

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

Mr. Nathaniel Philip^{1*}, Dr. Molly Joy²

ABSTRACT

This research study assessed the Impact of Sleep Education on the Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduate college students. The participants (N=10) were assessed using the Pittsburgh Sleep Quality Index, the Difficulties in Emotional Regulation Questionnaire and Barrat Impulsiveness Scale before and after a Sleep Education program with a 20-day span to see the effects of the intervention. The participants were all undergraduate students who were studying in Bangalore. The participants maintained a Sleep Report for the first 4 days and the last 5 days of the 20-day period. The findings show that there is a significant difference in Sleep Quality before and after the intervention ($t = 3.803$, $p < .005$). There was no significant difference in Emotional Regulation and Impulsivity before and after the intervention.

Keywords: Sleep Education, Sleep Hygiene, Sleep Quality, Emotional Regulation, Impulsivity

Sleep is a vital process in which the entire body restores itself, from cellular repair to growth and even preparing for the next day's needs; the brain is flushed of waste products and toxins (amyloid β) by the aid of Cerebrospinal fluids. Further sleep is implicated in synaptic pruning, neuroplasticity, rehearsal, memory consolidation, learning, insight, metabolic and endocrine functions. Sleep's importance cannot be downplayed, there is a reason 1/3 of our lives are spent sleeping. The sleep occurs in different stages of Wake, Non-Rapid Eye Movement (N1, N2, N3/ NREM) and Rapid Eye Movement (REM). A night's sleep usually involves 4 to 5 cycles of sleep going through the NREM stages and the REM stage repeatedly. A single cycle may take from 90 to 110 minutes. The first REM stage is usually short and increases in length through the night, the deep sleep stages of NREM sleep progressively decreases through the night. The Circadian rhythm is physical, mental, and behavioural changes that happen on a 24-hr cycle and also plays an important role in sleep.

Despite the necessity of good sleep, sleep is often ignored. It is often misconceived that sleep works according to the total number of hours that is spent sleeping. Even if one gets an adequate number of hours to sleep, the sleep quality may be poor. Sleep quality is determined by various factors including the body's health, the physiological state of the

¹Research Scholar, Department of Psychology, Kristu Jayanti College (Autonomous), Bangalore, India

²Head of Department, Department of Psychology, Kristu Jayanti College (Autonomous), Bangalore, India

*Corresponding Author

Received: May 21, 2023; Revision Received: July 14, 2023; Accepted: July 18, 2023

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

body, the influence of consumed substances, activity in the brain and the environment one sleeps in. It is commonly assumed that sleep can be skipped, regained on another night or at a later period. Research has clearly shown that poor sleep schedules if practised with regularity will lead to stress on the body and eventually illness (Cappuccio, et al. 2011).

The study is based on the premise that college students have markedly poor sleep habits, resulting in poor sleep quality. College students are known to often engage in various unhealthy practices to find time to fit in all their work or find time outside of their work for leisure, the time found often comes at the expense of time that is meant for sleep. A growing pattern of sleep-in modern society is of individuals depriving themselves sleep on the workdays and oversleeping on weekends, hoping to regain the lost sleep. College students and working professionals engage in similar behaviours or find coping mechanisms chiefly the intake of substantial amounts of coffee to maintain an elevated level of alertness instead of sleeping.

The poor sleep practices seen in college students may be for leisure and at other times to work for educational expectations. The poor sleep practices include keeping irregular bedtimes, taking frequent naps throughout the day, engaging in late night social activities (parties, movies, pubbing), trying to catch or regain sleep on the weekends, or even doing late night or early morning work assignments. Another possibility is the adjusting to the new living arrangements when joining a dormitory accommodation or simply a different sleep environment than one is used to. They may have shared accommodation with one or multiple roommates who may disturb or determine how others sleep. This study focuses on college students who are in their first 2 years of college life. The focus on this population assumed that the effect of poor sleep would be most pronounced in this age group as they are newly free from the expectations from home or are reaching the age or the symbol of autonomy by - "being in College/University." Current research states that the poor sleep habits of students may have substantial effects on their academic performance (Hershner, 2020). Research has shown emotional dysregulation in those who have had less sleep (Gruber, 2014) and even showing a bias to certain stimuli with exaggerated reactions (Gujar, et al. 2009). This study proposes that the subjects will have further problems with higher rates of impulsivity as suggested by research (Anderson, et al. 2011).

Sleep education is a process of educating an individual or groups on sleep hygiene thereby encouraging them to make simple lifestyle changes to then improve their sleep quality. Sleep disorders are often treated by behavioural changes (Sleep Hygiene, Cognitive behavioural therapy), Mechanical devices (CPAP), or pharmacological therapy (benzodiazepines and hypnotics); treatment often employing a combination of these interventions. Research has shown sleep hygiene intervention to have small to medium effects and Cognitive Behavioural Therapy having large effect (Friedrich, A., & Schlarb, A. A. 2018). The hope of study is to evaluate efficacy of the Sleep Education in improving sleep and the traits that are associated with poor sleep quality. The goal is to identify the barriers that keeps a college student from correcting their sleep patterns and enquiring to what can be done to realistically improve their sleep experience considering the demands of college and their general wellbeing. Various sleep education programs have been used as the Sleep to Stay Awake, Sleep 101, National Sleep foundation (USA) have all attempted to educate the population on sleep hygiene and have been implemented to varying degrees of success. One of the most comprehensive research projects on sleep of college students was done by Dr. Franklin Christian Brown; as a dissertation for his Doctoral studies at Louisiana Tech University in

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

2002. His study involved the development of a Sleep Treatment Education Program for Students (STEPS).

Emotional regulation refers to the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions (Thompson., 1991). Sleep deprivation is characterised by an increased reactivity towards aversive emotional information (Vandekerckhove & Wang., 2018). Sleep and emotions have a bidirectional relationship. Good sleep may enable good emotional states and good emotional states may enable good sleep. Sleep disturbances are notably seen as affective disorders at a high frequency. In a study (Tempest et al., 2010) participants were divided into two groups sleep deprived and non-sleep deprived, it was seen that the deprived group evaluated neutral stimuli as significantly more harmful when in comparison to the non-deprived group. There is a direct connection between sleep and Emotional regulation, particularly when it comes to stimuli of a positive or negative value, their perception or reaction is altered.

Impulsivity is a personality trait that is seen as a bad trait or a negative aspect. The term usually describes individuals likely to engage in a behaviour without appropriate forethought to the outcome of their actions. It is not always a bad thing as the trait exists in all individuals at varying degrees. Although it is important to note that higher levels of impulsivity are seen in psychopathology such as in cases of ADHD, Conduct Disorders, Substance use disorders and in some Personality disorders. The definition as suggested by one study (Moeller et al., 2001) was that impulsivity was firstly a decreased sensitivity to negative consequences of a behaviour, secondly it is rapid and unplanned reactions to stimuli before the complete processing of information and thirdly it is a lack of regard for long term consequences. As defined by Dickman (1990) impulsivity was divided into two types: Functional impulsivity and Dysfunctional impulsivity. It posited that impulsivity may be good in certain circumstances where speed was more important than the need for accuracy, this served as the functional / positive impulsivity. The circumstance is key as when impulsivity is seen in the absence of a justifiable circumstance, it becomes dysfunctional (e.g., Speeding to get your wife who is in labour to the hospital in comparison with Speeding to overtake someone who angered you on the road). According to a study by Salfi et al., 2020 – it was found that under the effect of total and partial sleep deprivation that people who were habitually more reflective were gathering less evidence in terms of deciding and people who were more cautious became more likely to risk taking situations requiring decision making based on deliberate reasoning. College students are stereotyped to have poor judgement and often engage in sensation seeking behaviours such as drugs, alcohol, petty crime, and risky sexual behaviours. The improvements in sleep quality may thus see a decrease in the impulsivity of the participants.

The prevalence of sleep disorders among college students and the lack of research on sleep quality in this population strata, in the geographical location calls for the need for the research on the current sleep quality of Indian College students. As alternate methods such as CBT, Medications and other interventions for sleep are impractical to administer to a larger population, there is a need to develop sleep education / hygiene programs for India. The development and administration need to be made simple and straightforward for it to be widely adopted and for it to be equally effective. Wide adoption of Sleep education programs is possible as opposed to the alternative methods to foster healthy sleep in the means that it is the most realistic method of influencing the largest number of students. The aim of the research is to find the impact of the Sleep education on Sleep Quality, Emotional

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

Regulation, and Impulsivity among the population of College Students.

METHOD

Research design

Quasi - Experimental Research (One Group Pre-test - Post-test group design/ No control group)

Statement of the problem

The study was conducted to study the impact of Sleep education on Sleep quality, Emotional Regulation, and Impulsivity of college students in India.

Objectives of the study

To test the impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity.

Hypotheses

Null Hypotheses

H₀₁ - There will be no significant increase in the Sleep quality, Emotional Regulation, and no significant decrease in Impulsivity of the group before and after Sleep education.

Directional Hypothesis

H_{D1} - There will be a significant increase in Sleep quality, Emotional regulation, and decreased Impulsivity of the group before and after Sleep Education.

Operational Definition

1. **Sleep Hygiene:** Sleep hygiene is lifestyle of healthy routines that promotes a natural sleep schedule. Sleep hygiene is the term used to describe the adoption of behaviours that promote sleep health across dimensions. (Broadus, 2022)
2. **Sleep Quality:** Sleep Quality includes a range of things, it is a quantitative aspect of sleep (Sleep duration, Sleep Latency and Number of Arousals), and a more subjective measure such as the Sleep 'depth' or 'restfulness'.
3. **Emotional regulation:** Emotional Regulation is how emotions are regulated to adaptively respond to emotion evoking circumstances. They can be measured by the acceptance of emotional responses, engaging in goal-directed behaviour, impulse control, emotional awareness, access to emotion regulation strategies and emotional clarity.
4. **Impulsivity:** It is defined as a predisposition to rapid and unplanned reactions to internal and/or external stimuli without adequate regard for possible negative consequences (Moeller, et al, 2001).

Sample and techniques

Technique

Purposive sampling—The sampling procedure involved screening of 79 participants, enrolment of 27 met the criteria from which 24 gave consent and joined the study. 10 participants disqualified or dropped out. 2 participants were excluded due to a diagnosed mental illness and fever during course of the intervention. Final sample size was for 10 participants.

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

Sample size

Total 10 participants.

Universe of the study: All First year or Second year undergraduate students with poor sleep quality from Kristu Jayanti College.

Geographical area: Bangalore, Karnataka.

Sample distribution

Inclusion Criteria

- Participant is an undergraduate college student in the 1st or 2nd year.
- Participants who have poor sleep quality with a PSQI score of greater than 7.
- Within the age of 18 - 20.

Exclusion Criteria

- Participant has a diagnosed mental illness.
- Participant has a pre-existing sleep disorder (Sleep apnea, Insomnia)
- Participant has illness in course of experiment (Fever, flu, etc)
- Participant has any form of blindness.

Ethical Considerations

Require permission from institutions for research approval, supervision of an institutional guide and consent of participants before sleep education. The participant safety and health were placed above the expectations of the study. Participation in the research was voluntary and consent was obtained.

Description of the tool

- 1. Pittsburgh Sleep Quality Index (PSQI):** The Pittsburgh Sleep Quality Index (PSQI) is a self-rated questionnaire which assesses sleep quality and disturbances over a 1-month time interval. Nineteen individual items generate seven "component" scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The sum of scores for these seven components yields one global score. The higher the score the poorer the Sleep quality, the lower the score the better the Sleep quality.
- 2. Difficulties in Emotional Regulation Scale (DERS):** The scale made by Gratz and Roemer, 2004, is a 36-item self-report measure of six facets of emotion regulation. The six facets are Non-Acceptance of emotional responses, Difficulty engaging in Goal-directed behaviour, Impulse control difficulties, Lack of emotional awareness, Limited access to emotion regulation strategies and Lack of emotional clarity. The items are rated on a scale of 1 to 5. Higher scores indicate more difficulty in emotion regulation.
- 3. Barratt Impulsiveness Scale (BIS):** It is a 30-item instrument that assesses impulsivity as a trait independent of anxiety. Ernest Barratt developed the Barratt Impulsiveness Scale Test in 1995 to measure a person's level of impulsiveness. The BIS, in fact, has been revised eleven times. There are three subscales of the BIS: impulsive non-planning, motor impulsivity, and attentional impulsivity. The higher the score the higher the impulsivity, the lower the score the lower the impulsivity. For the purposes of the study the only the global score is taken into consideration.

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

Procedure for Study

The intervention was done over 20 days.

Phase 1:

Pre-test is done at the beginning of this week. The Pittsburgh Sleep Quality Index was administered to screen the population, the sample was then identified according to inclusion criteria. The administration of Pre-test (Barratt Impulsiveness Scale, Difficulties in Emotional Regulation Scale) was then carried out. In the first 5 days the aim will be to implement the techniques and teach the participants while identifying and overcoming barriers. The first 5 days will be considered the learning period. Here they will attend a lecture on the need, benefits and how to get good sleep. The Group will maintain a Sleep diary. This will be done through an online table they will fill on a Google Doc.

Break period.

Phase 2:

The second intervention week will aim to follow up reinforce and maintain the learnt sleep hygiene techniques. In the last 5 days they will be given a physical checklist used to encourage the maintenance of the previously learnt sleep hygiene techniques. The checklist is to be returned after the period of use. The groups will need to maintain a note the various individual struggles that impeded their sleep schedule and space is provided in the checklist for the same. The administration of Post-test (Pittsburgh Sleep Quality Index, Barratt Impulsiveness Scale, Difficulties in Emotional Regulation Scale) was then carried out. Then statistical methods were applied to the data from the scales to analyse efficacy of treatment.

Sleep Education Script

The Script was developed by identifying the most important sleep hygiene practices looking at multiple sources from Research studies, Web articles, Online Videos and advise from a practicing psychiatrist. The most common and repeated sleep hygiene methods were identified and then the reasoning for why they are required was built around them. The most important sleep education points surrounded these topics of a regular sleep schedule, a relaxing pre-sleep routine, control of screen use, exercise and exposure to sunlight, maintaining bed for sleep distinctively, avoiding extended day time naps and control of consumption of Alcohol, Caffeine and Nicotine.

RESULTS AND DISCUSSION

The present research was conducted to measure the impact of Sleep Education on the Sleep Quality, Emotional Regulation, and Impulsivity of college students. The 10 participants were assessed before and after a sleep education programme, using the Pittsburgh sleep quality index (PSQI), the Difficulties in Emotional Regulation Scale and the Barrat Impulsiveness Scale. The results are given below according to each scale.

Analysis and Interpretation

Table. 1 Demographic details of participants

N	Gender		Age		
	Male	Female	18	19	20
10	2	8	5	4	1

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

The aim of the was to study the effect of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity. The study was conducted on 1st and 2nd year undergraduate students from various educational streams who were between the age of 18-20 as represented in Table. 1 according to gender and age. The final sample size was 10, as other participants were disqualified as they did not follow the required parameters of the study.

Table. 2 Normality Testing

	Shapiro - Wilk	
	Statistic	p
PSQI Pre-test	0.930	0.443
PSQI Post test	0.906	0.256
DERS Pre-test	0.890	0.170
DERS Post test	0.893	0.183
BIS Pre-test	0.969	0.880
BIS Post test	0.952	0.697

* p < 0.05

The Normality testing was done on the sample using Shapiro – Wilk test of Normality. The p value was found not to be significant at the 0.05 level thus the sample is assumed to be normally distributed. Thus, the parametric test ‘Paired Sample t test’ was used.

The Paired sample t test was conducted to evaluate the impact of Sleep Education on Sleep Quality, Emotional Regulation and Impulsivity of the sample. The results are given in Table. 3, which shows a score for Sleep quality according to the Pittsburgh Sleep Quality Index (PSQI), the Pre-test ($M = 11.6, SD = 2.12$) to Post test ($M = 8.6, SD = 2.99$), $t(9) = 3.803, p > .005$ (one tailed). The p value of 0.002 was found to be significant at the 0.05 level, therefore the null hypothesis is rejected, and the alternate hypothesis is accepted. As there is a significant difference the impact of the Sleep education was measured using the Cohen’s d as given in Table 4.4; the point estimate of 1.203 can be interpreted as a large effect size.

Table. 3 Paired sample t test results for pre- and post-measures in Sleep Quality, Emotional Regulation, and Impulsivity.

		Mean	S.D.	Paired t test		
				t	df	p
Sleep Quality	Pre-test	11.6000	2.11870	3.803	9	0.002*
	Post test	8.6000	2.98887			
Emotional Regulation	Pre-test	100.3000	29.45826	0.627	9	0.273
	Post test	97.7000	25.29844			
Impulsivity	Pre-test	69.6000	4.11501	-0.127	9	0.451
	Post test	69.8000	6.81175			

Note: One tailed test, * p < 0.05

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

Table 4 Paired Sample Effect Size

	Standardizer ^a	Point Estimate
Cohen's d	2.49444	1.203

The results of Table. 4.3 shows the Emotional regulation scores according to Difficulties in Emotional Regulation Scale (DERS), the Pre-test ($M = 100.3$, $SD = 29.46$) to Post test ($M = 97.7$, $SD = 25.30$), $t = 0.627$, $p > .005$ (one tailed). The p value of 0.273 was found to not be significant at the 0.005 level, therefore the null hypothesis is accepted.

The results of given in Table. 4.3 shows a score for Impulsivity according to the Barrat Impulsivity Scale (BIS), the Pre-test ($M = 69.6$, $SD = 4.115$) to Post test ($M = 69.8$, $SD = 6.812$), $t(9) = -0.127$, $p > .005$ (one tailed). The p value of 0.901 was found to not be significant at the 0.005 level, therefore the null hypothesis is accepted.

H₀₁ . There will be no significant increase in the Sleep quality, Emotional Regulation, and no significant decrease in Impulsivity of the group before and after Sleep education.

The null hypothesis is accepted in Emotional Regulation and Impulsivity but is rejected for Sleep Quality. The directional hypothesis is accepted in the case of Sleep quality as a reduction in PSQI scores indicate an increase in Sleep Quality.

The most important fact to note is that although Sleep Quality had improved from the Pre-test ($M = 11.6$, $SD = 2.12$) to Post test ($M = 8.6$, $SD = 2.99$) according to the PSQI. The post test scores indicate a better sleep quality but still can't be classified as good sleep quality. The interpretation for the PSQI states that a score of 5 or more is classified as poor sleep quality. So, although the sleep quality has improved it should be noted that the need for intervention or the continued Sleep monitoring may be necessary to further improve their sleep. It also may be true that sleep habits are formed over extended periods and that for them to change, it may require a longer timeframe than 20 days to see the effects of the intervention.

The drop out of the participants was high and some were disqualified on basis of illness and diagnosed mental illness. From the initial 79 that were screened, 27 met the criteria of a score of 7 or more on the PSQI. From the 27 there were 24 who gave consent to join the study, at the end due to incompleteness or participants being out of reach and dropouts from the research there were 10 participants at the end.

The result of the study may indicate the proposed method of the study to need longer periods of intervention to see results for changes in Emotional regulation and Impulsivity. Factors such as Impulsivity and Emotional regulation may take years to change, as the research assumes that sleep quality is markedly worse in college students, the impact of poor sleep on individual personality may be slow and more likely to require a larger time frame than has been afforded by this study.

In the research process it is noted that the first learning session was hard to track as the first form provided was an online doc to be filled daily. The process was made easy, but the participants struggled to follow the expectations, most participants could not follow it as the online form was not easy to use. For the second period a physical checklist was provided in

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

a plastic sleeve, with a pen to all the participants that they may fill their progress with more ease every morning. The sleeve was collected back at the end. The physical checklist garnered a far better response.

A systematic review by Dietrich, S. K, et al in (2016) tried to measure the effectiveness of sleep education programs on improving sleep hygiene knowledge or behaviour and Sleep quality. The research concluded with reference to 4 studies that measured the changes in sleep quality in response to the sleep education, 3 studies were found to show no significant difference at the 0.05 level and 1 reporting significant improvement in sleep quality ($P = 0.017$). The research concluded stating that there was insufficient evidence to determine the effectiveness of sleep education programs. This research shows that sleep education can be used as an effective means of improving sleep quality.

SUMMARY AND CONCLUSION

Summary

The Research conducted investigates the impact of Sleep Education on the Sleep Quality, Emotional Regulation, and Impulsivity among college students. The research was conducted on undergraduate student at a college in Bangalore urban. The 10 students partook in the research, 7 students had an improved sleep quality. The interventions and sleep reports were done across a 20-day period, with two sessions of intervention, 4 days at the beginning and 5 days at the end. The outcome of the research was that there was a significant improvement in Sleep Quality among the sample whereas there was no significant change in the Emotional Regulation and Impulsivity.

Conclusion

Sleep Education Intervention has a significant effect on Sleep Quality. It did not however influence Emotional Regulation and Impulsivity.

Implication

The study shows the efficacy of sleep education to improve sleep Quality. It provides basis for doing further research and makes a case for employing such programs to various educational institutes.

Limitations

- The sample size was small and the researcher being an independent researcher could not take on more.
- The research didn't use a previously standardized script to conduct the research with. The script was created with the use of various research, websites, and online lectures.
- The research design and tools used to measure the changes in Emotional Regulation and Impulsivity were poor, to test the short-term smaller improvements of sleep.

Future Suggestions

Some future directions that can stem from this paper can be a question of why Sleep Quality increases with number of years of Collegiate education, this may benefit from a qualitative approach whereby individual experience of improving sleep quality is examined or how they adapt to improve their sleep. A link has already been made between Sleep and Academic achievement and it may be interesting to see its role in quantitative impact on academic achievement.

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

REFERENCES

- Anderson, C., & Platten, C. R. (2011). Sleep deprivation lowers inhibition and enhances impulsivity to negative stimuli. *Behavioural brain research*, 217(2), 463-466.
- Beccuti, G., & Pannain, S. (2011). Sleep and obesity. *Current opinion in clinical nutrition and metabolic care*, 14(4), 402.
- Brown, F. C., Buboltz Jr, W. C., & Soper, B. (2006). Development and evaluation of the Sleep Treatment and Education Program for Students (STEPS). *Journal of American College Health*, 54(4), 231-237.
- Buyse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry research*, 28(2), 193-213.
- Cappuccio, P., D'Elia, L., Strazzullo, P., & Miller, A. (2011, May 1). NCBI - Sleep Duration and All-Cause Mortality: A Systematic Review and Meta-Analysis of Prospective Studies. www.ncbi.nlm.nih.gov/pmc. Retrieved December 20, 2022, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2864873/>.
- Colten, H. R. (2006). *Extent and Health Consequences of Chronic Sleep Loss and Sleep Disorders*. *Sleep Disorders and Sleep Deprivation - NCBI Bookshelf*. <https://www.ncbi.nlm.nih.gov/books/NBK19961/#:~:text=The%20cumulative%20long%2Dterm%20effects,%2C%20heart%20attack%2C%20and%20stroke>.
- Dietrich, S. K., Francis-Jimenez, C. M., Knibbs, M. D., Umali, I. L., & Truglio-Londrigan, M. (2016). Effectiveness of sleep education programs to improve sleep hygiene and/or sleep quality in college students: a systematic review. *JBIC Evidence Synthesis*, 14(9), 108-134.
- Evenden, J. L. (1999). Varieties of impulsivity. *Psychopharmacology*, 146(4), 348-361.
- Fischer, J., Corcoran, K., & Springer, D. W. (2020). *Measures for Clinical Practice and Research: Two-Volume Set (6th ed.)*. Oxford University Press.
- Friedrich, A., & Schlarb, A. A. (2018). Let's talk about sleep: a systematic review of psychological interventions to improve sleep in college students. *Journal of sleep research*, 27(1), 4-22.
- Good Sleep Habits*. (2022, September 13). Centers for Disease Control and Prevention. https://www.cdc.gov/sleep/about_sleep/sleep_hygiene.html
- Gouveia, P., Ramos, C., Brito, J., Almeida, T. C., & Cardoso, J. (2022). The Difficulties in Emotion Regulation Scale-Short Form (DERS-SF): psychometric properties and invariance between genders. *Psicologia: Reflexão e Crítica*, 35(1), 1-10
- Gruber, R., & Cassoff, J. (2014). The interplay between sleep and emotion regulation: conceptual framework empirical evidence and future directions. *Current psychiatry reports*, 16(11), 1-9.
- Gujar, N., Yoo, S. S., Hu, P., & Walker, M. P. (2011). Sleep deprivation amplifies reactivity of brain reward networks, biasing the appraisal of positive emotional experiences. *Journal of Neuroscience*, 31(12), 4466-4474.
- Hallion, L. S., Steinman, S. A., Tolin, D. F., & Diefenbach, G. J. (2018). Psychometric properties of the Difficulties in Emotion Regulation Scale (DERS) and its short forms in adults with emotional disorders. *Frontiers in psychology*, 9, 539.
- Hershner, S. (2020). Sleep and academic performance: Measuring the impact of sleep. *Current Opinion in Behavioral Sciences*, 33, 51-56.
- Kalmbach, D. A., Arnedt, J. T., Song, P. X., Guille, C., & Sen, S. (2017). Sleep disturbance and short sleep as risk factors for depression and perceived medical errors in first-year residents. *Sleep*, 40(3), zsw073.

The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates

- Ma MA, Morrison EH. Neuroanatomy, Nucleus Suprachiasmatic. [Updated 2022 Jul 25]. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK546664/>
- National Institute of General Medical Sciences. (n.d.). National Institute of General Medical Sciences (NIGMS). <https://nigms.nih.gov/education/fact-sheets/Pages/circadian-rhythms.aspx>
- Physiology of sleep | Concise medical knowledge. (2021, June 1). *Lecturio*. <https://www.lecturio.com/concepts/physiology-of-sleep/>
- Salfi, F., Lauriola, M., Tempesta, D., Calanna, P., Socci, V., De Gennaro, L., & Ferrara, M. (2020). Effects of total and partial sleep deprivation on reflection impulsivity and risk-taking in deliberative decision-making. *Nature and science of sleep*, 309-324.
- Spira, A. P., Chen-Edinboro, L. P., Wu, M. N., & Yaffe, K. (2014). Impact of sleep on the risk of cognitive decline and dementia. *Current opinion in psychiatry*, 27(6), 478.
- Stages of sleep | Introduction to psychology. (n.d.). Lumen Learning – Simple Book Production. <https://courses.lumenlearning.com/waymaker-psychology/chapter/stages-of-sleep/>
- Suni, E., & Suni, E. (2023, February 23). *Sleep Hygiene*. Sleep Foundation. <https://www.sleepfoundation.org/sleep-hygiene>
- The Characteristics of Sleep | Healthy Sleep. (n.d.). <https://healthysleep.med.harvard.edu/healthy/science/what/characteristics>
- Thompson, R. A. (1991). Emotional regulation and emotional development. *Educational psychology review*, 3(4), 269-307.
- Vandekerckhove, M., & Wang, Y. L. (2018). Emotion, emotion regulation and sleep: An intimate relationship. *AIMS neuroscience*, 5(1), 1.
- Wang, F., & Bíró, É. (2021). Determinants of sleep quality in college students: A literature review. *Explore*, 17(2), 170-177.
- Yoo, S. S., Gujar, N., Hu, P., Jolesz, F. A., & Walker, M. P. (2007). The human emotional brain without sleep—a prefrontal amygdala disconnects. *Current biology*, 17(20), R877-R878.

Acknowledgement

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: Philip, N. & Joy, M. (2023). The Impact of Sleep Education on Sleep Quality, Emotional Regulation, and Impulsivity among Undergraduates. *International Journal of Indian Psychology*, 11(3), 608-618. DIP:18.01.058.20231103, DOI:10.25215/1103.058