

Effects of Sleep Quality on Aggression and Memory

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ABSTRACT

This research investigates the intricate relationship between sleep quality and two critical aspects of human cognition and behavior: memory and aggression. Sleep, a fundamental physiological process, has been implicated in various cognitive and emotional functions, making it a central focus of study. The primary objective of this research is to unravel the effects of sleep quality on memory consolidation and aggression levels among university students, a demographic particularly susceptible to sleep-related challenges. The study employs a mixed-methods approach, combining quantitative measures such as standardized sleep assessments, memory tests, and aggression scales with qualitative data from participant interviews and sleep diaries. By examining both objective sleep parameters and subjective experiences, a comprehensive understanding of the multifaceted connections between sleep quality, memory performance, and aggression tendencies is sought. The research aims to delineate the specific impact of sleep quality on different memory processes, including encoding, consolidation, and retrieval. Additionally, it explores how variations in sleep quality may influence emotional regulation and impulse control, contributing to alterations in aggressive behaviors. The study's significance lies in its potential to inform strategies for enhancing memory function and mitigating aggressive tendencies through targeted interventions aimed at improving sleep quality. Findings from this research may have implications for academic institutions, mental health professionals, and policymakers, highlighting the importance of fostering healthy sleep habits among university students for optimal cognitive performance and emotional well-being. The comprehensive nature of this study aims to contribute valuable insights to the existing literature on sleep, memory, and aggression, ultimately paving the way for more informed interventions and support systems.

Keywords: *Sleep Quality, Aggression, Memory*

SLEEP. One of the most highlighted simultaneously most compromised parts of our modern life. Sample belonging especially to the teenage and young adult category of our population have got so many things to do and such little, especially in the state of constant stimulation, tend to neglect the necessities of our daily life which significantly effects our physiologically as well psychological well-being. One of the paramount aspects of sleep lies in its ability to facilitate and heal cognitive and emotional functions such as memory and aggression.

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Received: March 30, 2024; Revision Received: May 06, 2024; Accepted: May 10, 2024

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In our modern society, the importance of getting sufficient and good quality sleep cannot be overstated. Research conducted by Ayryza et al. has shown that poor sleep quality can have a negative impact on one's academic performance and overall well-being. This is particularly problematic for students who are often faced with the challenge of balancing academic demands with other responsibilities. When individuals suffer from sleep deprivation, they may experience difficulties with concentration, memory retention, motivation, mood swings, irritability, and anxiety. These factors can have a negative impact on learning outcomes and mental health. On the other hand, prioritizing high-quality sleep can lead to significant improvements in cognitive function, memory retention, and emotional regulation (Kenney, Lac, Labrie, Hummer, and Pham, 2013). Therefore, making a conscious effort to prioritize sleep should be considered a crucial component of a healthy lifestyle. By doing so, individuals can optimize their academic performance and overall well-being. According to research (Carskadon, 2011), during the second decade of life, pubertal changes can cause a shift in sleep/wake timing, affecting both the circadian timing and homeostatic sleep systems. As a result, adolescents and young adults may struggle with sleep loss and excessive daytime sleepiness as they try to align their naturally delayed schedule with the demands of everyday societal schedules, such as school and work hours. University students living in dormitories may face additional challenges that can further impact their quality of sleep, including noisy environments and roommates with different sleep habits (Pilcher & Walters, 1997). The pressure to participate in communal hall life and integrate socially within a high-density living environment, as well as stress from academic workloads and anxiety about independent adult life, can exacerbate these problems. Additionally, many students lack knowledge and practice of good sleep hygiene (Hershner & Chervin, 2014). It's no surprise that university students are often seen as being chronically sleep-deprived.

For a person as an academic and a student emotional control as well as memory functions are important. Memory is the basis of learning, which is restored everyday with the help of sleep as so as our emotions. Sleep quality is closely linked to emotional regulation. Inadequate sleep can lead to irritability, mood swings, and decreased patience, potentially contributing to aggressive behaviors. Sleep deprivation can lead to difficulties in recalling information, affecting exam performance and overall academic achievement.

Both memory and aggression are intertwined with overall cognitive functioning. Sleep quality influences cognitive abilities, and impaired cognition can impact academic performance. Addressing sleep quality among university students is crucial for both academic success and emotional well-being. Strategies that promote good sleep hygiene and stress management can positively impact memory, aggression, and overall cognitive functioning.

SLEEP AND ITS IMPORTANCE

Sleep is an indispensable physiological process that plays a pivotal role in maintaining overall health and well-being. It serves as a fundamental pillar for various essential functions within the body and mind. The significance of sleep transcends mere restfulness, extending into crucial realms such as cognitive performance, emotional regulation, and physical restoration.

One of the paramount aspects of sleep lies in its capacity to facilitate cognitive functions, particularly memory consolidation and learning. During sleep, the brain engages in intricate processes that solidify and organize newly acquired information, fostering optimal retention

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and recall abilities. This consolidation contributes significantly to effective learning experiences, enhancing academic and professional accomplishments.

Furthermore, sleep serves as a vital regulator of emotional equilibrium. Adequate and quality sleep is instrumental in promoting emotional resilience and stability. It aids in mitigating stress, anxiety, and irritability, fostering a more positive and adaptive emotional state. This emotional balance, in turn, influences interpersonal relationships, decision-making, and overall mental well-being.

From a physiological standpoint, sleep plays a pivotal role in the restoration and rejuvenation of the body. Cellular repair, immune system bolstering, and the release of growth hormones primarily occur during specific sleep stages. This restoration process is imperative for maintaining physical health, supporting immune function, and optimizing overall vitality.

In essence, sleep is not merely a passive state of rest; it is an active and intricate orchestration of physiological and cognitive processes that are indispensable for a flourishing life. Recognizing the profound importance of sleep underscores the need to prioritize healthy sleep habits, emphasizing its role as a cornerstone for holistic well-being. Stages of sleep are what determines what the quality of sleep one has obtained, below are the

Stages of Sleep

1. NREM Sleep:

- Stage 1: Light sleep, transition from wakefulness to sleep. Lasts a few minutes. Alpha brain waves transition to theta waves.
- Stage 2: Slightly deeper sleep. Characterized by sleep spindles (bursts of brain activity) and K-complexes (brief high-amplitude waves).

2. Deep NREM Sleep:

- Stage 3: Transitional stage to deep sleep. Delta waves appear, and it's often referred to as NREM-3.
- Stage 4: Deepest NREM sleep with predominantly delta waves. Critical for physical restoration and growth. Also called NREM-4.

3. REM Sleep:

- 3.1 REM Stage: Rapid Eye Movement and vivid dreaming occur. Brain activity resembles wakefulness. Essential for emotional regulation and memory consolidation.

Throughout the night, sleep cycles through these stages in approximately 90–110- minute cycles. The progression from lighter to deeper sleep, alternating with REM stages, contributes to overall sleep quality and restoration.

Sleep disorders encompass a wide range of conditions that affect the quality, timing, and duration of sleep. These disorders can significantly impact an individual's overall health, well-being, and daily functioning.

SLEEP DISORDERS

Here are some common sleep disorders:

These disorders can significantly impact an individual's overall health, well-being, and daily functioning.

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Here are some common sleep disorders:

2.1 Insomnia:

Description: Difficulty falling asleep, staying asleep, or experiencing non-restorative sleep.

Causes: Stress, anxiety, depression, medical conditions, or lifestyle factors.

2.2 Sleep Apnea:

Description: Interruptions in breathing during sleep, leading to brief awakenings and disrupted sleep.

Types: Obstructive sleep apnea (OSA) and central sleep apnea (CSA). Risk Factors: Obesity, older age, and certain medical conditions.

2.3 Narcolepsy:

Description: Chronic neurological disorder characterized by excessive daytime sleepiness and sudden episodes of muscle weakness (cataplexy).

Symptoms: Daytime sleep attacks, hallucinations, sleep paralysis.

2.4 Restless Legs Syndrome (RLS):

Description: Uncomfortable sensations in the legs, leading to an irresistible urge to move them.

Symptoms: Discomfort or pain, typically worse at night and during periods of inactivity.

2.5 Periodic Limb Movement Disorder (PLMD):

Description: Involuntary, repetitive limb movements during sleep, potentially disrupting sleep.

Symptoms: Jerking or twitching of the legs every 20-40 seconds.

2.6 Circadian Rhythm Sleep Disorders:

Description: Disruptions in the natural sleep-wake cycle, often due to shift work, jet lag, or irregular sleep schedules.

Examples: Delayed sleep phase syndrome, advanced sleep phase syndrome.

2.7 Parasomnias:

Description: Abnormal behaviors or movements during sleep. Examples: Sleepwalking, night terrors, sleep talking.

2.8 Sleep-related Eating Disorder (SRED):

Description: Consuming food during the night while partially or fully asleep. Risk Factors: Often associated with other sleep disorders or medications.

2.9 Hypersomnia:

Description: Excessive daytime sleepiness despite getting adequate nighttime sleep. Causes: Sleep apnea, narcolepsy, medical conditions.

2.10 Sleep-related Movement Disorders:

Description: Involuntary movements during sleep that can disrupt the sleep cycle. Examples: Rhythmic movement disorder, bruxism (teeth grinding).

MEMORY AND META MEMORY

Memory refers to the mental processes that are involved in encoding, storing, and retrieving information. It is the ability of the brain to retain and recall past experiences, knowledge,

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skills, and information. Memory is a crucial aspect of cognitive functioning and plays a fundamental role in various aspects of daily life.

The process of memory involves several stages:

1. Encoding: This is the initial phase where information is received and processed by the brain. It involves converting sensory input into a form that can be stored in memory.
2. Storage: After encoding, information is stored for later use. The brain has different storage systems, including sensory memory, short-term memory, and long-term memory.
 - a. Sensory Memory: Brief storage of sensory information (e.g., visual or auditory stimuli).
 - b. Short-Term Memory: Temporary storage for immediate use.
 - c. Long-Term Memory: Relatively permanent storage for more enduring information.
3. Retrieval: This is the process of recalling stored information when needed. Retrieval can be influenced by various factors, including the strength of the memory trace, context, and cues.

Memory is not a single, uniform process but is divided into different types:

1. Procedural Memory: Involves the memory of skills and how to perform tasks.
2. Declarative Memory: Involves the memory of facts and events and is further divided into semantic memory (general knowledge) and episodic memory (personal experiences).
3. Working Memory: Involves the temporary storage and manipulation of information for cognitive tasks.

Various factors can influence memory, including attention, emotional significance, rehearsal, and the overall health of the brain. Memory is a complex and dynamic process that allows individuals to learn from experiences, adapt to new situations, and navigate the challenges of daily life. Researchers continue to explore the intricate mechanisms of memory to deepen our understanding of how the brain stores and retrieves information.

Meta Memory

Metamemory is a multidimensional construct encompassing individuals' beliefs about their own memory and their control and monitoring of memory processes (Dunlosky & Thiede, 2013). It involves aspects such as memory-related knowledge, perceptions, appraisals, emotions, and self-regulation. Accurately measuring metamemory holds significance for clinical assessment and intervention. An instance is subjective memory impairment, which serves as a predictor of impending cognitive decline (Reid & MacLulich, 2006) and is a diagnostic criterion for mild cognitive impairment (Petersen, 2004). Additionally, the efficacy of memory interventions may be influenced by alterations in memory-related knowledge, attitudes, self-efficacy, ability, and compensation. Having psychometrically sound and clinically relevant measurement tools becomes valuable for these purposes.

Statement of the Problem

Sleep research has moved forward by looking into what sleep effects and how it affects. Even so, today we don't yet fully understand how sleep affects our behavior and our cognitions. Since we don't have a lot of information on this, there is a need for us to explore the realm of sleep and study it even deeper.

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There are so many unexplored possibilities and realms of sleep we haven't got to. But as a student, my curiosity was sparked by how in short terms sleep effects our performance in exams and our early day schools and universities.

Thus, How sleep quality affects memory and aggression amongst students? Effects of sleep quality on memory and aggression amongst students.

Purpose of the Study

The goal of this study is to learn more about the link between sleep, memory and aggression. While a lot of research has been done on the personal factors that cause sleep problems, more needs to be done on the social aspects of sleep, especially when it comes to academics. This study looks at the complex links between being an academic and the amount and quality of sleep. The goal of this project is to make scholars more aware of public health problems. Research on memory and sleep is useful in real life. We want to help people and the community by learning more about how memory and mood are affected by sleep.

Significance of the Study

The results of this study will affect both private and public health. Sleep disorders also make people less productive and cost more to treat. addressing sleep quality among university students is crucial for both academic success and emotional well-being. Strategies that promote good sleep hygiene and stress management can positively impact memory, aggression, and overall cognitive functioning.

REVIEW OF LITERATURE

A healthy person must engage in the restorative behavior of sleep (Chen et al., 2015). There is a lack of understanding regarding the social processes that influence sleep, even though poor sleep is associated with negative health outcomes in the elderly. They examined the impact of marriage, supportive marital relationships, and stressful marital relationships on the sleep characteristics of older adults (62–90 years old) as reported by self-report and as measured by actigraphy using novel actigraphy data from the National Social Life, Health, and Ageing Project (N = 727). When comparing married and single older adults, we discovered that married people had better sleep characteristics as measured by actigraphy, but self-reports were not as reliable. Improved altigraph-estimated sleep characteristics were found in married people who reported more positive aspects of their marital relationship. However, this association was reduced when factors related to physical and mental health as well as home environment were taken into consideration.

Research on what motivates athletes to perform at their best has revealed a number of elements (Gavin, 2022). Prior studies established that romantic relationships, pre-match routines, mood, and amount of sleep all had an impact on athletic performance. The study's premise is that, when it comes to sleep and mood, there is a difference between athletes who are doing well, moderately, and poorly. Belonging to a romantic relationship and having a pre-match routine both aid in predicting athletic performances, and there is a correlation between mood and sleep when it comes to self-rated performance. One hundred twenty-three people were enlisted via social media using snowball and convenience sampling methods. They were then asked to fill out an online survey that included questions about their demographics as well as measures of self-rated athletic performance, DASS-21, and PSQI. Why these factors significantly affected athletic performances while others did not is the topic of the present investigation. The effects of relationship status on athletic performance and pre-match rituals require further investigation.

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The purpose of the study by (Kurtovic & Hnojčik, 2021) was to investigate whether there was a correlation between the quality of sleep, depression, and the time of day that adolescents in Croatia went to school (both morning and afternoon). In all, 253 high school students, ranging in age from seventeen to eighteen, filled out sleep quality and depression questionnaires. The results showed that individuals whose school day begins in the morning also slept less, had more trouble with everyday functioning as a result of sleep problems, and were more sad than those whose school day began in the afternoon. However, they had greater habitual sleep efficiency. In addition, a lower global sleep quality index, shorter sleep duration, more sleep disturbances, prescription use for sleep, dysfunction throughout the day, and sadness were all associated with one another. Lastly, a morning school schedule was associated with an increased risk of depression, as were shorter sleep durations, sleep disruptions, medication use, and dysfunction during the day. The mediating roles of sleep length and dysfunction during the day were the school schedule and depression, respectively.

Brinda K. Rana, et.al. (2017) investigate the impact of sleep quality on cognition in midlife, considering its potential as a modifiable factor for later-life functioning. Studied 1220 middle- aged male twins (aged 51–60) using the Pittsburgh Sleep Quality Index, assessing episodic memory and executive functions, including inhibitory and interference control, updating in working memory, and set shifting. After adjustments and corrections, positive associations were found between sleep quality and visual-spatial episodic memory, updating in working memory, and set shifting in the context of working memory. A trend-level association was observed with interference control in the context of episodic memory. Sleep quality is linked to visual-spatial recall, resistance to interference, updating in working memory, and set shifting. The findings suggest that midlife sleep quality influences cognition at the intersection of executive function and memory processes, indicating potential implications for later-life cognitive decline reduction through improved sleep quality.

Daniela Tempesta, et.al. (2015). To study how sleep affects recall of memory amongst middle aged adults. Seventy-five subjects, divided into poor sleeper (PS), good sleeper (GS), and sleep deprivation (SD) groups, completed two recall (R) sessions: R1, 1 h after the encoding phase; and R2, after one night of sleep for PS and GS groups and after one night of sleep deprivation for the SD group. During the encoding phase, the participants rated valence and arousal of 90 pictures. During R1 and R2, the participants first made a yes/no memory judgment of the 45 target pictures intermingled with 30 non-target pictures, then rated valence and arousal of each picture. How good the recognition was higher for ps and gs groups as compared to sleep deprived groups. emotional response was negative to the remembered photos by sd people Brittany Holcomb, et.al. (2016) the determination if there is any relation between sleep quality and short term memory among students. The researcher used the pittsburg sleep quality index and perceived memory was measured on face value. It was conducted on 25 participants who were asked to abstain from any stimulants of any kind. The test revealed no significant difference between the male and females and there was minor difference recorded in short term memory.

Janine Kamphuis and Marike Lancel. (2016). To study the interrelation between the quality of sleep with anger, hostility and aggression control. Sleep has complex relations with anger, aggression and hostility. The inadequate duration of sleep is prone to diminishing the prefrontal control exerted over emotional responses, particularly when faced with negative or frustrating situations. This effect may involve the hypothalamic-pituitary-adrenal axis and

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the serotonin system. Those individuals characterized by poor impulse inhibition are likely to be especially vulnerable to the negative impact of insufficient sleep on both frustration tolerance and the ability to control aggressive impulses.

Janine Kamphuis, et.al. (2014) Disturbed sleep is often linked with psychotic behaviors and activities. This cross-sectional study aimed at effects of sleep quality on aggression and impulsivity in forensic psychiatric population. It was done on 96 psychiatric samples using Pittsburgh sleep quality index and sleep diagnosis list and aggressiveness questionnaire. At the end the final results supported the hypothesis that sleep quality is related to aggression and impulsivity.

Lyndsie Fiona Barker, et.al. (2016). The paper aims to study the association between sleep reported sleep quality and quantity and how these relate to aggression motivation and hostile cognition in a male prisoner sample. It consisted of 95 adult male prisoners who completed a sleep quality index. Sleep quantity and indicators of sleep quality did not show an association with aggression. However, the perception of poor sleep was significant. Individuals perceiving poor sleep quality were more likely to report engaging in aggression in the past week and had higher levels of implicit aggression compared to those perceiving good sleep. In the second study, increased indicators of poor sleep quality correlated with lower prosocial attribution tendencies and higher levels of reactive and proactive aggression. Sleep quantity did not exhibit any association, emphasizing the importance of perceived sleep quality. Those perceiving poor sleep were more likely to report higher levels of reactive and proactive aggression compared to those reporting good sleep.

Krizan, Z., & Herlache, A. D. (2016). This narrative review aims to amalgamate evidence across disciplines, proposing that various forms of sleep disruption can unleash aggressive impulses and contribute to violent behaviours. Through a narrative review, we delineate three pathways linking sleep disruption to aggression, involving compromised affective, cognitive, and response-control processes. Additionally, we explore reciprocal influences between sleep disruption and aggression, examining three domains where sleep disruption might significantly impact aggression and violence, offering intervention opportunities. The review highlights that sleep problems could be pivotal contributors to aggression, particularly in domains such as intimate partner violence, school and cyber bullying, and institutional aggression within psychiatric and correctional institutions.

Mitchell Kirwan, D.W. Svenson, Scott M. Pickett, Michele R. Parkhill (2019) conducted a research on to investigate the role that emotion control plays as a mediator between these aggressive interpersonal behaviors and inadequate sleep. Total 334 workers completed the questionnaire. The correlations between trait physical aggressiveness and relational violence perpetration and sleep quality were found to be partially mediated by emotion regulation, but the relationship between verbal aggression and sleep quality was totally mediated for all participants. Furthermore, for male individuals, the association between sleep quality and sexual assault perpetration was totally mediated by emotion management. These findings imply that poor sleep quality may in fact be a contributing factor to aggressive interpersonal behaviors through issues with emotion control.

Juan J. Madrid-Valero, Juan R. Ordoñana, Kelly L. Klump & S. Alexandra Burt (2019) aimed to study the link between behavioural problems and sleeping patterns. 1030 twin pairs were involved in this study as a sample. After fitting bivariate Cholesky genetic models to the data, we were able to dissect aggression, rule-breaking, and sleep functioning into their

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respective genetic and environmental components, as well as the variance within and among them. While the genetic associations between rule-breaking and sleep were largely minor and non-significant, there were substantial, moderate to large correlations between all sleep variables and aggression. The bulk of sleep-related factors did not appear to be causally or environmentally related to aggression; instead, genetic pleiotropy was clearly demonstrated. Less consistently, though, was the pattern of relationships between sleep measurements and rule-breaking. There seems to be a difference in the correlation between rule-breaking and aggression and sleep.

Jing-wen He ,Zhi-hao Tu ,Lei Xiao,Tong Su,Yun-xiang Tang (2020) aimed to study impact of limiting phone use before bed on mood, working memory, pre-sleep arousal, and sleep. In all 38 individuals participated in the study who were told not to use the phone for 30 minutes before bedtime. For four weeks, limiting the use of cell phones before bed reduced sleep latency, lengthened sleep, enhanced sleep quality, decreased pre-sleep arousal, and enhanced working memory and good affect. Limiting smartphone use before bed decreased pre-sleep agitation and sleep latency while increasing working memory and length of sleep. People with sleep difficulties were advised to make this easy switch to moderate consumption.

Eric J. Connolly a, Dylan B. Jackson b, Daniel C. Semenza (2021) conducted the study aimed to the connection between delinquency, sleep duration, and self-reported restless sleep. To determine how sleep affects delinquency in families both within and between the ages of 16 and 17, negative binomial regression models and sibling comparisons are constructed. Observable variables and unobservable familial confounders were controlled for, and siblings who self-reported more restless sleep were more likely to report higher levels of delinquency at the 16–17 age range. After adjusting for family confounding and temporal stability in both sleep and criminal behavior, variations in the restless sleep patterns of siblings between the ages of 16 and 17 were likewise linked to increases in delinquency between the ages of 18 and 19. Results imply that the main focus of intervention/prevention programming efforts for teenage delinquency may need to shift from the quantity of sleep to its quality.

Safaa M. El-Zoghby, Maha E. Ibrahim, Nancy M. Zaghoul, Shaimaa A. Shehata & Rasha M. Farghaly (2022) aimed to study the frequency of work-related stress (WPV) among medical residents, the potential harm it may do, particularly to sleep and mental health, and the atmosphere surrounding workplace safety. According to the study, among 101 medical residents in Egypt, verbal abuse was the most common type of abuse, and senior staff members were the most likely to do it. It was common to have poor quality sleep, with 59.4% of people reporting generalized anxiety disorder (GAD). It was noted that there was a high-risk psychosocial safety climate and that it was risky to report sexual harassment.

Maaikje M. Van Veen, Marika Lancel, Elise Beijer, Sharon Remmelzwaal, Femke Rutters (2021). Aggression has been consistently linked to poor sleep quality, according to a comprehensive review and meta-analysis of 96 research. Using data from 58,154 kids, teens, and adults, the study discovered an odds ratio of 3.61 and a correlation of 0.28. The results imply that in order to fully comprehend the cause-and-effect relationship and improve aggressiveness prevention and treatment, additional prospective and high-quality experimental data is required.

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Murat İskender, Ali Haydar Şar, Basri Özcelik and Gökçe Kocaman (2019) aimed to study links between a high school student's aggression, self-compassion, and sleep quality. 529 high school students took part in the survey, with 66% of them female and 34% male. The Aggression Questionnaire (AQ), the Self-Compassion Scale (SCS), the Pittsburgh Sleep Quality Index (PSQI), and a descriptive questionnaire were used to gather data from the individuals. Multiple linear regression was used to examine the variables' predictors of aggressiveness that were found through simple correlation. The findings showed that aggressiveness levels and every sub-dimension of self-compassion and sleep quality had a positive and substantial association. Furthermore, it was found that the sub-dimensions of self-compassion and sleep quality strongly predicted the levels of aggressiveness, with over-identification, self-judgment, and sleep quality being the first three most effective predictors.

Peggy S. Keller, Eric A. Haak, C. Natahan Dewall and Claire Renzetti (2017) aimed to conduct research on Lack of Sleep Is Linked to Increased Marital Anger and the Significance of Self-Control. 342 middle, white class people were involved in the study. In addition to doing a virtual voodoo doll assignment, participants answered online surveys regarding self-control, marital hostility, and sleep. Lower levels of self-control mediated the relationships between sleep issues and higher levels of hostility on all measures. The gender, number of children living at home, marital status, or income of the participants had no bearing on associations.

Prabha Siddarth, Kitikan Thana-udom, Rashi Ojha, David Merrill, Joseph M. Dzierzewski, Karen Miller, Gary W. Small and Linda Ercoli (2020) investigated the relationships between middle-aged and older people's self-reports of their sleep quality and a number of areas of both objective and subjective cognitive function. 203 individuals participated in the study. The study found that total PSQI scores were linked to sustained attention and subjective memory loss. Poor sleep quality and sleep disturbance were associated with worse sustained attention scores, while increased sleep latency and daytime sleepiness were linked to greater forgetting frequency.

Ji Hee Kim, Jun Hyong Ahn, Chan Yang Min, Dae Myoung Yoo, Hyo Geun Choi (2021). The purpose of the study was to determine whether self-reported sleep quality and SCD were related in a large sample of middle-aged and older persons in Korea. There were 135,119 respondents without SCD and 37,712 responders with SCD overall. The study found that poor sleep quality is closely related to both Sleep Deprivation Disorder (SCD) and functional limitations. The mean age of the SCD group was 62.7 years, and 28.9% of respondents were male. High sleep disturbance, use of sleep medication, and daytime dysfunction were associated with SCD.

Ayriza et al. (2019) in an article measuring Sleep Quality and how it acts as a Mediator in Well-being and Academic performance explore the effects of transitioning from high school to college on freshmen students. The adjustment to a new environment can lead to various challenges, including a decrease in well-being, which in turn affects academic achievement. Poor sleep quality can also exacerbate these issues. The researchers conducted a study with 231 freshmen students at a public university in Yogyakarta, Indonesia during the 2017 academic year. The data was collected using various surveys and analyzed using multiple regression techniques. The results showed that sleep quality did not significantly mediate the relationship between well-being and academic achievement. However, negative affect, a component of well-being, was found to significantly contribute to poor sleep quality. The

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study recommends preventing the development of negative affect in students to improve their overall well-being.

Abu-Snieneh et al. (2020), “the relationship between sleep quality, social media use, and academic performance among university students” used a cross-sectional correlation design, with 412 students participating in an electronic questionnaire. The findings revealed that the majority of university students experience poor quality of sleep, with WhatsApp, Snapchat, and YouTube being the most popular social media platforms. The study also found that addiction to Twitter was the strongest predictor of very poor sleep quality. The authors suggest that an educational program on the importance of adequate sleep should be implemented to support university students.

El Desouky and Awed in 2015 found a “correlation between quality of sleep and academic performance among female nursing students”. The study, conducted at the College of Nursing and Allied Health Sciences in Jazan city, Saudi Arabia, included 23 200 female nursing students who participated voluntarily. The study used a descriptive research design and three instruments to gather data on sociodemographic characteristics, sleep quality, and daytime sleepiness. The results showed that more than two-thirds of the students reported sleeping less than six hours per night and less than half had an average academic score. Additionally, over half of the students reported difficulty falling asleep within 30 minutes and having pain from one to three times per week. However, students who reported good total sleep quality had a positive correlation with good academic scores. The study suggests that educating undergraduate nursing students about the importance of adequate sleep may improve their academic performance and overall well-being.

A study conducted in 2022 by Almarzouki et al. explored the correlation between sleep, mental health, working memory, and academic performance in university students. The study involved collecting demographic data from students during the non-academic summer period and the academic term. Academic performance, sleep quality, depression, anxiety, and disordered social media use were measured, and working memory was assessed through the Cambridge Neuropsychological Test Automated Battery (CANTAB). The study found that students had worse sleep and distress scores in the academic term compared to the non-academic summer period. The scores of distress, anxiety, and depression were significantly correlated with worse sleep quality. However, despite poor mental health and sleep in the academic term, working memory improved and was also correlated with higher academic performance. Poor sleep quality can affect mental health, but it doesn't always impact academic performance. Cognitive resilience, including high working memory, may mask the negative effects of poor sleep quality on university students.

Hartmann and Prichard (2018), did a study on the “extent to which sleep problems affected academic performance compared to other known factors that contribute to decreased academic success”. Regression analyses were conducted on data from the Spring 2009 American College Health Association National College Health Assessment II dataset, with a sample size of 55,322 students. The study found that sleep disturbances were a significant independent predictor of academic problems, 24 with each additional day per week that a student experienced sleep problems raising the probability of dropping a course by 10% and lowering the cumulative GPA by 0.02. Other factors such as stress, binge drinking, marijuana and other illicit drug use had similar or relatively smaller negative associations with academic success compared to disturbed sleep. The study concluded that universities should focus more on sleep education as a means of maximizing retention rates and

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academic success, as approximately three-quarters of students surveyed reported never receiving information about sleep from their university.

METHODOLOGY

Aim - to assess the effect of Quality of Sleep on memory and aggression. of University Students.

Objectives:

1. To see the Quality of Sleep among adolescents and assess their meta memory and aggression
2. To examine the relationship between Quality of sleep, aggression, and memory.
3. To see the effect of Quality of Sleep on memory and Aggression.

Hypothesis:

1. There will be a significant relationship between Quality of sleep and memory.
2. There will be a significant relationship between Quality of sleep and aggression.
3. There will be a significant effect of Quality of sleep on memory and aggression.
4. There will be a significant difference between males and females in Quality of sleep, aggression, and memory.

Variables

- Sleep quality is defined as an individual's self-satisfaction with all aspects of the sleep experience. A low score in the sleep quality index indicates a good quality of sleep.
- Memory refers to the psychological processes of acquiring, storing, retaining, and later retrieving information. Meta-memory is a multidimensional construct that includes what people believe about their own memory and how they control and monitor it
- Aggression is a forceful action or procedure especially when intended to dominate and master.

Study Sample and Selection

The Target population chosen was University Students, aged 18-25, located in the Delhi NCR region. 100 university students participated in this study, comprising males and females. Due to the nature of the study, we chose to use the Purposive Sampling Technique, targeting only university students.

Inclusion- Students currently in their undergraduate or postgraduate degree

Exclusion – older population, due to the presence of more variables that could interfere with sleep.

Data Analysis

SPSS statistical techniques will be implemented to analyse the data. By employing descriptive statistics, regression analysis, and correlations, the impact of romantic relationships on sleep patterns can be determined.

Description of the tools

Pittsburgh Sleep Quality Index (PSQI)

The PSQI, developed by Dr. C.F. Reynolds, is a tool used to assess the quality of sleep in clinical populations. The questionnaire consists of 19 self-reported items that are grouped into seven subcategories, including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Tests have shown that the PSQI has a high internal reliability ($\alpha = .83$), a strong test-retest reliability (.85 for the global scale), and a high sensitivity (89.6%) and specificity (86.5%).

Buss perry aggression questionnaire

The Aggression Questionnaire formulated by Buss & Perry in 1992, is one of the most used instruments to assess aggression; it includes 29 items grouped into 4 factors.), which comprises 29 items grouped into four factors: physical aggression, verbal aggression, anger and hostility. This questionnaire has been validated in different countries and translated into several languages, including Spanish, Italian, Dutch, Japanese, German, French, Slovak and Greek. Not all those studies have supported the 4-factor structure originally proposed. Moreover, gender differences have not always been observed in the same dimensions.

Multifactor memory questionnaire

This scale measures satisfaction, concern, and overall appraisal of one's own memory. Each of 18 statements is rated based on degree of agreement. The score range is 0 to 72, with higher scores indicating a higher degree of satisfaction. The accurate measurement of metamemory is relevant for clinical assessment and intervention. Subjective memory impairment, for example, predicts future cognitive decline (Reid & MacLulich, 2006) and is one of the diagnostic criteria for mild cognitive impairment (Petersen, 2004). Also, the effectiveness of memory interventions may in part be determined by changes in memory knowledge, attitudes, self-efficacy, ability, and/or compensation. The availability of psychometrically sound, clinically relevant measurement tools can be useful for these purposes.

Procedure

In order to gather data on the relationship between sleep quality, aggression and memory, a comprehensive study was conducted by surveying 100 university students between the ages of 18-25. The student pool included both graduate and postgraduate students. Each participant was required to complete a self-report questionnaire that delved into their experiences with sleep quality, as well as their aggression and overall sense of memory. Through these measures, we were able to gain insight into the ways in which these factors intersected and impacted one another. Proper consent was taken from the participants; The participation in the study was completely voluntary and the individuals involved were not obligated to continue if they chose to withdraw at any point in time. No justification or reasoning was required for discontinuation of participation.

RESULTS

The study aims to understand assess the effect of Quality of Sleep on memory and aggression of University Students. To study the correlation between these variables Pearson's Correlation was used.

Effects of Sleep Quality on Aggression and Memory

Section- I

Descriptive Statistics

Table 1 Descriptive statistics of the study sample

	N	Mean	Standard Deviation
Aggression	99	83.27	19.012
Memory	99	58.40	19.800
Sleep	99	13.12	7.385

Table 1 depicts the descriptive statistics of the study sample. The average scores aggression, Memory and Sleep were 19.012, 19.800 and 7.385 respectively.

Section- II

Correlation Analysis

Table 2 Pearson's correlation across the study variables

	Aggression	Memory	Sleep
Aggression	-	-.547**	.671**
Memory	-.547**	-	-.416**
Sleep	.671**	-.416**	-

Table 2 represents Pearson's correlation between three variables. The association between aggression with memory and memory with sleep was significant and negative for both. Furthermore, the link between aggression and sleep was significant and positive.

Analyzing the data more thoroughly, it was found that aggression and memory have negative correlations (-0.547) while memory and sleep have negative correlations—-0.416. This suggests that those who score higher on aggression also typically have lower memory scores, while those who score higher on memory typically sleep less hours each night. Aggression and sleep, on the other hand, have a positive connection (0.671). More sleep is linked to those who score higher on aggression in this instance.

DISCUSSION

The study aims to understand assess the effect of Quality of Sleep on memory and aggression of University Students. To fulfill this particular aim we framed three objectives, the following are the objectives:

- First, to see the Quality of Sleep among adolescents and assess their meta memory and aggression.
- Second, to examine the relationship between Quality of sleep, aggression, and memory. Third, to see the effect of Quality of Sleep on memory and Aggression.
- A framework for examining the connections between these factors was provided by these objectives, which also directed the study process. Hypotheses were developed as per the objectives and findings that exist in the literature.
- First, there will be a significant relationship between Quality of sleep and memory. Second, there will be a significant relationship between Quality of sleep and aggression. Third, there will be a significant effect of Quality of sleep on memory and aggression.
- Lastly, there will be a significant difference between males and females in Quality of sleep, aggression, and memory.

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To examine these relationships, the target population chosen was University Students, aged 18- 25, located 100 university students participated in this study, comprising males and females. The average scores for aggression, memory, and sleep were computed using descriptive statistics. The characteristics of the sample offer a synopsis of the study participants and aid in comprehending the overall demographic of the group being studied.

The correlation analysis showed significant and positive relation between Aggression and sleep, (0.671). More sleep is linked to those who score higher on aggression in this instance. The hypothesis is satisfied that there will be a significant relationship between quality of sleep and aggression.

Memory and sleep quality have a moderately negative link, as indicated by the correlation value of $-.416^{**}$. This shows that adolescents who sleep less well generally perform worse when it comes to memory. This research supports other studies that show how critical sleep is to the processes involved in memory consolidation. Disrupted sleep habits in adolescents can lead to difficulties with memory recall and cognitive skills, ultimately affecting their academic performance and day-to-day functioning. Hence, the hypothesis stands true for this case.

The hypothesis that sleep quality has a considerable influence on memory and aggression is supported by the significant connections found between these two measures and sleep quality. Teenagers who get poor-quality sleep are more likely to be aggressive in addition to having memory problems. The correlation between sleep and behavioral and cognitive features is underscored by these results, emphasizing the necessity of all-encompassing sleep hygiene therapies to improve memory function and lessen aggressive tendencies.

This hypothesis does not provide correlation coefficients, indicating that the comparison of gender differences is the main focus instead of relationship analysis. Subsequent investigations employing suitable statistical tests, like ANOVAs or t-tests, might investigate possible gender disparities in teenage memory ability, aggression, and sleep quality. It is essential to comprehend these distinctions in order to customize therapies to target particular requirements according to gender-related patterns in aggressiveness, sleep, and memory performance.

The study reveals a significant negative correlation between sleep quality and memory performance among adolescents, suggesting that poorer sleep can lead to lower memory function. This suggests that sleep hygiene interventions may improve cognitive functioning in this population. A strong positive correlation was found between sleep quality and aggression levels, suggesting that disrupted sleep patterns increase aggression. This highlights the importance of addressing sleep disturbances in interventions aimed at reducing aggressive behaviors. The study also found a significant impact of sleep quality on both memory and aggression, emphasizing the significant impact of sleep on cognitive and behavioral aspects in this age group. It also highlighted the need to consider gender differences in sleep quality, aggression levels, and memory performance for tailored interventions. The findings contribute to our understanding of the complex interplay between sleep, aggression, and memory in adolescents, emphasizing the importance of promoting healthy sleep habits to support cognitive and behavioral well-being.

SUMMARY AND CONCLUSION

In conclusion, the study aims to examine the effect of Quality of Sleep on memory and aggression of University Students. The results show a strong inverse relationship between memory function and sleep quality, suggesting that teenagers who get less sleep have a tendency to have worse memory. This emphasizes how important sleep is for memory consolidation processes and how treatments aimed at improving sleep hygiene may improve cognitive performance and academic achievement. Furthermore, a high positive link between aggression levels and sleep quality is shown in the study, indicating that disturbed sleep patterns may be a factor in teenagers' increased aggressiveness. Sleep disorders like insomnia or sleep deprivation can exacerbate aggressive tendencies by causing impulsivity, impatience, and problems with emotional regulation. Teenagers' violent tendencies may be lessened and a more positive social and emotional environment may be fostered by addressing sleep issues through programs that promote healthy sleeping habits.

The study highlights the complex relationship between sleep, aggression, and memory in adolescents. Poor sleep quality affects memory function and increases aggression. Interventions targeting sleep hygiene can improve memory performance and reduce aggressive behaviors. Gender differences in sleep quality, aggression, and memory should be considered for effective interventions. Fostering healthy sleep habits is crucial for optimal cognitive and behavioral outcomes.

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Acknowledgment

The author(s) appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author(s) declared no conflict of interest.

How to cite this article: Kapoor, V. & Dutt, S. (2024). Effects of Sleep Quality on Aggression and Memory. *International Journal of Indian Psychology*, 12(2), 1088-1105. DIP:18.01.098.20241202, DOI:10.25215/1202.098