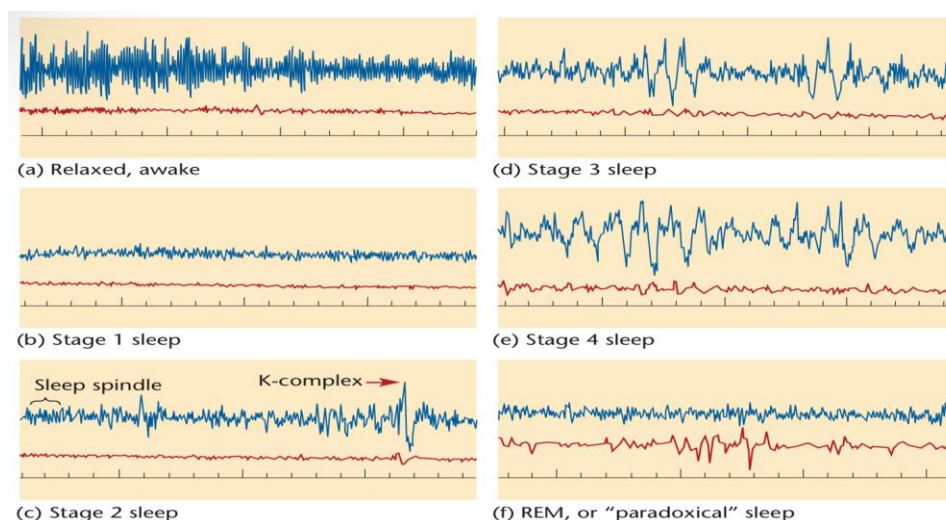


Figure 1. Example of Polysomnographic Patterns at Each Sleep Stage

Description: The uppermost wave represents the EEG (electroencephalogram) recorded from an electrode attached to the scalp. The middle wave represents the recording of eye movements. The bottom line indicates time intervals of one second each (Kalat, J.W., 2017).

Given these developmental characteristics, adolescent sleep is not intrinsically poorer than sleep at other life stages but may become more vulnerable to restriction and irregularity due to the interaction of circadian phase delay, homeostatic sleep pressure, early school schedules, and social behaviors. During puberty, a tendency toward later sleep timing may conflict with fixed school schedules and social activities, reducing opportunities for adequate sleep (Tarokh & Guterrez Herrera, 2025). Persistent sleep restriction and irregularity have been associated with insomnia symptoms and adverse mental health outcomes among adolescents.

Characteristics of Adolescent Sleep

Adolescent Sleep Requirements

One of the key elements influencing teenagers' mental, physical, and emotional health is sleep. According to several studies (Chaput et al., 2016; Henderson et al., 2019; Master et al., 2023; Raniti et al., 2017; Short & Weber, 2018), sleep deprivation is linked to more physical and mental health issues, poorer academic performance, higher absenteeism, learning challenges, depression, and auto accidents.

In order to promote optimal health and daytime performance, the *American Academy of Sleep Medicine* (AASM) advises adolescents between the ages of 13 and 18 to regularly get 8 to 10 hours of sleep every 24 hours (Paruthi et al., 2016). However, many adolescents do not meet this recommendation. Six out of ten middle school students and seven out of ten high school students in the US do not get enough sleep, and 72.7% of high school students said they slept for less than eight hours on school nights (Wheaton et al., 2018). These results suggest that getting too little sleep is still a widespread issue throughout adolescents.

According to Amelia and Annisa (2022), 62.9% of Indonesian teenagers between the ages of 12 and 15 report having sleep disruptions, and their average sleep length is 7.35 hours (Lukman et al., 2024). The impact can also be observed in daily functioning. A study conducted in South Tangerang showed that 25.6% of adolescents with poor sleep quality had low learning concentration (Novita & Rochmani, 2019). In the meantime, 38.82% of junior high school students in Minahasa reported poor sleep quality,

according to a study (Ponidjan et al., 2022).

Classification of Common Sleep Disorders in Adolescents

The *International Classification of Sleep Disorders*, Third Edition (ICSD-3), and the *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition (DSM-5), are the primary classification systems for sleep disorders. Although both systems cover many of the same conditions, ICSD-3 is more comprehensive and specific, whereas DSM-5 establishes 12 major categories of sleep disorders.

Adolescents may have insomnia, obstructive sleep apnea (OSA), circadian rhythm sleep-wake disorders, insufficient sleep syndrome, hypersomnolence disorders, parasomnias, and restless legs syndrome, among other sleep disorders. Insomnia is characterized by trouble falling asleep, staying asleep, or waking up early. It can also be linked to exhaustion, irritability, and problems concentrating during the day. Snoring, gasping, and daytime tiredness are symptoms of OSA, which is characterized by recurring upper-airway obstruction during sleep. A chronic delay in sleep and wake timing is a feature of circadian rhythm sleep-wake disorders, especially delayed sleep-wake phase disorder, which can interfere with everyday activities and education. Other disorders, including insufficient sleep syndrome, hypersomnolence, parasomnias, and restless legs syndrome, may also affect sleep quality, daytime functioning, and psychological well-being.

The Bidirectional Relationship Between Sleep and Mental Health

Mental health and sleep issues are correlated in both directions. Both symptoms and significant risk factors for mental illnesses can be found in sleep disruptions. According to Scott et al. (2021), adolescents with sleep difficulties had a 1.88-fold increased risk of developing bipolar disorder, psychotic illnesses, or depression in the future.

During adolescence, changes in SWS and *sleep spindle* amplitude make sleep more fragile than during other stages of life. This condition represents a natural risk factor that makes adolescents more vulnerable to chronic sleep deprivation, which may subsequently predispose

them to insomnia and various psychiatric disorders (Tarokh & Guterrez Herrera, 2025).

Insomnia in Adolescents and Psychiatric Disorders

Insomnia is one of the sleep disorders that has a strong association with psychiatric disorders. When adolescents experience insomnia, the risk of mental health problems becomes increasingly important to consider. A study by Alvaro et al. (2017) involving 10,123 adolescents showed that insomnia symptoms increased the risk of suicidal ideation by 6.2-fold, suicide planning by 10.4-fold, and suicide attempts by 10.5-fold compared with adolescents without sleep disorders.

Factors Linking Sleep and Psychiatric Disorders

Genetic Factors

A genetic architecture involving molecular processes linked to neurotransmitter modulation, circadian rhythms, and brain function may be shared by mental diseases and sleep disorders. Although their impacts can differ among persons and features, shared genetic variations may have an impact on both sleep and psychiatric phenotypes. The observed comorbidity between sleep problems and psychiatric diseases may be partially explained by this genetic overlap (Stahl et al., 2019; Wray et al., 2018; O'Connell et al., 2021).

Because sleep disturbances frequently predict the likelihood of psychiatric diseases and vice versa, this genetic overlap may have clinical significance. Intervention options that target the same biological pathways, such as enhancing sleep patterns as part of the treatment of mental diseases, are made possible by an understanding of the shared genetic architecture (Stahl et al., 2019; Wray et al., 2018; O'Connell et al., 2021).

Long-Term Mechanisms

One long-term mechanism is linked to childhood trauma or adversity, which includes exposure to domestic violence, neglect, and physical, emotional, and sexual abuse. Children's neurobiological development may be impacted by early-life trauma exposure, including disruption of the hypothalamus-pituitary-adrenal axis (HPA axis) and an increase in amygdala sensitivity, which is involved in threat reactivity and emotional regulation (Dannowski et al., 2012).

HPA axis dysregulation causes excessive

release of stress hormones, making individuals more vulnerable to sleep disturbances, including difficulty falling asleep, REM sleep disturbances, and chronic nightmares. These conditions may subsequently increase the risk of psychiatric disorders (McKay et al., 2021; Jin et al., 2024). Traumatic experiences may also shape negative cognitive schemas regarding oneself, others, and the world that can persist into adulthood.

Short-Term Mechanisms

Short-term sleep deprivation affects emotional processing and cognitive function through interactions between the amygdala and the *medial prefrontal cortex* (mPFC). The amygdala plays a role in detecting and responding to emotional stimuli, particularly threats or stressful situations, whereas the mPFC is involved in emotion regulation, impulse control, social cognition, decision-making, and working memory (Goldstein & Walker, 2014; Gujar et al., 2011).

According to Yoo et al. (2007) and Jin et al. (2024), sleep loss enhances amygdala response to negative emotional cues, making people more prone to irritation, anxiety, or extreme terror. The amygdala and mPFC's functional connection is similarly diminished by sleep deprivation. This weakened connection limits the ability of the mPFC to suppress amygdala emotional reactivity, resulting in emotional lability, difficulty controlling impulses, and reduced capacity for adaptive emotional regulation (Goldstein & Walker, 2014; Gujar et al., 2011; Jin et al., 2024).

The Importance of REM Sleep in Emotional Memory Processing and Emotion Regulation

Emotional memory processing and emotion control are significantly impacted by *rapid eye movement* (REM) sleep. The amygdala, hippocampus, striatum, and medial prefrontal cortex are among the brain areas linked to emotion that become more active during this phase. These changes are accompanied by decreased levels of noradrenaline, which contributes to reducing emotional *arousal*. This condition allows the brain to process emotional experiences more adaptively and supports the integration of emotional experiences into long-term memory (Goldstein & Walker, 2014; Sotres et al., 2004; Jin et al., 2024).

One concept explaining the function of REM sleep is the “*sleep to remember, sleep to forget*” theory. This theory suggests that REM

sleep allows individuals to retain memories of an event while reducing the emotional load associated with it. However, research has also shown that REM sleep does not always reduce emotional intensity. Under certain conditions, REM sleep may maintain or even strengthen the emotional significance of an event, depending on the context and the importance of the experience (Walker & van Der Helm, 2009; Werner et al., 2015; Genzel et al., 2015; Vandekerckhove & Wang, 2018).

REM sleep deprivation may impair emotion regulation by increasing activity in the limbic system and reducing prefrontal cortical control. This condition makes individuals more emotionally reactive, easily irritable, and less able to regulate their emotions. Sleep deprivation also disrupts the processing and integration of emotional memories and may contribute to psychological disorders such as anxiety and depression (Gross, 2014; Vandekerckhove & Cluydts, 2010; Vandekerckhove & Wang, 2018).

Transdiagnostic and Neurophysiological Perspectives

The transdiagnostic approach in psychiatry conceptualizes sleep disorders as core mechanisms that cut across various mental disorders rather than merely secondary symptoms. Sleep disorders, particularly insomnia, contribute to emotional dysregulation, cognitive impairment, and increased vulnerability to depression, anxiety, and psychosis. Insomnia may act as both a risk factor and a maintaining factor for various psychiatric disorders through mechanisms involving cognitive hyperarousal and impaired emotional regulation (Mayeli et al., 2024).

From a neurophysiological perspective, changes in sleep microstructure provide objective evidence of central nervous system involvement in mental disorders. Thus, alterations in sleep characteristics are not only associated with symptoms experienced by individuals but also indicate the involvement of neurophysiological processes related to psychiatric disorders.

Treatment and Intervention

Cognitive Behavioral Therapy for Insomnia (CBT-I) is an effective first-line intervention for improving sleep quality and reducing psychopathological symptoms. Insomnia serves as both a risk factor and a prodromal condition for mental disorders;

therefore, sleep-focused interventions may provide therapeutic effects across diagnostic categories.

CBT-I is an established intervention for insomnia, with evidence from meta-analyses indicating improvements in insomnia symptoms and depressive symptoms, primarily in general or adult populations (Alimoradi et al., 2022). Evidence regarding its effects on psychotic symptoms is more limited and has mainly been examined in populations with psychotic disorders (Palagini et al., 2024). Therefore, these findings should not be directly generalized to adolescents without adolescent-specific evidence. In adolescents, CBT-I should be considered based on the available age-specific evidence, clinical characteristics, and underlying diagnosis.

CBT-I is also linked to improvements in delusions, hallucinations, and mental health in patients with psychotic disorders, especially in the early stages of treatment (Ugurlu et al., 2024). Additionally, there is a reciprocal association between sleep therapy and mental wellness. Sleep quality can be improved by treating psychological disorders including sadness and anxiety. By lowering cognitive and emotional hyperarousal, treatments for anxiety and depression in teenagers, such as cognitive behavioral therapy or medication like *selective serotonin reuptake inhibitors* (SSRIs), may enhance sleep patterns.

The connection between sleep and emotional well-being in teenage populations has been studied, including if getting more sleep could lessen depression symptoms later on (Waloszek et al., 2015). Stress, anxiety, and pre-sleep rumination can interfere with sleep initiation and continuity, while sleep disturbances may also be associated with subsequent emotional difficulties. This reciprocal relationship may contribute to a cycle in which sleep problems and emotional symptoms reinforce one another.

Conclusion

Based on a comprehensive review of the literature, sleep disorders in adolescents are not merely secondary consequences of behavioral or psychological problems but represent clinically relevant factors associated with neurobiological development and mental health. Adolescence is a critical phase of brain maturation characterized by *synaptic pruning*, myelination, and reductions in the amplitude of

Slow-Wave Sleep (SWS) and *sleep spindles*. These neurophysiological changes naturally make adolescent sleep patterns more fragile and vulnerable to sleep deprivation.

Chronic sleep deprivation and irregular sleep patterns, including *social jetlag*, have been associated with structural differences in brain regions involved in emotional regulation, including the prefrontal cortex, amygdala, and hippocampus, as well as altered fronto-limbic connectivity. These neurobiological differences have been linked to emotional and cognitive difficulties and may contribute to vulnerability to psychiatric symptoms. Sleep disruptions are linked to sadness, anxiety, and suicidal thoughts or actions. The association between sleep problems, especially insomnia, and mental health is thought to be bidirectional and transdiagnostic. Thus, potential strategies for promoting teenage mental health include sleep-based therapies like *Cognitive Behavioral Therapy* for Insomnia (CBT-I) and better sleep hygiene (Waloszek et al., 2015).

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