

Effect of Physical Activity, Exercise and Sedentary Behaviour on Academic Performance of Students in Higher Institutions

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Abstract:

This study investigated the relationship between physical activity, exercise, sedentary behaviour, and academic performance in higher education students. Staying physically active is crucial for preserving general health and well-being. The study aims to investigate the effect of physical activity, exercise and sedentary behaviour on students' academic performance in tertiary institutions. The study employed a descriptive survey design. The population comprised 200 students from the Federal, State and Privately owned tertiary institutions in Ekiti State. Physical activity and exercise levels were assessed using a self-developed questionnaire titled: "Effect of

Physical Activity, Exercise and Sedentary Behaviour on Students' Academic Performance (EPSSAP)" as an instrument for the study. The instrument's dependability was determined using the test-retest procedure. The Pearson Product Moment Correlation (PPMC) was used to collect and analyze the responses. With a reliability coefficient of 0.83, it was found that the instrument proved reliable for the research. Two hypotheses and three research questions were presented. Inferential and descriptive statistics were used to analyze the collected data. The findings of the study revealed that most undergraduate students are aware that regular activities or exercise positively impact their academic performance; the findings of the study further revealed that a sedentary lifestyle makes students too lazy to get involved in physical activities or exercise, which eventually tells on their academic performance and that despite the wealth of knowledge on the importance of being physically active, majority of undergraduate students still live a sedentary lifestyle, among others. The study concluded that physical activity, exercise, and sedentary behaviours are not opposite ends of the spectrum. However, there are distinct behaviours with different predictors and pathways towards students' academic performance in tertiary institutions. Based on the findings, the study recommended that regular exercise can positively impact cognitive function, memory, and attention, which can lead to improved academic performance.

Keywords: *physical activities, exercise, sedentary behaviour, undergraduates, academic performance, higher institutions.*

Introduction

Maintaining an active lifestyle is essential for overall health and well-being. Physical Activity and Exercise are beneficial to the body and mind

in many ways. PA has been shown in numerous researches to improve a person's physiological well-being. However, several studies have demonstrated the negative impacts of inactivity on a person's physiological well-being. The

finding by Warburton et al. (2010) that physical inactivity is a modifiable risk factor for many diseases, including cardiovascular and bone and joint diseases, as well as chronic conditions like obesity, hypertension, and malignancies of the breast and colon, is particularly noteworthy. In recent years, there has been growing interest in the relationship between physical activity, mental health, and academic performance in higher education students. While physical activity has been shown to improve physical and mental health, it is unclear whether it also impacts academic performance. Additionally, mental health has been linked to academic performance, but the nature of this relationship is not well understood. This study sheds light on these complex relationships by examining the association between physical activity, mental health, and academic performance in a sample of higher education students.

Any physical activity that improves or maintains general health and physical fitness is considered exercise (Burke et al. (2017)). It promotes several physiological advantages by engaging muscles and joints. Frequent exercise has several positive effects on one's physical and mental health. Exercise is unquestionably essential for preserving well-being and excellent health. Activities that entail sitting or lying down and demand minimal energy expenditure are called sedentary behaviours. It is typified by inactivity and low levels of physical activity long-term inactivity is linked to several health hazards and can hasten the onset of chronic illnesses.

Physical exercise is directly associated with health and well-being since it improves bone health, muscle strength, cardio-respiratory capacity, and metabolic and cardiovascular markers. Four main types of physical exercise were distinguished by Weissleder (2011): bone-strengthening, aerobic, muscle-strengthening, and muscle, which includes the arms and legs. Running, walking, riding, swimming, and other activities are examples of aerobic exercises. Over time, consistent aerobic exercise develops and improves the function of the heart and lungs, causing the heart to beat faster than usual. Due to its enormous benefits to people and communities, the World Health Organization

(WHO) is a prominent force in promoting exercise and physical activity programs throughout the world (Alla & Ajibua, 2012). They use pedometers to measure physical activity. Michalopoulou et al. (2011) discovered that boys between the ages of 9 and 14 are more physically active than girls. Children who participate in sports and physical activities benefit from this in terms of their social and emotional development since they acquire self-control and self-esteem, disciplined behavior, self-trust, flexibility in new circumstances, cooperation, compromise, and resistance to different issues (Batista et al., 2016).

School physical education has become a critical component influencing young people's future development and plays a significant role in the learning, growth, and physical and mental health of students. According to Luy (2006) in Garber et al., (2011), physical activity can enhance spiritual and cultural pursuits as well as advance physical development and health. Sports that combine anaerobic and aerobic activity with low-, medium-, and high-intensity activities are ball sports like basketball, football, long jump, and other track and field sports. After conducting a literature search on the topics of "physical exercise" and "academic performance," it was discovered that the relevant literature mostly addresses the ideas listed above. As a result, the current study is carried out on a large scale.

Since the mid-1900s, researchers have used various forms of theoretical speculative explanation, questionnaires, and empirical cases to learn about the relationship between physical exercise and academic performance. In the modern era, these researchers have combined social science methods, leading to an improvement in academic achievements (Warm, 2015). Academic performance can be positively impacted by appropriate physical exercise, according to the majority of scholars in this field. However, in the current educational system, parents and certain school administrators prioritize academic performance over cultural learning, which leaves students with little time for physical exercise. Exercise specifically maintains and improves cognitive performance

by improving blood oxygen function, gene expression, and synapse function in brain areas involved in cognitive processing.

Adolescent mental health generally improves with exercise (Asare & Danquah, 2015). Additionally, Fedewa and Ahn (2011) discovered that, while aerobic exercise appears to have the biggest impact, physical activity helps youngsters perform better academically. Curious questions like: "can physical activity or exercise improve academic performance?" and "How do the two affect each other?" or, have researchers searching for solutions; the links between physical activity, teenage cognitive processing capacity, and academic achievement have long been discussed in academic circles.

At any age, maintaining long-term health and wellbeing can be facilitated by leading a conscientious lifestyle. In this regard, engaging in regular physical activity (PA) is essential for reducing non-communicable diseases and major contributors to early morbidity and death. However, 31% of individuals globally do not reach the minimal PA recommendation compiled by professional health associations such as the World Health Organization (WHO, 2010) due to their physical inactivity. Physical inactivity has been identified by the WHO as the fourth greatest risk factor for world mortality (WHO, 2010; Herens, et al. 2016). It has a substantial detrimental impact on individuals and the economy (Ding et al., 2016).

Garber et al. (2011) state that in order to counteract the negative effects of physical inactivity and improve health, the World Health Organisation (WHO) suggests strength training twice a week in addition to 150 minutes of moderate or 75 minutes of intensive physical exercise per week. Walking is considered to be low-intensity physical activity (PA) since it provides the most health benefits at 3,000 metabolic equivalents of the task- (MET-) minutes/week (Kyu et al., 2016). Regardless of the kind of physical activity engaged in, sedentary behaviour (SB) is another factor that has a substantial impact on health and wellbeing. Garber et al. (2011) state that in order to counteract the negative effects of physical

inactivity and improve health, the World Health Organisation (WHO) suggests strength training twice a week in addition to 150 minutes of moderate or 75 minutes of intensive physical exercise per week. Walking is considered to be low-intensity physical activity (PA) since it provides the most health benefits at 3,000 metabolic equivalents of the task- (MET-) minutes/week (Kyu et al., 2016). Regardless of the kind of physical activity engaged in, sedentary behaviour (SB) is another factor that has a substantial impact on health and wellbeing. Due to the sedentary lifestyle of a large portion of Nigerian citizens, particularly the undergraduate population and young people in general, the issue of inactivity has become epidemic in Nigerian society, depriving these individuals of crucial background time during the formative years of their long-term lifestyles. The problem of this study is to learn more about how students view the obstacles and enablers associated with doing exercises and less physical activity. We hypothesized that students who chose to respond to the open-ended questions would offer on-campus intervention components for reducing student sedentary behaviour because there is a dearth of prior research on various groups' perceptions of facilitators and barriers to sedentary behaviour.

The purpose of the study is to investigate the effect of physical activity, exercise and sedentary behaviour on academic performance of students in tertiary institutions.

Research Questions

Does the level of knowledge of undergraduate students on the benefit of physical activity and exercise have an impact their academic success?

2. To what extent does a sedentary activity influence physical activity and sedentary behaviour among undergraduate students in Ekiti State?

3. What is the interwoven effect of physical activities, exercise and sedentary behaviour on academic performance of students in tertiary institutions?

Research Hypotheses

The following research hypotheses were formulated for the study.

1. There is no significant impact of undergraduate students' knowledge of the benefit of physical activity and exercise on their academic success.
2. There is no significant influence of sedentary activities on physical activity and sedentary behaviour among undergraduate students in Ekiti State.

Methodology

A descriptive survey design was used in the course of the study as it allows data to be collected from a representative sample of a targeted population in order to accurately represent situations as they exist, a descriptive survey design was employed. The study was directed at the population of tertiary institutions in Ekiti State. The target population involves all the students in the Faculty of Science in the Federal, State and privately owned tertiary institutions in Ekiti State. Students were randomly selected from different departments and levels through stratified random sampling technique in five (5) tertiary institutions in the State. In all, a total of two hundred (200) students formed the study sample.

A self-developed questionnaire titled: "Effect of Physical activity, Exercise and Sedentary

behavior on Students' Academic Performance (EPESSAP)" was used as instrument for the study. The reliability of the instrument was ascertained by the use of test-retest method. The questionnaire was administered twice within an interval of two weeks on 25 respondents who were not part of the study. The scores of the two sets of responses were collated and analyzed using Pearson Product Moment Correlation (PPMC). A reliability co-efficient of 0.83 was obtained which indicated that the instrument is adjudged reliable for the study.

The data collected was analyzed using both descriptive and inferential statistics. The descriptive statistic of frequency counts, percentages, mean scores and Standard Deviation was used to answer the research questions while the hypothesis 1 formulated for the study was tested using Analysis of Variance (ANOVA), hypothesis 2 was tested using Chi square of independent sample while hypothesis 3 was tested using inferential statistic of Multiple Linear Regression analysis at 0.05 level of significance using SPSS version 23.

Results and Discussion

The result of data analysis and the interpretation of the result are presented below:

Research Question 1

Does the level of knowledge of undergraduate students on the benefit of physical activity and exercise have an impact their academic success?

Table 1. Response to Whether the Levels of Knowledge of Undergraduate Students on the Benefit of Physical Activity and Exercise have an Impact their Academic Success

S/N	ITEMS	SA (%)	A (%)	D (%)	SD (%)	Mean	SD	Remark
1	I am aware that regular activities or exercise positively impact on students' academic performance	96 (48.0)	87 (43.5)	16 (8.0)	1 (0.5)	1.61	.656	SA
2	I am aware of the recommended guidelines for the amount of physical activities or exercise I should be getting each week with its attendant benefits on my academic performance	87 (43.5)	60 (30.0)	41 (20.5)	12 (6.0)	1.89	.934	SA

3	I am aware of the potential health risk associated with prolonged sedentary behaviour and this made me to engage in physical activities and exercise	82 (41.0)	64 (32.0)	38 (19.0)	16 (8.0)	1.94	.960	SA
4	I am aware that regular physical activity and exercise is indistinguishably connected to a plethora of health benefits	59 (29.5)	83 (41.5)	42 (21.0)	16 (8.0)	2.08	.907	A
5	I am aware that regular participation in physical activities and exercise facilitates a students' physical, psychological, and social development	38 (19.0)	98 (49.0)	49 (24.5)	15 (7.5)	2.21	.835	A
6	I am aware that in promoting an overall improved quality of life, physical activity and exercise is extremely beneficial for the learning environment, academic performance and classroom behaviour	96 (48.0)	71 (35.5)	17 (8.5)	16 (8.0)	2.56	.761	SA
7	I am aware that physical activities helps students' fitness and mental capacity to assimilate faster	41 (20.5)	82 (41.0)	67 (33.5)	10 (5.0)	2.23	.831	A
8	I am aware that physical activities and exercise can maintain and improve students' cognitive ability in cognitive processing-related brain regions which helps in students' academic performance	29 (14.5)	106 (53.0)	57 (28.5)	8 (4.0)	2.22	.738	A

The study examined undergraduate students' understanding of the advantages of exercise and physical activity for their academic performance as shown in Table 1. While 8.5% of respondents thought otherwise, the majority of respondents (91.5%) agreed that regular activities or exercise have a favorable impact on academic achievement. The majority of respondents (73.5%) were aware of the benefits of weekly physical activity requirements and their recommendations. They also exercised and participated in physical activities since they understood the possible health concerns connected to long-term inactivity. Frequent exercise and physical activity is linked to several health advantages, supporting social, psychological, and physical growth. It also

improves classroom behavior, academic performance, and the learning environment. The majority of respondents (61.5%) knew that engaging in physical activity improves pupils' fitness and ability to integrate information more quickly, whereas 67.5% thought that exercise and physical activity preserve and enhance cognitive function in brain regions associated to cognitive processing, which aids in scholastic achievement.

Research Question 2

To what extent does a sedentary activity influence physical activity and sedentary behaviour among undergraduate students in Ekiti State?

Table 2. Response to the Extent that Sedentary Activities Influence Physical Activity and Sedentary Behaviour among Undergraduate Students in Ekiti State

S/N	ITEMS	SA (%)	A (%)	D (%)	SD (%)	Mean	SD	Remark
1	Long hours of lectures mostly prevents me from participating in physical activities and exercise on regular basis	69 (34.5)	58 (29.0)	49 (24.5)	24 (12.0)	2.34	.979	SA
2	Long hours spent on computer and watching television habitually prevents me from participating in physical activities and exercise on regular basis	39 (19.5)	88 (44.0)	48 (24.0)	25 (12.5)	2.30	.923	A
3	Undergraduate students' everyday life is characterized by sedentary activities such as visiting lectures, classes and seminars, studying, which enhances sedentary behaviours among them	82 (41.0)	64 (32.0)	38 (19.0)	16 (8.0)	1.94	.960	SA
4	The prevalence of sedentary behaviour appears to be much higher among university students than other arms of educational levels	59 (29.5)	83 (41.5)	42 (21.0)	16 (8.0)	2.08	.907	A
5	Regardless of the physical activities and exercise performed, sedentary behaviour is another factor that strongly influence health and wellbeing of undergraduate students and their academic performance	56 (28.0)	80 (40.0)	57 (28.5)	7 (3.5)	2.08	.838	A
6	Most undergraduate students spend significant part of their waking hours using gadgets such as TV/videos, playing video/digital games and personal computing which ultimately increase their sedentary lifestyle	41 (20.5)	100 (50.0)	40 (20.0)	19 (9.5)	2.19	.869	A

With a mean range of 1.94 – 2.34 and a standard deviation range of .838 – .979, Table 2 presents the statistical analysis of the answer to the extent that sedentary activities influence physical activity and sedentary behavior among undergraduate students in Ekiti State. According to analysis, 63.5 percent of respondents agreed with the statement that lengthy lecture sessions mostly prohibit them from engaging in regular exercise and physical activity, while 36.5% of respondents had a different opinion.

Furthermore, the majority of respondents (63.5%) believed that spending a lot of time on computers and watching television prevents them from regularly exercising and engaging in physical activity, and 73.0% believed that undergraduate students' daily lives are characterized by sedentary activities that encourage sedentary behavior in them, like attending lectures, workshops, and seminars and studying. It appears that university students have

a much higher prevalence of sedentary behavior than students in other educational levels, as evidenced by the following: (71.0%) of respondents; (68.0%) of respondents held that sedentary behavior is another factor that strongly influences undergraduate students' health and wellbeing as well as their academic performance; and (70.5%) of all respondents held that the majority of undergraduate students spend a significant portion of their waking hours using gadgets like TVs, videos, and personal computers, which ultimately leads to a more sedentary lifestyle.

Research Question 3

With a mean range of 1.94 – 2.34 and a standard deviation range of .838 – .979, Table 2 presents the statistical analysis of the answer to the extent that sedentary activities influence physical activity and sedentary behavior among undergraduate students in Ekiti State. According to analysis, 63.5 percent of respondents agreed

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evidenced by the following: (71.0%) of respondents; (68.0%) of respondents held that sedentary behavior is another factor that strongly influences undergraduate students' health and wellbeing as well as their academic performance; and (70.5%) of all respondents held that the majority of undergraduate students spend a significant portion of their waking hours using gadgets like TVs, videos, and personal computers, which ultimately leads to a more sedentary lifestyle.

Research Question 3

There is no significant impact of undergraduate students' knowledge of the benefit of physical activity and exercise on their academic success.

Table 4. One-Way Analysis of Variance (ANOVA) Showing the Impact of Undergraduate Students' Knowledge of the Benefit of Physical Activity and Exercise on Their Academic Success

Source	SS	Df	MS	F	P
Between Group	211.378	2	120.689	3.937	0.021
Within Group	545.400	198	30.652		
Total	566.778	200			

Note: P<0.05

Table 4 presents the findings of a one-way Analysis of Variance (ANOVA) examining the relationship between undergraduate students' knowledge of the benefits of exercise and physical activity and their academic performance. $F = 3.937$, $P = 0.021$ less than the 0.05 significance level was found. This implies that undergraduate students' understanding of the advantages of exercise and physical activity

significantly affects their academic achievement. The null hypothesis was therefore not accepted.

Hypothesis 2

There is no significant influence of sedentary activities on physical activity and sedentary behaviour among undergraduate students in Ekiti State.

Table 5. Chi Square Test Analysis of Influence of Sedentary Activities on Physical Activity and Sedentary Behaviour among Undergraduate Atudents in Ekiti State

Chi-Square Tests					
	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.992 ^a	1	.319		
Continuity Correction ^b	.753	1	.386		
Likelihood Ratio	1.000	1	.317		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	.989	1	.320		
N of Valid Cases	200				
<i>a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 35.88.</i>					
<i>b. Computed only for a 2x2 table</i>					

Table 4 presents the findings of a chi-square test analysis examining the impact of sedentary behaviours and physical activity on undergraduate students in Ekiti State. According to the chi-square test, the estimated χ^2 (.001) was less than the significant level at 0.05. This suggests that passive activities significantly influence sedentary behaviours and physical inactivity among undergraduate students in Ekiti State. Resultantly, the null hypothesis was rejected.

Discussion of Findings

The research investigated how physical activity, exercise, and sedentary behaviour impacted students' academic performance in higher education institutions. The study employed a descriptive approach to address its three research questions and two (2) hypotheses which were tested using inferential statistics, namely Analysis of Variance (ANOVA) and Chi-square, respectively.

The study's descriptive analysis showed that most undergraduate students were aware of the benefits of regular physical activity and exercise for their academic performance and the guidelines to achieve sufficient physical activity or exercise each week.

The undergraduate students are also aware of the possible health risks linked to extended periods of inactivity. This awareness has led them to participate in physical activities and exercise, as they know that these activities are inextricably linked to numerous health advantages and that regular physical activity and exercise promote a student's social, psychological, and physical growth. Additionally, it was discovered that most undergraduate students know the many benefits physical activity and exercise have for academic performance, classroom behaviour, and fitness. Physical activity also helps students assimilate faster and maintain and improve their cognitive abilities related to cognitive processing in the brain. All of these benefits contribute to an overall improved quality of life.

The study's descriptive analysis also showed that, despite an array of information about the benefits of physical activity, most undergraduate students remain sedentary. This indicates that students who lead sedentary lifestyles are too lazy to engage in physical activities or exercise, eventually affecting their academic performance. It was believed that allowing children to play video games and watch television would encourage sedentary behaviour, unintentionally harming their academic achievement. Furthermore, it was discovered that sedentary behaviour and physical activity or exercise are components of mental and physical health variables that positively and beneficially affect undergraduate students' academic well-being. Additionally, students' academic performance largely depends on family factors, such as parental support for sedentary behaviour and encouragement for physical activity or exercise. Undergraduate students generally believed that physical activity, exercise, and sedentary behaviour directly affect students' academic performance, either favourably or unfavourably.

The study's inferential analysis showed that undergraduate students' understanding of the advantages of exercise and physical activity significantly affected their academic performance. The results validated Luy's (2006) assertion that physical activity can enhance spiritual and cultural pursuits while fostering bodily growth and well-being. The results showed that exercise and physical activity improve academic performance and classroom behaviour, consistent with what other researchers have shown (Carlson et al., 2018; Field et al., 2011; Jarrett et al., 2008; Mahar et al., 2016). The results also supported the view of Clark et al. (2009), who suggested that exercise and physical activity can preserve and enhance students' cognitive performance by boosting gene expression, synapse function, brain areas associated with cognitive processes, such as gene expression and blood oxygen function.

Finally, it was discovered that among undergraduate students in Ekiti State, sedentary behaviours and physical inactivity were

significantly influenced by passive activities. The results supported the theory that young people lead sedentary lifestyles for many years. This supersedes the estimate made by Schwarzfischer et al. (2019), according to which young people use gadgets (TV/videos, video/digital games, and personal computers) for about one-third of their waking hours. This suggests that a person participates in sedentary behaviour when sitting or lying down.

The results corroborate the theory by Li et al. (2022) that young people can increasingly engage in sedentary behaviours such as playing video games, making phone calls, and utilizing the internet for social media or assignments.

The results supported the assertion made by Akindutire et al. (2013) regarding sedentary behaviours, which held that a significant number of Nigerians—particularly managers, administrators, public servants, students, and a host of other individuals—lead sedentary lifestyles, contributing to the epidemic of inactivity in Nigerian society. Individuals are not inclined to exercise physically to maintain their fitness or do their jobs well.

Conclusion and Recommendation

A significant finding about the impact of exercise, physical activity, and sedentary behaviour on students' academic performance in postsecondary institutions is provided by this study. Based on social cognitive theory models, the study examined conceptual frameworks for the relationship between sedentary behaviour, exercise, and physical activity. Physical activity, exercise, and sedentary behaviour were distinct behaviours with diverse predictors and routes towards students' academic achievement in higher institutions rather than being at opposite extremes of a spectrum. Based on the study's findings, regular exercise was suggested to enhance cognitive function, memory, and attention, which can increase academic achievement. A significant finding about the impact of exercise, physical activity, and sedentary behaviour on students' academic performance in postsecondary institutions is

provided by this study. Based on social cognitive theory models, the study examined conceptual frameworks for the relationship between sedentary behaviour, exercise, and physical activity. Physical activity, exercise, and sedentary behaviour were distinct behaviours with diverse predictors and routes towards students' academic achievement in higher institutions rather than being at opposite extremes of a spectrum. Based on the study's findings, regular exercise was suggested to enhance cognitive function, memory, and attention, which can increase academic achievement.

As a result, students ought to engage in 150 minutes or more of moderate-intense exercise per week. Furthermore, it is advisable to promote brief stops for physical exercise throughout lectures. These breaks have the potential to lower stress and boost output. Include exercises such as stretching, fast walks, or even short workouts. Overly sedentary behaviour, such as extended periods of sitting, can harm undergraduate students' academic performance. Long stretches of sitting should be interspersed with standing or walking breaks for students. Since students can bike or walk to campus, join sports teams, or enroll in fitness programs at their schools, it is essential to encourage them to incorporate physical activity into their daily routines.

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