Academic Performance in relation to Physical Activity among University Students during COVID 19 Pandemic Measures

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ABSTRACT

Background: (COVID-19), which is currently causing havoc in practically every country on the planet. Most countries implemented a stay-at-home order to limit the spread of COVID-19 during the beginning of the pandemic. It is safe to say that Saudi Arabia is among the countries that have adopted this technique, and all phases of education have been carried out remotely via the Internet, using online learning. Children, adolescents, and adults who engage in regular physical activity have been demonstrated to be healthier and lessen the chance of developing numerous diseases. Recent years have seen an increase in interest in the link between regular physical activity and academic success, particularly in the professional education system. The purpose of this study is to investigate the link between physical exercise and academic achievement among university undergraduates. in Al-Riyadh and Al-Kharj in KSA during COVID-19 Lock-down.

Methods: Cross-sectional study, Cochran's Formula was used to compute sample size 400 participants. All of the participants were undergraduate male and female students from several university colleges in Riyadh and Alkharj, Saudi Arabia, who were between the ages of 19 and 24 years. Data was gathered through the use of a self-administered online questionnaire, which was then disseminated via Google Form. Engaging in physical activity (PA) for the week, we used an Arabic version of the International Physical Activity Questionnaire The grade point average (GPA) was used to determine academic performance (GPA).

Results: Moderate to high levels of physical activity were found to be associated with improved academic performance (p 0.05), but low levels of physical activity had no effect.

Conclusion: Moderate and high physical activities were found to have a strong correlation with academic achievement. No difference between academic performance in males and females. Physical exercise is thought to be a significant element influencing university students' academic success..

Key words: COVID-19, Physical activity, Academic performance, Body mass index

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INTRODUCTION

Infecting humans with the highly contagious SARS-CoV-2 virus (severe acute respiratory syndrome coronavirus-2 causes coronavirus disease-19 (COVID-19), which is wreaking havoc in nearly every country on the earth [1]. From the beginning of the epidemic, the majority of countries implemented a stay-at-home order and encouraged facemask use and personal hygiene practices in an effort to reduce the transmission of COVID-19 [2,3]. One of the countries is Saudi Arabia that has adopted this

technique, and all phases of education have been carried out remotely via the Internet, using online learning. Multiple behavior changes were documented by staying at home and not spreading the virus, especially in year one when COVID-19 was a pandemic. Disturbed eating habits are one of the most typical side effects [4]. During the virus outbreak, a variety of psychological effects were identified, including a decrease in well-being and an increase in depressed and anxious symptoms [5,6]. Children, adolescents, and adults should engage in regular physical activity has been shown to improve health and lessen the chance of developing numerous diseases in previous study studies [7].

Depression, anxiety, and well-being can all be prevented and managed by regular physical activity (PA), which is widely accepted to play an important role [8,9]. The connection between regular physical activity and academic success has gained prominence in recent years, particularly in the professional education system. Many researchers believe that Academic performance and physical fitness are closely linked. There are numerous streams of empirical evidence [10] show that Physical activity has been linked to better academic performance in adolescents. improved cognitive and psychomotor development [11].

The basis for PA's influence on AP has been postulated to be that the parts of the brain associated with cognition benefit from PA [12], particularly the increasing levels of neurotransmitters and altering the control of neurotrophins, a process executive function can be improved. [13,14]. Furthermore, neuroimaging studies have shown that single bouts of exercise or frequent activity cause alterations in the brain [15,16].

An increase in the percentage of fat mass to muscle mass can lead to obesity when the ratio of height to weight exceeds the optimal threshold. Globally, the use of BMI as a screening indicator for morphological development and nutritional status is common since fat content is associated with a variety of long-term health implications and increased risk of disease. As a result, BMI is an important indication for detecting weight disorders [17].

BMI is a widely used metric for determining the association between weight issues, such as obesity, and academic achievement. In addition to being more susceptible to mental health concerns like anxiety and depression, obese university students are also more likely to be socially isolated [18]. During the COVID-19 Lock-down in Saudi Arabia's Al-Riyadh and Al-Kharj cities, this study aims to see if students' participation in physical exercise affects their academic performance.

METHODS

The easy sampling approach was utilized in this cross-sectional investigation. Cochran's Formula was used to compute sample size. There were 400 responses altogether, with 13 incomplete surveys being eliminated,

leaving 387 responses for study, 197 males and 190 females. All of the participants were undergraduate male and female students from several university colleges in Riyadh and Alkharj, Saudi Arabia, who were between the ages of 19 and 24 years.

Data collection
Data were gathered through the use of a self-administered online questionnaire, which was then disseminated via Google Form. The data was collected for 30 days, from July 1 to July 30, 2021. It was separated into two sections: the first contained anthropometric and demographic data such as age, weight and height; the second contained a question to assess if they are free of chronic disease; and the third contained a question about their GPA. The physical activity pattern was measured in the second section.

Physical activity
The International Physical Activity Questionnaire (IPAQ) was used to gather data on students' weekly physical activity (IPAQAn Arabic translation of the brief IPAQ questionnaire was employed (19). The survey inquired about seven different aspects of physical activity, including how much time was spent doing vigorous and moderate exercises, walking, and sitting, in the workplace, daily life, and leisure. It was decided to document only those activities that lasted for at least 10 minutes with no significant breaks in the prior seven days. It was necessary to multiply the reported time (in minutes) by the MET unit intensity (in METs) for each activity to arrive at an overall MET value of 8, 4, or 3.3. It was estimated by putting the three types of activities together and expressing it in MET-min/week; additionally, the total weekly sitting time was recorded. The following was the outcome of the analysis: Low activity (below 600 MET-min/week), i.e. not meeting the threshold for moderate or high activity.

One or more of the following conditions must be met for a moderate amount of exercise: Three or more days of vigorous activity, at least 20 minutes a day; five or more days of moderate activity or walking, at least 30 minutes a day; or five or more days of any combination of the aforementioned, with a total weekly activity exceeding 600 MET-min (calories expended per minute).

One or more of the following conditions must be met: Two of the following: a. Three or more days of vigorous exercise totaling at least 1500 MET-min per week; b. Seven or more days of any combination of vigorous, moderate, or walking activities totaling at least 3000 MET-min per week [19].

Body Mass Index (BMI)
Weight categories (underweight, normal weight, overweight, and obese) and the level of fat deposition that may pose a health risk can be determined using BMI, which is a simple and effective method. Based on the relationship between weight (kg) and height (m), it is an international metric (meters). Using percentiles,

the data is transformed [20].

Academic performance

According to NCAHE/NCAA, the following factors went into calculating a student's grade point average (GPA); the criteria utilized by NCAHE/NCAAA are as follows: A+ (grade between 95 and 100) is equal to a score of 5.0. To put it another way, grades 90 to less than 95 equal 4.75=A It's an A+ if your grade is 90 to fewer than 95. Grade 85 to less than 90=4.5=B- 4.5 out of 5 stars, which equates to a B+ in grades 85 to 90. In the 80-to-85 range, a 4.0 grade is equivalent to a "B." Grades of 80 to less than 85 (4.0) are considered excellent; Graduation from 75 to less than 80=3.5 Grades 75-80=3.5=C+; excellent work. Graduation from 70 to 75 is 3.0, which is a C; good, grade 70 to 75 is 3.0. Perfection for the grade of D+ in the 65-70 range: 2.5 Grades of 60-75=2.0=D pass, grades below 60=1.0=F fail. a flop [21]. GPA was calculated based on the last academic year attended during the COVID 19 lockdown period.

Statistical design

All the data were entered into SPSS (Statistical Package for Social Science) version 21 and other statistical applications for the purpose of analyzing it. There were two categories of statistics:

Descriptive statistics, these statistics include percentages (percent), mean values (x) and standard deviations (SD).

Analysis statistics include the following, as outlined in the table

Chi-square test ($\chi2$): It was used to indicate presence or absence of a statistically significant difference between two qualitative variables.

Independent Samples t Test: It was used to compare the means of two independent groups to indicate presence or absence of a statistically significant difference.

ANOVA: It was used to find out whether the differences between groups of data are statistically significant. It works by analyzing the levels of variance within the groups through samples taken from each of them.

Pearson correlation: It was used as a measure of the strength of a linear association between two quantitative variables. P-value of <0.05 was considered statistically significant.

RESULTS

Results are mentioned in the tables (Table to Table 5) and Figure 1.

Table 1: Characteristics of study participants (N=387).

Characteristic	Value
Demographic	
Age, y	
Mean ± SD	20.8 ± 1.6
Range	19- 24
Height, m	
Mean ± SD	1.67 ± 0.09
Range	1.45 – 1.91
Weight, kg	
Mean ± SD	72.2 ± 10.2
Range	52-94
BMI, n, %	
Underweight (<18.5)	8 (2.1)
Normal weight (18.5–24.9)	170 (43.9)
Overweight (25–29.9)	134 (34.6)
Obese (>30)	74 (19.1)
Mean ± SD	26 ± 4.3
Range	17–38.3
Sex, n, %	
Male	197 (50.9)
Female	190 (49.1)
SD: Standard Deviation	
M: Meter	
Kg: Kilogram	
Y: Year	
BMI: Body Mass Index	

Table 2: Distribution of physical activity and academic performance among the study participants.

	The sample (N=387)	
The variable	Frequency	%
Physical activity		
Low	182	47
Moderate	84	21.7
High	121	31.3
Academic performance		
Low	136	35.1
High	251	64.9

Table 3: The physical activity in relation to the different characteristics of study participants.

| Items	The physical activity						Test	P. value
	Low		Moderate		High			
	No.	%	No.	%	No.	%		
Sex								
Male	80	44	45	53.6	72	59.5	χ^2= 7.336	0.026*
Female	102	56	39	46.4	49	40.5		
Age								
Mean ± SD	20.7 ± 1.6		20.8 ± 1.4		21.1 ± 1.7		F= 2.4	0.08
Height								
Mean ± SD	1.67 ± 0.09		1.66 ± 0.09		1.7 ± 0.09		F= 0314	0.731
Weight								
Mean ± SD	80.05 ±6.6		67.4.3 ± 4.8		63.9 ± 8.6		F= 215.3	0.000*
BMI								
Mean ± SD	28.9 ± 3.7		24.6 ± 3.3		22.8 ± 4.3		F= 128.1	0.000*
χ^2: Chi-square test								
t: Independent Samples t Test								
F: ANOVA								
SD: Standard Deviation								
%: Percentage of column								
*: Significant								

Table 4: The academic performance in relation the physical activity, body mass index and sex among the study participants.

Items	Academic performance				Test	P. value
	Low		High			
	No.	%	No.	%		
Physical activity						
Low	104	76.5	78	31.1		
Moderate	15	11	69	27.5	χ^2= 73.280	0.00*
High	17	12.5	104	41.4		
Body Mass Index (classified)						
Underweight	1	0.7	7	2.8		
Normal weight	37	27.2	133	53.2	χ^2= 32.874	0.00*
Overweight	56	41.2	78	31.2		
Obese	42	30.9	32	12.8		
Body Mass Index (General)						
Mean ± SD	27.9 ± 4.3		25 ± 3.9		t= 6.339	0.000*
Sex						
Male	61	44.9	136	54.2	χ^2= 3.073	0.08*
Female	75	55.1	115	45.8		
χ^2: Chi-square test						
t: Independent Samples t Test						
SD: Standard Deviation						
%: Percentage of column						
*: Significant						

Table 5: Correlation between GPA (academic performance indicator) with weight and BMI among the study participants.

	GPA (r- value)	P. value
Weight	-0.402	0.000*
BMI	-0.333	0.000*
Correlation is significant at the 0.01 level		
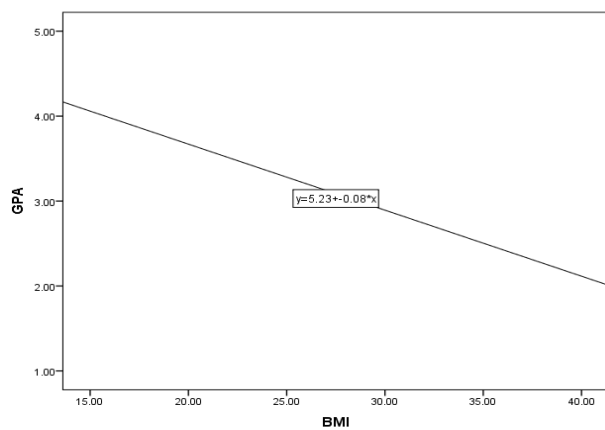
Figure 1: Correlation between GPA and BMI among the study participants.

DISCUSSION

The purpose of the study was to examine the effect of physical activity on academic performance among college students during the COVID-19 lock-down. To name a few, physical activity [PA] has been shown to increase bone strength, muscular health and the likelihood of becoming obese [22,23]. PA has also been shown to improve memory and learning in people of all ages when consumed at high doses [24]. Participant activity was found to be associated with significantly better overall academic performance than participant inactivity, according to this research. The total mean academic achievement of those with a high or medium PA is also much higher.

According to previous research, there should be a positive or negative association between PA and AP, or there should be none at all [25-27]. [22,25,28-30]. The findings of this study are consistent with other studies that have found a positive correlation between PA and AP [22,25-27,31]. It's important to keep in mind that the correlations between PA and AP are at least somewhat determined by how PA and cognitive capacity are linked [28,32,33]. It is also challenging to define PA and AP as variables because they can be defined in many different ways. Certain of the inconsistencies may be attributable to methodological conflicts, small sample sizes in some study, and the fact that genetic impacts change with time. Physical activity improves concentration and attention span by increasing arousal and decreasing boredom [34,35].

Additionally, it's possible that increased physical exercise is associated with an increase in self-respect, which in turn could improve classroom behavior and academic achievement [36]. In addition, significant reductions in anxiety were noted. This finding was in line with other studies showing that regular physical activity might lessen the effects of anxiety-related stress and sadness, improve mood, and even help students do better in school [37]. University students who engage in regular physical activity are less likely to suffer from academic anxiety, stress, and depression, according to past research [38,39]. Also Reduced lipid peroxidation has been found to be a result of regular PA use [40]. Increased expression of many neurotrophic and physiological factors involved in neural survival, differentiation, and memory improvement is one way that physical exercise protects against hippocampal cell injury, which causes brain memory loss [41,42] and facilitates injury recovery and improves cognitive function [43,44].

Study results reveal that moderate aerobic training for 24 weeks increased cognitive function in healthy older individuals, including motor praxis, vasomotor organization, thinking processes and attention/concentration outcomes. An increase in antioxidant capacity and a decrease in oxidative stress free radicals have been found to be associated with this [45]. Students in particular are at risk for a wide range of BMI-related illnesses, including obesity, over- and under-nutrition [46].

The mean BMI of 43.9 percent of the subjects investigated was within the normal range, according to the results of this study. With respect to Al-Momani M's findings, we agree with them [47]. In addition, this study found that more than half of the subjects had a normal BMI. Ikujenlola, et al. [48] and Alazayani, et al. [49] reported that undergraduates' BMI was normal.

According to the results of the current study,

undergraduates with high GPAs had significantly normal BMIs, but those with low GPAs had significantly obese or overweight BMIs. According to Jinbo, et al. [50], and Muhammad et al. [51] who found a weak and negative association between female participants' BMI and their academic performance, these findings are in line with previous studies. BMI or obesity was found to have a negative connection with academic performance by Anderson et al. [52]. There is no correlation between BMI and academic achievement, according to a study conducted in Siri Lanka [18]. Aleidi, et al. findings on the other hand, were in line with the current findings [53]. Several studies, however, have found that BMI has only a little impact on academic achievement [54].

According to the conclusions of this study, male and female college students perform equally well academically. Our findings are in line with those of a number of other studies [55-57]. To explain the enormous rise in female academic achievement, Wilkinson blamed "the gender revolution," which brought about a major shift in attitudes about what women should and shouldn't do in society [58]. Wi-Young So's earlier research found that boys who engaged in vigorous physical exercise were more likely to succeed academically, whereas girls who engaged in moderate physical activity were more likely to succeed academically. In contrast, neither males nor females' academic performance was demonstrated to be connected with strength-training activities [59].

Due to the online nature of the study, no one was able to perform a physical measurement of the participants' height and weight; instead, they were asked to fill out a survey. Because of this, it's possible that these numbers are wrong.

CONCLUSION

Moderate and high physical activities were found to have a strong correlation with academic achievement. No difference between academic performance in males and females. Physical exercise is thought to be a significant element influencing university students' academic success.

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