

The Impact of Exercise on Health Care Student Academic Performance in Riyadh, Saudi Arabia

Hussein Saad Amin¹⁻⁹, Yasser A. Alrumih², Ali S. Alrawdhan³, Fahad Y. Alturkey⁴,
Abdulrahman M. Alakeel⁵, Muath I. Alsabih⁶, Ahmed S. Allohidan⁷, Ammar A. Naji⁸

¹Assistant Professor and Consultant in Family Medicine, Department of Family and Community medicine, College of Medicine, King Saud University

^{2, 3, 4, 5, 6, 7, 8} Medical Interns, College of Medicine, King Saud University

⁹KSU Chair for Medical Education Research and Development

Abstract: *It is assumed that the students of health care colleges have a greater knowledge about healthy lifestyle and dietary habits when compared to other students. The main goal of this study was to determine the prevalence and effect of exercise on the academic performance of the health care students. This a cross-sectional study was conducted on 376 male healthcare students at King Saud University in Riyadh from colleges of medicine, dentistry and pharmacy in the period from December 2014 until March 2015. The study population was selected by multistage random sampling. A self-administered questionnaire was used for data collection. A pilot study was conducted to test its feasibility. A statistical package for the social sciences (SPSS) version 21.0 was used for data analysis. 56.6% of the subjects were found to be physically active. Those who did not perform exercise, lack of time (55.8%) and lack of interest (36.2%) appeared to be the two most common causes for not exercising. The effect of physical activity on academic performance was found to be statistically significant in only two domains which were being less likely to be being late to the classes (P.026) and relatively better concentration during lectures (P.001). The study included that a significant positive effect of exercise was found on two domains of academic performance, namely better concentration in classes and punctuality in attending lectures, but with no significant effect on GPA of students.*

Keywords: Physical Activity, Academic performance, Healthcare students, Punctuality, Concentration

1. Introduction & Literature Survey

Healthcare education can be stressful, preventing the students from practicing their hobbies, like physical activity (PA), which is defined by World Health Organization as any bodily movement produced by skeletal muscles that requires energy expenditure [1]. An adequate PA defined as 150 minutes per week of moderately intense PA such as a brisk walk and resistance exercise [2]. A study showed that students who spend more time engaged in PA are predisposed to a below average academic record [3]. Several authors [4-7] have observed a positive relationship between PA and students' academic results. We studied the relationship of PA and Academic performance of medical students in Riyadh, Saudi Arabia.

2. Methods

A cross-sectional study was performed on medical, pharmacy and dental colleges at King Saud University in Riyadh during the period from December 2014 to March 2015.

Prevalence of students doing exercise was assumed to be 50%. The sample size of 385 subjects was calculated by using the following equation: $N = Z^2 \cdot P(1-P) / d^2$ where $Z_{\alpha} = 1.96$, $D = 0.05$ and $P = .5$

Since the study subjects were planned to be from three different colleges, a multistage random sampling was the sampling technique for this study. The students in each college were distributed by academic year and listed in

groups. We distributed 25 questionnaires randomly to each group of medical students in each academic year.

A questionnaire was designed to fit the study objectives. It was divided into three sections. The first section described the subject's personal data that included the subject's age, residence, college, academic year, smoking habits, social status, past medical history and the way they arrived at the college. The second section included the type of exercise, the frequency and gym participation. The third section focused on the subject's academic performance, considering their concentration in the lectures, grade point average (GPA), average sleep hours, class attendance, daily mood, study method, the general effect of exercise on study and the effect of exercise on orientation in classes. For instance, the questionnaire including participation in housework, waking time in usual study days, the status and way of study such as studying while watching TV or listening to music.

From an ethical point of view, Institutional Review Board (IRB) of College of Medicine approved the research proposal. A pilot study was conducted among 30 volunteers of medical students to assess the validity and feasibility of the questionnaire. The pilot study was very helpful in improving the questionnaire. Ambiguous and unclear statements were rectified as needed.

Statistical Package for the Social Sciences (SPSS) version 21.0 was used to analyze the data. To compare between physical activity & academic performance, the tests that were selected in this comparison are independent frequency tables to estimate the frequency different dependent and independent variables. To test the association between

variables, the independent T test was used for continuous data and chi-square test for categorical data. Statistical significance was set at $P < .05$.

3. Results

Description of enrolled students:

The medical students who responded and participated in this study were 376 with a mean age of 21.7 years. The majority were from colleges of medicine (53.7%), followed by dentistry (27.4%) and pharmacy (18.9%). The great majority of students were single (97.2%). 11.7% were current smokers and there were no demographic differences of statistical significance between students who exercise and others who did not ($P = .557$). The data showed variable duration of smoking ranging from 1-10 years. Nearly three quarters reported waking up at 6-7 am. The mean of sleeping hours was 6.7 hours with no significant association between sleeping time and exercise ($P = .134$) (Table 1). The majority of students (92.8%) use cars to come to colleges and only a few of them used to come walking (6.1%) or by biking (1.1%) with no significant difference between both groups ($P = .758$).

Table 1: Factors related to exercising among students

Factors related to exercising	Exercising				P-value
	Yes		No		
	No.	%	No.	%	
Academic year					.177
First	34	16.0	37	22.7	
Second	59	27.7	29	17.8	
Third	40	18.8	31	19.0	
Fourth	43	20.2	35	21.5	
Fifth	37	17.4	31	19.0	
College					
Medicine	117	54.9	85	52.1	.865
Dentistry	57	26.8	46	28.2	
Pharmacy	39	18.3	32	19.6	
Smoking					
Yes	25	11.7	19	11.7	.557
No	188	88.3	144	88.3	
Health problems					
Yes	32	15.0	16	9.8	.08
No	181	85.0	147	90.2	
Transport to college					
Car	197	92.5	152	93.3	.758
Bicycling	13	6.1	10	6.1	
Walking	3	1.4	1	0.6	

The study showed that (12.8%) of students were currently suffering from chronic health problems. The most frequent were asthma (64.6%) followed by skin allergy (12.5%) and cardiac problems (10.4%) (Table 2).

Table 2: Health problems among medical students

Health problems (n=48)	Number	%
Asthma	31	64.6
Skin allergy	6	12.5
Cardiac problems	5	10.4
Allergic rhinitis	3	6.3
Musculoskeletal problems	1	2.1
Hyperopia	1	2.1
Irritable Bowel Syndrome	1	2.1

Around one third of students perceived themselves to have mood disturbance including stressed mood (14.6%), depression (12.8%) and anxiety (4.3%). No significant association was found between perception of mental disturbance and exercise ($P = .194$) (Table 6).

Rates and pattern of physical activity:

Physical exercise was reported by (56.6%) of the students. The most frequent reported type of exercise was brisk walking (50.7%), followed by running (43.2%), weight lifting (40.8%), football (36.2%), and swimming (30%). The common frequent reason of not exercising was lack of time (55.8%), followed by lack of interest (36.2%) and medical problems (3.1%). Exercise intensity was vigorous among 24.4% of students and moderate among 35.2%, where more of students experience light exercise 40.4%. Most of the students were exercising 3-6 days weekly (64.8%), everyday (10.8%) and Less than 3 days weekly (24.4%). Students who exercise on average for 30 min per day came to be (24.9%), those more than 30 min and less than one hour per day were 38.5% and more than one hour per day were 36.6%. In addition, less than half of students (47.9%) were participating in the house chores (Table 3, 4)

Table 3: Prevalence and pattern of physical exercises reported by students

Exercises	No.	%
Doing physical exercise		
Yes	213	56.6
No	163	43.4
Intensity of exercise		
Vigorous Exercise	52	24.4
Moderate Exercise	75	35.2
Light Exercise	86	40.4
Timing of exercising		
Morning	10	4.7
Afternoon	30	14.1
At evening	168	78.9
Any time of the day	5	2.3
Duration of exercising (minutes per day)		
≤ 30 minutes	53	24.9
31 - 60 minutes	82	38.5
> 60 minutes	78	36.6
Frequency of exercising (days per week)		
Every day	23	10.8
3 - 6 days	138	64.8
Less than 3 days	52	24.4
Participation in house chores:		
Yes	102	47.9
No	111	52.1

Table 4: Type of exercise among medical students

Type of exercise among medical students	Number of students	Percentage %
Walking	108	50.7
Running	92	43.2
Weight lifting	87	40.8
Football	77	36.2
Swimming	64	30
Bicycling	32	15
Jogging/brisk walking	30	14
Tennis	13	6.1

Half of the students, who exercise, do workouts in the gym (50.7%). The most frequent reported type of exercise in the gym was weight lifting, followed by treadmill and biking together, then swimming (Table 5).

Table 5: Workout in gym of students who report exercising

Workout	No.	%
Workout in gym		
Yes	108	50.7
No	105	49.3
Pattern of workout[†]		
Cardio	91	84.3
weight lifting	66	61.1
Treadmill	57	52.8
Biking	57	52.8
Swimming	55	50.9
Elliptical	42	38.9
Aerobics	27	25
Hours spent in gym (hours Per day)		
1 hour	41	38.0
2 hours	58	53.7
3 hours	8	7.4
> 3 hours	1	0.9

[†] Categories are not mutually exclusive

More than half of students spend 2 hours in the gym (53.7%), students who spend one hour in the gym were (38%) and the least of students spend more than 2 hours in the gym were (8.3%).

Factors related to exercising:

The students who were exercising reported that, they concentrate in class most of the time (55.4%), while those who did not do exercise, came to be (47.2%). There is a significant association between exercise and concentration in class ($P .001$). The students who were doing exercise and were frequently coming late to the class were (27.2%) whereas those who did not exercise were (38.0%), revealing a significant association between exercise and coming late to class ($P .026$). There was no significant association between exercise and missing classes ($P .145$). The exercise showed no significant effect on improvement of students' GPA ($P .541$) (Table 6).

Table 6: Factors reflected academic performance and their relation to exercise

Relation to Exercise					
Factors related to exercising	Exercising				P-value
	Yes		No		
	No.	%	No.	%	
Late to class					
Yes	58	27.2	62	38.0	.026
No	155	72.8	101	62.0	
Absence from class					
Yes	50	23.5	47	28.8	.145
No	163	76.5	116	71.2	
Concentration on lectures					
All the time	19	8.9	3	1.8	.001
Sometime	76	35.7	83	50.9	
Most of the time	118	55.4	77	47.2	
GPA					
4.5 – 5	32	15.0	16	9.8	.541
4 - 4.49	181	85.0	147	90.2	
3.5 - 3.99	37	17.4	31	19.0	
< 3.49	5	2.3	8	4.9	

Mood					
Not disturbed	155	72.8	102	62.6	.194
Depressed	22	10.3	26	16.0	
Anxious	8	3.8	8	4.9	
Stressed	28	13.1	27	16.6	
	$\bar{x} \pm s$		$\bar{x} \pm s$		
Age	21.63±1.48		21.79±1.65		.330
Sleeping hours	6.60±1.25		6.82±1.49		.134

4. Discussions

One of the main goal of the current study was to investigate the effect of exercise among health care students. More specifically, it aimed to investigate the effect of exercise on academic performance. We had assumed that health care students would have a higher prevalence of exercise than general population considering their knowledge and awareness regarding the benefits of physical activities.

WHO in its prevalence of insufficient physical activity among adults' data by country report in 2010 [8], stated that the global prevalence of physical activity among adults over 18 is 77%, while Saudi Arabia was occupying the third most inactive population with prevalence of inactivity of 53.2%. A study by Al-hazaa [9] reported that physical inactivity ranged from 43.4% to 99.5% in Saudi Arabia depending on the age group and estimated that physical activity prevalence was 28.4% in people between the ages 15-29. In the current study we found that, the prevalence of physical activity among health care students was 56.6%, which is higher than the above-mentioned studies related to the general population. The difference could be attributed to the increased awareness and knowledge of the importance of the physical activity among the health care students. Still, it is lower than the global prevalence and the possible explanation could be the limited number of facilities available for practicing physical activity at the university as well as city of Riyadh.

The Bureau of Labor Statistics (BLS) of the United States (US) Department of Labor [10] reported that, the most common reported types of exercise among population between 15-24 years were basketball, American football and soccer while weight lifting and walking were not that common. In comparison to this research, we found that walking was the most common type of exercise among the students, followed by running and then weight lifting. This may be due to the environmental and cultural differences and variability of interests.

Regular exercise releases chemicals, which are the key for memory, concentration and mental sharpness [11]. This fact might be applied on our sample, as we found a significant difference between physically active and inactive students in concentration during classes. This study also showed that a significant higher percentage of students, who reported exercising, were less frequently late for their classes. As being late to classes could be considered as lack of punctuality, we could conclude that the exercise is a positive factor in time management.

A study on health sciences graduate students reported, "there was no significant correlation between GPA and level of

physical activity" [12], which is consistent with the observation in the current study. This was contradictory to the findings of Soo Shin who showed that students who spend more time engaged in physical inactivity are predisposed to a below average academic record [3].

WHO has reported that regular physical activity may reduce anxiety and depression [2]. However, our findings did not support this concept as no significant association was found in the current study between physical activity and reduction of stress and anxiety. However, these variables are more subjective than objective.

Finally, the present study is not without limitations. Firstly, the sample distribution showed that there were less number of pharmacy students than medical and dental students as academic years for Pharmacy College are four years whereas medicine and dentistry colleges' academic years are of five years duration. Secondly, female students were not included due to the impression that males in this country are more likely to be engaged in exercise than the females due to cultural and environmental factors. Thirdly, academic performance was evaluated subjectively, which may have caused instrumental bias.

5. Conclusion

This study showed that more than half of the healthcare students of KSU colleges perform physical activity. There was a significant positive effect of exercise on some domains of academic performance, especially concentration in classes and punctuality but with no significant effect on GPA.

Health care students might face stress and lack of time for the exercise. However, they should be encouraged to consider the great benefits related to its effect on academic performance. Therefore students should try to find a time for their physical activities.

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References

- [1] World Health Organization. Physical Activity. Geneva, Switzerland: WHO; 2015.
- [2] World Health Organization. Global strategy on diet, physical activity and health. Geneva: Switzerland; 2010
- [3] Soo Shin, Young So. Association between Physical Inactivity and Academic Record. Iran J Public Health. 2012; 41(10): 36-42.
- [4] Shephard RJ. Habitual physical activity and academic performance. Nutr Rev. 1996;54(4 pt 2):S32-S36.
- [5] Castelli DM, Hillman CH, Buck SM, Erwin HE. Physical fitness and academic achievement in third- and fifth-grade students. J Sport Exerc Psychol. 2007;29:239-252.
- [6] Chomitz VR, Slining MM, McGowan RJ, Mitchell SE, Dawson GF, Hacker KA. Is there a relationship between physical fitness and academic achievement: positive results from public school children in the northeastern United States. J Sch Health. 2009;79:30 - 37.
- [7] Basch CE. Physical activity and the achievement gap among urban minority youth. J Sch Health. 2011;81:626-634
- [8] World Health Organization. Risk factors, Prevalence of insufficient physical activity. Geneva, Switzerland: WHO; 2010.
- [9] Al-Hazzaa HM. Health-enhancing physical activity among Saudi adults using the International Physical Activity Questionnaire (IPAQ). Public Health Nutr. 2007 Jan;10 (1): 59-64.
- [10] U.S. Bureau of Labor Statistics. Sports and Exercise: BLS Spotlight on Statistics. Washington: U.S. Bureau of Labor Statistics; 2015.
- [11] Harvard Health Publications, Harvard Medical School. Regular exercise releases brain chemical key for memory, concentration and mental sharpness, from the May 2013 Harvard Men's Health Watch. Harvard: Harvard Health Publications; 2013.
- [12] Gonzalez EC, Hernandez EC, Coltrane AK, Mancera JM. The correlation between physical activity and grade point average for health science graduate students. OTJR (Thorofare N J). 2014; 34(3): 160-7.

Author Profile



Development

Dr. Hussein Amin is Assistant Prof. and Consultant in Family and Community Medicine Department, College of Medicine, KSU. KSU Chair for Medical Education Research and



Dr. Yasser Alrumin is Medical intern, College of Medicine, KSU



Dr. Ali AlRawdhan is Medical intern, College of Medicine, KSU



Dr. Fahad Alturkey is Medical intern, College of Medicine, KSU



Dr. AbdulRahman AlAkeel is Medical intern,
College of Medicine, KSU



Dr. Muath Alsabih is Medical intern, College of
Medicine, KSU



Dr. Ahmed Alhaidan is Medical intern, College
of Medicine, KSU



Dr. Ammar Naji is Medical intern, College of
Medicine, KSU