



ORIGINAL ARTICLE

ASSOCIATION OF PROCRASTINATION WITH MOTOR AND COGNITIVE FATIGUE AMONG STUDENTS: A CROSS-SECTIONAL STUDY

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Background: Procrastination reflects delaying tasks, staying organized, and mentally alert. This can reduce productivity and add to emotional strain. Mental fatigue means difficulty concentrating, slower thinking, or forgetting things easily. Physical tiredness refers to reduced stamina, and sense of exhaustion. In medical profession where constant alertness are required, this affects both performance and well-being. The objective of this study was to assess the association of procrastination with motor and cognitive fatigue among students. **Methods:** This cross-sectional study was conducted at Ayub Medical College. A total of 206 students and graduates between 18 and 25 years of age were included after using convenience sampling. Incomplete proformas and other causes of fatigue like chronic medical conditions, mental illnesses and on medications were excluded. Duration of study was six months. Information was gathered through a self-administered questionnaire. Basic details, including age, level of education, and average sleep duration and 28 statements rated on a five-point scale, exploring patterns of procrastination with relation to mental and physical tiredness were recorded. The data was analysed using SPSS-25. To explore the relationship between procrastination and fatigue, Pearson's correlation and simple regression analysis were applied, and $p \leq 0.05$ was taken as significant. **Results:** There was a significant positive association between procrastination and motor-cognitive fatigue authenticated by Pearson's correlation analysis which revealed a significant relationship ($p < 0.05$). **Conclusion:** Higher levels of procrastination corresponded to increased fatigue, highlighting its impact on students' performance and well-being.

Keywords: Cognition, Motor fatigue, Procrastination

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INTRODUCTION

Procrastination is usually described as putting off a task even when one knows that the delay may lead to unwanted consequences.¹ It is commonly seen among students and young professionals, particularly in settings where academic and professional expectations are high.² Earlier studies have linked procrastination with greater stress, constant time pressure, lower productivity, and weaker academic outcomes.³ Although these effects have been widely discussed, much less attention has been given to how procrastination may relate to mental and physical tiredness.

Cognitive fatigue is a state of mental exhaustion featured by decreased concentration, impaired decision-making, and reduced memory efficiency following prolonged cognitive effort.⁴ Physical, or motor, fatigue is different; it reflects a sense of bodily exhaustion and reduced physical efficiency after continued activity. Both types of fatigue can interfere with daily responsibilities and academic work. In demanding environments, where long hours of focus and effort are routine, their impact can be particularly noticeable.⁵

Procrastination may lead to fatigue through a repeating pattern of delay and pressure. When tasks are

pushed close to deadlines, they often have to be completed in a short span of time, requiring intense focus and persistent effort. Working under such pressure can drain mental energy more quickly and leave a lingering sense of exhaustion.⁶ If this cycle continues, it can gradually affect overall well-being. What begins as occasional delay may turn into a habit of last-minute effort, followed by exhaustion and reduced performance. Over time, this pattern can interfere with both daily functioning and long-term academic or professional growth.⁷

Although procrastination is increasingly seen as one form of failure of self-regulation shaped by personality, emotions, and environmental factors, like constant digital distractions.⁸ In particular, how procrastination relates to both mental and physical tiredness has received little attention, especially in young adults. This link is important because students and early-career professionals often deal with ongoing academic and work pressures, which can make both mental and physical exhaustion worse.⁹

Building on this background, the current study was set out to explore how procrastination relates to fatigue, with a particular focus on mental and physical exhaustion among students and young professionals. Addressing procrastination effectively begins with

awareness recognizing one's own tendency to delay tasks. From there, simple strategies can make a difference: setting realistic, manageable goals, breaking larger tasks into smaller steps, reducing distractions, and limiting time spent on social media, which often consumes more time than intended.⁹

Using these approaches can help sustain motivation and interrupt the cycle of delay, with higher procrastination linked to greater mental and physical tiredness.¹⁰ Understanding what drives procrastination is therefore important, not just theoretically but also in practice, because it can guide interventions aimed at improving academic outcomes, professional efficiency, and overall well-being in young adults which is the objective of our study to assess the association of procrastination with motor and cognitive fatigue among students and young professionals.

MATERIAL AND METHODS

This cross-sectional, questionnaire-based study was conducted at Ayub Medical College, Abbottabad over 6 months (Jan–Jun 2026). A total of 206 participants, aged 18–25 years, were recruited through convenience sampling. The study included both currently enrolled students and recent graduates who voluntarily agreed to participate and provided written informed consent. Individuals with diagnosed psychiatric or neurological disorders, chronic medical conditions known to cause fatigue, or incomplete questionnaire responses were excluded from this study.

The sample size was calculated using Open-Epi version 3.01 specific for cross-sectional studies with a 95% confidence level, a 5% margin of error, and prevalence of 50%. Ethical approval was obtained for this study from the Institutional Review Board (IRB) of Ayub Medical College (Ref. No. RC-EA-2026/07). Data was collected through a self-administered structured, questionnaire proforma divided into two sections. The first section captured basic demographic information regarding age, educational level, and average sleep duration. The second section focused on assessing levels of procrastination, and mental and physical fatigue.

Procrastination criteria was assessed using a improved version of General Procrastination Scale.¹¹ The questionnaire included 15 items, each utilizing on a five-point Likert scale (5=always, 4=often, 3=sometimes, 2=rarely, 1=never). Scores could range from 15 to 75, with higher total levels reflecting a higher level of procrastination.² Fatigue was measured using a 13-item scale covering both physical and mental exhaustion. Five items focused on motor fatigue, while eight items assessed cognitive fatigue. Each item was rated on a five-point scale from 1 (never) to 5 (always), resulting in total scores in ranges from 13 to 65. Higher scores indicating greater levels of fatigue.²

A pilot study with 20 participants was carried

out to check the clarity, understandability, and practicality of the questionnaire. According to their feedback, minor word changes were made to improve precision. Data from the pilot study participants was not included in final analysis. The reliability of the procrastination scale was assessed by using Cronbach's alpha statistics, with the procrastination scale showing good consistency ($\alpha=0.90$) and the fatigue scale demonstrating high internal consistency ($\alpha=0.92$).

Data were analysed using SPSS 25. Descriptive statistics, like mean, standard deviations, frequency, and percentages were used to summarize the participants' demographic data and questionnaire scores. Bivariate linear regression was carried out to examine the relationship between procrastination (as the independent variable) and total fatigue score (as the dependent variable). Before running the analysis, key assumptions of linear regression, including normality, linearity and independence were checked. Results with $p \leq 0.05$ were considered statistically significant.

RESULTS

The study included 206 participants, mostly young adults. The largest groups were aged 21–25 years (107, 51.94%) and 15–20 years (95, 46.12%), with a very small number (4, 1.94%) aged 26–30 years, and no participants in the 31–35 age range. Most of the sample were graduates (175, 84.95%), reflecting a highly educated group. The remaining participants had higher secondary education (9, 4.37%), having post-graduate degrees (8, 3.88%), specialty education (8, 3.88%), or other educational backgrounds (6, 2.91%).

Regarding sleep, most participants (151, 73.30%) reported 5–8 hours per day, consistent with typical adult sleep recommendations. A smaller portion (43, 20.87%) slept more than 8 hours, while 11, 5.34% reported less than 5 hours daily. Sleep data for one participant (0.49%) was invalid. Overall, this sample represents young, well-educated adults with generally adequate sleep patterns. (Table-1).

Table-1: Summary of sample characteristics (n=206)

Characteristic/Category	Frequency (N)	Percentage
Age		
15–20 years	95	46.12%
21–25 years	107	51.94%
26–30 years	4	1.94%
31–35 years	0	0%
Education Level		
Higher Secondary	9	4.37%
Graduate	175	84.95%
Post-Graduate	8	3.88%
Specialty	8	3.88%
Other	6	2.91%
Sleep Hours/24 hours		
Less than 5 hours	11	5.34%
5–8 hours	151	73.30
More than 8 hours	43	20.87
Invalid data	1	0.49

The correlation Table-2 shows the association between procrastination (PR) and fatigue (FA) using Pearson correlation. The Pearson correlation coefficient between PR and FA was 0.477, indicating a moderate positive correlation. There was a clear and meaningful impact of procrastination on fatigue. (Table-2).

The regression model yielded Beta coefficient as 0.830, R-square as 0.228, and an F-statistic of 60.096, which was highly significant ($p < 0.001$).

Table-2: Association between procrastination and fatigue

		PR	FA
PR	Pearson Correlation	1	0.477**
	<i>p</i> (2-tailed)		0.000
	N	206	206
FA	Pearson Correlation	0.477**	1
	<i>p</i> (2-tailed)	0.000	
	N	206	206

**Correlation is significant at 0.01 level

DISCUSSION

This study observed a clear positive relationship between procrastination and fatigue in students and young professionals. Procrastination accounted for 22.8% of the variation in fatigue scores, highlighting its role as a meaningful predictor. The moderate positive correlation ($r=0.477$) and the statistically significant regression results indicate that higher procrastination is linked to greater mental and physical fatigue. In this group of young, well-educated adults, those who reported higher levels of procrastination also experienced more mental fatigue, including reduced focus, slower decision-making, and a general sense of mental drain, along with lower physical energy.¹¹ Cognitive fatigue here appears to stem from the mental toll of delaying tasks, dealing with internal conflict, and facing repeated deadline pressure. Motor fatigue, meanwhile, may develop when postponed tasks are completed hastily under pressure, requiring extra physical effort in a short time.¹⁻¹⁰ This cycle of delay followed by urgent work seems to intensify both mental and physical exhaustion.

Procrastination has long been conceptualized as a failure of self-regulation.¹² Students who manage their tasks well usually show stronger executive control, higher academic performance, and greater self-confidence.¹³ In contrast, chronic procrastination is linked to delayed preparation, last-minute work, and increased emotional stress.¹⁴ While much research has focused on its academic and psychological effects, less is known about how it relates to mental and physical fatigue. Our study adds to this understanding by showing that procrastination is not only tied to emotional strain but also to measurable symptoms of cognitive and motor fatigue as shown by high scores of responses in questionnaire.

From a psychological standpoint, procrastination often serves as a way to avoid tasks that trigger anxiety.¹⁵ Comparable to this study our participants reported when academic demands feel overwhelming, putting off work can provide brief relief. Yet this temporary ease is usually followed by increased stress, self-criticism, and pressure to meet deadlines.^{11,12} Prolonged stress sometimes involving heightened sympathetic nervous system activity can drain students mental energy and can lead to feeling of exhaustion as shown by findings of Khan *et al.*¹⁴ Neuropsychological models point to reduced efficiency in prefrontal brain regions that govern executive control and decision-making.¹⁶ When these cognitive processes are impaired, starting tasks become harder, errors become more taxing to monitor, and mental fatigue intensifies. Our results align with these models, highlighting how delaying tasks is closely linked to both behavioural and neurocognitive strain.¹⁵

The regression results in our study reinforce this interpretation. Procrastination accounted for almost a quarter of the variation in fatigue, showing that its influence is meaningful, even if not the sole factor. These findings are consistent with previous research linking procrastination to reduced cognitive efficiency, higher stress levels, and excessive engagement with digital devices.¹⁷

Interestingly, most participants reported getting 5–8 hours of sleep per night, which falls within the recommended range. This suggests that the fatigue observed in our sample was unlikely to be caused solely by lack of sleep. While previous studies have linked delaying bedtime and poor sleep quality to lower cognitive performance¹⁸, our results indicate that procrastination itself even when sleep is adequate can contribute to fatigue as shown by Windred DP *et al.*¹⁸ This distinction is important, as it points to procrastination as a direct behavioural factor rather than just a consequence of insufficient rest.

The academic environment plays a key role in this process. Students in challenging programs often face continuous mental demands and performance pressure. When tasks are postponed, these pressures can increase emotional exhaustion and reduce both mental and physical efficiency. Stress-avoidance models suggest that when individuals see a task as threatening or overwhelming, they may temporarily withdraw or delay engagement.¹⁹ From a practical point of view, these findings emphasize the value of improving self-regulation skills. Various strategies such as breaking long tasks into smaller steps, setting clear objectives, and restructuring unhelpful thought patterns can help reduce procrastination and the fatigue that accompanies it. Behavioural approaches like ‘if then’ planning, structured to-do lists have been shown to support better task initiation and completion.²⁰ Cognitive-behavioural

techniques may be especially useful, as procrastination is often fuelled by irrational beliefs, fear of failure, and negative automatic thoughts.²¹ Psychological support programs, mindfulness practices, and lifestyle adjustments can further enhance academic resilience and help reduce both mental and physical exhaustion.²²

This study adds to the rising evidence that procrastination is more than a simple habit it has measurable effects on both mind and body. By showing its link to mental and physical fatigue in young adults, our findings expand the view of procrastination from being just an academic delay to a factor affecting overall well-being. Future research using longitudinal designs could help clarify cause-and-effect relationships and examine how factors like stress response, executive functioning, and emotional regulation might influence this connection. Gaining insight into these mechanisms could guide the development of specifically targeted strategies to reduce procrastination and the fatigue.

CONCLUSION

Procrastination is a strong predictor of both mental and physical fatigue, with higher levels linked to greater exhaustion. Tackling procrastination through practical strategies like setting clear objectives, breaking longer tasks into manageable small steps, and limiting digital distractions may help reduce fatigue, improve academic performance, and boost professional efficiency.

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