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Abstract: Sleep helps relax both the body and mind while unconscious of the surroundings. People experience different sleep qualities and measure them in two ways: quantitatively and qualitatively. The quantitative aspect refers to how long someone sleeps, while the qualitative aspect is about how restful they feel when they wake up. This study looks to identify the factors linked to poor sleep quality. It uses secondary data and focuses on qualitative analysis. Several theories explain why we need sleep, including the Repair and Restoration Theory, Evolutionary Theory, Information Consolidation Theory, and the Clean-Up Theory. The findings indicate a strong connection between sleep quality and poor academic performance in adolescents. In Nepal, several studies have shown that many students experience sleep disturbances, with reports of poor sleep quality between 31% and 60.9%. These sleep disorders lead to health issues and ultimately result in poor academic performance.

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Introduction

Sleep is a dynamic and highly organized biological process encompassing one-third of the human life. Sleep is a regular, repeating, and easily reversible state of the organism, identified with relative motion and a high reaction threshold to exterior stimuli compared to the individual's awake state(1). Sleep quality encompasses a multi-faceted concept comprising different sleep attributes such as sleep duration, efficiency, latency, disturbances, daytime somnolence, and an individual's subjective sleep experience(2). The quality of sleep is a measure of both the quantitative and qualitative components of sleep. The quantitative component includes the duration of sleep, while the qualitative component is a subjective measure of the depth and feeling of restfulness upon awakening(3) . Adequate and quality sleep is vital for physical and mental well-being, especially during adolescence, where it plays a crucial role in normal physical development as sleep duration and overall sleep quality could also influence growth hormone secretion. For optimum health and performance, adolescents are recommended to get 8 to 10 hours of sleep daily(2).

In fact, restoring sleep is strongly related to better physical, cognitive, and psychological well-being. By contrast, poor or disordered sleep leads to possible impairments of cognitive and psychological functioning and to a worsened general physical health. For these reasons, understanding changes in sleep quality becomes a research imperative that leads to the need for the definition of what restoring or quality sleep means(4). Adolescence is known as a high-risk factor for sleep disorders. Sleep disorders in adolescents are common and healthcare professionals face many adolescents suffering from some kinds of sleep disorders. Adolescents have many biological changes, such as modifying sleep, awake, and sleep patterns settings (reduced delta sleep, reduced Rapid Eye Movement (REM) Sleep. During adolescence, many changes occur in adolescent brain development. Adolescents' sleep plays a great role in healthy brain development. Adolescents need more sleep compared to pre-puberty time, but there is much turmoil in their sleep and waking cycles(1). Sleep disorders are considered to be harmful to adolescents as they may decrease work efficiency and learning ability. Sleep quality leads to issues with learning and behaviours. Adolescents who do not get proper and adequate sleep are

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more likely to be inattentive, distracted, uninterested, impulsive, and hyperactive. Sustained, untreated sleeping disorders may lead to major depression, anxiety disorders, and substance abuse. Various factors decide sleep quality (such as age, gender, habitat, BMI, physical activity or sports). Heavy smoking, frequent alcohol and coffee intake, lack of regular exercise, poor diet, and skipping breakfast are associated with short sleep duration and insomnia among adolescents. Short-term effects of sleep disorder in school-aged children and adolescents manifest as daytime fatigue only, while medium-term effects have been associated with daytime sleepiness and behavior problems(5).

Evidences show a strong association between sleep quality and poor academic performance of adolescents. Epidemiological studies conducted in West Bengal and Karnataka have reported the prevalence of sleeping disorder-related symptoms ranging from 20% to 48%. Students experiencing several sleep problems may have an impact on their academic performance, health, and mood. The higher prevalence of poor sleep quality has been noted among adolescents in different nations throughout the world. A meta-analysis of 20 studies from 12 countries found that 37% of adolescents experience sleep problems. In Nepal, multiple studies have documented concerningly high levels of sleep disturbance among students at various academic levels, with the prevalence of poor sleep quality ranging from 31% to 60.9%(2).

Methodology

Comprehensive searches of scholarly publications and papers on the internet were used to gather data and pertinent information. Finding reputable, academic publications was emphasized in order to guarantee the quality and dependability of the reviewed information. An in-depth investigation and critical evaluation of the themes and conclusions offered in the body of existing literature were made possible by the narrative synthesis, which produced a cogent and comprehensive grasp of the subject.

Comprehensive theories on sleep function: Experts concur that sleep is crucial for good health and wellness, and sleeping habits typically follow a fairly predictable routine. Numerous

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hypotheses have been put out to explain why sleep is necessary, as well as its objectives and functions. The main theories that have been proposed are as follows.

Repair and Restoration Theory

According to the repair and restoration theory of sleep, sleeping is essential for revitalizing and restoring the physiological processes that keep the body and mind healthy and properly functioning(6). This theory suggests that NREM sleep is important for restoring physiological functions, while REM sleep is essential for restoring mental functions. Support for this theory is provided by 2011 research that shows periods of REM sleep increase following periods of sleep deprivation and strenuous physical activity(6). During sleep, the body also increases its rate of cell division and protein synthesis, further suggesting that repair and restoration occur during sleeping periods.

Evolutionary Theory

Evolutionary theory, also known as the adaptive theory of sleep, suggests that periods of activity and inactivity evolved as a means of conserving energy. According to this theory, all species have adapted to sleep during periods of time when wakefulness would be the most hazardous(6). Support for this theory comes from the comparative research of different animal species. Animals that have few natural predators, such as bears and lions, often sleep between 12 to 15 hours each day. On the other hand, animals that have many natural predators have only short periods of sleep, usually getting no more than 4 or 5 hours of sleep each day(6).

Information Consolidation Theory

The information consolidation theory of sleep is based on cognitive research and suggests that people sleep in order to process information that has been acquired during the day. In addition to processing information from the day prior, this theory also argues that sleep allows the brain to prepare for the day to come(7). Some 2012 research also suggests that sleep helps cement the things we have learned during the day into long-term memory. Support for this idea stems

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from several sleep deprivation studies demonstrating that a lack of sleep has a serious impact on the ability to recall and remember information(7).

The Clean-Up Theory

Another major theory suggests that sleep allows the brain to clean itself up. The October 2013 mouse study found that the brain cleans itself of toxins and waste produced during the day while asleep. Brain cells produce waste products during their normal activities. As we sleep, fluid flow through the brain increases. This acts as something of a waste disposal system, cleansing out the brain of these waste products(8).

Conclusion

Inadequate sleep quality in adolescents poses a major public health issue with extensive impacts on physical, cognitive, and mental health. Sleep issues during this vital growth stage can hinder learning, behavior, and overall brain development, leading to heightened risks of mood disorders and diminished academic achievement. Numerous elements—such as biological modifications, lifestyle practices, and environmental factors—impact sleep quality, rendering adolescents particularly susceptible. Grasping the complex aspects of sleep and its crucial roles, as illustrated by theories like repair and restoration, evolutionary adaptation, information consolidation, and brain waste elimination, highlights the necessity of encouraging healthy sleep habits. Improving sleep quality by increasing awareness, recognizing issues early, and implementing interventions can reduce its adverse effects on adolescents' health and academic performance.

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