

Abundant Evidence That Frequent Sports or Physical Activities Positively Affect Academic Performance

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Abstract

Background: To investigate the effect of physical activity and sports on the academic performance of higher education students in Jeddah, Saudi Arabia during the academic years 2017/2018 and 2018/2019. **Methods:** A 15-item internet-based survey was distributed among students - both members and non-members of Jeddah Runners Club (JRC) - studying in public and private universities in Jeddah, Saudi Arabia. The survey collected participants' information such as demographic details, important habits, sport and physical activities, and GPA scores. Responses reached a total of (N=425) male %87.3 (N= 371) and female %12.7 (N=54) and the data was analyzed using IBM SPSS. **Results:** Results show that there is a significant negative linear relationship between the time students spend doing no physical activity and their GPA scores ($\beta = -0.28$, $P < 0.05$). However, there is a statistically significant positive linear relationship between GPA scores and the time spent in sports or physical activity ($\beta = 0.12$, $P < 0.05$). Similarly, the time students spend in sports or physical activity in their colleges also positively affects their academic performance ($\beta = 0.10$, $P < 0.05$). Ultimately, the more time spent in doing sports or physical activity in or outside their colleges, the better they achieve in their academic performance. **Conclusion:** The more time spent in physical activity or sports in or outside colleges, the better academic performance will be. Public physical activities and sports are highly welcomed by the Saudi community. Saudi women have shown an increasing interest in doing public physical activities and sports.

Keywords: Physical activity, sport, academic performance, GPA, obesity, higher education.

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INTRODUCTION

The current literature has witnessed a wide concern on the issue of physical activity [1] and its relationship with academic performance [2]. Similarly, the link between physical health and cognition is a solid belief that is dominant for a long time. For instance, a simple search on PubMed in 2015 about "physical activity human" reached ($N = 23323$) results in the form of published papers [1].

The Problem of the Study

The lifestyle changes and prevalence of obesity in the Saudi community is a big health challenge [3]. Studies have proved that there is a high percentage of association between major health problems and the sedentary way of living worldwide and among the Saudi community [4]. It is also important to mention that obesity in Saudi Arabia is a

growing health concern with health officials stating that it is one of the leading causes of preventable deaths in Saudi Arabia. According to the World Health Organization, Saudi Arabia ranks 14th on the Prevalence of Obesity 2016 list with a percentage of 35.4.3% of Saudi citizens being overweight (BMI>25).

The researchers in [5] worked on identifying several lifestyle factors related to obesity which work as effective targets for obesity prevention and management among Saudi adolescents aged between 14 and 19 years old. Their sample was randomly selected from the three major Saudi cities. They compared males with females and adolescents in private schools with those in public schools and found that males and adolescents in private schools are susceptible to being obese or overweight. Moreover, they concluded that Saudi adolescents will appear as having higher odds of

being overweight, obese, or abdominally obese when they do a less frequent vigorous physical activity, consume vegetables or breakfast less than three days a week, and take sugar-sweetened beverages three to four days a week or less than three days a week.

Two important aims of a local running club called Jeddah Runners Club (JRC) are to take action in solving such a major conflict and to clarify the misconceived correlation between sports and academics based on studies and frequent feedback from the club members and the public. According to recent literature, numerous findings go on contrary to the dominant belief of the public that participation in extra-curricular physical activities and sports might negatively affect the student's academic performance [6, 7]. The recent research findings are of contradictory results that range between positive and negative proofs with different quantitative, qualitative, and mixed methods.

The Aim of the Study

This study depends on the community gathering and dataset of Jeddah Runners Club (JRC) who represent the Saudi students studying in different universities in the city of Jeddah, Saudi Arabia. It aims at investigating the way the study sample perform physical activities or sports and its relationship with their academic performance in the form of GPA scores they got at the end of the academic years 2017/2018 and 2018/2019.

LITERATURE REVIEW

The last few years have witnessed a lack of physical activity in teenagers as a major concern [8] and a risk factor responsible for various diseases such as obesity and diabetes [9]. Nevertheless, it has been demonstrated by extensive scientific evidence that regular physical activity is proved to promote development and growth in youth and is responsible for bringing several mental, physical, and cognitive health benefits [10]. Likewise, higher education which stands as an inevitable sector that encompasses the largest number of prospective candidates of the physical activity realm is still in need of thorough investigations regarding teenagers' participation in physical activity and its relationship to academic achievement. The current study is an attempt to scrutinize the effect of physical activity on university students' academic performance in Saudi Arabia.

Consequently, students' physical activity has been under the focus of several studies [11] which considered it as having a negative or positive effect on students' academic achievement [9, 12, 13]. Recently, some studies have findings that show no relationship between physical activity and students' academic performance [9]. Similarly, Scheuer and Mitchell stated that enhanced body builds or perceptions, energy levels, self-esteem, brain function, and behavior are attributed

to physical activity and better academic performance [14]. This is a considerable statement that goes in line with the fact that students' physical activity could be enhanced by quality physical education that is accompanied by appropriate assessments and instruction [10].

In fact, there is a wide range of evidence to support the studies claiming that participation in organized athletic activities would promote a collection of physical, psychological [11], intellectual, and social skills contributing to better student's academic performance [15]. Other studies such as that of Resaland, Moe [16] reported that the sort of active learning, which is the combination of physical activity and academic content has a mixed impact on the academic process.

An in-depth meta-analysis of ($N=59$) studies published between 1947 and 2009 has been conducted by Fedewa and Ahn [11] to examine the effects of physical activity and/or fitness on cognitive functions or academic achievement. Their findings concluded that performance in math and reading, and intelligence quotient were the topics most affected by physical activity. The same findings have been reached by an identical study conducted by Ahn and Fedewa [17] who analyzed ($N=73$) studies to examine moderator effects such as gender, the implementer of the physical activity, mental status, mental health outcome, type of physical activity, and cognitive ability, etc. Results of the study demonstrated small but significant overall effects of physical activity on children's mental health. Ultimately, children's mental health outcomes have been affected by average physical activity.

Charness G, Cappelen AW, Ekström MP *et al.* reported results of whether physical exercising improves college students' academic performance. They found that physical activity generates a significant and strong enhancement in academic performance, especially for students struggling at the baseline based on their lifestyle habits. The study concluded that incentivizing students to exercise can act as an important tool in enhancing educational performance. Correspondingly, the Institute-of-Medicine [10] states that physical activity enhances some brain functions such as the basic cognitive and executive functions responsible for attention and memory that underline academic performance.

The Institute-of-Medicine [10] concluded that it was suggested by evidence that improvements in academic performance may be met by increasing physical activity and physical fitness. Furthermore, the report also concluded that dedicated time to physical activity, physical education class, and recess could facilitate academic performance. The report also stated that reading and mathematics which depend on

effective and efficient executive function, are the most influenced subjects by physical activity. Similarly, it was recently reported by Donna De La Cruz [18] from the New York Times who has collected a number of comments regarding children's physical activity and its relationship to academic achievement that more programs designed to encourage movement have been adopted in schools. The report has positively supported the idea that children should not sit still all the time in schools because that is against the human's nature.

In that regard, Tremblay, Inman [19] worked on examining the relationship between grade-six children's ($N=6923$) scores in reading and mathematics, and physical activity, body mass index (BMI), and self-esteem, along with socioeconomic status, family structure, and sex as control variables. The study suggested that physical activity had a weak relationship with academic achievement. Interestingly, their findings are supported later on by the Institute-of-Medicine [10] regarding the fact that mathematics and reading stand as the academic subjects most influenced positively by physical activity.

Consequently, Muñoz-Bullón F, Sanchez-Bueno MJ and Vos-Saz A aimed at providing a more rounded understanding of the previous mixed findings by analyzing the influence of participating in physical activities on academic performance among higher education students. The dataset of the study was processed by comparing the grades of academic performance of sports participants with those of the non-participants. The authors concluded that there is an association between participation in formal sports activities with higher grades among the sample. In more details, they found that there is a relationship between participation in sports and GPA scores of students. These findings push forward the consideration that academic performance in higher education is proved to be enhanced by students' participation in sports [12].

Similarly, a recent study [20] collected data from Minnesota Student Survey of which its sample reached ($N=29535$) 12th-grade students participating regularly (once to twice times per week) in sports organized by the school. It has found that there is an association between participating in school-organized sports and higher GPAs and other values such as increased perceptions of teacher and family or community support and favorable perceptions of school safety.

Likewise, a current study [21] recently reported their findings with a conclusion of that children's involvement in (moderate to vigorous) physical activities is associated with less socioemotional difficulties that could be associated with enhanced academic performance. In other words, there is a positive association between children's

involvement in moderate-to-vigorous physical activities (MVPA) and their academic performance. Their study sample consisted of ($N=17318$) Chinese children.

Another recent study [16] examined the influence of baseline academic achievement and gender as active learning moderators on the academic performance of ($N=1129$) 5th-grade children from 57 Norwegian elementary schools. The study measured numeracy, English, and reading academic performance and calculated a composite score for them and divided students in tertiles (low, middle, and high). Then using mixed model regression, the study investigated three-way interactions for "group" as intervention and control, "gender" as boys and girls, and "academic performance" as low, middle, and high. Results showed that academic performance has significantly increased for the low-performing children. This result proved that children in need of adapted education have benefited from active learning (combination of academic content and physical activity), however, it might have no or negative impact on girls with high academic performance.

In a cross-sectional study setting [22], Muntaner-Mas A, Pere P, Vidal-Conti J et al went [22] on examining the relationship between indicators of obesity and fitness components with school children's academic performance. Additionally, they aimed at exploring the (combined and meditation) role of physical fitness components that appears in the relationship between children's obesity and academic performance. The study gathered its data from ($N=250$) Spanish schoolchildren aged between 10 and 12 years old. The study considered obesity measures to include a body-mass index (BMI), waist-to-height ratio, hip circumference, and body fat. Whereas for fitness, components included speed-agility, muscular fitness, and cardiorespiratory fitness. Academic performance, on the other hand, has been collected as Spanish language, English language, Catalan language, arts, social sciences, natural sciences, religion, physical education, and GPA. Interestingly, the study concluded that all mentioned obesity measures showed a negative relationship to at least three academic performance indicators including GPA. Speed-agility and cardiorespiratory fitness, however, showed a positive relationship to all academic indicators. Moreover, muscular fitness was positively related to three academic indicators. Strikingly, better academic performance was associated with the students who were considered fit. Ultimately, the study concluded that the negative impact of obesity on academic performance might be ameliorated by physical fitness.

Furthermore, Morales J, Gomis M, Pellicer-Chenoll M *et al.* analyzed academic performance and its relationship to the amount of physical activity of the 3rd-year students ($N=284$) in three secondary schools in

Barcelona area [23]. The study utilized the International Physical Activity Questionnaire to enable students to self-report their physical activity amount. Yet, for comparison, they obtained the students' academic records. They found that there is a linear relationship between physical activity and academic performance.

Chuan, Yusof [13], similarly, investigated the factors that influence the academic achievement of the Malaysian university athletes ($N=156$) hockey players. The factors they set as dependent variables are stress level, socializing, academic assistance, training factors, financial aid, support systems, the learning environment, parental influence, and the relationship between team subculture. The authors utilized the Team Socializing Scale to examine these factors and their relationship to the academic achievement of their sample. The study suggested that support systems and learning environment are significantly related to academic achievement. It also suggested that there is a significant positive relationship between academic achievement and learning environment. Moreover, it concluded that a good learning environment is a direct cause of outstanding academic achievement among university athletes.

MATERIALS AND METHODS

Definition and activities of Jeddah Runners Club (JRC)

Jeddah Runners Club (JRC) is a totally non-profit organization and a sports club for the society with all abilities in Jeddah, Saudi Arabia. JRC is an egalitarian sports club that is literally for everyone: young and old, male and female, runners and walkers, professionals and hobbyists, etc. The club believes that there is never a boundary or limit for promoting one's health. Running has connected the Saudi community to exercise, socialize and share the same spirit.

Jeddah Runners Club has twelve organizers with different roles who represent the committee of the club. The club arranges an exercise session once, twice or thrice every week. The group usually tends to do a five-to-eight kilometers run which takes about 45 minutes to one hour; however, some of the runners take the extended route to finish a ten-to-twelve kilometers run. The club also occasionally arranges a variety of other sports events and outdoor activities.

DATA COLLECTION

The JRC committee frequently collects data regarding the status of the academic performance of both the members and non-members of the club throughout the year. The committee used questionnaires in multiple settings such as interviewing questionnaires, email questionnaires, and through the social media questionnaires to various public and private universities in Jeddah, Saudi Arabia. So, in the current work as a descriptive study, a survey consisting of 15 items

divided into three scales: the "Demographic Information" scale (4 items), the "Participation in Sports" scale (7 items), and the "Average Time Dedicated for Study" scale (4 items) was designed and distributed among both the members and non-members of JRC. The aim of the survey was to collect a bunch of information about students' demographic details, and important habits and trends. GPA (as high and low) and its correlation to participation in sports activities (in-school and post-school activities) formed the core of this study.

The survey was distributed as an internet-based format amongst the students enrolled in public and private universities in Jeddah, KSA. Participants responded anonymously to all the required questions in the survey. A total of ($N=425$) responses were received from the participants who form the sample of the current study. No participants were dropped out of the study. The collected data was analyzed using the IBM SPSS Statistics v. 22.

Patient and Public Involvement

No patient involved.

RESULTS

As shown in (Table 1) below, a total of ($N=425$) male %87.3 ($N= 371$) and female %12.7 ($N=54$) students participated in the survey. Our dataset also shows that the sample of the study contains male and female undergraduate medical students and others ($N=425$) composed of 20% ($N=85$) sophomores, 20% ($N=85$) freshmen, 23.5% ($N=100$) juniors, 19.5% ($N=83$) seniors, 16.9% ($N=72$) students in the fifth year or others. So, the sample of the current study could be considered as a representative of the university students in Jeddah, Saudi Arabia. Moreover, participants are enlisted under six age groups where those aged under 18 years old form 1.2% ($N=5$), 18 – 25 years old form 81.9% ($N=348$), 25 – 35 years old form 11.1% ($N=47$), 35 – 45 years old form 3.8% ($N=16$), 45 – 55 years old form 1.6%, and 55 or older form 0.5% ($N=2$) as the least in number among the whole sample of the study.

Table-1: Participants' Demographic Data

Gender	N	%
Male	371	87.3
Female	54	12.7
Total	425	100
Grade		
Sophomore	85	20
Freshman	85	20
Senior	83	19.5
Fifth year / other	72	16.9
Junior	100	23.5
Total	425	100
Age		
Under 18	5	1.2
18 - 25	348	81.9

Gender	N	%
25 - 35	47	11.1
35 - 45	16	3.8
45 - 55	7	1.6
55 or older	2	0.5
Total	425	100

Regarding the students' GPA scores, 61.6% ($N=262$) of the students had a GPA of 4.1 or above,

23.8% ($N=101$) had a GPA of 3.6 – 4.0, 10.6% ($N=45$) had a GPA of 3.1 – 3.5, 2.1% ($N=9$) had a GPA of 2.6 – 3.0, 1.4% ($N=6$) had a GPA of 2.1 – 2.5, and 0.5% ($N=2$) had a GPA of 2.0 or below. Consequently, students' GPA scores were divided into two broad categories as high 85.4% ($N=363$) and low 14.6% ($N=62$) scores based on higher and lower than (3.5/5.0), respectively (Table 2).

Table-2: Students under GPA Bands and GPA Level Categories

GPA Band	Frequency	Percent	Category	Frequency	Percent
4.1 or above	262	61.6	High GPA	363	85.4
3.6 - 4.0	101	23.8			
3.1 - 3.5	45	10.6	Low GPA	62	14.6
2.6 - 3.0	9	2.1			
2.1 - 2.5	6	1.4			
2.0 or below	2	.5			
Total	425	100.0		425	100

From the figures in (Table 2), it is obvious that the majority of the study participants – 85.4% ($N=363$) - obtain high GPA scores which are higher than 3.5 out of 5.0. Additionally, low GPA scores which are less than 3.6 out of 5.0 were obtained by 14.6% ($N=62$) participants. The GPA classification in this table could be interpreted as that most of the students who are engaged in any kind of physical activity obtain the highest GPA scores in their academics. In addition, the table can be interpreted as that most of the students who perform physical activity or sports obtain the highest GPA scores (4.1 or above).

Factors affecting the academic performance of the participants

Initially, a simple linear regression was used to assess the linear relationships between the GPA scores

– as the dependent variable – and a set of nine independent variables thought to affect the students' academic achievement (Table 3). Independent variables are Number of study hours when doing no sports, Number of study hours when doing sports, Involvement in a sports club, Involvement in intra-college sports, Sports organized by college which student participates in, Number of hours of participation in sports out of college, Number of occasions the student participates in sports per week, Representing the college in competitive sports, and In-college sports time. The aim was to determine whether this linear regression is statistically significant.

Table-3: Factors Affecting Medical Students' GPA Scores Analyzed by Multiple Regression

Independent Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.240	.366		6.113	.000
Study hrs. when doing no sports	-.277	.046	-.329	-6.045	.000
Study hrs. when doing sports	.122	.049	.134	2.476	.014
Involvement in a sports club	-.018	.108	-.008	-.163	.871
Involvement in intra-college sports	-.030	.132	-.012	-.226	.821
On-college-site sports students participate in	.003	.006	.023	.454	.650
Hrs. of participation in out-of-college sports	.064	.049	.077	1.305	.192
Occasions of participation in sports a week	-.061	.044	-.082	-1.392	.165
Representing college in competitive sports	-.099	.161	-.034	-.616	.538
Time of doing activity at the college	.010	.002	.202	4.323	.000

The dependent variable is GPA scores.

$$R = 0.361, R^2 = 0.130, R^2 \text{ (adjusted)} = 0.111, F(9,414) = 6.889, *P < 0.05$$

Much more importantly, the results of the multiple linear regression analysis provided by (Table 3) above show that there is a significant negative linear

relationship between the number of study hours students spend when doing no sports or physical activity and their GPA scores ($\beta = -0.28, P < 0.05$). In

other words, such a relationship indicates a reverse correlation between the number of study hours for those who do not do any type of sports and their GPA scores. In contrast, there is a statistically significant linear relationship between the Number of study hours when doing sports or physical activity and the students' GPA scores ($\beta = 0.12, P < 0.05$). This statistically significant result indicates that the students' academic achievement is significantly influenced by the number of hours the students spend in sports or physical activity in a positive way. Likewise, the analysis shows another positive linear relationship between the time of doing activity in the college and the students' GPA scores ($\beta = 0.10, P < 0.05$). This statistically significant linear relationship shows that the students' academic achievement is affected positively by the time the students spend on doing physical activity at the college. The other independent variables or factors such as Involvement in a club, Involvement in intra-college sports, On-college sports students participate in, Hours of participation in out-of-college sports, Occasions of participation in competitive sports, and Representing college in competitive sports did not show any effect on the academic achievement of the students and their intercept was not statistically significant ($P > 0.05$).

DISCUSSION

Middle-aged participants

It is obvious from the participants' demographic data in (Table 1) that most of the participants are of middle ages located under the groups (18 - 25) and (25 - 35) years making up 93.0% ($N=395$) participants. This finding indicates that Saudi university students – middle-aged participants - are aware of the benefits that they could gain from exercising and participating in sports events and physical activities. On the other hand, those who are aged 55 or older make up only 0.5% ($N=2$) participants, indicating that the elderly rarely participate in sports events or exercises. This fact requires that the Saudi elderly be incentivized and their awareness of participation in sports be raised through large campaigns because of their health fragility and aging-related consequences.

More sports time, better academic performance

It is worth mentioning here that the more time students offer for doing sports or physical activities, the better their academic performance or GPA scores will be. This is obviously reflected by the positive linear correlations in (Table 3) between the time students offer for doing sports in general and in the college respectively. This finding goes in agreement with what Álvarez-Bueno, Pesce [7] stated that physical activity in the form of curricular exercises is the most effective in enhancing young learners' academic performance and classroom behaviors. Additionally, the results show a statistically significant negative relationship between the time which the students offer for studying and

academics when they do no sports or physical activities and their GPA scores. This negative relationship also provides a conclusive proof that it is necessary for university students in higher education to dedicate some time for doing sports or physical activity in order to enhance their academic performance.

Similar findings from previous literature

Interestingly, the findings of the current study regarding the positive linear relationships between the amount of time dedicated by students for sports or physical activities in or outside the college are in line with those of the following studies [7, 9, 12-15, 24] etc. Fascinatingly, our findings reported that the more time dedicated by university students for physical activity and sports, the better their academic achievement will be, irrespective of their fields of study. Similarly, the majority of the students who do no sports or physical activity usually get low GPA scores according to the results shown in the linear multiple regression analysis of the dependent and independent variables in (Table 3).

Irrelative independent variables

Moreover, the rest of the independent variables appeared as having no statistically significant relationships with the dependent variable – GPA scores or academic achievement. It is to be mentioned here that only changes in the settings of the timing independent variables (Study hours when doing sports, Study hours when doing no sports, and Time of doing activity or sports at the college) will be followed by a consequent positive or negative change in the academic achievement of the participants. In contrast, the findings of Coe, Pivarnik [25] reported that academic performance was not influenced by the timing of the physical education class. In other words, the action of dedicating time for learners to do physical activities as part of their curriculum or extra-curricular activities is not associated with any effect on their academic achievement. Furthermore, it has been argued that academic performance will be negatively affected by the wasted hours on physical activity and it would get an adverse reaction [26]. Nevertheless, our study proves the opposite in which time offered for physical activities and sports in higher education is of a great benefit on learners' academic performance.

CONCLUSIONS

Running is one of the most effective sports for general mental and physical soundness. There is a strong positive interrelationship between sports and academics. Through constant feedback from Jeddah Runners Club members and regular population surveys of enrolled students in various public and private universities, we have found that there is a general improvement in the physical and mental wellbeing of people who exercise on a regular basis. The club members who run after school or work said that their

stress has also greatly diminished. We have also found that the GPA scores of the university students - both members and non-members of the club - who do sports in general are actually higher than the scores of the students who are not engaged in any physical activity. The statistics have shown that athletic students spend fewer hours on studying and that their GPA scores are still higher than other indolent students. Therefore, such results and outcomes suggest significant improvements in mental concentration and overall health.

LIMITATIONS

This study is restricted by a number of limitations although its sample is considerably reasonable ($N=425$) participants. It is also worth mentioning to note that there are some factors responsible for the simplification of the study. Those factors may be named as single college dataset, geographic limitations, and demographic limitations whereas female representatives are smaller in number 12.7% ($N=54$) than male representatives 87.3% ($N=371$). Moreover, the participation of the elderly was very small at 0.05% ($N = 2$) as compared to the other categories. This finding may be due to their limited appearance in public activities or other reasons that need to be studied rigorously.

RECOMMENDATIONS

It is highly recommended that similar studies be conducted in other Saudi areas aiming at providing wider database and a diversity of viewpoints regarding the physical activity issue and its effect on academic performance in higher education institutions. On the other side of the equation, a phenomenon such as the Jeddah Runners Club is worth being studied thoroughly because of the enthusiastic response of participants who rise in number from week to another.

Although the current physical activity and its beneficial consequences have witnessed a slight appearance of young Saudi women, it is highly recommended by the authors that Saudi women be incentivized to participate in similar events and that their outcome be similarly studied and generalized. The thorough study of Rasheed [27] previously reported that (75%) of Saudi women were either exercising infrequently or not exercising at all. Another study by Alsaif, Hakim [28] also reported that the prevalence of obesity among women was 49.15% of the total women population ($N=1619$). These results make promoting exercising and physical activity events among women inevitable.

It is still being claimed that obesity data in Saudi Arabia are nonexistent [29]. Therefore, the current study is an attempt to nourish the Saudi literature with comprehensive data on physical activity and its effect on academic achievement. The study also calls for similar works to be done in the field in order to

provide an extensive database which can be made available for the benefit of the Saudi community and other extended studies.

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