

The relationship between body mass index and physical activities among medical students in Saint Lucia

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ABSTRACT

Objective: To assess the relationship between body mass index (BMI) and physical activities among preclinical medical students at the Spartan Health Sciences University in St. Lucia, West Indies.

Methodology: This is a cross-sectional study. Two hundred and fifty questionnaires were distributed, 194 were correctly completed, resulting in a response rate of 78%. Body mass index was calculated by using self-reported height and weight.

Results: The results showed that 20.1% spend more than seven hours per week in some form of active motion. Twenty four (14.4%) of the respondents indicated that they are smokers and ninety four (48.5%) said that they consume alcohol. The mean BMI of the students was 21.9 Kg/m².

Conclusion: This study demonstrates that students participate less in organised physical activity. It is therefore suggested that students should be encouraged to become more engaged in physical activities to prevent future possible health risks associated with sedentary lifestyle.

KEY WORDS: Body mass index, Medical students, Obesity, Health risk.

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INTRODUCTION

Body weight and height relationship and its relationship with physical activities are considered to be indicators of a lifestyle and health status.¹ The prevalence of overweight and obesity among young adults and college students has previously been documented.^{2,3} The main cause of this global trend is

not yet fully understood, however sedentary leisure activities and high consumption of energy dense food have been implicated as possible contributing factors.⁴

Over time, the level of physical activity of people has been on the decline. Many reasons for this phenomenon has been suggested such as an increase in the use of motor vehicles to commute, longer time spent in sedentary activities, and less participation in well structured sporting activities.⁵ Some studies have indicated that overweight or obese people show a tendency to present with an increased arterial blood pressure.^{4,6} Walking to school is frequently associated with an increase in some form of physical activity such as participation in sport among students from several countries. Research conducted among adolescents and young adults has shown that weight gain was more prevalent among students who travelled to school by bus or car when compared to those who walked or biked to school.⁵ In combination with a sedentary lifestyle due to prolonged sitting at computers and television, obesity has been implicated as a cause for morbidity in the developed world.⁷⁻⁹

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Due to an increase in awareness of the health implications ascribed to obesity, weight control behaviour is now being encouraged among adolescents and young adults. The most common types of weight control strategies which at present are being promoted include dietary changes and increased physical activity.^{10,11} The practice of maintaining regular physical exercises that is associated with maintaining optimum body weight, cardiovascular and respiratory health fitness and also to lower the risk of developing chronic diseases is also linked to diet and lifestyle in order to be of real benefit.

A study conducted among adults in a community in South Africa and also among university students in 1998, reported a lower BMI in the students when compared to that of the public. This might be an indication that university students are more conscious of their body weight than the general public. Therefore, monitoring of weight by age, weight/height (BMI) is very important when one wishes to advise the general public to practise a normal healthy lifestyle.¹ In the South African study, factors that were found to be significantly associated with a high BMI included gender, age, marital status, obesity among parents, dieting, last physical check up, year of study, number of brothers and sisters, regular meals eaten and high school grade. Also, a study done in the USA noted that obesity among female students is associated with smoking and decreased physical activity.¹²

Studies performed in developed countries have identified a relationship between body mass index (BMI) and physical activity as well as health status however; literature searches performed showed that no such study has previously been undertaken among university students in St Lucia. This study is considered to be relevant in this group of people (young adults) as it is widely believed that many important healthy habits are established during this period of life which may develop into a sustained lifestyle. A clearer understanding of the interaction between physical activity and BMI with resultant improved health status is necessary in order to identify individuals who may be at risk of developing obesity associated and/or related medical conditions.

METHODOLOGY

This study was conducted using self-administered questionnaires. The survey was conducted from October 2007 to March 2008, after approval by the Spartan Health Sciences University Research and Academic Committee.

Data on age, height, weight, biographical data and information on lifestyle behaviour such as physical activity, cigarette smoking and alcohol consumption was collected from students at the Spartan Health Sciences University, Vieux Fort, St Lucia. Smokers were classified as those who stated that they were smoking more than one cigarette per day for at least three consecutive months. Ex-smokers were considered to be those who had not been smoking for the last three consecutive months and non-smokers are those who did not fall in any of these two groups.

Participation in the study was voluntary and verbal consent was obtained from the participants after explaining the purpose as well as the procedure to be used in the study to them. After the respondents completed the questionnaires, they were collected and the data processed.

Body mass index was calculated by dividing body weight in kg by height of participants in metres squared, using self-reported height and weight. To assess their physical activity, participants were asked to estimate the average time (1-19 min/wk, 20-59 min/wk, 1hr/wk, 1.5 hr/wk, 2-3hr/wk, 4-6 hr/wk and or greater than or equal to 7 hr/wk spent on activities during the last 12 months on walking, hiking, jogging (>10 minute mile), running (<10 minute mile bicycling, aerobic exercise, aerobic dance or the use of exercise machines, swimming, tennis, squash and any other form of exercise.

Statistical analysis: was performed using the Statistical Package for Social Sciences version 10.0 (SPSS Inc, Chicago, IL, USA). Results were expressed as mean and standard deviation (SD). ANOVA and Student's paired t-test were used for data analysis. A p-value of less than 0.05 was considered to be significant. The relationship between BMI and physical activity was determined by using regression analysis.

RESULTS

Of the 250 questionnaires distributed, 194 were correctly completed, resulting in a response rate of 78%. The age distribution ranged from 18 to 48 years with a mean of 25.3 ± 8.8 . The number of males to females was 98 to 95, giving an approximate ratio of 1:1. One respondent did not indicate gender and the questionnaire were excluded in the gender analysis.

Body mass index (BMI) was computed as weight in kilograms divided by height in metre square and categorised according to the World Health Organization guidelines: BMI < 18.5 kg/m² (underweight); BMI= 18.5-24.9 Kg/m² (normal); BMI=

Table-I: Monthly expenditure of the students.

Range of money	Frequency	Percent
< 1,000 ECD	9	4.6
1,001 - 2,000 ECD	60	30.9
2,001 - 3,000 ECD	50	25.8
3,001 - 4,000 ECD	31	16.0
> 4,001 ECD	21	10.8
Others	23	11.9

ECD: East Caribbean Dollars

25.0-29.9 Kg/m² (overweight); BMI 30.kg/m² (obese). In this study, the percentages of respondents' BMI were as follows; underweight 11%, normal 50%, overweight 20% and obese 16%. The mean BMI was 21.9Kg/m².

Table-I shows the monthly expenditure by the students: 30.9% spend less than one thousand East Caribbean Dollars on food/feeding and 10.8% more

Table-III: Specific physical activities.

Activity	Time / Distance	Frequency	%
Walking	>10 min. per mile	110	17.5
	< 10 min. per mile	52	22.7
Hiking	>10 min. per mile	34	17.5
	< 10 min. per mile	44	22.7
Jogging	>10 min. per mile	42	21.6
	< 10 min. per mile	60	30.9
Bicycling	>10 min. per mile	29	14.9
	< 10 min. per mile	55	28.4
Aerobic Exercise	>10 min. per week	51	26.3
	< 10 min. per week	46	23.7
Aerobic Dance	>10 min. per week	39	20.1
	< 10 min. per week	43	22.2
Exercise machine	>10 min. per week	58	29.9
	< 10 min. per week	39	20.1
Swimming	>10 min. per mile	35	18.0
	< 10 min. per mile	46	23.7
Tennis	>10 min. per week	17	8.8
	< 10 min. per week	41	21.1
Squash	>10 min. per week	17	8.8
	< 10 min. per week	39	20.1
Football	>10 min. per mile	45	23.2
	< 10 min. per mile	36	18.6
Others	>10 min. per mile	78	40.2
	< 10 min. per mile	49	25.3

Table-II: General physical activity per week.

Duration of activity	Frequency	Percent
1- 19 minutes	32	16.5
20 - 59 minutes.	27	13.9
1 hour	19	9.8
1.5 hours	17	8.8
2 - 3 hours	27	13.9
4 - 6 hours	29	14.9
> 7 hours	39	20.1
Others	4	2.1

than four thousand East Caribbean Dollars on food/feeding. The percentages of other respondents and their corresponding expenditures are shown in Table-I.

Table-II shows the time spent on general physical activities per week, thirty nine (20.1%) spend more than seven hours per week on active motion, while 32 persons (16.5%) spend less than 20 minutes per week on active general physical exercise. The general activities of other respondents are shown in Table-II while Table-III shows the time spent on specific physical activities. Most of the respondents participated in various physical activities.

Table-IV (lifestyle) shows the frequency of consumption of alcohol and cigarettes by respon-

Table-IV: Lifestyle: Cigarette smoking and alcohol consumption/day.

Cigarettes	Frequency	Percent
1 - 4 per day	3	1.5
5 - 9 per day	1	0.5
10 - 14 per day	6	3.1
20 - 24 per day	4	2.1
25 - 30 per day	3	1.5
>30 per day	2	1.0
Non-smokers	175	90.3
Alcohol	Frequency	Percent
1-4 cups/day	64	33
5-9 cups/day	9	4.6
10-14 cups/day	3	1.5
15-19 cups/day	2	1
20-24 cups/day	1	0.5
25-30 cups/day	3	1.5
>30 cups/day	2	1.0
Non-alcohol consumers	110	56.9

dents. Only 19 (9.7%) admitted that they are smokers and 84 (43.1%) admitted to alcohol consumption. The correlation between BMI and general physical activity of participants was significant ($P < 0.02$).

DISCUSSION

The mean BMI of the students who participated in this study was 21.9 Kg/m². This is in line with data reported in studies done among university students in Europe (BMI=21.3Kg/m²)¹³, South Africa (BMI=21.8 kg/m²)¹⁴ and the United States (BMI= 21.5Kg).¹⁵ Our findings possibly refute the presence of a strong bias in the current study when mean BMI as determined in our study is compared to other studies.

This study also found that 20% of the students reported height and weight that classified them as overweight or at risk of being considered to be overweight. The relationship between weight perception and BMI has been reported by other authors, so it may not be surprising to find that the tendency to underestimate their weights and overestimate their heights may be present in this data compilation. Actual measurements of the heights and weights were not done in this study to confirm this perception.^{16,17} Perception of overweight is the main determinant of nutritional habits and weight management. Many students who are overweight or at risk of becoming overweight but who do not perceive themselves as such, are unlikely to engage in weight control practices such as physical activities.¹⁶

The students in this study came from various social strata, many exhibiting different motivating factors.¹⁸ Sixty (30.9%) of the students spend less than one thousand East Caribbean dollars per month for feeding themselves (1 US Dollar is equivalent to 2.7 East Caribbean dollars). It has been reported that university students may face the risk of obesity due to affluence and modernization as well as the dynamic changes in their levels of physical activities and caloric intake as reported in a study conducted in Kuwait.¹⁹ This may explain the differences in the respondents' monthly expenditure.

We showed that 20.1% of the students spend more than 7 hours per week on active motion while 16.5% spend less than 20 minutes per week on any active general physical exercise. The guideline for physical activity established by the US Health Department suggests that adolescents should engage in moderate physical activity for at least 30 minutes per day on five or more days per week and in vigorous physical activity that promotes cardio-respiratory fitness for at least 20 minutes per day on three or more days per week.²⁰ It is believed that medical students tend

to participate less in organised physical activities because of the volume of academic work they need to cover, especially at the Spartan Medical School and the fact that the students sit for an average of 6-7 hours per day in lecture halls. However, the students are constantly being encouraged to make use of the school's gymnasium.²¹ Another study has shown that students with normal BMIs, participate more regularly in physical activity than underweight or overweight students.¹⁴ The students in our study reported BMI within a normal range, but whether the reported BMI among the students is a reflection of their physical activity is not clear especially due to the fact that most of them have reported to be spending less time on organised physical activities.

Walking to school is considered to be associated with increased physical activity among students.²² The advent of easily accessible transport, computers and cable network televisions has been shown to contribute to a decline in physical activities while promoting sedentary lifestyles. Most of the students in this study reside very close to the medical school and individuals own a laptop computer as well as a car. It is our opinion that these factors probably affect the students' involvement in walking as a form of exercise.

Smoking prevalence has been noted among university students to be associated with weight loss. According to a study done in South Africa and the United States, students who stopped smoking gained weight, however in this study we did not try to establish such a correlation. A previous study reported that smoking was found to be common among Spartan medical students.²³

Smoking and alcohol consumption have been shown to affect BMI.²² Whether smoking and alcohol consumption contributed to the BMI reported among the respondents in this study could not be confirmed, hence further study is recommended.

Recommendations:

Based on our results, we recommend that the students should be encouraged to participate in physical activities aimed at promoting good health and there is a need to include healthy lifestyles for medical students in the medical curriculum.

CONCLUSION

The study shows that slightly over 20% of the students spend more than seven hours per week in structured physical activities, suggesting that the majority of the students participate less in organised physical activities.

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