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The Effect of Physical Activity on Cognitive Function on Young Adults Among UiTM Seremban 3



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Abstract | In the demanding landscape of university life, where sleep deprivation and mental exhaustion are commonplace, this study explores whether physical activity could be a game-changer for students, enhancing both academic success and overall well-being. Could physical activity be key to unlocking more significant cognitive potential and ensuring restorative sleep? Purpose: Although exercise and sleep quality are associated with cognitive function, their beneficial effects on cognitive function remain unclear. This study examines the impact of physical activity on sleep quality and cognitive function. Methods: 26 healthy young adults (age 22.3 ± 1.04 years) participated in this study. The Exercise amount was assessed using a uniaxial accelerometer. This study evaluated physical activity and sleep quality by actigraphy. Cognitive function was tested using the N-back task and the Wisconsin Card Sorting Test (WCST). Results: There were no significant associations between physical activity and sleep quality ($B = -2.63e-4, p = 0.616$), N-back task performance ($B = -2.84e-4, p = 0.670$), or WCST performance ($B = -2.61e-5, p = 0.679$), while sleep quality was significantly associated with N-back task performance ($B = 0.540, p = 0.030$) but not WCST performance ($B = 0.0401, p = 0.097$). Conclusion: Physical activity was not significantly associated with sleep quality or cognitive function. However, sleep quality was positively associated with working memory performance, suggesting that better sleep quality may enhance cognitive abilities in specific domains.

Keywords: Physical activity, accelerometer, N-Back Test, working memory, Wisconsin Sorting Card test (WCST), executive function.

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I. INTRODUCTION

The dynamic and intellectually stimulating atmosphere of a university campus, populated by young adults, provides an optimal setting to examine the potential cognitive benefits of physical activity. This study aims to investigate and comprehend the impact of physical activity on cognitive function among young adults enrolled at Universiti Teknologi MARA (UiTM) Seremban 3.

II. METHODS

A cross-sectional correlational research design was employed to examine this relationship in a sample of 26 conveniently selected, healthy students representing various faculties within the university. Participants (age 22.3 ± 1.04 years) underwent cognitive assessments using the Wisconsin Card Sorting Test (WCST) and the N-Back Test, while physical activity levels were measured using an accelerometer (Actigraph) over a seven-day period.

III. RESULTS AND DISCUSSION

There was no significant correlation between levels of physical activity and cognitive function. For working memory, N-Back test ($B = -2.84e4$, $p = 0.670$), and executive function, the WCST test ($B = -2.61e5$, $p = 0.679$). There is insufficient evidence to support the association between physical exercise and cognitive performance in young to middle-aged individuals, according to some studies [1], whereas other studies have found a strong positive correlation [2]. Even though physical activity, sleep, and nutrition may not be reliable indicators of cognitive function in young and middle-aged individuals, according to some studies [3]. It suggests that while students may not exercise frequently, the pressures of college life, such as time management and presentations, may aid in the improvement of their working memory and executive function [4].

TABLE I
LINEAR REGRESSION TABLE

	Linear Regression Analysis	
	<i>b</i>	<i>p</i>
N-Back	Mean Correct %	
Physical Activity	-284e-4	0.670
WCST	z-axis WCST	
Physical Activity	-2.61e-5	0.679

IV. CONCLUSIONS

Despite the study showing that university students' physical activity levels on cognitive performance, working memory, and executive function were performed not that well, because there were also other factors, it emphasizes the importance of prioritizing healthy sleep habits for students to achieve optimal academic performance and overall well-being. Future studies should employ larger sample sizes for cognitive evaluations, and greater sample numbers to fully clarify this association.

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