

## Prevalence of Obesity and Physical Inactivity Behaviors among Nursing Students in Mutah University, Jordan

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**Abstract:** To assess the prevalence of obesity and patterns of physical inactivity among nursing students, a cross-sectional design was conducted from May 2013 to January 2014. A simple random sampling technique was adopted to choose the study subjects. Data was collected using an adapted version of a physical activity questionnaire (Al-Hazzaa, 2003). Chi square test and Monte Carlo test were used to analyze the data. More than one third of nursing students did not exercise or engage in sports activities for at least 20 minutes; furthermore, more than two-thirds did not exercise for at least five days or more a week. In addition, more than half of the students did not engage in any stretching exercises. The BMI indicated that about half the students were overweight and 14.7% were obese. Physical education classes should be integrated in the nursing faculty curriculum to avoid the increased prevalence of overweight.

**Key words:** Physical Inactivity • Obesity • Behaviors • Nursing Students • Community health

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### INTRODUCTION

Obesity is considered as a worldwide health problem. Obesity and physical inactivity are important risk factors in the increasing prevalence and development of several chronic diseases such as cardiovascular diseases, diabetes, hypertension, dyslipidemia and some types of cancer. Which in turn lower the quality of life and increase the probability of premature death [1-4]. This increasing prevalence has obliged the World Health Organization (WHO) to specify obesity as a significant habit problem throughout the world [5]. On the other hand, there is substantial evidence that engaging in an adequate level of physical activity will promote health and prevent such chronic diseases [1,6]. WHO has defined physical activity (PA) as “any bodily movement produced by the skeletal muscles that uses energy. This includes sports, exercise and other activities such as playing, walking, doing household chores or gardening” [7].

Low physical activity contributes to obesity, which increases the risk of diabetes type II complications [8]. Furthermore, incorporating physical activity in daily life reduces the risk of developing obesity and promotes psychological well being [9]. Engagement in sports

activity during adolescence is often extended into adulthood [10]. Opportunities for physical activity are linked to social, economic and cultural factors and the physical environment [9]. The age of college students (18-25 years) is considered as a transition stage between late adolescence and young adulthood, characterized by independent living and increasing susceptibility to weight gain. Reduction in physical activity, changes in dietary pattern and increase in social relations during this transitional period play an active role in leading to weight gain [11]. Unfortunately obesity, the disease of the twenty-first century, is becoming a common condition in the Eastern Mediterranean region. Musaiger [12] and El-Qudah [13] reported an alarming rate of obesity in developing countries including the United Arab Emirates, Saudi Arabia and Jordan.

Documentation of college students' health risk behaviors in Jordan is limited and little is known about nursing undergraduates regarding physical inactivity and obesity. The study was designed to help nursing students to improve their health behaviors and develop healthy skills and was conducted to assess the prevalence of obesity and patterns of physical inactivity (PI) among nursing students.

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**Research Question:** What is the prevalence of physical inactivity and obesity among nursing students?

## MATERIALS AND METHODS

**Design and Sample:** A descriptive cross-sectional design was conducted from May 2013 to January 2014. A simple random sampling technique was adopted to choose the study subjects from the total of 450 students in the Nursing Faculty in Mutah University.

The number of participants (n) to be included in the study was estimated using Stephen's Formula (2013) [14]:

$$n = \frac{N \times p(1-p)}{\left[ \left[ N - 1 \times (d^2 \div z^2) \right] + p(1-p) \right]}$$

Since the actual prevalence of obesity and physical inactivity in the Nursing Faculty is unknown, the probability of its occurrence was estimated to be equal to that of its non-occurrence ( $p=q=0.50$ ) and value of 0.05 is chosen as the acceptable limit of precision (D) at 95% confidence intervals where ( $Z=1.96$ ). Based on these assumptions, the sample size was estimated to be 208 students. The sample size was increased to 280 university students to increase the validity of this study. Of these, 177 students returned the questionnaires (response rate = 63%).

Participants were aged from 18-24 years, were of both sexes, full time undergraduates, single and had given written consent for their participation in the study. The study proposal was reviewed by the Research Ethics Committee of the Faculty of Nursing and the subjects were assured that their participation was voluntary and that they could withdraw at any time. Confidentiality was ensured by asking students not to enter their names on the questionnaires.

The Faculty of Nursing was established in order to meet the needs of the Jordanian community in general and the southern region of the country in particular for highly qualified nurses. It awards graduates a bachelor degree in general nursing science after completion of 133 credit hours. The faculty has about 450 students, most of them female.

**Measures:** Data was collected using a modified questionnaire [15] which had been used for assessing physical activity in 15-25 year-olds in Saudi Arabia. This self-administered standardized questionnaire is divided into three parts with 43 questions in total: the first part contains 14 questions about general health and socio-

demographic characteristics; the second (17 questions) asks about physical activities, described as rigorous, moderate, regular, stretching, running and machine exercises, in addition to domestic activities; and the final part (12 questions) investigates body mass index (BMI) and weight attitudes.

To ensure the validity of the instrument, an extensive field test was carried out and revised in consultation with three experts from the Faculty of Nursing. The pilot questionnaire was modified according to the subjects' culture and based on the experts' revision. A pilot study was conducted on 30 students aged 18-24 to test the feasibility, applicability and comprehension of the tool. 15-20 minutes was given to complete the questionnaire after explaining how to fill it in and then weight and height were registered for the purpose of measuring BMI.

**Analytic Strategy:** SPSS version 19.0 was used and the analyzed data was tabulated by using frequency percentages. Statistical analysis tests applied included the Chi square test and Monte Carlo test. Finally the level of significance used for the study was P value equal to or less than 0.05.

## RESULTS

The results of this study are presented in three parts.

**Part I:** Health and socio-demographic characteristics of the 177 student subjects, 54 (30.5%) were male and 123 (69.5%) female with a mean of 21.8 years. Table 1 presents the participants' socio-demographic characteristics; more than half (58.8%) were aged 20 to less than 22 years, almost a third (29.4%) were aged 18 to less than 20 years and a minority (5.1%) were aged 24 years. A significant gender difference in relation to age was noted ( $p=0.028$ ).

Regarding religion, the table illustrates that the vast majority (96.6%) of the students were Muslims. Significant gender difference was not noted in relation to religion ( $p=0.669$ ). With respect to residence characteristics, it was found that most of the students (81.4%) lived with their families, while 16.9% (16.7% among males and 17.1% among females) lived in student accommodation. However, more than half (59.9%) lived in rural areas and a minority (1.7%) lived in Badya. There was no statistically significant difference between male and female students regarding residence characteristics ( $p=0.407$ ) (Table I).

Table 1: Distribution of the studied students according to their socio- demographic characteristics (n=177).

Socio-demographic characteristics	Male (54)		Female (123)		Total (177)		Statistical Significance Test (p value)
	No.	%	No.	%	No.	%	
<b>Age</b>							
18 -	13	24.1	39	31.7	52	29.4	$\chi^2=8.78$ (0.028) *
20 -	29	53.7	75	61	104	58.8	
22 -	6	11.1	6	4.9	12	6.8	
24	6	11.1	3	2.4	9	5.1	
<b>Enrollment Year</b>							
First	9	16.7	24	19.5	33	18.6	$\chi^2=4.43$ -0.226
Second	23	42.6	43	35	66	37.3	
Third	4	7.4	23	18.7	27	15.3	
Fourth	18	33.3	33	26.8	51	28.8	
<b>Religion</b>							
Muslim	53	98.1	118	95.9	171	96.6	$\chi^2=0.561$ -0.669
Christian	1	1.9	5	4.1	6	3.4	
<b>Current residence</b>							
Home	43	79.6	101	82.1	144	81.4	$\chi^2=1.882$ -0.508
Student's accommodation	9	16.7	21	17.1	30	16.9	
With relatives	2	3.7	1	0.8	3	1.7	
<b>Residency</b>							
Urban	21	38.9	47	38.2	68	38.4	$\chi^2=1.934$ -0.407
Rural	31	57.4	75	61	106	59.9	
Badya	2	3.7	1	0.8	3	1.7	

Table 2: Distribution of the studied students regarding sweating and stretching exercises during past 7 days (n=177).

Exercising or participating in sports activities for at least 20 minutes	Sex						Statistical Significance Test (p value)
	Male(54)		Female(123)		Total (177)		
	No.	%	No.	%	No.	%	
0	16	29.6	48	39	64	36.2	$\chi^2=7.004$ -0.458
1	11	20.4	28	22.8	39	22	
2	8	14.8	16	13	24	13.6	
3	6	11.1	17	13.8	23	13	
4	3	5.6	5	4.1	8	4.5	
5	5	9.3	5	4.1	10	5.6	
6	1	1.9	0	0	1	0.6	
7	4	7.4	4	3.3	8	4.5	
<b>Stretching exercises</b>							
0	23	42.6	75	61	98	55.4	$\chi^2=13.593$ (0.028)*
1	10	18.5	20	16.3	30	16.9	
2	5	9.3	12	9.8	17	9.6	
3	7	13	7	5.7	14	7.9	
4	1	1.9	0	0	1	0.6	
5	4	7.4	7	5.7	11	6.2	
6	0	0	1	0.8	1	0.6	
7	4	7.4	1	0.8	5	2.8	

Table 3: Distribution of the studied students regarding regular walking and the patterns of walking (n=177) .

On how many of the past 7 days did you walk regularly for at least 30 minutes at a time?	Sex						Statistical Significance Test (p value)
	Male (54)		Female (123)		Total (177)		
	No.	%	No.	%	No.	%	
0	7	13	29	23.6	36	20.3	$\chi^2=8.715$
1	4	7.4	17	13.8	21	11.9	-0.26
2	11	20.4	19	15.4	30	16.9	
3	5	9.3	14	11.4	19	10.7	
4	8	14.8	8	6.5	16	9	
5	5	9.3	15	12.2	20	11.3	
6	4	7.4	6	4.9	10	5.6	
7	10	18.5	15	12.2	25	14.1	
Walking patterns							
Slow	4	8.5	4	4.3	8	5.7	$\chi^2=3.322$
Moderate	37	78.7	67	71.3	104	73.8	-0.209
Fast	6	12.8	23	24.5	29	20.6	

Table 4: Distribution of the studied students regarding running exercise and using exercise machine (n=177).

On how many of the past 7 days did you run?	Sex						Statistical Significance Test (p value)
	Male (54)		Female (123)		Total (177)		
	No.	%	No.	%	No.	%	
0	20	37	65	52.8	85	48	$\chi^2=32.274$
1	9	16.7	17	13.8	26	14.7	(0.000)
2	7	13	17	13.8	24	13.6	
3	11	20.4	0	0	11	6.2	
4	2	3.7	8	6.5	10	5.6	
5	1	1.9	8	6.5	9	5.1	
6	3	5.6	2	1.6	5	2.8	
7	1	1.9	6	4.9	7	4	
On how many of the past 7 days did you use exercise machine?							
0	40	74.1	105	85.4	145	81.9	$\chi^2=9.110$
1	2	3.7	5	4.1	7	4	(0.243)
2	6	11.1	3	2.4	9	5.1	
3	3	5.6	3	2.4	6	3.4	
4	1	1.9	1	0.8	2	1.1	
5	0	0	1	0.8	1	0.6	
6	0	0	2	1.6	2	1.1	
7	2	3.7	3	2.4	5	2.8	

**Part II: Physical activity patterns**

Table 2 indicates in the previous seven days about one third of the students (29.6% males and 39.0% females) neither exercised nor engaged in sporting activities for at least 20 minutes “that made them sweat or breathe hard”. On the other hand only 10.7% of them have performed this exercise for at least 5 days and more. Regarding stretching, the table data indicates that more than half of the students (42.6% of males and 61.0% of females) did not engage in these exercises. There was a

statistically significant difference between male and female students in relation to stretching exercises ( $p=0.028$ ). (Table 2).

Table 3 shows that 13.0% of males and 23.6% of females never walk regularly for at least 30 minutes at a time. At the same time 30.0% of them had walked for five days or more during the previous week. Regarding walking patterns, the table shows that the majority of those who did perform this exercise followed moderate patterns. No gender differences were observed regarding walking exercises and their patterns ( $p>0.05$ ) (Table 3).

Table 5: Distribution of the studied students regarding BMI, weight description, and weight reduction (n=177).

	Sex						Statistical Significance Test (p value)
	Male (54)		Female (123)		Total(177)		
	No.	%	No.	%	No.	%	
<b>BMI</b>							
Underweight	1	1.9	1	0.8	2	1.1	$\chi^2=2.760$
Normal weight	16	29.6	46	37.4	62	35	-0.407
Overweight	31	57.4	56	45.5	87	49.2	
Obese	6	11.1	20	16.3	26	14.7	
<b>Weight description</b>							
Less than normal	8	14.8	19	15.4	27	15.3	$\chi^2=2.190$
Slightly less than normal	10	18.5	13	10.6	23	13	-0.678
Average	24	44.4	63	51.2	87	49.2	
Slightly more	9	16.7	21	17.1	30	16.9	
More	3	5.6	7	5.7	10	5.6	
<b>Weight Attempts patterns</b>							
Decrease	21	38.9	58	47.2	79	44.6	$\chi^2=2.913$
Increase	15	27.8	36	29.3	51	28.8	-0.405
Keep it normal	10	18.5	20	16.3	30	16.9	
Nothing	8	14.8	9	7.3	17	9.6	
<b>Reduce weight by exercising</b>							
Yes	14	25.9	39	31.7	53	29.9	$\chi^2= 0.598$
No	40	74.1	84	68.3	124	70.1	-0.439
<b>Reduce weight by dieting</b>							
Yes	19	35.2	50	40.7	69	39	$\chi^2= 0.471$
No	35	64.8	73	59.3	108	61	-0.492
<b>Reduce weight by diet pills</b>							
Yes	8	14.8	20	16.3	28	15.8	$\chi^2= 0.059$
No	46	85.2	103	83.7	149	84.2	-0.808

Table 4 shows that more than one third (37.0%) of male students and more than half (52.8%) of female students never ran during the previous week and the majority (81.9%) of all students had not used an exercise machine during that time. A gender difference was observed regarding running exercise ( $p=0.000$ ) but not regarding machine exercise ( $p=0.243$ ) (Table 4).

### Part III: Body Mass Index (BMI) and weight

BMI is calculated from height and weight ( $BMI = \text{weight } \{kg\} / \text{height } \{m\}^2$ ). BMI measurements indicated that 1.1% of the students were underweight (1.9% males and 0.8% females), 35.0% were normal weight (29.6% males and 37.4% females), 49.2% were overweight (57.4% males and 45.5% females) and 14.7% were obese (11.1% males and 16.3% females). Half (49.2%) of the students described their weight as average and fewer than half attempted

to decrease their weight by exercise, dieting or pills (29.9%, 39.0%, 15.8% respectively). No statistical differences were observed between male and female students regarding BMI and other weight variables ( $p>0.05$ ) (table 5).

### DISCUSSION

In the current study some physical activity outcomes were examined. Regular activity is defined as either at least 20 minutes of vigorous activity on three or more of the previous seven days, or at least 30 minutes of moderate activity on five or more of the previous seven days. On the other hand, inactivity is defined as either less than 20 minutes of vigorous activity or 30 minutes of moderate activity in the last seven days [16].

Measured against the WHO [7] Physical Activity Guidelines, the nursing students did not meet the following recommendations:

- Adults aged 18–64 should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity.
- Aerobic activity should be performed in bouts of at least 10 minutes' duration.
- For additional health benefits, adults should increase their moderate-intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate- and vigorous-intensity activity.
- Muscle-strengthening activities should be done involving major muscle groups on two or more days a week.

The study data showed that less than one third of the students were exercising or participating in sports activities for at least 20 minutes per day. At the same time, more than half of them performed no stretching exercises.

In addition, the study revealed that about half of the students did not walk regularly for at least 30 minutes at a time; less than a third walked on five or more days and the majority of walking followed moderate patterns. Moreover, the majority of the students did not use any exercise machine. These results, which indicate that most of the participants were physically inactive, are similar to those of a study in the United States by Calxton and Wells [17], that only a quarter of adults reported that they were engaging in the amount of physical activity recommended by WHO. The Student Data Report in Western Carolina University based on the Behavioral Risk Factor Surveillance System (BRFSS) indicated that most students do not get enough physical activity and more than half of them do not meet the recommended guidelines for moderate physical activity; almost three-quarters of Americans do not meet recommended guidelines for vigorous physical activity (Western Carolina University Wellness Council and University Health Center [18].

In 2010 Al-Kilany *et al.* [19] conducted a study on Kuwaiti students and reported that more than two-fifths were physically inactive.

Our study indicated that male students were more physically active than female students. This is consistent with studies conducted among Saudi Arabian university students [20] which revealed that males reported more frequent participation in high intensity PA than their female counterparts and that there was a high prevalence

of students who did not meet the WHO recommendations for PA at a vigorous-intensity level. Results from another international study conducted by Varela-Mato *et al.* [21] among Spanish university students reported high inactivity levels among female students.

In our study, BMI ranged from 16.66 to 46.0 kg/m<sup>2</sup>. 1.1% of the students were underweight (1.9% males and 0.8% females), 35.0% were normal weight (29.6% males and 37.4% females), 49.2% were overweight (57.4% males and 45.5% females) and 14.7% were obese (11.1% males and 16.3% females).

Brunt and Rhee [22] conducted a study to determine if living arrangements influenced dietary variety and other health behaviors among American college students. They indicated that 25.0% of the students were overweight and 9.0% were obese; however, 4.0% were underweight. The remainders were of healthy weight. Another inconsistent finding was shown in a cross-sectional study among a sample of undergraduate students enrolled in University Putra Malaysia by Hazizi *et al.* [23] to assess pedometer-determined physical activity. They reported that the majority of subjects (73.0%) had a normal BMI, followed by underweight (13.2%), overweight (10.4%) and obese (14.7%).

Our findings are almost in accordance with a study done in India by Gupta *et al.* [24] among medical students in Delhi. They revealed that the overall incidence of overweight was 17.5% and obesity 3.4%.

Olusanya and Omotayo, [25] implemented a study among university students and reported that obesity was more common among female students than males (10.0 and 4.6% respectively). These findings are similar to the current study (16.3 and 11.1% respectively). Finally, the higher rate of normal weight among female students than male students (37.4 and 29.6% respectively) in the current study was expected since female students are more worried about their body shape and appearance than male students, due to societal perception which prefers females to be slim [26-29]. This finding was supported by the fact that only 7.0% of female students were underweight as compared to 4.3% of males in the studied sample.

## CONCLUSIONS

The findings of this study indicate that nursing students do not meet the WHO guidelines regarding physical activity and therefore run the risk of being overweight. Accordingly, the students' awareness of the importance of physical activity should be raised. Since the incidence of overweight students was high, it is important to determine the correlates of overweight in youth.

**Recommendations:** A physical education course should be included in the students' syllabus because it provides the optimal setting to encourage college students to increase their activities and to shift toward better health. Further examination of the physical activity patterns among the college students should be continued. Use of a further objective method of physical activity assessment should be explored in any similar future research.

**Study Limitations:** Although the purpose of conducting this cross-sectional study was to explore the association between obesity and PA characteristics, it was not possible to infer a causal relationship using this design. Therefore, further studies might use more comprehensive and objective measures of obesity and physical activity, with other sedentary behaviors. Since the research involved only adolescents and young adults, the findings cannot be used to draw conclusions for men or women of other ages.

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