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Original Article

Correlation of Revenge Bedtime Procrastination with Academic Performance in Undergraduate Students of Medical Sciences: An Online Cross-sectional Study

Mina Azwar[1] MBBS, Anam Shafqat[1] MBBS, Mahnoor Fatima[1] MBBS, Farhat Ijaz[1] MBBS, MPhil, CHPE, CME&P, FCPS, Rahat Naseem[2] MBBS, MPHIL, Rana Khurram Aftab[3] MBBS, CHPE, CME&P, MPhil

[1]Department of Physiology, CMH Lahore Medical College and Institute of Dentistry, [2]Department of Physiology, King Edward Medical University, [3]Department of Physiology, Services Hospital Lahore, Lahore, Pakistan.

***Corresponding author:**
Farhat Ijaz,
Combined Military Hospital Lahore Medical College and Institute of Dentistry (National University of Medical Sciences), Lahore, Pakistan.

farhat_khurram_rana@cmhlahore.edu.pk

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ABSTRACT

Objectives: Procrastination is the deliberate delay or postponement of tasks with an awareness of unfavorable results. Revenge bedtime procrastination refers to the choice of forgoing sleep in favor of leisure time due to a daily schedule devoid of adequate free time. The objective of this study was to determine the correlation between revenge bedtime procrastination and academic performance in undergraduate medical students.

Material and Methods: The participants in this study were medical students from different institutes in Lahore. A total of 239 participants completed our online survey. Students previously diagnosed with sleep disorders were excluded from our sample. Our study, which centeredon exploring the correlation between bedtime procrastination as a retaliatory act and academic achievement, employed an online questionnaire containing the academic performance scale (APS) and bedtime procrastination scale (BPS) disseminated through Google Forms.

Results: The findings demonstrated a negative correlation between delaying sleep for personal leisure time and academic achievement. The correlation coefficient (R) value between APS and BPS came out to be −0.324, and the *P* value was 0.01, which means that the relationship is statistically significant. The major demographics came out to age 15–20 years (72.4%) studying Bachelor of Medicine and Bachelor of Surgery (87.2%) and Bachelor of Dentistry (10.9%), and the majority of them were in the 1st (37.6%) and 2nd year 51.9% of their degree.

Conclusion: This study found a negative correlation between sleep procrastination and academic performance. Variables such as intelligence, motivation, and self-discipline were not considered in our study, and this gap can be filled by future research considering additional variables to gain a more comprehensive understanding of this complex phenomenon.

Keywords: Revenge bedtime procrastination, Academic performance, University students, Sleep insufficiency, Personal leisure time

INTRODUCTION

Procrastination is the deliberate delay or postponement of tasks with an awareness of unfavorable results.[1] The revenge aspect explains how people tend to retaliate against their hectic schedule by sacrificing their sleep time to enjoy some "me" time as a coping mechanism from their busy daytime schedule.[2] Hence, revenge bedtime procrastination describes the decision to sacrifice sleep for leisure time that is driven by a daily schedule lacking in free time. It refers to an

individual's incapacity to adhere to a predetermined bedtime in the absence of any external hindrance.[3] High-stress jobs and demanding work hours are more likely to be the cause of this delay in bedtime.[4] There seems to be a connection between revenge sleep procrastination and noticeable daytime stress. For numerous individuals, delaying sleep may arise as a reaction to prolonged work hours, which, when coupled with a complete night's rest, allows little to no time for leisure or unwinding. For such individuals, spending the evening alone, engaging in things they enjoy, or simply using their smartphones for entertainment might be the only solace. While succumbing to revenge, bedtime procrastination might hold allure momentarily. Consecutive late nights and early mornings can directly result in severe sleep deprivation. Reduced sleep can markedly and adversely impact academic performance.

The key aspects of revenge bedtime procrastination are that it (a) negatively affects a person's overall quality of sleep at night, (b) no illness or an environmental issue is causing this delay, and (c) people who engage in this type of behavior are aware of the consequences but do it.[5]

According to a study done by (indicate name(s) of the author here), it was found that bedtime procrastination was more prevalent among women and undergraduate students.[6] Subpar sleep quality is linked to a broad spectrum of academic problems, such as decreased work quality, lower examination scores, inferior grades, heightened academic misconduct, and increased instances of course failures. Revenge bedtime procrastination reduces sleep duration and, therefore the sleep quality of students. Insufficient hours of sleep prevent the mind and body from adequately rejuvenating, leading to detrimental impacts on the academic performance of students.

A 2014 study suggested (indicate the name of the author here) a link between revenge bedtime procrastination and lack of self-restraint. That is, despite seeking to have a normal bedtime schedule, such people do not show behavior that lines up with such a goal.[7] The term "revenge bedtime procrastination" was originally used in a Chinese publication in 2016.[8] Studies so far have acknowledged a positive relationship with anxiety,[9] depression,[10] stress,[11] fatigue,[12] smartphone use,[13] and a negative correlation with cognition,[14] self-regulation,[14] sleep quality,[15] and mindfulness.[16] Studies have also shown a negative correlation with academic performance.[17] Our main aim was to assess this correlation in medical students by analyzing academic performance based on the student's participation and keenness expressed during class rather than in their grades. Therefore, the academic performance scale (APS) was chosen accordingly. Medical students frequently experience high levels of stress, lack of sleep, and work overload, which could have a negative impact on their academic performance. The difficulties experienced by medical students could be made worse by revenge bedtime procrastination, which has a negative impact on their capacity to perform well academically.[2] To better identify and manage the issues influencing medical students' academic achievements, it is imperative to look into any potential associations between revenge bedtime procrastination and academic performance. Based on this rationale, we hypothesized that there would be a significant correlation between revenge bedtime procrastination and academic performance in undergraduate students of medical sciences, with higher levels of revenge bedtime procrastination showing poorer academic performance.

MATERIAL AND METHODS

Study design

This study was a cross-sectional correlation design conducted online using a closed survey. The survey was administered in English, lacking any subsequent participant follow-up.

Participants

The present study was conducted in Pakistan from February to May 2023. The participants in this study were undergraduate students of different medical sciences from Lahore. The sample size was 239, which was calculated using the formula $n = (Z^2 \times P \times (1–P))/e^2$.

Where the n (sample size), confidence level (z) was 95% (1.96), the margin of error (e) was 6%, and the prevalence of night sleeping hour (P) was taken 0.339.

Sample selection criteria

Students previously diagnosed with sleep disorders were excluded from our sample by taking the history of the participants and asking if they were taking sleeping pills or had their sleep disorders previously diagnosed by doctors. We used pretested questionnaire as our research instrument, which was distributed through Google Forms. The responses were kept anonymous therefore not invasive of participants' integrity. Informed consent was obtained from all participants. The study was conducted following the declaration and approval of the Ethics Committee of CMH Lahore Medical College and Institute of Dentistry (112/ERC/CMHLMC).

Questionnaire

The questionnaire consisted of three sections. The first section consisted of the demographics questions, the second contained the APS[18], and the third contained the bedtime procrastination scale (BPS).[7] An introductory paragraph stating the purpose of our research and asking for the participant's consent was added.

Demographics

The demographics questions inquired about the age, that is, 15–20 years, 21–26 years, or 27–31 years, field of study, that is, Bachelors of dentistry (BDS), Bachelor of medicine and Bachelor of surgery (MBBS), Allied health sciences (AHS) or Doctor of physiotherapy (DPT), and year of study, that is, 1st year, 2nd year, 3rd year, 4th year, or 5th year.

BPS

BPS is a pretested and self-evaluating questionnaire consisting of nine items containing questions about sleep-related behaviors and routines indicating the level of bedtime procrastination.

The responses were recorded against a five-point Likert scale labeled "1=(rarely) to 5=(almost always)." Four of the items are reverse-coded. Agreeing to these items would indicate a behavior opposite to that of bedtime procrastination; therefore, to ensure consistency among all the items in terms of what "agree" and "disagree" imply reverse coding was done. The total score dictates the level of procrastination, with higher scores indicating more procrastination.[7] The English version of BPS showed Cronbach's alpha of 0.89 in an online survey and a value of 0.90 in two samples by Sirois *et al.*, suggesting it was a reliable scale.[19]

APS

Academic performance was assessed using the APS that had an internal consistency of 0.89 and test-retest reliability of 0.85.[18] The scale consisted of eight items recorded on a 5-point Likert scale ranging from "1= (strongly disagree) to 5=(strongly agree)," a higher score indicating better performance. The cutoff value taken was a score of 20. Therefore, a score of ≥20 indicates good performance, whereas <20 indicates poor performance.[18]

Bias

Bias was controlled by preventing "duplication of responses" and allowing participants to respond to the Google Form only once.

Statistical analysis

The data from the participants were analyzed using SPSS version 26. The frequency and percentages of the descriptive data were calculated. Confounding variables were controlled by data stratification. Pearson correlation between the outcome variable that is, academic performance, and exposure variable, that is, bedtime procrastination, was determined, which came out to be significantly negatively correlated, as discussed later in the results. $P < 0.05$ was taken as significant.

RESULTS

The age group was from 15 to 25 years, including 173 samples from 15 to 20 years of age group, and 21–25 was 66. Medical students from 1st to final year of MBBS, BDS, AHS, and DPT were included [Table 1].

Table 2 represents the overall mean values for the APS score and BPS scale, also indicating the standard deviation from the mean value and explaining the range by mentioning the minimum and maximum values. The overall mean value for APS was calculated to be 21.51 with a standard deviation of 5.954, whereas the overall mean value for the BPS scale was calculated to be 23.3 with a standard deviation of 7.026.

The pearson correlation test between APS scores and bedtime procrastination shows negative correlation as predicted. As predicted both variables are significantly negatively correlated, indicating that bedtime procrastination poorly affects the academic performance of students.

The correlation coefficient (R) value between APS and BPS is −0.324 and $P = 0.01$, which means that the relationship is statistically significant. Therefore, the result corresponds with our hypothesis that academics can be improved by lowering bedtime procrastination.

Table 1: Frequencies and percentages of demographic data.

Variable	Category	Sample (%)
Age	15–20	173 (72.4)
	21–25	66 (27.6)
*Degree	BDS	26 (10.9)
	MBBS	208 (87.02)
	AHS	2 (0.83)
	DPT	3 (1.25)
Year of Study	1st year	90 (37.6)
	2nd year	124 (51.9)
	3rd year	10 (4)
	4th year	5 (1.6)
	5th year	10 (4)

*MBBS: Bachelor of medicine and bachelor of surgery, BDS: Bachelor of dentistry, AHS: Allied health sciences, DPT: Doctor of physiotherapy

Table 2: Mean values for APS and BPS scales.

	Statistics	
APS	Mean	21.51
	Std. deviation	5.954
	Range	32
	Minimum	8
	Maximum	40
BPS	Mean	23.23
	Std. deviation	7.026
	Range	33
	Minimum	9
	Maximum	42

APS: Academic performance scale, BPS: Bedtime procrastination scale

The correlation between individual items of the BPS and the total APS score was calculated. The results showed that the reverse coded items of BPS, that is, "I go to bed early if I have to get up early in the morning," "If it is time to turn off the lights at night, I do it immediately," "I have a regular bedtime which I keep to," and "I can easily stop my activities when it is time to go to bed" showed positive correlation whereas the rest of the items showed negative correlation with APS. Therefore, we can speculate that better and healthier sleep habits, as indicated by the four items mentioned above, are related to better academics. Table 3 shows this data written in bold and showing *P*-values. The table also gives a brief overview of the APS scores along with individual mean values and the standard deviations.

DISCUSSION

Our objective for this study was to find the correlation between revenge bedtime procrastination and academic performance of medical students. Considering the findings of previous works done on this topic, academic achievement and revenge bedtime procrastination may be related to several factors. First, retaliatory bedtime procrastination can result in decreased sleep quantity and quality, which can impair cognitive functions and make it more difficult to learn, retain, and recall knowledge.[12] In addition, lack of sleep can lead to higher levels of stress and exhaustion, which further impair academic performance. Retaliatory bedtime procrastination may also interfere with a person's regular daily schedule, resulting in a lack of structure and consistency in their study habits and reducing the efficacy of their learning tactics[20]. Insufficient sleep has also been related to severe outcomes, including health problems, and is increasingly recognized as causing problems related to mental and physical well-being.[21]

Another intriguing aspect of bedtime procrastination is that even though procrastination is commonly defined as the deliberate postponement of unpleasant tasks, going to bed is not typically regarded as unpleasant. Instead, we hypothesize that the issue is more about not wanting to stop doing other things than it is of not wanting to sleep, and generally, procrastinators want to receive enough sleep but fail to achieve this goal. Such a phenomenon is known as the intention-behavior gap.[22]

Individuals who engage in revenge bedtime procrastination may find themselves significantly more distracted from their work than was the case a few decades ago. This increased distraction can be attributed to the rise of electronic devices and the proliferation of 24/7 entertainment establishments, both of which contribute to delaying sleep and subsequently impacting academic performance. Furthermore, the observation that procrastinators struggle to adhere to their planned bedtime implies that managing distractions could potentially be a contributing factor to overcoming bedtime.[9]

The results of our study also indicate that academic performance suffers significantly from bedtime procrastination. For effective learning memory consolidation and other cognitive functions that depend on sleep are essential. Due to procrastination, students who do not get enough sleep may find it difficult to focus, remember knowledge, and handle complex issues.[14] Consistently putting off going to bed might lead to a vicious cycle. Students

Table 3: Correlation between APS and scores and individual BPS items.

BPS items	Total APS score	Mean	Correlation with APS score	*P*-values
"I go to bed later than I had intended."	≥20	2.02 (±1.031)	−0.032	0.613
	<20	2.04 (±0.988)		
"I go to bed early if I have to get up early in the morning."	≥20	3.09 (±1.090)	**0.411**	**0.000**
	<20	2.42 (±1.164)		
"If it is time to turn off the lights at night,	≥20	2.98 (±1.197)	**0.292**	**0.000**
I do it immediately."	<20	2.48 (±1.274)		
"Often, I am still doing other things when it is time to go to bed."	≥20	2.07± (0.946)	−0.150	0.017
	<20	2.37± (1.081)		
"I easily get distracted by things when	≥20	2.33 (±1.153)	−0.178	0.004
I actually would like to go to bed."	<20	2.63 (±1.168)		
"I do not go to bed on time."	≥20	2.15 (±1.041)	−0.185	0.003
	<20	2.57 (±1.097)		
"I have a regular bedtime, which I keep to."	≥20	3.53 (±1.218)	**0.356**	**0.000**
	<20	3.00 (±1.242)		
"I want to go to bed on time, but I just don't."	≥20	2.27 (±1.056)	−0.056	0.378
	<20	2.34 (±1.118)		
"I can easily stop with my activities when it is time to go to bed."	>=20	3.23 (±1.116)	**0.296**	**0.000**
	<20	2.75 (±1.167)		

APS: Academic performance scale, BPS: Bedtime procrastination scale, bold values: P-value ≤ 0.001

may experience worry and anxiety when their academic performance deteriorates, which makes it harder for them to quit their procrastinating habits and develop a regular sleep schedule.[9,11]

Students who were a part of our study had late bedtime habits, which had greater impact on academic performances, mindfulness, daytime fatigue, and health problems.[3] The research study shows that people want to be good at their academics but due to their irregular and bad sleep schedules, distractions and lack of self-control were a hindrance to academic success.[7]

After discussing all the data, and stating their interpretations, and implications, we have reached the point where we should also consider the limitations of our study. Particularly concerning bedtime procrastination, students who exhibit disrupted sleeping patterns, as noted in the study by Lund *et al.*, may not accurately represent the broader population.[23] One limitation was only medical students participated in our research; the general public from all walks of life was excluded from our study, participants had varying ages, workloads, lifestyles, and years of professional study. The study only deals with academic performance and not other aspects that can lead to revenge bedtime procrastination, such as enjoyable activities and self-efficacy. Other exposure variables such as stress, depression, sleep hygiene habits, and anxiety were not considered as variables which is the limitation of our work.

CONCLUSION

This study focused on the relationship between sleep procrastination, specifically bedtime procrastination as a form of revenge, and academic performance. The findings demonstrated a negative association between delaying sleep for personal leisure time and academic achievement. By sacrificing sleep, individuals experience insufficient rest, leading to daytime fatigue that can impair cognitive functions crucial for effective learning and academic success, such as attention, memory, and information processing. Chronic sleep deprivation resulting from bedtime procrastination can also increase stress levels and decrease overall well-being, further hindering academic performance. However, the relationship is not strictly one-way, because factors such as individual differences, workload, and time management skills can moderate the effects. Future research should consider additional variables such as motivation, self-discipline, and support systems to gain a more comprehensive understanding of this complex phenomenon.

Ethical approval

The study was approved by IRB of CMH Lahore medical college and institute of dentistry, number 69/ERC/CMHLMC, Dated: 23-03-22.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI.

REFERENCES

1. Steel P. The Nature of Procrastination: A Meta-analytic and Theoretical Review of Quintessential Self-regulatory Failure. Psychol Bull 2007;133:65-94.
2. Tyagi J. Revenge Bedtime Procrastination during the Pandemic. Int J Indian Psychol 2022;10:720-7.
3. Zhu L, Meng D, Ma X, Guo J, Mu L. Sleep Timing and Hygiene Practices of High Bedtime Procrastinators: A Direct Observational Study. Fam Pract 2020;37:779-84.
4. Sprajcer M, Jay SM, Vincent GE, Vakulin A, Lack L, Ferguson SA. The Effects of Anticipating a High-stress Task on Sleep and Performance during Simulated on-call Work. J Sleep Res 2018;27:e12691.
5. Magalhães P, Cruz V, Teixeira S, Fuentes S, Rosário P. An Exploratory Study on Sleep Procrastination: Bedtime vs. While-in-bed Procrastination. Int J Env Res Public Health 2020;17:5892.
6. Herzog-Krzywoszanska R, Krzywoszanski L. Bedtime Procrastination, Sleep-related Behaviors, and Demographic Factors in an Online Survey on a Polish Sample. Front Neurosci 2019;13:963.
7. Kroese FM, De Ridder DT, Evers C, Adriaanse MA. Bedtime Procrastination: Introducing a New Area of Procrastination. Front Psychology 2014;5:611.
8. Huifeng H. Coronavirus: China's Economy Unlikely to be Saved by 'Revenge Spending' as Worried Consumers Emerge from. New York: South China Morning Post; 2020.
9. Geng Y, Gu J, Wang J, Zhang R. Smartphone Addiction and Depression, Anxiety: The Role of Bedtime Procrastination and Self-control. J Affect Disord 2021;293:415-21.
10. Gao WJ, Hu Y, Ji JL, Liu XQ. Relationship between Depression, Smartphone Addiction, and Sleep among Chinese Engineering Students during the COVID-19 Pandemic. World J Psychiatry 2023;13:361-75.
11. Eswi AS, Radi S, Youssri H. Stress/Stressors as Perceived by Baccalaureate Saudi Nursing Students. Middle East J Sci Res

2013;14:193-202.
12. Herzog-Krzywoszanska R, Jewula B, Krzywoszanski L. Bed-time Procrastination Partially Mediates the Impact of Personality Characteristics on Daytime Fatigue Resulting from Sleep Deficiency. Front Neurosci 2021;15:727440.
13. Zhang MX, Wu AM. Effects of Smartphone Addiction on Sleep Quality among Chinese University Students: The Mediating Role of Self-regulation and Bedtime Procrastination. Addi Behavi 2020;111:106552.
14. Hosnavi Z, Saed O, Zenozian S. The Effectiveness of the Cognitive Behavioral Group Therapy Based on Edinger and Carney's Protocol on Insomnia and Bedtime Procrastination in Patients with Insomnia. J Sleep Sci 2018;3:68-74.
15. Ma X, Meng D, Zhu L, Xu H, Guo J, Yang L, *et al.* Bedtime Procrastination Predicts the Prevalence and Severity of Poor Sleep Quality of Chinese Undergraduate Students. J Ame Col Health 2022;70:1104-9.
16. Teoh AN, Wong JW. Mindfulness is Associated with Better Sleep Quality in Young Adults by Reducing Boredom and Bedtime Procrastination. Behav Sleep Med 2023;21:61-71.
17. Ghafoor RZ, Nawaz S, Zahra T, Hakeem TA. Effect of Smartphone Addiction on Academic Performance; Mediation of Self-regulation and Bedtime Procrastination. Pak J Med Health Sci 2022;16:618-22.
18. Odida M, Patience B, Jovia Ayebazibwe A, Ayebazibwe P, Mbabazi J, Amoding B. Stress, Substance Use and Academic Performance among Students in Makerere University Kampala, Uganda (Doctoral Dissertation, Makerere University).
19. Sirois FM, Nauts S, Molnar DS. Self-compassion and Bed-time Procrastination: An Emotion Regu Persp. Mindfulness 2019;10:434-45.
20. Jeevan M. A Clinical and Technical Methodological Review on Stress Detection and Sleep Quality Prediction in an Academic Environment. Comput Methods Programs Biomed 2023;235:107521.
21. Buxton OM, Marcelli E. Short and Long Sleep are Positively Associated with Obesity, Diabetes, Hypertension, and Cardiovascular Disease among Adults in the United States. Soc Sci Med 2010;71:1027-36.
22. Garza KB. How do we Close the Intention-behavior Gap? J Am Pharm Assoc 2018;58:240-1.
23. Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep Patterns and Predictors of Disturbed Sleep in a Large Population of College Students. J Adolescent Health 2010;46:124-32.

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