



RELATIONSHIP BETWEEN MENTAL FATIGUE AND ACADEMIC PERFORMANCE AMONG COLLEGE STUDENTS

Physiotherapy

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ABSTRACT

Objective: To examine the correlation between academic performance and mental fatigue levels among undergraduate physiotherapy students, utilizing the Mental Fatigue Scale (MFS) as the primary outcome measure. **Background:** Academic success in physiotherapy programs demands sustained cognitive effort, practical engagement, and emotional resilience. Prolonged academic stress may contribute to mental fatigue, potentially impairing cognitive functions such as memory, attention, and decision-making. Understanding the relationship between mental fatigue and academic performance could help in developing strategies to support student well-being and optimize academic outcomes. **Methods:** A cross-sectional study was conducted among undergraduate physiotherapy students. Participants completed the Mental Fatigue Scale (MFS), a validated tool assessing symptoms such as concentration difficulties, mental recovery time, sensitivity to stress, and emotional lability. Academic performance was assessed via cumulative grade point average (CGPA). Pearson's correlation coefficient was used to analyse the relationship between MFS scores and academic performance. **Results:** Preliminary findings indicate a statistically significant negative correlation between mental fatigue and academic performance ($r = -0.43$, $p < 0.01$), suggesting that higher levels of mental fatigue are associated with lower academic achievement. Further subgroup analysis showed that senior-year students reported higher mental fatigue scores compared to juniors, indicating a cumulative effect of academic pressure over time. **Conclusion:** The study highlights a moderate inverse relationship between mental fatigue and academic performance among undergraduate physiotherapy students. These findings underscore the importance of early interventions and mental health support systems to manage fatigue and improve educational outcomes in health science education.

KEYWORDS

Mental Fatigue, Academic Performance, Physiotherapy Students, Mental Fatigue Scale (MFS), Undergraduate Education, Cognitive Stress

INTRODUCTION

The academic performance is a complex integration of various aspects such as study habits, personality traits and personal interests of a student as well as teaching skills of a concerned faculty. Mental fatigue is commonly known as exposure to prolonged mental stress, a state of mind, where the person experiences cognitive stress and overwhelming mental pressure due to cognitive abilities. The study focuses on what can be the relationship between the workload and mental fatigue. Understanding the relationship between mental fatigue and academic performance is crucial, as it sheds light on how cognitive overload and emotional strain may hinder learning outcomes, reduce productivity, and contribute to academic burnout. This study aims to explore how mental fatigue influences various dimensions of academic performance, including memory retention, problem-solving ability, and overall academic achievement. A Danish study revealed that for every hour later in the day, children's test scores decreased by 0.9% of a standard deviation due to increasing mental fatigue in daily learning (Sievertsen et al., 2016). Many students experience high level of stress and anxiety which can contribute to mental fatigue understanding how mental fatigue correlates with the academic performance finds significant hindrance in the academic of the students. Mental fatigue can impair cognitive functions such as concentration, memory retention, and decision-making, all of which are critical to academic success. Studying this relationship can help identify the extent to which fatigue hinders academic performance. College students often exceed 8 hours of screen time daily, which correlates with decreased attention span, reduced cognitive abilities, increased stress, and lower academic achievement.

METHODOLOGY

- Study setting : Nehru college of physiotherapy
- Study duration: 4 months
- Study sampling: convenient sampling method
- Study design: correlation study
- Out come measure and tool: Mental fatigue and mental fatigue scale

Selection Criteria

Inclusion Criteria

- Both males and females were included
- Undergraduates – among 90 – 85 students were taken
- Cooperative students
- Sleep disturbances
- Increased screen time that includes 8 hours per day

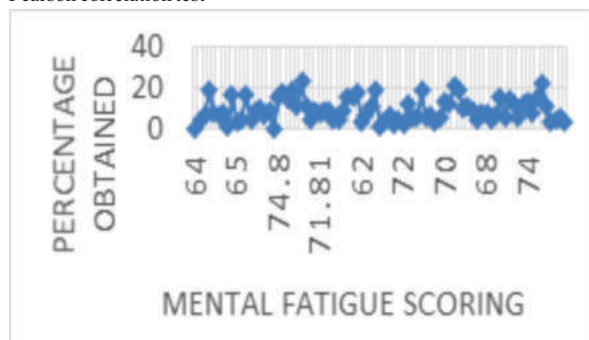
Exclusion Criteria

- Student with psychiatric diagnosis

- Chronic neurologic disease - EPILEPSY
- Recent major life stressor in the past three months – serious illness, family crises
- Students under medication

Procedure

The study carried out with a informed concern of the volunteers. The participants include second years and the third years. A google form was created with the base of Mental fatigue scale. The participants completed an online survey and the data were taken and analyzed with Pearson correlation test



Graph 1.1 Relationship Between Mental Fatigue Score and Percentage Obtained

Table – 1

Statistic	Value	Interpretation
Correlation Coefficient (R)	0.1129	Positive correlation, but very weak
Strength of Relationship	Weak	$r < 0.2$ indicates minimal linear association
Direction of Relationship	Positive	-
Statistical Significance	Not significant ($p > 0.05$)	No strong evidence of a meaningful relationship

The Above graph 1.1 Shows The Relation Between The Mental Fatigue And The Academic Performance, The Correlation Coefficient Shows Gives The R Value Of 0.1129 which is less than 0.2 shows This Shows There Is A Positive Correlation Between The Variables But It Is Weak.

DISCUSSION

High academic pressure and competition are common in South Indian colleges, especially in engineering, medical, and arts & science streams. This often leads to performance anxiety and mental fatigue. Mental fatigue and physical fatigue represent distinct phenomena. Physical fatigue refers to tiredness resulting from repeated muscle activity (Mizuno et al., 2011). In contrast, mental fatigue is a psychobiological state arising from extended engagement in cognitively demanding tasks, leading to decreased cognitive performance efficiency (Craig, 2014; Tanaka, Ishii & Watanabe, 2014).

Mental load is conceptualised in terms of perceptual load and processing capacity. Perceptual load refers to the quantity of information required to process a given task (Forster & Lavie, 2016). Elevated perceptual load induces inattention blindness, which subsequently impairs memory performance (Murphy, Groeger & Greene, 2016; Murphy & Greene, 2016).

Perceptual load is one reason for high mental load, but higher mental load can also happen from tasks that use executive functioning skills, even if they don't have a high perceptual load (Blair, 2016). Another thing is processing capacity, which is how much information a person can handle at once (Hancock et al., 2021; van Elburg et al., 2021). When someone reaches their limit, it becomes hard to take in new information, leading to mental overload. Spending a long time in mental overload can cause mental fatigue (Mizuno et al., 2011). A study in which cross-sectional study of 138 nursing students at AJA University of Medical Sciences, Tehran (2013). Tools used: Pittsburgh Sleep Quality Index (PSQI) and Fatigue Severity Scale (FSS). High prevalence of poor sleep and fatigue during exams. Improving sleep quality may help reduce fatigue and enhance student well-being, even if academic performance isn't directly affected.

The correlation analysis between academic performance and mental fatigue yielded a coefficient of 0.112, suggesting a weak positive relationship between two variables. It indicates that increase in mental fatigue are only minimally associated with increase in academic performance. The weak positive can be interpreted as an indication that students who exert more mental effort potentially leading to greater fatigue. May be slightly more academically engaged or motivated, thereby achieving marginally better academic outcomes. It is possible that students who are high achieving tend to push harder, which results in higher level of mental fatigue.

Mental fatigue is primarily associated with changes in the frontal and posterior regions of the brain. Research examining brain wave activity has shown that mental exhaustion corresponds with an increase in slow-wave activity across the cortex (Craig et al., 2012; Qi et al., 2019). This pattern suggests that under sustained cognitive demand, the brain's capacity to manage stress diminishes, resulting in slower neural processing (Klimesch, Sauseng, & Hanslmayr, 2007). Consequently, individuals experience reduced alertness and impaired performance on cognitively demanding tasks. Additionally, neuroimaging studies have indicated that mental fatigue leads to decreased activation in specific brain areas, particularly in the posterior midline regions involved in object recognition, as well as other areas responsible for language processing, memory, visual perception, and multisensory integration. (Tanaka, Ishii & Watanabe, 2015).

Research has shown that mentally fatigued individuals tend to have decreased performance in cognitive tasks that require vigilance, sustained attention, and divided attention (Smith et al., 2019). On the one hand, this observation could be partially attributed to fatigue-related motivation. Motivation has been found to play a role in the declining cognitive performance observed in mentally fatigued individuals. A study comparing cognitive performance found that individuals who were not being rewarded showed less cognitive effort, a decreased frequency of saccades, and increased blinks compared to participants who were expecting a reward, both groups reporting mental fatigue (Herlambang, Taatgen, & Cnossen, 2019). Similarly, it was found that individuals with higher levels of intrinsic motivation performed better in a cognitive task compared to those with low levels of intrinsic motivation, regardless of whether they were mentally fatigued or not (Herlambang, Cnossen, & Taatgen, 2021). Nevertheless, there are limited objective measures to firmly associate the motivation decline caused by mental fatigue to be the core factor of a poorer cognitive performance (Jimura, Locke & Braver, 2010).

CONCLUSION

This study concludes that there is a weak positive correlation between academic performance and mental fatigue. This study focuses only on academic stress. Future studies should focus on health issues. Familial stressors can be added where the students face a different level of stress

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