ORIGINAL ARTICLE

Assessment of physical activity and body weight among medical students in Banja Luka, Bosnia and Herzegovina

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ABSTRACT

Aim To assess obesity and weekly physical activity among medical students at the University of Banja Luka, Bosnia and Herzegovina, related to gender and years of study profile.

Methods This is a prospective, descriptive study conducted among the student population across all six years, comprised of a validated survey instrument Youth Risk Behaviour Survey Questionnaires. The study was approved by the Ethics Committee of the School of Medicine and carried out as an anonymous survey, during the winter semester of the academic year 2017/2018.

Results Of the total 601 students, the study included 543 students, 327 (60.2%) females and 216 (39.8%) males. The majority of students 337 (62.1%) had normal weight, and 13 (2.4%) had class 1 obesity. Most female students, 255 (75.7%) had normal weight, while 132 (61.1%) males were overweight. Physical inactivity was found among 349 (64.3%) students; 11 (2%) exercised regularly twice a week and 16 (2.9%) exercised five times a week.

Conclusion This study should help better understanding and identifying the onset of obesity among the students of the School of Medicine in Banja Luka and promote awareness of the obesity problem among them that would have benefit for health of this population group.

Key words: overweight, obesity, physical inactivity, students

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INTRODUCTION

Physical inactivity and obesity can increase the risk of developing many potentially serious health conditions and mental disorders that affect adolescents and youth. A healthy and diverse diet, combined with regular physical activity, decreases the risk of potential cardiovascular, malignant diseases and diabetes mellitus (1-5). The World Health Organization (WHO) defines overweight and obesity as abnormal and excessive fat accumulation in the body that may impair health (6). Obesity is second cause of death, and could be prevented. The following factors are associated with obesity: heredity, physical inactivity, an increased intake of energy-dense foods, endocrine and metabolic disorders, traumas, hypothalamic tumours, and iatrogenic disorders caused by regular use of antidepressants and corticosteroids (7-9). Other factors that influence onset of obesity are socioeconomic and socio-demographic, as well as dietary behaviour (10,11). The WHO uses Body Mass index (BMI index) to calculate nutritional status. It is defined as a person's weight in kilograms divided by the square of his/her height in meters. For adults over 18 years of age overweight is a BMI greater than or equal to 25 kg/m^2 (12). By the WHO estimation more than 1.9 billion adults, aged 18 years and older, were overweight in 2016. The worldwide prevalence of obesity is nearly tripled between 1975 and 2016 (11,13).

Lack of physical activity has been identified as the fourth leading cause of death attributing to 6% of all mortality in the world (14). In the WHO European Region approximately 31% of people over 15 years of age are not physically active enough, with one million deaths annually and treatment costs for physical inactivity between 150-300 euros per European inhabitant yearly (15,16). In Republika Srpska, Bosnia and Herzegovina (B&H), physical inactivity is considered to be a leading cause of morbidity in the population. More than two thirds (70.80%) of people have sedentary lifestyles (14). Pace of life, lack of sports facilities, sedentary lifestyle, too much television viewing and computer addiction lead to physical inactivity in free time (17,18). Playing sports of one's choice, age, ability and health status appropriate, should be an integral part of daily life (19).

To stay healthy, adults aged 18-64 should try to be active throughout the week, at least 150 minutes of moderate aerobic activity or 60 minutes of vigorous aerobic activity. This age group, with no health problems, should do vigorous aerobic activity that works the heart, lungs, muscles and needs to make breathing hard and fast (14,15,20,21). Examples of activities that require vigorous effort for most people include: running, jogging, hiking, cycling, swimming, aerobics, football, basketball and similar sports, gardening, lifting or moving weight over 20 kg (15).

The aim of this study was to assess obesity and weekly physical activity among medical students at the University of Banja Luka related to the gender and years of study.

PATIENTS AND METHODS

Patients and study design

This was a prospective, descriptive study conducted among student population across all six years of the School of Medicine at the University of Banja Luka (B&H).

A validated survey instrument Youth Risk Behaviour Survey Questionnaires (YRBS) (22) was used, meeting study requirements (gender, age, year of study) and questions about self-weight assessment and physical activity levels.

Written consent was obtained from the Ethics Committee of the School of Medicine of the University of Banja Luka. The study was conducted as an anonymous, during the winter semester of the academic year 2017/2018.

Methods

The survey was carried out during scheduled lectures provided by the Vice Dean for Teaching. The questionnaire took 10-20 minutes to complete. Of the total of 601 medical students, 543 (90.3%) were surveyed: year 1 – 110 students, year 2 – 91 students, year 3 – 128 students, year 4 – 98 students, year 5 – 60 students, year 6 – 53 students.

Youth Risk Behaviour Survey Questionnaire (YRBS) (22) is related to the gender, age, year of the study, and questions about self-weight assessment and physical activity levels. All questions were simple, and students had opportunities to mark answers (a-h). Question of self-weight assessment was: "How do you describe your weight?

Table 1. Body mass index (BMI) classification of students related to gender and year of study

Year of the study*	No (%) of students at BMI				
	Gender†	Underweight	Normal weight	Overweight	Obesity class 1
Year 1	M	1 (0.9)	12 (10.9)	21 (19.1)	2 (1.8)
	F	9 (8.2)	61 (55.5)	4 (3.6)	0 (0)
Year 2	M	1 (1.1)	11 (12.1)	26 (28.6)	0 (0)
	F	5 (5.5)	40 (44.0)	8 (8.8)	0 (0)
Year 3	M	0 (0)	25 (19.5)	27 (21.1)	4 (3.1)
	F	5 (3.9)	54 (42.2)	12 (9.4)	1 (0.8)
Year 4	M	0 (0)	14 (14.3)	32 (32.7)	2 (2.0)
	F	2 (2.0)	34 (34.7)	14 (14.3)	0 (0)
Year 5	M	0 (0)	7 (11.7)	9 (15.0)	2 (3.3)
	F	3 (5.0)	35 (58.3)	4 (6.7)	0 (0)
Year 6	M	0 (0)	9 (16.1)	5 (8.9)	2 (3.6)
	F	3 (5.4)	35 (62.5)	2 (3.6)	0 (0.0)
Total		29 (5.4)	337 (62.2)	164 (30.2)	13 (2.4)

*p=0.002 †p=0.000;

(very underweight, slightly underweight, about the right weight, slightly overweight and very overweight). Students wrote in this questionnaire their height end weight.

Four questions checked their physical activity during the past 7 days: How many days were you physically active for a total of at least 60 minutes per day? How many days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting? How many hours do you watch TV? How many hours do you use Facebook, Instagram, Twitter?.

The BMI was calculated for each student.

Statistical analysis

Statistical methods included: descriptive statistics using measures of central tendency and standard deviation (Student's t-test), and the differences between individual groups of respondents were tested by the $\chi 2$ test. There was statistical significance between compared data if the probability was less than 5% ($p<0.05$).

RESULTS

Of the total of 601, the study population included 543 students (90.3%) aged 18-29 years old, 327 females (60.2%) and 216 (39.8%) males. The highest number of students was in the 6th year, 56 (96.5%), and the lowest one was 4th, 98 (83.7%) year. The BMI related to gender and year of study showed that male respondents were overweight in the first five years of study. In the 6th year both genders, 35 (62.5% females and 9 (16.1%) males had normal weight (p=0.000) (Table 1).

The majority of students were not engaged in any form of physical activity, 349 (64.3). Overall 349 (64.3%) did not do any physical activity throughout the week, and only 16 (2.9%) were physically active five times a week. No statistical difference related to gender was found (p=0.106); there was statistically significant difference related to year of study (p=0.001) (Table 2).

The majority of students, 148 (27.3%), did not watch television throughout the week, and a small number, eight (1.5%) watched television five or six hours per day. Statistically significant

Table 2. Classification of students engaged in physical activity (gym, aerobics, yoga, pilates) related to gender and year of study

Year of study*	Gender†	No (%) of student days in physical activity						
		0 days	1 day	2 days	3 days	4 days	5 days	Total
Year 1	M	29 (26.4)	3 (2.7)	3 (2.7)	1 (0.9)	0	1(0.9)	37 (33.6)
	F	56 (50.9)	0	6 (5.5)	4 (3.6)	4 (3.6)	3 (2.7)	73 (66.4)
Year 2	M	32 (35.2)	0	2 (2.2)	4 (4.4)	0	2 (2.2)	40 (44.0)
	F	35 (38.5)	0	6 (6.6)	7 (7.7)	2 (2.2)	1 (1.1)	51 (56.0)
Year 3	M	32 (25.0)	3 (2.3)	5 (3.9)	10 (7.8)	3 (2.3)	3 (2.3)	56 (43.8)
	F	55 (43.0)	2 (1.6)	8 (6.3)	5 (3.9)	1 (1.6)	0	72 (56.3)
Year 4	M	27 (27.6)	1 (1.0)	9 (9.2)	7 (7.1)	4 (4.1)	0	48 (49.0)
	F	23 (23.5)	3 (3.1)	8 (8.2)	10 (10.2)	4 (4.1)	2 (2.0)	50 (51.0)
Year 5	M	7 (11.7)	2 (3.3)	2 (3.3)	4 (6.7)	0	3 (5.0)	18 (30.0)
	F	22 (36.7)	0	10 (16.7)	6 (10.0)	3 (5.0)	1 (1.7)	42 (70.0)
Year 6	M	5 (8.9)	5 (8.9)	4 (7.1)	3 (5.4)	0	0	17 (30.4)
	F	26 (46.4)	3 (5.4)	1 (1.8)	4 (7.1)	5 (8.9)	0	39 (69.6)
Total		349 (64.3)	22 (4.1)	65 (12.0)	64 (11.8)	27 (4.8)	16 (2.9)	543 (100)

*p=0.001; †p=0.106;

Table 3. Classification of students watching television related to gender and years of study

Year of study*	Gender†	No (%) of student time watching television							
		Not at all	<1h	1h	2h	3h	4h	≥5h	Total
Year 1	M	10 (10.0)	4 (3.6)	8 (7.3)	8 (7.3)	4 (3.6)	1 (0.9)	1 (0.9)	37 (33.6)
	F	25 (22.7)	16 (14.5)	13 (11.8)	13 (11.8)	4 (3.6)	2 (1.8)	0	73 (66.4)
Year 2	M	8 (8.8)	4 (4.4%)	1 (1.1)	13 (14.3)	13 (14.3)	1 (1.1)	0	40 (44.0)
	F	11 (12.1)	9 (9.9)	10 (11.0)	17 (18.7)	2 (2.2)	1 (1.1)	1 (1.1)	51 (56.0)
Year 3	M	12 (9.4)	8 (6.3)	12 (9.4)	17 (13.3)	6 (4.7)	0	1 (0.8)	56 (43.8)
	F	22 (17.2)	19 (14.8)	9 (7.0)	17 (13.3)	3 (2.3)	1 (0.8)	1 (0.8)	72 (56.3)
Year 4	M	5 (5.1)	4 (4.1)	7 (7.1)	11 (11.2)	17 (17.3)	3 (3.1)	1 (1.0)	48 (49.0)
	F	10 (10.2)	10 (10.2)	10 (10.2)	13 (13.3)	5 (5.1)	2 (2.0)	0	50 (51.0)
Year 5	M	5 (5.1)	4 (6.7)	0	6 (10.0)	2 (3.2)	0	1 (1.7)	18 (30.0)
	F	16 (26.7)	12 (20.0)	5 (8.3)	5 (8.3)	2 (3.3)	0	2 (3.3)	42 (70.0)
Year 6	M	9 (16.1)	6 (10.7)	1 (1.8)	1 (1.8)	0	0	0	17 (30.4)
	F	14 (25.0)	10 (17.9)	5 (8.9)	6 (10.7)	4 (7.1)	0	0	39 (69.6)
Total		148 (27.3)	106 (19.5)	81 (14.9)	127 (23.4)	62 (11.4)	11 (2.0)	8 (1.5)	543 (100)

*p=0.000; †p=0.000;

difference related to gender and year of study was found (p=0.000) (Table 3).

Respondents engaged social media via computer two or three hours per day during the week, females in 314 (58.8%) and males in 222 (41.2%) cases; statistically significant difference related to gender (p=0.001) and year of study (p=0.000) was (Table 4).

DISCUSSION

Of 543 students from our study 60.2%-were females and 39.8% males. The majority of students (62.1%) had normal weight, and 2.4% had class 1 obesity. Most female students 75.7% had normal weight, while their male colleagues 55.6% were overweight, 5.6% had class 1 obesity. Similar findings have been reported by Prišlin et al. in a study conducted at the School of Veterinary Medicine in Zagreb among 2nd year students over the course of three academic years 2014-2017; the study found that prevalence of normal weight was 81.7%, overweight 8.06%, class 1 obesity 1.09%, and underweight 9.16% (1). In the study, conducted on a sample of 248 students from Rijeka in 2011-12, Čulin and Anđelić-Breš found that prevalence of normal weight was 70.6%, overweight 17.6%, class 1 obesity 10.2% and underweight 1.6%. Similar results were reported across gender match, normal weight (75.6% in female) and class 1 obesity (17.9 % in male) (23). Crnobrnja et al. carried out a study on students from the University in Novi Sad in 2012 and found that prevalence of normal weight was 73.3%, overweight 22%, class 1 obesity 1.08%, and underweight 4.58%. The prevalence of overweight (41.7%) and obesity (1.9%) was higher among male students compared to their female colleagues, which corresponds to our findings (24). Likewise, Simić et al. conducted a study on students from Novi Sad and found that prevalence of overweight and obesity were higher among male than in female students (overweight 33.5%, obesity 7.5%) (25). The findings by Grujić et al. from a study that included the population from Vojvodina aged 20-29 years old, showed that overweight among male students was 29.6% and 11.5% among female, obesity was 9.7% and 7.7%, respectively (26). The study from Niš showed a

Table 4. Classification of students engaged in social media (Facebook, Instagram, Twitter) related to gender and years of study

Year of study*	Gender†	No (%) of students spending time							
		No at all	<1h	1h	2h	3h	4h	≥5h	Total
Year 1	**M**	2 (1.8)	6 (5.5)	2 (1.8)	12 (10.9)	7 (6.4)	4 (3.6)	4 (3.6)	37 (33.6)
	F	15 (13.6)	10 (9.1)	7 (6.4)	20 (18.2)	13 (11.8)	5 (4.5)	3 (2.7)	73 (66.4)
Year 2	**M**	1 (1.1)	4 (4.4)	3 (3.3)	7 (7.7)	12 (13.2)	5 (5.5)	8 (8.8)	40 (44.0)
	F	9 (9.9)	4 (4.4)	5 (5.5)	10 (11.0)	13 (14.3)	6 (6.6)	4 (4.4)	51 (56.0)
Year 3	**M**	3 (2.3)	6 (4.7)	14 (10.9)	13 (10.2)	12 (9.4)	4 (3.1)	4 (3.1)	56 (43.8)
	F	7 (5.5)	8 (6.3)	13 (10.2)	13 (10.2)	21 (16.4)	6 (4.7)	4 (3.1)	72 (56.3)
Year 4	**M**	0	2 (2.0)	4 (4.1)	10 (10.2)	10 (10.2)	9 (9.2)	13 (13.3)	48 (49.0)
	F	6 (6.1)	6 (6.1)	5 (5.1)	11 (11.2)	7 (7.1)	9 (9.2)	6 (6.1)	50 (51.0)
Year 5	**M**	0	4 (6.7)	3 (5.0)	3 (5.0)	5 (8.3)	2 (3.3)	1 (1.7)	18 (30.0)
	F	4 (6.7)	9 (15.0)	3 (5.0)	7 (11.7)	11 (18.3)	6 (10.0)	2 (3.3)	42 (70.0)
Year 6	**M**	1 (1.8)	3 (5.4)	6 (10.7)	4 (7.1)	3 (5.4)	0	0	17 (30.4)
	F	4 (7.1)	6 (10.7)	8 (14.3)	9 (16.1)	5 (8.9)	4 (7.1)	3 (5.4)	39 (69.6)
Total		52 (9.6)	68 (12.5)	73 (13.4)	119 (21.9)	119 (21.9)	60 (11.0)	52 (9.6)	543 (100)

*p=0.000; †p=0.001;

high prevalence of overweight among male 38.2% and 7.95% among female students, while obesity was 7.2% and 1.32 %, respectively (27).

We found that 64.3% respondents did not engage in any form of physical activity, 12% exercised regularly twice a week and only 2.9% exercised five times a week. The results varied by gender, 66.4% female and 61.1% male students showed no patterns of physical activity. In a similar study, Lolić et al. from Paneuropean University Apeiron in Banja Luka found that 29.3% students exercised regularly, 18.6% women and 10.7% men (28). Prišlin et al. found that 28.7% exercised regularly two to three times a week and 50% did not engage in any form of physical activity (1). Also, a study conducted in Kansas by Terry et al. in which YRBS Questionnaires were used, found that 16.1% respondents showed no patterns of physical activity throughout the week, of these 21.5% were women and 11% men (29). Further, Macanović et al. surveyed students from the College of Applied and Law Sciences Prometheus in Banja Luka and found that 77.7% students engaged in regular physical activity, of these 56.8% were men and 43.1% women. The highest percentage of respondents (55.5%) exercised regularly two to three times a week.

Our results showed 27.3% of both gender students did not watch television through the week, almost a quarter of them watched television two to three hours per day, and 1.5% more than five hours per day; gender profile showed that both male (23.1 %) and female students (30%) did not watch television during the week. Also, 43.8% of our students engaged in social media via computer two or three hours per day, 9.6% did not use computer through the week, and 9.6% engaged social media via computer more than five hours per day. The prevalence of women who did not use computer was among 1st year students 13.6%, and 8.8% among men in 2nd year. Macanović et al. found that 48% students spent two to three hours per day on television viewing and computer and more than four hours 29%, respectively (30). Likewise, 31% students from Sisak Vocational School (Croatia) answered they spent one hour per day on television viewing, and 11% more than three hours per day, respectively, only 5% did not watch television at all; the proportion of respondents who used the Internet every day was 92% and 8% did not use it at all (31). The findings from student by Rogina, conducted among students from the J. J. Strossmayer University of Osijek (Croatia), demonstrated that 71.6% respondents engaged in social media via computer (32).

The study found a high prevalence of overweight among male respondents compared to their female colleagues, who had predominantly normal weight. Another finding showed that the majority of respondents did not exercise regularly. Compared to other findings, this study should help better understand and identify the onset of obesity among the students of the School of Medicine in Banja Luka and promote preventive measures that would have benefit for health of this population group.

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TRANSPARENCY DECLARATION

Conflicts of interest: Nothing to declare.

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