

Correlation Between Aerobic Exercise, Sleep Quality, and Daytime Sleepiness in Florida Gulf Coast University Graduate Students

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Introduction

College and graduate-level students in the U.S frequently report high stress levels, with lack of / poor sleep being one of the most cited reasons for this stress.¹ Aerobic exercise, a very popular forms of recreational physical activity, has positive correlations with improved sleep parameters in prior studies.^{2,3} Two frequently consumed substances, alcohol and caffeine, also play a role in overall sleep health.^{4,5} This study aims to determine if aerobic exercise and improved sleep parameters were correlated in graduate-level students, and if the variables of caffeine and alcohol potentially effect this relationship.

Objectives

The purpose of this study was to determine if aerobic exercise and better sleep quality (measured by the Pittsburgh Sleep Quality Index [PSQI] and Epworth Sleepiness Scale [ESS]) had a positive correlation in graduate students. Further analysis was done to see if confounding variables (alcohol and caffeine intake) had a relationship with aerobic exercise or average sleep duration.

Methods

This study used an anonymous online survey that required participants to fill out 2 validated outcomes that measured sleep disturbances and daytime sleepiness (with a higher score indicating greater sleep disturbances), while also entering the amount of average aerobic exercise (in minutes) per week they participated in. They were also asked to report the average number of alcoholic and caffeinated beverages they consume on a weekly basis. Statistical analysis was performed to determine if a correlation coefficient of .30 was present with a statistical significance of $p < .05$ via power analysis. To reach this level, a desired participant level was set at 68.

Results

Table 1: Descriptive Analysis of Results

Variable	Responses (N)	Mean	SD	p	Distribution
Average minutes of aerobic exercise per week	26	154.96	±112.169	.07	Parametric
Average hours slept per night	26	7.38	±.908	<.05	Non-parametric
PSQI score	26	4.85	±2.053	.05	Parametric
ESS score	26	6.88	±3.315	<.03	Non-parametric
Average Alcohol intake (drinks per week)	26	2.96	±3.156	<.05	Non-parametric
Average Caffeine intake (drinks per week)	26	5.81	±3.359	.3	Parametric

Table 2: Results of Correlational Statistics

Variables	Test used	r	p
Average hours slept per night and average minutes per week performing aerobic exercise	Spearman's rho	.18825	.35707
Average minutes per week performing aerobic exercise and PSQI score	Pearson's correlation	-.119	.586281
Average minutes per week performing aerobic exercise and ESS score	Spearman's rho	-.17173	.40156
Average hours slept per night and average weekly caffeine intake	Spearman's rho	.17504	.39242
Average hours slept per night and average weekly alcohol intake	Spearman's rho	.19978	.32784
Average minutes per week performing aerobic exercise and average weekly alcohol intake	Spearman's rho	.24414	.22938
Average minutes per week performing aerobic exercise and average weekly caffeine intake	Pearson's correlation	-.156	.446655

Data Analysis

This survey received 26 responses, well below the intended 68. Correlational analysis was performed based on the distribution of the data set. In the case of correlations using a validated outcome measure, a favorable result is indicated by a negative correlation. Out of all the results, none reached statistical significance ($p < .05$). For the purposes of this study, correlation coefficient (r) values were defined as weak ($r = .25$), moderate ($r = .50$), and strong ($r = .75$).⁶

Discussion

The results of this study indicate that individuals who perform increasing amount of aerobic exercise have a weak correlation with reporting sleeping more, having higher sleep quality, and having more daytime energy. However, there is still the potential that the confounding variables alcohol and caffeine play a role in this relationship. Individuals who report obtaining more sleep on average have a weak-to-moderate correlation with consuming more alcohol and caffeine, both of which could potentially alter sleep habits and daytime energy. Although individuals who perform more aerobic exercise report consuming more alcohol, they actually consume less caffeine overall, indicating that daytime energy may be more influenced by aerobic exercise.

Conclusions

According to this research, increasing levels of aerobic exercise are mildly associated with improved sleep quality, greater sleep duration, and less daytime sleepiness. However, some of these relationships may be influenced by similar associations between aerobic exercise / sleep duration and the popular stimulants alcohol and caffeine. Several limitations exist in this current study. These include, low sample size, historically poor survey response rate, honesty about habits (exercise, sleep, and substances), and the potential for change in habits throughout a year.