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# Determination of Factors Affecting Physical Activity Status of University Students on a Health Sciences Campus

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**Background:** Upon graduation, students studying in departments related to health will work in the health sector and will guide and enlighten people with their knowledge and behavior. The purpose of this study was to determine the factors affecting the physical activity (PA) conditions of university students on a health sciences campus.

**Material/Methods:** A cross-sectional study was carried out on 706 students in a Turkish university. The data was obtained from a survey prepared by the researchers. The 26-question survey aimed to discover the students' socio-demographic characteristics and their awareness and practices concerning PA.

**Results:** We found that 30% of the students engage in some type of PA during their university education. A relationship was observed concerning their current PA and their family inactivity levels, as well as between inactivity before entering the university and inactivity during their education. The presence of a chronic disease in family members does not affect student PA. A majority of the students believe PA is beneficial (98.7%), 93.9% believe it relieves stress, and 94.5% believe it helps control body weight.

**Conclusions:** Although students of medicine and related disciplines are aware of the importance of proper diet and adequate levels of PA in health, they did not implement theory into practice. Thus, it is questionable how young health professionals will promote the positive effects and necessity of regular physical activity if they do not apply these activities to their own lifestyle.

**MeSH Keywords:** **Motor Activity • Public Health • Students, Health Occupations**

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## Background

Physical activity (PA) can be defined as all daily activities that activate the skeletal muscles and necessitate expending energy. Exercise (regular PA) consists of physical activities which combine 1 or more components of physical compatibility and are regular, planned, and repeated actions. Sports are activities conducted according to certain regulations and generally have a competitive feature. They are done by licensed amateurs and professional sportspeople [1–3].

The physical activities that the World Health Organization (WHO) recommends for adults (ages 18–64) are medium strength (e.g., fast-paced walking) exercise at least 5 days a week and for a 30-min duration, or high strength aerobic activities (e.g., running or high-tempo sports) at least 3 days for a 20-min duration [2,3]. PA is crucial for a healthy life. Technological advances continue to make life easier and cause a reduction in PA levels which in turn can lead to obesity [1,4,5]. The WHO has identified physical inactivity as the fourth leading risk factor for global mortality, resulting in an estimated 3.2 million deaths each year [3]. Although there is a strong relationship between obesity and genetics, many other factors, including nutrition transition, sedentary lifestyle, family history, religion, gender identity, financial status, and environmental issues, have been identified to explain the increasing prevalence of overweight and obesity in developing countries. Unhealthy dietary habits are associated not only with obesity but also with chronic diseases such as cardiovascular diseases and cancer. The risk of developing chronic diseases has been shown to increase with the consumption of a diet rich in energy, total fat, saturated fat, and cholesterol but relatively low in unsaturated fats, fruits, and vegetables. Large epidemiological studies have also demonstrated associations between higher physical activity levels and lower rates of several chronic diseases [1–3,5–8]. According to the WHO, globally, in 2010, approximately 23% of adults aged 18 and over were not active enough (males 20%, females 27%); 12% of men and 24% of women in low-income countries were inactive as compared to high-income countries, where 26% of men and 35% of women were insufficiently physically active. Globally, in 2010, 81% of adolescents aged 11–17 years were insufficiently physically active [5].

In Turkey, studies of the frequency of regular PA levels of students showed differences ranging from 16.6% to 71.8% [9–13]. Studies of university students in other countries indicated that the majority of students were physically inactive [14–20]. University students are encouraged to do sports for overall well-being, relaxation, and because it improves mental and physical health both during their education and afterward [6,7,9,21]. PA in adolescence not only benefits academic development, but also enables adolescents to become strong

and well-balanced individuals [4,6]. PA plays a critical role in human health; therefore, the knowledge, attitudes and behavior of students in health-related departments are very important. This is because upon graduation, these students will work in the health sector and raise awareness in the community not only by providing information but also by being good role models. Therefore, a need arose concerning the determination of the physical activity status of students during their university education.

The purpose of this study was to determine the factors affecting the physical activity conditions of university students on a health sciences campus.

## Material and Methods

### Subjects

The study was carried out in Dokuz Eylül University (DEU), which is one of the biggest public universities in Turkey and has specialized medical centers which provide both medical and academic services. The health campus of DEU consists of 2 faculties and 3 colleges. This was a cross-sectional study and the data were collected from December 2014 to April 2015. The study encompassed 4 semesters and included the responses of 3355 students from the Schools of Medicine on the health campus of DEU (Vocational School of Health Services, School of Physical Therapy and Rehabilitation, Faculty of Nursing, School of Sports Sciences and Technology, and the Faculty of Medicine).

### Study sample

A study of the physical activity practices of the students in the Faculty of Medicine had been done in recent years and 24.6% of students regularly engaged in sports [10].

Therefore, when calculating sample size, 25% was considered to be the regular physical activity prevalence. Using the Epi-info StatCalc program, the sample of the study was calculated as 646 by using a prevalence of 25% and precision of 3%, with 95% confidence interval level. Predicting the possibility of difficulties in obtaining samples, and the fact that there might be some problems concerning participation in the study, 10% was considered as a substitute figure and the required sample size was determined as 711 individuals.

### Data collection

The researchers prepared a questionnaire based on previous studies determining physical activity, sports, and exercise levels. In this study, physical activity levels were determined according to the WHO recommendations [3]. A survey with 26

questions was prepared to determine the students' demographic characteristics, physical activity levels, awareness, and behaviors concerning nutrition and dietary habits. The student class lists were obtained from the schools. Student numbers were determined from these lists and leveled sampling was implemented according to the grades the students were currently enrolled in. The method of clustered simple random samples was used to choose the samples.

The questionnaires were distributed to the students before class lectures. The questionnaires were individually completed by the students in the presence of the researchers. The students gave voluntary consent and then completed the questionnaire. There was no place on the questionnaire for the students' names or identities.

BMI was calculated for each participant. The participants were asked to report their weight (kg) and height (meter) in order to calculate the BMI ( $\text{kg}/\text{m}^2$ ) to classify the sampled population into the categories of underweight, overweight, pre-obese, and obese. This classification was based on the WHO classification for BMI. Normal BMI range is 18.50–24.99, pre-obese BMI range is 25–29.99, and obese range is  $\text{BMI} \geq 30$ .

All the expenses of the study were funded by the researchers and department. Official permission for the study was obtained from the Non-invasive Clinical Research Ethics Committee of Dokuz Eylül University Faculty of Medicine (2014/37-16). After obtaining ethics consent, official permission was obtained from the manager of each of the faculties and schools involved. Written consent was obtained from participants.

### Statistical analysis

The SPSS 15.0 statistics packet program was used for statistical analysis. The defining characteristics were number, percentage, and means. In the statistical analysis, the Pearson chi-square and chi-square test for trend were used to compare students' demographic characteristics, the schools they attended, habits, and family histories with their physical activity behavior. A multiple variable logistic regression analysis was conducted. P values less than 0.05 were regarded as statistically significant.

## Results

A total of 706 students (60.1% females, 39.9% males) studying on the health campus of the Dokuz Eylül University participated in this study. In this study, the access to samples was 99.3% and 37.0% of the students attending the Faculty of Medicine, 22.5% the Faculty of Nursing, 15.3% the School of Physical Therapy and Rehabilitation, 17.4% the Vocational

School of Health Services, and 7.8% were in the School of Sport Sciences and Technology. The participants' ages and body mass index means were  $20.7 \pm 2.1$  and  $21.9 \pm 3.0$ , respectively, and the age they began to do sports was  $14.0 \pm 5.1$  years. The physical inactivity levels were found to be the highest in the Faculty of Nursing, especially for first year and for female students ( $p < 0.01$ ) (Table 1). There was a significant relationship between being currently physically inactive and the family members' physical inactivity. In addition, there was also a correlation between current and previous physical inactivity ( $p < 0.01$ ). The students were questioned whether or not their parents or siblings suffered from chronic diseases such as hypertension, hypercholesterolemia, cardiovascular diseases, type II diabetes mellitus, or breast or colon cancers. There was no significant relationship between the presence of a chronic disease among family members and the students' physical activity ( $p > 0.05$ ) (Table 2). Some of the students' individual characteristics were compared according to gender (Table 3). Most of the students with a body mass index of  $\leq 24.99 \text{ kg}/\text{m}^2$  were female ( $p < 0.01$ ). Physical activity levels were higher in the female students' families ( $p < 0.01$ ). Physical activity levels of male students were higher than female students both before entering university and during their university education ( $p < 0.01$ ).

In Table 3, based on the schools they were attending, some of the individual characteristics of the students were compared. There was more physical activity in the families of the students in the Faculty of Medicine ( $p < 0.01$ ). Higher levels of physical activity were found among the students in the Faculty of Medicine before entering university and during their university education ( $p < 0.01$ ) (Table 3).

In our study, 30% of the students who participated were physically active during their university education. A little over half of these students (56%) only took advantage of the sports facilities on campus ( $p < 0.01$ ). The students' thoughts concerning the sports facilities available on our university health campus are provided in Table 4. In this study, 83.7% of the students indicated that they wanted to do sports on the health campus, 72.55% claimed that the facilities on campus were inadequate, 93.8% indicated that they thought the sports facilities should be free, and 82.4% said that the presence of various sports club on campus would increase the interest to do sports. Additionally, 92.4% of the participants wanted opportunities to be provided to engage in their favorite sports on the campus (Table 4).

The majority of the students (98.7%) claimed that physical activity was beneficial, 93.9% said it decreased stress, 94.5% said it helped control body weight, 93.1% indicated it decreased body fat, 82.4% said it helps control glucose, 90.7% said it helped prevent cardiovascular disease, and 95.9% knew it strengthens muscles and bones. We found that 55.7% of the students

**Table 1.** Physical activity status according to sociodemographic profiles and individual characteristics.

Characteristics	Physical inactivity		Physical activity		
	n	%	n	%	
School	Medical	180	69.0	81	31.0
	Nursing	125	<b>78.6*</b>	34	21.4
	Physical therapy and rehabilitation	79	73.1	29	26.9
	Vocational school of health services	96	78.0	27	22.0
	Sport sciences and technology	14	25.5	41	74.5
Year of school	1 <sup>st</sup>	161	<b>76.7**</b>	49	23.3
	2 <sup>nd</sup>	174	73.4	63	26.6
	3 <sup>rd</sup>	82	61.2	52	38.8
	4 <sup>th</sup>	77	61.6	48	38.4
Sex	Female	329	<b>77.6*</b>	95	22.4
	Male	165	58.5	117	41.5
Age	18–20	288	<b>74.4***</b>	99	25.6
	21–23	171	64.5	94	35.5
	≥24	35	64.8	19	35.2
BMI (kg/m <sup>2</sup> )#	≤18.49	61	79.2	16	20.8
	18.50–24.99	373	70.1	159	29.9
	≥25.00	60	61.9	37	38.1

\* Pearson chi-square, \*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.05$ ; #  $p$  for trend,  $p < 0.05$ .

**Table 2.** Physical activity-related characteristics of students and their families.

Characteristics	Physical inactivity		Physical activity	
	n	%	n	%
Physical inactivity in the family members#	367	<b>80.7*</b>	88	19.3
Presence of chronic disease in the family#	218	<b>70.6**</b>	91	29.4
Physical inactivity before university#	354	<b>84.1*</b>	67	15.9

\* Pearson chi-square, \*  $p < 0.001$ ; \*\*  $p > 0.05$ ; # here shown that the answer is yes.

were aware that physical activity has a protective role against breast and colon cancers (Table 5).

When compared to the other schools, students in the Faculty of Medicine were found overall to be more aware of the above-mentioned benefits of physical activity and this was statistically significant ( $p < 0.005$ ).

When we evaluated the dietary habits, we found that 39.3% of the students had 3 main meals and 2 snacks per day, 54.4% generally consumed fatty and high-calorie foods such

as fast-food, 41.5% added sugar to their drinks, and approximately half drank 2–3 liters of water per day.

Table 6 shows the dietary habits of the students according to the schools they attend. In the Faculty of Medicine 39.1% had 3 main meals and 2 snacks per day ( $p < 0.01$ ), 31.9% of the students in the Vocational School of Health Services had the habit of consuming 5 portions or more of fruits and vegetables ( $p < 0.01$ ), and 38.8% of the students in the Faculty of Medicine generally consumed fatty and high-calorie foods such as fast-food ( $p < 0.01$ ) (Table 6).

**Table 3.** Some individual characteristics based on gender differences and determined according to the schools.

Characteristics	Sex		School				
	Male n (%)	Female n (%)	Medical n (%)	Nursing n (%)	Physical Therapy and Rehabilitation n (%)	Vocational School of Health Services n (%)	Sport Sciences and Technology n (%)
BMI (kg/m <sup>2</sup> )							
≤24.99	218 (35.8)	391 (64.2)*	225 (36.9)	142 (23.3)	90 (14.8)	105 (17.2)	47 (7.7)
≥25.00	64 (66.0)	33 (34.0)	36 (37.1)	17 (17.5)	18 (18.6)	18 (18.6)	8 (8.2)
Are your family members physically active?							
Yes	116 (46.2)	135 (53.8)**	106 (42.2)*	44 (17.5)	32 (12.7)	39 (15.5)	30 (12.2)
No	166 (36.5)	289 (63.5)	155 (34.1)	115 (25.3)	76 (16.7)	84 (18.5)	25 (5.5)
Did you participate in regular physical activity before university?							
Yes	154 (54.0)*	131 (46.0)	100 (35.1)*	47 (16.5)	38 (13.3)	49 (17.2)	51 (17.9)
No	128 (30.4)	293 (69.6)	161 (38.2)	112 (26.6)	70 (16.6)	74 (17.6)	4 (1.0)
Do you participate in regular physical activity during your university education?							
Yes	117 (55.2)*	95 (44.8)	81 (38.2)*	34 (16.0)	29 (13.7)	27 (12.7)	41 (19.3)
No	165 (33.4)	329 (66.6)	180 (36.4)	125 (25.3)	79 (16.0)	96 (19.4)	14 (2.8)

Pearson chi-square, \*  $p < 0.01$ ; \*\*  $p < 0.05$ .

**Table 4.** Opinions of the students about the sports facilities on the campus.

Opinions	Agree n (%)	Disagree n (%)
Sports facilities are not adequate on the campus	512 (72.5)	194 (27.5)
I would like to exercise on the campus	591 (83.7)	115 (16.3)
I want the sports facilities on the campus to be free of charge	662 (93.8)	44 (6.2)
I would like more facilities to be made available for my favorite sport in order to exercise more	652 (92.4)	54 (7.6)
If more sports facilities are available on the campus, I can devote more time to my studies	423 (59.9)	283 (40.1)
If there were a variety of sports clubs on the campus, it would increase my desire to exercise	582 (82.4)	124 (17.6)
Planned sports events on the campus motivate me to exercise	600 (85.0)	106 (15.0)
Tournament matches on the campus motivate me to exercise	531 (75.2)	175 (24.8)

Logistic regression models were developed to determine the factors affecting students' physical inactivity. The type of school, body mass index, physical activity status in the family, and whether the student previously did physical activity were included in the regression model. The model showed that female students were 1.59 (OR=1.59, 95%CI: 1.06–2.37) times more inactive than male students. When the School of

Sports Sciences and Technology was considered as a reference point, physical inactivity was found to be higher among other students, but only the students in the Faculty of Nursing (OR=4.58, 95%CI: 2.01–10.40) showed significant differences. Students with physical inactivity in their families were found to be 3.04 times (OR=3.04, 95%CI: 2.07–4.45) less physically active, and students who were previously physically inactive

**Table 5.** Students' awareness and knowledge about the benefits of physical activity.

Opinions	Agree n (%)		Disagree n (%)	
Physical activity is beneficial to health	697	(98.7)	9	(1.3)
Physical activity reduces stress	663	(93.9)	43	(6.1)
Physical activity helps to maintain body weight	667	(94.5)	39	(5.5)
Physical activity reduces body fats	657	(93.1)	49	(6.9)
Physical activity helps regulation of glucose levels	582	(82.4)	124	(17.6)
Physical activity is protective against cardiovascular diseases	640	(90.7)	66	(9.3)
Physical activity strenghtens the muscles and bones	677	(95.9)	29	(4.1)
Physical activity is protective against colon and breast cancer	393	(55.7)	313	(44.3)

**Table 6.** Nutritional habits according to the schools (n=706).

Nutritional habits	Medical n (%)	Nursing n(%)	Physical Therapy and Rehabilitation n (%)	Vocational School of Health Services n (%)	Sport Sciences and Technology n (%)
I eat 3 main and 2 small meals in a day (n=276)	108 (39.1)*	45 (16.3)	36 (13.0)	60 (21.7)	27 (9.8)
I eat 5 portions or more of fruits and vegetables everyday (n=72)	18 (25.0)	14 (19.4)	8 (11.1)	23 (31.9)#	9 (12.5)
I usually eat vegetables (n=265)	86 (32.5)*	81 (30.6)	36 (13.6)	50 (18.9)	12 (4.5)
I eat bread or other grains (pasta, rice, legumes) everyday (n=526)	191 (36.3)	120 (22.8)	80 (15.2)	93 (17.7)	42 (8.0)
I drink 2–3 liters of water per day (n=376)	129 (34.3)##	90 (23.9)	50 (13.3)	67 (17.8)	40 (10.6)
I usually eat fast food and fatty foods (n=384)	149 (38.8)*	73 (19.0)	64 (16.7)	59 (15.4)	39 (10.2)
I salt food before tasting it (n=154)	49 (31.8)	37 (24.0)	24 (15.6)	31 (20.1)	13 (8.4)
I put sugar in my drinks (n=293)	94 (32.1)	67 (22.9)	48 (16.4)	57 (19.5)	27 (9.2)

Pearson chi-square, #  $p < 0.01$ ; ##  $p < 0.05$ .

were 3.37 times (OR=3.37, 95%CI: 2.26–5.01) less physical-ly active.

## Discussion

For university students, being physically active during their university education is a way of ensuring good physical and mental health, not only as young adults but also later in life. The fact that the university campus is an ideal environment for the promotion of physical activity is of great importance [22]. The purpose of this study was to determine the factors affecting the physical activity habits of university students on a health sciences campus, who upon graduation will not only work in

the medical fields but will also be assuming many missions such as being role models for society and increasing awareness.

We found that 30% of the students participating in this study were physically active during their university education. Our results on the frequency with which students do physical activities were similar to some other studies in Turkey [10], while others indicate higher levels [11–13]. In 1 study in the universities in Turkey, 16.6% of the students claimed that they participated in sports activities [9]. The proportion of university students who engage in PA is lower than that found in some other countries [14–17,19,20] and were higher than some other studies [18]. A study in Egypt measured the intensity of the physical activity of students and found that 52.0% engaged

in medium levels of PA and 36.7% engaged in high levels of PA [14]. A study of physical activity strength in Ghana was consistent with the Egyptian study's findings [15]. Three different studies in Poland [7], Malaysia [16], and Brazil [20] indicated that approximately 40% of students engaged in PA. In a study in the U.S.A., Hartz et al. determined that 75.3% of the students were physically inactive [18]. A study in Jordan found that 48.5% of the students were quite physically active [17].

A study demonstrated that adolescent girls were less physically active than adolescent boys, with 84% vs. 78%, respectively [3]. The male students who participated in our study were found to be more physically active. When compared to the males, PA among female students was 1.59 times lower. Studies in other cultures and other countries have demonstrated results supporting ours, indicating that female students tend to be more sedentary than males and do less PA [14,15,17,19–21,23,24]. In a study conducted in Pakistan, Nisar et al. observed that male medical school students were more physically active than females and that the risk of being overweight was 42% less for males [23]. The study in Egypt pointed out that some cultural norms influenced the female students' participation in some sports [14]. In a study in Kuwait, 10.3% of the male students and 13.8% of the female students felt embarrassed about doing sports in open areas. In the same study, 25.4% of the female students believed that culture had an effect on PA [25]. However, in our country and especially in the city in which the research was conducted, there is no cultural or sexual discrimination concerning physical activity. The fact that in Turkey males tend to participate in group activities like football and basketball may have had an impact leading to higher physical activity levels among male students. In order to increase the students' awareness of health improvements, the theoretical importance of physical activity should be emphasized to all students.

It is recommended by the WHO Global Action Plan 2013–2020 for school-based support programs to encourage physical activity (the importance of physical activity should be taught and sports facilities should be provided to students) [8]. In this study, the highest incidence of PA was observed among the students of the School of Sports Sciences and Technology (74.5%). The highest levels of physical inactivity were observed among the students in the Faculty of Nursing. The School of Sports Sciences and Technology students were considered as a reference point in the logistical regression analysis to determine physical inactivity status according to the schools. The physical inactivity among the Vocational School of Health Services students was not found to be statistically significant. However, the students in the Faculty of Nursing were found to be 4.5 times more physically inactive than students in the School of Sports Sciences and Technology. Likus et al. conducted a study of students in medical departments

and found results similar to ours, indicating that the students in the nursing and midwifery departments were more physically inactive [7]. Another study in Egypt observed that when compared to the medical school students, physical inactivity levels were 1.8 times higher in students studying in the social science departments [14]. Since most of the nursing students are females, the difference in PA levels can be seen as relating to gender. The nursing students must be informed and made aware that PA is one of the most important factors affecting health and must be maintained as a lifelong practice.

Engaging in PA in the early years and maintaining it as a lifestyle choice can enable people to practice it routinely in their later years. In this study, the highest levels of physical inactivity were observed among first-year students. Those students who were physically inactive before their university years were found to be 3.3 times more physically inactive while attending university. A study in Spain observed that approximately half of the students stopped doing PA after they entered the university [22]. In Egypt, a study indicated that an increase in the years of studying decreased physical inactivity, while an increase in social status increased physical inactivity [14].

Children learn healthy lifestyle choices from their families. The parents are the best role models for the students to develop healthy behavior patterns. In our study, there was a significant correlation between parents' levels of physical inactivity and the university students' present inactivity levels. The fact that the families were physically inactive increased the risk of physical inactivity during the university years 3.0 times. A recent study in Spain has shown that there is a positive relationship between parents engaging in physical activity and the students' PA habits. Romaguera et al. studied students and found that the fact that fathers were physically inactive did not influence male students but affected female students significantly. The mothers' physical inactivity had a significant impact on both males' and females' physical inactivity levels [22].

In the literature, there is a clear correlation between the socio-cultural status of individuals and their PA levels [16,17,25]. Our study observed that there was a higher level of PA in the families of the Medical School students. A recent study in China demonstrated that the socioeconomic status of the families of medical school students was higher. In addition, there was a positive relationship between the physical activity levels of the students and the educational backgrounds and financial status of their parents [26]. In our study, we did not ask questions pertaining to social or economic status; therefore, we cannot make any similar claims.

In our study, we observed that there was more PA in the female students' families. Nevertheless, it was seen that this did not affect the female students. The students were questioned

about the prevalence of chronic diseases such as hypertension, hypercholesterolemia, cardiovascular diseases, type II diabetes mellitus, and breast or colon cancers in their families. No significant correlation was found between the presence of such as diseases and the PA levels of the students. A study in Pakistan determined that although the body mass index of students with a family history of diabetes was higher, their PA levels were insufficient [23].

Approximately one-third of the participants in our survey ate 3 main meals and 2 snacks per day, and a similar amount consumed a diet high in vegetables. Almost half consumed fatty and high-calorie foods such as fast-food and 41.5% added sugar to sweeten their drinks. The students in the Faculty of Medicine had 3 main meals and 2 snacks per day and generally consumed fatty and high-calorie foods such as fast-food. Greece is a country which lies to the west of Turkey and has similar dietary habits. A study there found that medical school students had healthier nutritional habits than students in other faculties [27]. An earlier study of medical school students at our university found similar results in that approximately one-third of the students consumed fatty foods high in calories like fast-food [10]. Findings of research from various other countries indicate results similar to ours, and it appears most students have unhealthy nutritional habits [15–17,21,27,28]. In research conducted on university students studying in the medical and health sciences departments, it was observed that 15.2% of the students consumed fruit and vegetables more than 3 days a week, and at least once a day. The results also showed that approximately half the students consumed animal products at least 3 times a week and once a day [15]. In a study in Jordan, approximately one-fifth of the students indicated that they consumed fruit and vegetables at least 4 times a day or more, but 80% consumed fast-food products at least once or 3 times per week [17]. Another study observed that approximately one-third of the students consumed fruit once a day whereas others consumed fruit much less frequently. The same study showed that almost half of the students consumed high-calorie fatty foods like fast-food twice a week [7]. Two other studies with students showed similar results in that the consumption of fruits and vegetables was lower than the consumption of fast-foods [16,21]. A study conducted in China determined that the physical activity levels and healthy nutritional choices of students were insufficient. As a consequence, it was suggested that educational attempts to increase awareness and positive behaviors should be implemented [28]. Greene et al. carried out a web-based research project to improve health and found that healthy nutritional habits developed after the intervention [29].

Most of the students who participated in our study knew that doing PA was beneficial and that it reduced stress, helped control body weight, decreased body fat, enabled the control of

glucose, was protective against cardiovascular disease, strengthened bones and muscles, and that it had a protective effect on certain cancers. A previous study conducted at our university showed that most of the medical students were aware of the importance of physical activity and some other habits due to their effectiveness in the prevention of cancer [10]. When compared to our results, the study in Egypt produced findings that indicated the students were less aware of the benefits of physical activity. Those students expressed the opinion that physical activity at most improves health, changes the structure and form of the human body, and is beneficial for developing muscles [14]. Likus et al. conducted research on students in the health-related fields and found that more than half believed obesity was caused by physical inactivity. These students indicated that they engaged in physical activity first to feel better mentally, and then to improve their health [7]. The knowledge of the benefits of physical activity among medical school participants in our study was more advanced than that of other schools. Within the scope of theoretical courses in medical school, the students are taught the effects of obesity and weight control on overall health and the causal relationships between obesity and illnesses are emphasized in great depth. The participants in our study were found to be quite well informed of the benefits of PA but still did not put this information into practice. The students in our study were asked their opinions as to whether the facilities on the university campus were effective in their choice of engaging/or not engaging in PA. Our campus has basketball, volleyball, football, fitness, and swimming facilities. Female students may engage in physical activities alone and membership cost is reasonable in these facilities. Approximately half of the students doing physical activities were using the sports facilities on campus. The majority of the students indicated that they wished to do sports on the health campus but that the facilities were insufficient and that the sports opportunities should be free of charge. We found that 92.4% of the participants wanted the campus to provide opportunities to do sports within their own interest areas. In a study in Turkey, 21.2% of university students claimed that the sports facilities on campus were insufficient [9]. In a study in Kuwait, 17.2% of the male students and 24.5% of the female students claimed the physical conditions for doing sports and other physical activities were not adequate [25]. A study in Brazil found that 14.5% of males and 10.9% of females cited the absence of sports facilities as a reason for physical inactivity [20]. Gilany et al. recommended that to enhance PA there should be free opportunities for students to do sports in their leisure time [14]. In addition, seminars should be given to students to inform them of the benefits of PA and that PA should be included in the school curriculum [6,14,24]. The WHO Global Action Plan 2013–2020 recommended these proposals to increase physical activity: to implement evidence-informed public campaigns through mass media, social media, and at the community level, to create

social marketing initiatives to inform and motivate both adults and young people about the benefits of physical activity, and to facilitate healthy behaviors. Campaigns should be linked to supporting actions across the community and within specific settings for maximum benefit and impact [8].

### The strengths of the study

The rate of questionnaire response was quite high. Since the sample encompassed all students studying in the different schools on the health campus, the results can be generalized to include all students on the health campus. The results of this study are enlightening to the directors on the health campus in that all students should be encouraged to do, and supported in their pursuit of, physical activity.

### The limitations of the study

The students in this study were asked about their physical activity levels but were not questioned about the intensity of the physical activity. In the determination of the factors affecting PA, a questionnaire was used. A memory factor may have played a role in some of the data. The fact that we had no means to determine whether the information was given haphazardly was another limitation of our study. The students' financial situations, cultural aspects, and religions were not asked in our questionnaire.

## Conclusions

We found that 30% of the students who participated in our study were physically active during their university education. The factors which influenced this were having engaged in

physical activity in earlier years, and the fact that family members were also physically active. It was observed that most of the students did not possess sufficient healthy dietary habits. The majority of students knew the benefits of doing physical activity. When compared to the other students, the students in the Faculty of Medicine had more knowledge concerning the advantages of physical activity. Half of the students engaging in physical activity utilize the campus sports facilities. The majority of students cited a desire to do sports on campus but claimed that the sports facilities on campus were inadequate.

It is obvious there is a clear need for establishing a pro-healthy education for both medical students and all others who are studying related subjects. It is necessary not only to increase the awareness of appropriate nutritional habits but also to enhance the levels of physical activity in students studying medically orientated subjects, who in the future will be responsible for promoting public health. Universities should organize conferences and scientific activities on healthy diets and the importance of physical activity to create both an awareness of healthy lifestyle practices and to instill a culture of nutritional health. In addition to increasing their physical activity, student tournaments should be organized on campus and sports clubs should be established.

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### Declaration of conflicting interest

The authors declare that they have no conflicts of interest.

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