Original Article

The Association between Body Mass Index and Lifestyle with Academic Performance of College of Medicine Students, Majmaah University, Saudi Arabia

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Abstract

Introduction: Obesity rates have risen rapidly in both industrialised and developing countries, across all age groups and genders. The researchers wanted to see if there was a link between body mass index (BMI) and lifestyle and academic performance among College of Medicine students at Majmaah University in Saudi Arabia. **Materials and Methods:** Male and female students studying at college of medicine who were registered for the academic year 2020–2021 studying in levels 2–6 were included in this cross-sectional study. A total of 269 participants were chosen as part of the sample. A pretested questionnaire was used to collect the information. **Results:** Males made up more than half of the participants (153, or 56.6%), with the majority (245, or 91.1%) being between the ages of 17 and 24 years. Participants' BMIs ranged from 15.2 to 43.2, with an average SD of 24.5 5.3. One hundred and fifty (55.8%) of the kids were of average weight. The statistical research indicated a link between cumulative grade point average (CGPA) and BMI. In comparison to the rest, normal-weight participants had a higher CGPA. **Conclusion:** Being a male, younger age, high family income, second-year level and parents' education are all linked to strong academic achievement, according to the study. Normal weight, nutritional and sleeping habits are also linked to good academic performance.

Keywords: Academic performance, body mass index, lifestyle, medicine students

Introduction

Obesity rates have grown dramatically in both developed and developing nations, affecting people of all ages and genders. Adiposity is connected to a variety of illnesses and disorders, including diabetes, hypertension, coronary artery disease and cognitive impairment.[1] Exam scores play an influence on obesity, according to the findings of a research conducted by Florin *et al*., in 2011.[2] In younger children, physical activity and body mass index (BMI) have been demonstrated to effect academic achievement, but there is limited evidence for university students.[3] Obesity, hyperlipidaemia, hypercholesterolemia, hypertension, cerebral artery disease, type 2 diabetes and metabolic syndrome have all been demonstrated to have a substantial influence on morbidity reduction. Improved muscular control, physical efficiency, cardiovascular control, self-esteem, self-concept and lessened depressive/anxiety symptoms are all benefits of physical exercise.[4,5] There are some relationships between the body and the mind that can help you stand out and improve your grades. Physical activity increases some neurotransmitters, such as serotonin, according to Field *et al*.[6] Higher academic achievement throughout university studies and professional success after graduation have a strong relationship.[7] Poor nutrition and excessive junk food consumption are caused by a multitude of factors; pupils who consume more junk food than the norm have a stronger correlation with worse test grades. Students' academic performance is affected even if they do not have breakfast every day. Students who do not

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get adequate exercise are more likely to be overweight and have a worse grade point average.[8] University students are more likely to indulge in harmful eating habits because of the psychological and social changes that occur during this period, but it is also a chance to start living a healthy lifestyle because of the shift from childhood to maturity. This is also a period when important decisions must be made.[9] A lot of study has been done on the association between BMI and lifestyle and school pupils' academic performance. Because such research is rare among university students, this effort might be one of the first in our field. At the national and global levels, a body of recorded data warns of an increase in the prevalence of obesity (>95% in BMI for sex and age) in children and adolescents.[10] Many policymakers are working to reduce childhood obesity; California Governor (Arnold Schwarzenegger) passed legislation in September 2005 requiring the implementation of tight criteria and circumstances to ban the sale of junk food in public schools to combat childhood obesity by limiting food sugar and fat levels.[11]

Although physical education classes have long been and will continue to be an important part of schools, interest in them has recently grown as a result of the critical role that schools play in monitoring children's fitness as a result of the rise in childhood obesity, which is partly due to the No Child Left Behind Act.[12] Regarding the relationship between BMI and the academic performance, a study in Sri Lanka found an association between BMI and the academic performance of the students.[13] The researchers wanted to see if there was a link between BMI, lifestyle factors, sociodemographic characteristics and academic achievement among students at Majmaah University's College of Medicine in Saudi Arabia.

Materials and Methods

Study design and setting

The goal of this cross-sectional study at Majmaah University in Al-Majmaah, Saudi Arabia, was to discover if there was a link between BMI and lifestyle variables and academic achievement among students.

Study population

This research focused on students enrolled in Majmaah University's faculties of medicine for the academic year 2020–2021. The research comprised both male and female pupils from levels 2 to 6. Students who dropped out of school during that academic year were not included in the study.

Sampling

Stratified sampling was used in this study. The sample size was calculated as 269. Male students were 153 while female students were 116.

Data collection

A pretested questionnaire was used to obtain the information. There were two parts to the questionnaire. Age, gender, student level, location of origin, domicile and financial situation were all covered in the first section. There were questions about academic performance reported as a Cumulative Grade Point Average (CGPA). The first section also contained information about lifestyle factors such as the amount of hours spent sleeping, bedtime, exercise and eating habits. The measurement of BMI by measuring weight and height was the second phase of the data gathering tool. The formula for calculating the BMI was: BMI = weight (kg)/height (m) (height in meter) 2. The following are the World Health Organization's recommendations for BMI levels for adults: Underweight is 18,5, normal weight is 18.5–24.9, pre-obesity is 25.0–29.9, obesity class I is 30.0–34.9, obesity class II is 35.0–39.9 and Obesity class III is over 40. [Figure 1] weighing was done using two Omron automated digital weighing systems (Brand name Dingheng, Zhengzheu city. China), with calibration taking place every 10 measurements to reduce misleading findings. 210 cm Stadiometers were used to measure height. Before being measured for weight and height, participants were told to take off their shoes, heavy clothing and anything that wore on their heads, as well as anything in their pockets, including phones and keys.

Data analysis

SPSS version 24 (Chicago, Illinois, USA) was used to analyse the data using Chi-square tests (Fisher's and Pearson's Chi-square) for qualitative variables analysis. A $P < 0.05$ was taken as a statistical significance level.

Ethical considerations

The participants gave their informed consent, and the Majmaah University Institutional Review Board granted ethics approval. Permission and cooperation were obtained from the College of Medicine's administration.

Results

As shown in Table 1, the study comprised a total of 269 medical students. Men made up more than half of the competitors, 153 (56.6%), with the majority of 245 (91.1%) being between the ages of 17 and 24 years, and the remainder 24 (8.9%) being above the age of 24 years. Only 12 (4.5%) of those surveyed were married, with 257 (95.5%) being single. The majority of the students were in their 4th year (30.1%), followed by 54 (20.1%) in their 3rd year, 52 (19.3%) in their 2nd year, 49 (18.2%) in their 5th year and 33 (12.3%) in their 6th year. 177 (65.8%) of the students live with their parents, while 92 (34.2%) live alone. More over a quarter of their fathers (22.3%) possessed a college diploma. In terms of their moms' education, 126 (46.8%) held a bachelor's degree or above. The majority of the participants, 191 (71%) had a family income of more than 10,000 SR per month, 67 (24.9%) had a family income of between 5000 and 10,000 SR per month and 11 (4.1%) had a family income of <5000 SR per month.

One hundred and seventeen (43.5%) of the students ate dinner on a regular basis, 82 (30.5%) ate breakfast on a regular basis, 55 (20.4%) ate vegetables 7 times or more per week, 55 (20.4%) were smokers, 39 (14.5%) ate three meals on a regular basis and 33 (12.3%) ate fruits 7 times or more per

week. Two hundred and seventeen students (80.7%) exercised for <2 h and a half each week, whereas 52 students (19.3%) exercised for 2 h and a half or more per week. One hundred and forty-six students (54.3%) had a CGPA of 4.0–5.0, 123 (45.7%) had a CGPA of 3.0–3.99 and 59 (21.9%) had a CGPA of <3.0 [Table 2].

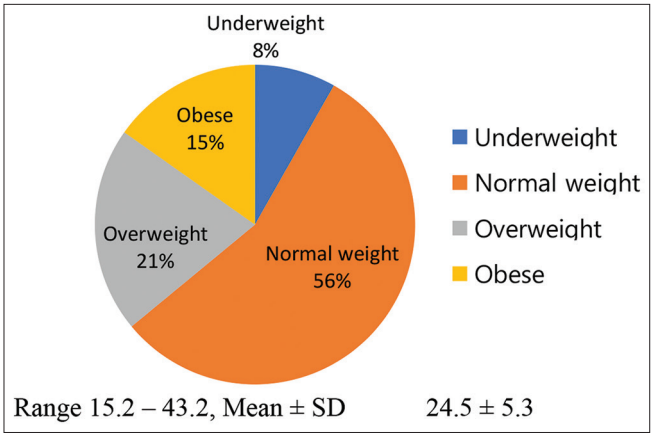

Figure 1: BMI among participants. BMI: Body mass index

Table 1: Demographics characteristics of the sample (*n*=269)

Characteristic	*n* (%)
Sex	
Male	153 (56.9)
Female	116 (43.1)
Age	
17-24	245 (91.1)
>24	24 (8.9)
Social status	
Married	12 (4.5)
Not married	257 (95.5)
Educational level	
2nd year	52 (19.3)
3rd year	54 (20.1)
4th year	81 (30.1)
5th year	49 (18.2)
6th year	33 (12.3)
Live with your parents	
Yes	177 (65.8)
No	92 (34.2)
Educational level of the father	
Primary	38 (14.1)
Intermediate	24 (8.9)
High school	60 (22.3)
University	147 (54.6)
Primary	51 (19)
Intermediate	35 (13)
High school	57 (21.2)
University	126 (46.8)
Place of residence	
Urban	249 (92.6)
Rural	20 (7.4)

Table 3 associates socio-demographic characteristics with academic success as indicated by the CGPA. In the statistical study, gender, age, respondents' educational level, the mother's educational level, family income level and residence all showed to have a significant link with academic achievement. A comparison between academic achievement and nutritional condition is shown in Table 4. Students who are underweight, normal weight, overweight or obese had great academic performance in 12.3%, 56.2%, 24.0%, and 7.5% of the time, respectively. A comparison between students' academic achievement and lifestyle is shown in Table 5. GPA was shown to have a significant relationship with sleeping duration, time to sleep, eating supper frequently. According to statistical studies, drinking soft drinks four times or more per week, smoking four times or more per week and eating fast food four times or more per week are all risk factors.

Discussion

According to our findings, students who are of a healthy weight do better academically. These findings backed up those of

Table 2: Lifestyle of the students, college of medicine, Majmaah University (*n*=269)

Lifestyle characteristics	*n* (%)
Sleep duration (h)	
<5	33 (12.3)
5-8	183 (68)
>8	53 (19.7)
Time to go to sleep	
Before 11 pm	24 (8.9)
11-12	55 (20.4)
After 12 midnight	190 (70.6)
Dietary habits	
Eat breakfast regularly?	82 (30.5)
Eat lunch regularly?	135 (50.2)
Eat dinner regularly?	117 (43.5)
Eating three meals regularly?	39 (14.5)
Eat vegetables 7 times or more per week	55 (20.4)
Eat fruits 7 times or more per week	33 (12.3)
Drink soft drinks 4 times or more per week	131 (48.7)
Smoker	55 (20.4)
Eat fast food 4 times or more per week	149 (55.4)
The total number of hours of exercise per week (h)	
<2.5	217 (80.7)
2.5 or more	52 (19.3)
The number of days you exercise each week	
<5	233 (86.6)
5-7	36 (13.4)
CGPA	
<3.0	59 (21.9)
3.0-3.99	64 (23.8)
4.0-4.49	76 (28.3)
4.5-5.0	70 (26)
GPA	
3.0-3.99	123 (45.7)
4.0-5.0	146 (54.3)

GPA: Grade point average, CGPA: Cumulative GPA

Table 3: Relation between academic performance and sociodemographic characteristics

Sociodemographic characteristics	CGPA		*P*
	Low and average (3.0-3.99 (*n*=123)	High (4.0-5.0) (*n*=146)	
Sex			
Male	79 (64.2)	74 (50.7)	0.025*
Female	44 (35.8)	72 (49.3)	
Age			
17-24	101 (82.1)	144 (98.6)	<0.001*
>24	22 (17.9)	2 (1.4)	
The educational level			
2nd year	8 (6.5)	44 (30.1)	<0.001*
3rd year	23 (18.7)	31 (21.2)	
4th year	45 (36.6)	36 (24.7)	
5th year	26 (21.1)	23 (15.8)	
6th year	21 (17.1)	12 (8.2)	
Living with parents			
Yes	77 (62.6)	100 (68.5)	0.310
No	46 (37.4)	46 (31.5)	
The educational level of the father			
Primary	15 (12.2)	23 (15.8)	0.594
Intermediate	13 (10.6)	11 (7.5)	
High school	25 (20.3)	35 (24)	
University	70 (56.9)	77 (52.7)	
The educational level of the mother			
Primary	17 (13.8)	34 (23.3)	0.028*
Intermediate	20 (16.3)	15 (10.3)	
High school	33 (26.8)	24 (16.4)	
University	53 (43.1)	73 (50)	
Family income level (K)			
<5	9 (7.3)	2 (1.4)	0.014*
5-10	24 (19.5)	43 (29.5)	
>10	90 (73.2)	101 (69.2)	

*Significant at 5% level of significance, Grade point average, CGPA: Cumulative GPA

Table 4: Comparison between academic performance and nutritional status

Nutrition status (BMI)	Academic performance		*P*
	Average, low (3.0-3.99) (*n*=123)	High (4.0-5.0) (*n*=146)	
Underweight	4 (3.3)	18 (12.3)	<0.001
Normal weight	68 (55.3)	82 (56.2)	
Overweight	21 (17.1)	35 (24.0)	
Obese	30 (24.4)	11 (7.5)	

BMI: Body mass index

Bradley and Greene, who demonstrated that obesity has an impact on cognitive capacity and that obesity is impacted by nutrition quality (as nutrition quality drops, the likelihood of obesity rises), hence bad nutrition is associated to poor academic performance.[14-21] However, not all studies have shown a link between BMI and academic performance; Taras *et al*.,[22] and Gaffar *et al*.,[23] for example, found no link, whereas Baxter *et al*. found the opposite.[24]

Our findings backed with Melby and Conger[24] findings, which found a link between a mother's and father's educational attainment, parenting and adolescent academic performance. According to Stevenson and Baker,[25] well-educated women with a predilection for school knowledge are more likely to discuss their child's school accomplishment than less-educated mothers. Well-educated women, according to the same study, have higher expectations for their children's academic advancement and lay larger demands on them.

Our study found a smoking prevalence of 20.4%, which was greater than previous studies in Jazan, which found a smoking frequency of 10.7%–16.8%.[26] Tobacco smoking was adversely related to the CGPA, according to the students' academic achievement; these findings are consistent with many prior research that have found a negative relationship between smoking and academic performance.[18,19]

Our findings revealed a favourable relationship between participants' CGPA and their family income. Similar to the findings of Mahfouz MS *et al*.,[27] who discovered a link between family income and academic achievement. This can

Table 5: Comparison between academic performance and lifestyle

	GPA		*P*
	3.0-3.99 (*n*=123)	4.0-5.0 (*n*=146)	
Sleep duration (h)			
<5	7 (5.7)	26 (17.8)	0.003*
5-8	85 (69.1)	98 (67.1)	
>8	31 (25.2)	22 (15.1)	
Time to go to sleep?			
Before 11 pm	17 (13.8)	7 (4.8)	0.024*
11-12	21 (17.1)	34 (23.3)	
After 12 midnight	85 (69.1)	105 (71.9)	
Dietary habits			
Eat breakfast regularly	33 (26.8)	49 (33.6)	0.232*
Eat lunch regularly	60 (48.8)	75 (51.4)	0.672*
Eat dinner regularly	64 (52)	53 (36.3)	0.010*
Eating three meals regularly	19 (15.4)	20 (13.7)	0.685*
Eat vegetables 7 times or more per week	30 (24.4)	25 (17.1)	0.141*
Eat fruits 7 times or more per week	18 (14.6)	15 (10.3)	0.278*
Drink soft drinks 4 times or more per week	75 (61)	56 (38.4)	0.000*
Smoker	35 (28.5)	20 (13.7)	0.003*
Eat fast food 4 times or more per week	87 (70.7)	62 (42.5)	0.000*
The total number of hours of exercise per week (h)			
<2.5	96 (78)	121 (82.9)	0.318*
2.5 or more	27 (22)	25 (17.1)	
The number of days you exercise each week			
<5	105 (85.4)	128 (87.7)	0.580*
5-7	18 (14.6)	18 (12.3)	

* Significant at 5% level of significance, GPA: Grade point average

be explained by the fact that an increase in income may allow the student to obtain course material in other ways, such as purchasing a large number of references, paying for additional lectures, or reading new material in his field using modern paid means, such as subscribing to some sites that provide paid research, amongst other options.

Our findings revealed a relationship between sleeping hours and academic success, with people sleeping between 5 and 8 h per day having a higher CGPA. Several studies have discovered that the right sleeping hours each night are a key parameter in a healthy lifestyle that leads to exceptional academic performance and that people who sleep less or more than the recommended sleeping hours have poor academic accomplishment.[8,28,29] Ghaffar *et al*.,[30] who showed no relationship between sleeping hours and academic performance, disagreed with our findings.

Furthermore, there was a negatively significant relationship between fast food consumption and academic achievement. This is in line with the findings of McIsaac *et al*.[28] and Alswat *et al*.[8] who identified a link between nutrition and academic success.

Similar to our findings, Ghaffar *et al*.[30] found no connection between physical activity and academic achievement. On the other hand, some study suggests that moderate physical activity is strongly associated with excellent academic achievement.[31,32] Physical activity was connected to greater cognitive performance in early adolescence, but the most active adult had inferior cognitive performance later in life, according to another study. This suggests that the relationship between academic success and a healthy lifestyle may be shifting.[16] Because our study was limited to students at Majmaah University's College of Medicine, the results cannot be generalised. It is difficult to create a random sample when we rely on an online questionnaire to obtain our data.

Conclusion

According to the study, excellent academic accomplishment is associated with male gender, younger age, high family wealth, second-year level and parents' education. Academic success is also linked to maintaining a healthy weight, eating habits and sleeping patterns. According to the survey, keeping a healthy weight, exercising frequently and improving food and sleeping habits are all important aspects of living a healthy lifestyle. More research should be done on larger and more diverse groups, according to the researchers.

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Conflicts of interest

There are no conflicts of interest.

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