



Impact of Sleep Quality on Cognitive Functioning and Emotional Regulation in Graduate Students

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Abstract

Several researches have stated the importance of quality sleep for optimum cognitive functioning and emotional regulation. However, this study fills the gap of research in this area by focusing on graduate students, who experience distinctive academic challenges and intricacies, by extension, the sleep quality. The current research aimed to study how poor quality of sleep can impact one's cognitive and emotional regulation abilities, particularly focusing on the population of graduate students. Three main variables are measured in this study: a) Sleep quality; b) Cognitive functioning and c) Emotional regulation abilities. A quantitative approach was adopted, gathering 250 valid responses from graduate students using a questionnaire. The results of regression analysis suggested a significant positive relationship between poor sleep quality and cognitive failure, also poor sleep quality was found to have a weak but significant negative effect on emotional regulation, indicating that individuals with poor sleep experience more difficulties in cognitive function and controlling their emotions. The obtained results call for the requirement of developing necessary interventions for

improving sleep quality catering to the unique needs of graduate students for their mental health and well-being.

Key words: *Quantitative study, sleep quality, cognitive failure, emotional regulation, graduate students.*

Introduction

Sleep can be categorized as one of the indispensable biological processes of people and is a prerequisite for the efficient handling of affairs as well as overall health. National Institutes of Health explains that sleep is a second basic native to all human beings alongside food and potable water (National Institutes of Health, 2014). Sleep that is restorative is associated with a person's good physical, cognitive and psychological wellbeing, on the contrary, when sleep is poor or has been interrupted, such individuals will be deficient in these various areas and their health will be compromised as well (Crivello et al., 2019).

Thousands of studies have included causal effects between sleep deprivation and cognitive impairment within young adults. The various deficits in the broad categories of cognitive functioning, such as those related to memory, executive functions, psychomotor vigilance, reaction time, and mood, are all related to this kind of deprivation. Many of these sleep loss research studies have shown that it has negative effects on memory consolidation, executive function, and tasks requiring vigilant attention in terms of reaction time (Philip et al., 2004), all of which are necessary components for daily functioning and academic performance among young adults (Kuula et al., 2018; Rasch & Born, 2013).

Some of these findings are repeated in a broader review of the literature, where repeated results of sleep deficiency correlating to declining cognitive performance have been demonstrated (Killgore, 2010; Lim & Dinges, 2010).

Emotional regulation is the management of one's emotional reactions through internal processing, evaluation, and identification of emotions and external expression or suppression

of such feelings. It has a significant role in determining psychological health and the quality of social interaction. Efficient emotional regulation supports successful social function; poor emotional regulation is associated with many types of psychological disorders. Hummel and Zhang (2017) in their study found that the working staff having reduced sleep scores are more susceptible to emotional reactivity, are not emotionally competent enough at workplaces under stressful situations and were suffering from high stress tensions, high conflicts. All this confirmed that sound sleep hygiene at the work stations helps regulate emotional response better.

With a sample of 150 participants with both young and older adults, Tempesta et al. (2018) examined the association between quality sleep and both cognitive performance and emotional stability. West et al. (2022) suggests that the quality of sleep is linked with emotional regulation strategies as well as adolescents' resilience under the condition of the COVID-19 pandemic. It was mainly a call for the exploration of ways that would help support these emotional regulation strategies in order to further enhance better sleep quality and the overall psychological resilience of subjects under stress. This work might recommend that efforts to enhance the quality of sleep also create more general positive effects pertaining to emotional and mental wellbeing when undertaken during periods of high levels of stress like a pandemic.

Gao et al. (2023) investigated the associations between sleep quality and a range of mental health outcomes: anxiety, depressive symptoms, and cognitive emotion regulation among college students. Significant associations were found, meaning poor sleep quality was associated with greater levels of anxiety and depressive symptoms and also problems with the cognitive regulation of emotions. These findings suggested that sleep was a necessary element in mental health and enhancement of the quality of sleep could be one of the crucial intervention points that are aimed at reducing the levels of mental health problems among college students.

In conclusion, sleep quality is a very complex, multifaceted construct that plays an important role in general health and functioning. Quality of sleep aside from affecting the daily mood and cognitive performance, has an important impact on long-term psychological and physical health. To understand quality of sleep, one needs to look at both subjective experiences, objective measures, as well as the multitude of factors influencing sleep across the lifespan. Advances in research and technology into the future will help clarify, measure, and provide means for the improvement of quality of sleep and subsequently, a healthier person across all life cycles. The accumulating body of evidence requires emphasis on the importance of sleep health in clinical practice, public health approaches, and individual self-care strategies in efforts to maintain optimal functioning and well-being.

Hypothesis

1. There will be a significant positive correlation of poor sleep quality on the cognitive failure.
2. There will be a significantly negative correlation between poor sleep quality and emotional regulation

Method

This study explores the relationship between sleep quality, cognitive functioning, and emotional regulation among graduate students. Recognizing the unique stressors faced by this population—such as academic pressures and irregular schedules. This research investigates how these factors influence sleep quality and subsequently impact cognitive and emotional functioning. To achieve the research objectives, a quantitative approach was employed, using a survey method to collect data through online platforms.

Study design

The research design is based on a quantitative survey approach, utilizing standardized and validated questionnaires to ensure the reliability and validity of the measurements.

Graduate students were recruited using a convenience sampling method, which allowed for easy access to the target population. Inclusion criteria required participants to be currently enrolled in a graduate program, while exclusion criteria disqualified individuals with diagnosed sleep or neurological disorders or those on medications known to affect sleep, cognitive functioning, or emotional regulation. The study aimed to collect responses from 250 graduate students.

Instruments

Three well-established instruments were used to gather data. The Sleep Quality Scale (SQS), a 28-item Likert-scale questionnaire, was used to measure participants' sleep quality over the past month. The Cognitive Failures Questionnaire (CFQ), consisting of 25 items, assessed everyday cognitive errors such as forgetfulness and distractibility, demonstrating high reliability with a Cronbach's alpha of 0.85. Emotional regulation strategies were measured using the Emotion Regulation Questionnaire (ERQ), a 10-item scale that evaluates the use of cognitive reappraisal and expressive suppression, with an acceptable internal consistency (Cronbach's alpha > 0.70).

Procedure

Participants were invited to join the study via university email lists and social media platforms. Upon providing informed consent, they completed an online questionnaire comprising the SQS, CFQ, and ERQ. The entire process was designed to ensure anonymity, with the questionnaire taking approximately 20–30 minutes to complete.

Analysis

The data collected was analysed using JAMOV software. Descriptive statistics, including means and standard deviations, were calculated to summarize the sample characteristics. Pearson correlation coefficients were used to explore the associations between sleep quality, cognitive functioning, and emotional regulation. To further investigate the impact

of sleep quality, multiple regression analyses were conducted, controlling for specific dimensions of cognitive functioning. A significance level of $p < 0.05$ was applied, and effect sizes were reported to provide additional context to the findings.

Ethical considerations

This study adhered strictly to the ethical guidelines set forth by the American Psychological Association (APA). Participants were informed about the study's purpose, procedures, and their right to withdraw at any time without penalty. All data were kept confidential and anonymous throughout the research process. Additionally, approval for the study was obtained from the university's Institutional Review Board (IRB) prior to data collection.

Results

Table 1: *Normality test*

	POOR SLEEP QUALITY	COGNITIVE FAILURE	EMOTIONAL REGULATION
N	250	250	250
Shapiro- Wilk W	0.947	0.947	0.985
Shapiro- Wilk p	< .001	< .001	0.009

Interpretation

- a) *Poor sleep quality* ($W = 0.947$, $p < .001$): A high level of statistical significance of the test is evidenced with $p < .001$. This indicates that the observed distribution for scores of poor quality sleep is significantly abnormal.

- b) *Cognitive failure* ($W = 0.947$, $p < .001$): A non-normal distribution of the cognitive failure scores is maintained since the Shapiro-Wilk test corroborates it.
- c) *Emotional Regulation* ($W = 0.985$, $p = 0.009$): The scores for emotional regulation also have a statistically significant result but with a p-value closer to .01, indicating a slight deviation from normality.

All three variables deviate from normality as indicated by the significant p-values.

Table 2: *Correlation tests, poor sleep quality and cognitive failure*

		POOR SLEEP QUALITY
EMOTIONAL REGULATION	Spearman's rho	-0.169**
	df	248
	p-value	0.008
Note. * $p < .05$, ** $p < .01$, *** $p < .001$		

Interpretation

Spearman's rank-order correlation was run to establish if poor quality sleep has a relation with failure to cognitively process information. The finding had a moderate positive rank order, and it had a significance value of $< .001$ that the poor sleep quality is significantly related with cognitive failure, $\rho(248) = 0.559$, $p < .001$. This would imply a positive relationship that shows how as the poor sleep quality increase, so does the cognitive failure increase.

Table 3: *Poor sleep quality and emotional regulation*

		POOR SLEEP QUALITY

EMOTIONAL REGULATION	Spearman's rho	-0.169**
	df	248
	p-value	0.008
Note. * $p < .05$, ** $p < .01$, *** $p < .001$		

Interpretation

Spearman's rank-order correlation analysis was used to examine a possible association between low-quality sleep and emotional regulation. The analysis indicated a low negative association, $\rho(248) = -0.169$, $p = 0.008$. Thus, this was a negative association that found that a small increase in poor-quality sleep correlated to a very small decline in emotional regulation. Again, the correlation was low but still revealed an association in these variables.

Table 4: *Impact of sleep quality on cognitive functioning*

Model Fit Measures		
Model	R	R²
1	0.630	0.397

Model Coefficients: *Cognitive Failure*

Predictor	Estimate	SE	t	p
Intercept	20.067	1.8527	10.8	< .001
POOR SLEEP QUALITY	0.746	0.0585	12.8	< .001

Interpretation

A linear regression analysis was conducted to determine the effect of poor sleep quality on cognitive failure. The results indicated that poor sleep quality significantly predicted cognitive failure, $B = 0.746$, $SE = 0.0585$, $t(248) = 12.8$, $p < .001$. This implies that for every unit increase in poor sleep quality, there is an increase in cognitive failure by about 0.75 units.

The general model was statistically significant accounting for about 39.7% of the variance in cognitive failure, $R^2 = 0.397$, which means that the effect size was moderate. The model fit was $R = 0.630$, which indicates a very strong correlation between poor sleep quality and cognitive failure.

Table 5: *Impact of sleep quality on emotional regulation*

Model Fit Measures		
Model	R	R ²
1	0.243	0.0593

Model Coefficients – <i>Emotional Regulation</i>				
Predictor	Estimate	SE	t	p
Intercept	53.335	1.4550	36.66	< .001
POOR SLEEP QUALITY	-0.181	0.0459	-3.95	< .001

Interpretation

A linear regression analysis was run to test the effect of poor quality of sleep on emotional regulation. Results: Poor quality of sleep was significantly predictive of emotional regulation, $B = -0.181$, $SE = 0.0459$, $t(248) = -3.95$, $p < .001$. It means that for every one unit increase in poor quality of sleep, emotional regulation reduces by about 0.18 units.

The overall model was statistically significant but explained only a trivial amount of variance in the regulation of emotions, $R^2 = 0.0593$, indicating small effect size. The correlation

between poor sleep quality and emotional regulation was weak based on the model fit obtained as $R = 0.243$.

Discussions of Results

Findings of this study are aligned and advance findings from existing research on sleep quality, cognitive function, and emotional regulation. Following the hypotheses made here, poor sleep quality had implications both in the realm of cognitive functioning as well as emotional regulation.

Our first hypothesis was that graduate students having poor sleep quality will have a low level of cognitive functioning, and it got supported by data. Results showed that a very high and positive correlation of poor-quality sleep existed with cognitive failure, suggesting that the poorer students slept, the poorer they did with tasks involving cognitive failure. . Similar findings were reported by Lim and Dinges (2010), which observed significant decreases in cognitive flexibility and attention following some sleep loss, in line with our result that poor sleep quality significantly correlates with cognitive failure among graduate students. A moderate effect size of the present study reveals that nearly 40% of the variance in cognitive failure can be explained by sleep quality, thus underlining the importance of sleep in academic performance. This outcome is also in line with Gaultney's (2010) findings on how sleep disorders among college students affected their academic performance negatively. The study confirms that one of the significant interventions with improvements in cognitive functioning for students could be an improvement in sleep quality, as supposed by Orzech, Salafky, & Hamilton (2011) and Prichard, Schuman, & Goelz (2015), who established a tight link between quality of sleep and academic outcomes.

The second hypothesis had assumed that the quality of sleep had a great effect on the regulation of emotions. Having a small but very significant negative impact on quality of sleep, it also meant that poor-quality sleep makes one experience more control difficulties on

emotions. In fact, it corroborates the conclusion reached by Alhola and Polo-Kantola's (2007) review whereby they came to the conclusion that deprivation of sleep has negative impacts on emotional regulation making the people more irritable and not capable of managing stress levels. For example, Gruber et al. (2012) found that poor sleep increased the negative emotional response; it further supports the connection of sleep quality to emotional regulation. The size of effect observed in the study is relatively small because the value for R^2 is 0.0593; therefore, though sleep quality has influence on emotional regulation, the variance in that outcome that it explains is relatively very small. This resonates with Baglioni et al. (2016) who argued that there is a complex and two-way association between sleep quality and emotional regulation, arguing for more than just the sleep issues being the causative agents of poor emotional regulation. Along the same line, Fantozzi et al. (2024) outlined the bidirectional relationship between sleep and emotional dysregulation, positing that poor sleep fuels the problematic emotional experience that worsens sleep quality. This cycle is further supported by the findings of our study, especially concerning graduate students who are generally vulnerable to sleeping problems as a result of academic pressure.

Conclusion

This study explored the association between sleep quality, cognitive functioning, and emotional regulation in graduate students. Results revealed that poor sleep quality significantly increased cognitive failures, highlighting its critical role in sustaining memory, attention, and cognitive tasks. Additionally, poor sleep quality moderately affected emotional regulation, often resulting in higher stress and reduced emotional resilience. These findings emphasize the importance of healthy sleep hygiene for enhancing cognitive and emotional well-being, ultimately supporting academic success and overall psycho-social health.

While the study provides valuable insights, its reliance on self-reported measures, cross-sectional design, and convenience sampling limits generalizability and causal inferences. Future research should incorporate objective measures, longitudinal designs, diverse samples, and controlled interventions to deepen understanding and establish causality. Practical implications include implementing sleep hygiene programs and emotional resilience workshops for students, fostering healthier lifestyles and academic success.

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