

Level of Physical Activity at Lebanese Universities' Students of Both Genders: A Comparative Study

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ABSTRACT

Background: Examining students' levels of physical activity is important because these students will be the future leaders of their communities. **Objectives:** The aim of this study was to generate primary information and describe the lifestyle behavior patterns considering physical activity prevalence among gender-related Lebanese college students. **Methods:** The study involved 600 students (346 Men, 254 Women with mean age 23.5 ± 3.96). The participants' levels of physical activity was examined by utilizing the International Physical Activity Questionnaire (IPAQ). The over-all level of physical activity including the four-lifestyle fields: work, transportation, home and gardening, and leisure-time, was presented as metabolic equivalent-min per week (MET-min/week). **Results:** Findings indicated 22% of students with high physical activity level, 61% and 17 % with moderate and low levels respectively. Based on activity Intensity, 47% (n= 282) of students were engaged in vigorous activity, while 45.2% (n= 271) were engaged in moderate activity, and 68.3% (n=410) were engaged in walking activities. Average time spent sitting for the whole sample was 6.23 daily hours. The level of weekly total physical activity expressed in metabolic equivalent represented 2970.5 MET/min/week in males and 2719.5 MET/min/week in females. **Conclusion:** In general, Lebanese universities students were equally active, with trivial supremacy for males. Lebanese university students met the (WHO) recommendations for physical activity (>150 min/week of moderate activity or > 75 min/week of vigorous activity or an equivalent combination of both activities). Physical Activity must be developed by the provision of physical activity classes in the university curriculum and extracurricular activities.

Key words: Physical Activity, University Students, Gender, Metabolic Equivalent, Energy Expenditure

INTRODUCTION

The need of engaging in regular physical activity is underlined in relation to a number of current society's health requirements (Janssen, 2007; WHO, 2006; WHO, 2009; Lee & Paffenberg, 2000; Niznikowska & Stepień, 2015). Inadequate physical activity is linked to the progression of several noncommunicable diseases (Kohl, 2001; Hermelati, et al., 2004), which result in 1.9 million early deaths each year around the world (WHO, 2002). Meanwhile, new studies reveal that physical activity is declining in society, with the most dramatic reduction occurring among university graduates and students. (Kwan et al., 2012; Bray & Born, 2004; Crombie et al., 2009; Sigmundova et al., 2011). The dilemma of diminishing physical activity and increasing sitting time is widespread and affects people of all ages (Bauman et al., 2011; Matthews et al., 2008; Soussa & Silva, 2017).

Physical activity promotes good aging by lowering the risk of disease, making the person feels better, and allowing him/her to live longer. Physical activity is critical for the prevention of disease, the maintenance of autonomy, and the enhancement of quality of life in the aged. One of the most common difficulties in elderly adults is a lack of physical activity, which can lead to muscle weakening, osteoporosis, and other health issues (Booth et al., 2012; Sun et al., 2013; & Greco et al., 2019).

Hamidieh et al. (2021) in an experimental study has proved that moderate to high intensity physical activity offers several benefits and advantages for the elderly varsity.

An intervention protocol used the TRX exercise method, which is a resistance exercise that uses body weight to improve strength, balance, flexibility, and core stability (Gaedtke & Morat, 2015). The protocol included performing TRX interventions for 60 min/day, three days/week for 8 weeks

after randomization. Exercises included Swedish push-up, chest press, rowing, single-handed rowing, Swedish atomic push-up, biceps curls movement, standing chest press movement, reverse mountain climber movements, bridge movement, single-leg squat, TRX Spiderman push-up, side plank, the crunch will be performed. Results of this study showed that TRX training could be used as a beneficial training method for increasing the level of physical activity.

As a result, the study of physical activity that attracts students as future community leaders should take center stage, because they are social influencers whose attitudes to everyday physical exercise may be emulated by others (Steptoe & Wardle, 2001; Hunt & Eisenberg, 2010).

Although numerous methods are used to measure physical activity, the International Physical Activity Questionnaire (IPAQ) is now the most widely used and valid instrument for assessing physical activity (Booth, 2000).

Several studies were directed to assess the level of physical activity using the IPAQ tool to classify physical activity levels based on their activity domains, types and energy indicators.

Padmapriya et al. (2013) studied the prevalence and patterns of physical activity among young Indian medical students. High level of physical activity students counted 41.3% of the investigated sample, students with moderate level counted 43.0%, while those with low level were 15.4%. The metabolic equivalent of the whole sample displayed a median of 39.13 MET/hour/week, which is equivalent to (2348 MET/min/week).

Another European comparative study (Bergier et al., 2018) analyzed and contrasted physical activity levels of students from different European countries by looking at the factors that influence physical activity levels. The scientists came to the conclusion that University students from the Visegrad countries (Hungary, Slovakia, Czech Republic, and Poland) had greater levels of overall physical activity (5588.5 MET/min/week) in comparison to their colleagues in Ukraine (4233.4 MET/min/week).

Ewelina Ninikowska et al. (2019) evaluated high school youth physical activity levels in Visegrad nations, including gender indicators, to see if WHO recommendations were followed. Males had 7291 MET/min/week of physical activity, while females had 6200 MET/min/week.

It is important to understand and identify lifestyle behaviors, particularly the physical activity level in college students from different countries, to develop country-specific recommendations on health promotion to be provided to students during the transition to college. While most research in this area has identified and compared physical activity levels across homogeneous and gendered samples, there is a lack of research studies comparing physical education levels between gender, as well as academic specialties. The results of this study will help health educators develop personalized interventions and programs aimed at improving the well-being and lifestyle of young students. There are few studies that look at the pattern of physical activity and inactivity among Lebanese adults and adolescents. Therefore, the aim of this study was to generate primary information and describe the lifestyle behavior patterns considering physical activity prevalence among gender-related Lebanese college students.

METHODS

Participants and Study Design

This study is an applied deductive quantitative research study using the cross-sectional descriptive research method. In Lebanon, there are approximately 180850 university students spread over 38 public and private universities (Yacoub & Badre, 2012). Statistical calculators based on a reference technique for sample size (Qualtrics Experience Management, 2021), and in a population of 180850, a sample of 384 participants is judged representative at the 95 percent confidence level, with a standard margin of error of 5%. However, because we have access to approximately 25 universities (65.8% of all universities in the country), it was planned to randomly recruit 384 males and 384 females' Lebanese university students, but 600 participants accepted to participate in the study, 346 males (57.6%) and 254 females (42.4%), with an average age of 23.5 ± 3.96 years. Finally, the students were chosen randomly from nine academic field majors representing twenty national and private universities, at a rate of 30 students per university, in collaboration with the student affairs departments of these institutions. Table 1 lists the sample academic majors as well as all other characteristics.

Instruments and Procedures

After being informed about the study's topic and purpose and agreeing to participate by filling out the survey, participants completed the self-administered extended form English version of IPAQ, which contains 27 questions that cover four (4) domains of physical activity (work-related physical activity, transportation-related physical activity, domestic (housework) and gardening (yard) activities, leisure-time physical activity), and time spent sitting (IPAQ, 2005).

The amount of physical activity during the preceding seven days was measured. The IPAQ questionnaire was supplemented with relevant social demographic and anthropometric parameters to assess the sample characteristics. This questionnaire has been indorsed for validation in different countries, and it has shown acceptable psychometric properties for assessing physical activity levels with good reliability and with a Spearman correlation coefficient values around 0.8 (Craig et al., 2003). Students completed and submitted the online google form version of IPAQ between January and August 2019.

The research was carried out in accordance with the Declaration of Helsinki: Recommendations for Physicians Conducting Biomedical Research Involving Human Subjects (Williams, 2008), and was approved by the Ethical Board of the Faculty of Sport and Physical Education, University of Belgrade, Serbia (No. 484-2).

Physical Activity Assessment

For IPAQ continuous score, each domain of physical activity was expressed in three energy dimensions: vigorous, moderate, walking. The results were presented as the esti-

Table 1. Sample characteristics from 20 Lebanese Universities

Variable	Males (n=346)	Females (n=254)	Total (N= 600)	p.value
	Mean±SD	Mean±SD	Mean±SD	
Age (years)	23.5 ± 3.8	23.5 ± 4.1	23.5 ± 3.96	0.98
Weight (kg)	83.5± 10.3	59.7± 8.2	73.3± 15	0.00
Height (cm)	176± 6.4	164± 5.6	171± 10	0.00
BMI (kg/m ²)	26.9± 3.1	22.2± 2.8	24.9± 3.8	0.00
Place of Birth (%)				
Lebanon	97.7	99.2	98.3	0.15
Outside Lebanon	2.3	0.8	1.7	0.15
Place of Living (%)				
Mount Lebanon	37.6	43.3	40.5	0.157
North Lebanon	5.2	7.5	6.4	0.252
South Lebanon	18.2	13.4	15.8	0.11
Bekaa	7.2	4.7	6.0	0.20
Beirut	31.8	31.1	31.5	0.85
Major of Study (%)				
Education	5.5	3.1	4.3	0.17
Physical Education	22.8	17.3	20.05	0.09
Management	21.7	25.2	23.45	0.31
Engineering	22.3	18.5	20.4	0.26
Computer science	9.2	7.5	8.35	0.44
Media - Journalism- (Radio - TV)	0.81	3.1	1.95	0.01
Medical & Health Sciences	8.9	11.0	9.95	0.40
Law	1.5	2.7	2.1	0.26
Humanities /Social Sciences	7.5	11.4	9.45	0.10
Mother's Level of Education (%)				
Elementary	7.8	6.3	7.05	0.48
Intermediate	23.7	16.9	20.3	0.04
Secondary	26.6	29.2	27.9	0.49
University	41.9	47.6	44.75	0.16
Father's Level of Education (%)				
Elementary	11.8	14.5	13.15	0.33
Intermediate	10.7	8.4	9.55	0.32
Secondary	28.6	27.9	28.25	0.86
University	48.9	49.2	49.05	0.93
Marital Status (%)				
Single	91.0	90.2	90.6	0.71
Married	9.0	8.9	8.95	0.71
Families with Children	10.1	13.8	11.95	0.30
Professional Status (%)				
Employed	56.4	58.3	57.4	0.64
Unemployed	43.6	41.7	42.7	0.64

mation of energy expenditure in metabolic equivalent minutes per week (MET/min/week). The total physical activity was calculated by estimating the data in MET/min./week in particular domains, multiplying the duration in minutes by the number of days and the corresponding intensity factor: walking - 3.3, moderate - 4.0, vigorous - 8.0. The percentage

of students that participated in physical activity was used to calculate the prevalence of physical activity.

The study sample was divided into three categories, according to the IPAC Scoring Protocol, (IPAQ, 2005), to measure the categorical physical activity score: "high level," "moderate level," and "low level or physically inactive".

The following are the standard scoring criteria:

- 1) High Level: meets one of the following two criteria: (a) > 3 days of vigorous intensity activity, accumulating at least 1500 MET/min/week; or (b) > 5 days of any combination of moderate intensity activity, vigorous intensity activity, and walking activities, obtaining at least 3000 MET/min/week.
- 2) Moderate Level: meets one of the following three criteria: (a) 3 days of vigorous activity lasting at least 20 minutes per day, (b) 5 days of moderate intensity activity, or walking for at least 30 minutes per day for at least 10 minutes at a time; or (c) 5 days of any combination of walking, moderate, or vigorous intensity activity lasting at least 600 MET/min/week.
- 3) Low Level: does not meet the "moderate" or "high" level standards.

Data Analysis

SPSS software, version 25, was used to conduct all statistical analyses. For each domain of physical activity separately, as well as for total physical activity, the Mean, Standard Deviation (SD), and Median were computed. The non-parametric Mann-Whitney U test was used to test statistically significant differences in physical activity between both genders. The significance level was set at $P < 0.05$ for all analyses processes (Hair, 1988).

RESULTS

The sample characteristics presented an average BMI ($26.9 \pm 3.1 \text{ kg/m}^2$) for males and ($22.2 \pm 2.8 \text{ kg/m}^2$) for females. The total sample average was ($24.9 \pm 3.8 \text{ kg/m}^2$). Other social demographic parameters were clearly presented in Table 1.

The categorical physical activity levels displayed a moderate physical activity level of 61.0% (between 58.7 – 63.0%), while the high and low levels were 22.0% and 17.0% (between 20.0 – 24.4%, and 21.3 – 12.6%), respectively.

Table 2 showed IPAQ results of the sample subjects considering physical activity and gender-related differences among the domains of physical activity. A significant difference was established at three domains of physical activity. Traveling in a motor vehicle ($p = 0.001$); Time of walking ($P = 0.017$); and the Domestic and Garden domain ($P = 0.015$).

Levels of physical activity and inactivity among genders showed that 53.8% of males were active while 46.2% were inactive, while 53.4% of females were active and 46.6% were considered inactive.

Physical activity was found to be prevalent in four lifestyle fields or domains: 41.0% ($n=246$) were engaged in work-related activity, 67.2% ($n= 403$) in transport-related activity, 53.8% ($n=323$) in home and gardening, and 52.3% ($n= 314$) of students showed engagement in leisure time activity. A percentage of 47.0% ($n= 282$) of students were engaged in vigorous activity, 45.2% ($n= 271$) of them were engaged in moderate activity, and 68.3% ($n=410$) were engaged in walking activities.

Students studying Physical Education and Sport ($n=122$, 20.3%), showed a significant difference in in-

volvement in leisure time activities 89.7%, while students of different academic majors and specialties showed 43.0%.

The weekly level distribution of physical activity for Lebanese university students based on intensity and type of activities reflected the following results: 139.0 min/week of vigorous physical activity, and 165.0 min/week of moderate physical activity.

The Mann Whitney U test used to determine the levels of continuous scoring of IPAQ scoring protocol expressed in Metabolic equivalent (MET) did not indicate any significant difference between genders through the four main IPAQ domains (work, transportation, domestic and gardening, and leisure time) activities. Results of this part were expressed obviously in Table 3.

The level of weekly total physical activity based on domains of physical activity expressed in three energy dimensions: vigorous, moderate, walking was 2970.5 MET/min/week in males, and 2719.5 MET/min/week in females.

DISCUSSION

The aim of this study was to generate primary information and describe the lifestyle behavior patterns considering physical activity prevalence among gender-related Lebanese college students. As for the BMI parameter of the Lebanese university students, both genders revealed an average ranging between underweight and overweight categories, (females: $22.2 \pm 2.8 \text{ kg/m}^2$) and (males: $26.9 \pm 3.1 \text{ kg/m}^2$). BMI results showed a normal healthy weight average for total participants ($24.9 \pm 3.8 \text{ kg/m}^2$). In general, students with healthy BMI were 50.7% ($n=304$), while those classified overweight and obese were 43.0% ($n=258$), and 6.3% ($n=38$) were classified underweight. Healthy weight BMI averages of students in this study are considered lower than those of (Bergier et al., 2018) study where healthy BMI averages of Visegrad countries (Hungary, Slovakia, Czech Republic, Poland) in comparison with Ukraine students averages showed 68.0% and 75.0% respectively. Regarding overweight BMI level, this study showed much higher averages than those represented in the study of (Bergier et al., 2018), since Visegrad countries sample revealed 22.9% while Ukraine sample presented 9.0%.

According to the IPAQ categorical scoring method, 22.0% ($n=132$) of the sample had a high level of physical activity, completing a minimum of 3 days of strenuous activity and the minimum of 3000 MET/min/week. 61.0% ($n= 363$) of students had a moderate level of physical activity, achieving at least 600MET/min/week. The requirement of 5 days walking for at least 30 minutes per day for more than 10 minutes at a time was used to obtain this moderate level of physical activity. 17.0% ($n=105$) of the participants did not meet the aforementioned two criteria, and were thus classed as having a low level of physical activity.

The IPAQ categorical scores of physical activity levels in the Lebanese students were as follows: High = (22.0% $n=132$), Moderate = (61.0% $n=363$), and Low = (17.0% $n=105$). However, these categorical scores in the Indian students study (Padmapriya et al., 2013) displayed the following results: (High = 41.3%, $n=107$), (Moderate = 43.2%, $n=112$) and (Low = 15.4%, $n=40$). This finding revealed that the majority of Lebanese students

Table 2. IPAQ Original Questions about specific domains by Gender presented in mean and p-value:

Variable	Whole Sample (600)		Males (346)		Females (254)		p.value
	Days/Week	Time/Day (Min)	Days/W	Time/Day	Days/W	Time/Day	
	Mean	Mean	Mean	Mean	Mean	Mean	
1 Vigorous physical activities at work	0.96		0.96		0.95		0.97
2 Time of vigorous physical activities at work		50.2		50.38		49.96	0.94
3 Moderate physical activities at work	0.53		0.51		0.56		0.60
4 Time of moderate physical activities at work		25.5		26.53		24.09	0.53
5 Walking for at least 10 minutes at a time at work	2.27		2.29		2.25		0.85
6 Time of walking at work		51.6		51.94		51.14	0.87
7 Traveling in a motor vehicle	5.0		5.18		4.71		0.00 *
8 Time of traveling in a motor vehicle		51.9		51.03		53.03	0.36
9 Bicycling to go from place to place	0.54		0.54		0.54		0.94
10 Time of bicycling from place to place		15.8		15.46		16.36	0.77
11 Walking to go from place to place	3.2		3.23		3.09		0.44
12 Time of walking from place to place		30.2		32.13		27.55	0.01 *
13 Vigorous physical activities around the house	1.07		1.1		1.04		0.52
14 Time of vigorous physical activities around the house		47.1		51.23		41.48	0.01 *
15 Moderate activities around the house	1.29		1.26		1.33		0.49
16 Time of moderate physical activities around the house		49.7		48.37		51.59	0.34
17 moderate activities inside the house	0.84		0.79		0.91		0.25
18 time of moderate physical activities inside the house		32.8		32.34		33.31	0.78
19 walking for at least 10 minutes at a time in leisure time	2.67		2.79		2.5		0.16
20 Time of walking in leisure time		37.3		37.73		36.71	0.72
21 vigorous physical activities in leisure time	1.26		1.31		1.2		0.47
22 time of vigorous physical activities in leisure time		32.9		33.73		31.73	0.55
23 Moderate physical activities leisure time	1.52		1.56		1.47		0.55
24 Time of moderate physical activities in leisure time		39.16		40.11		37.87	0.55
25 Sitting on a weekday (hours)		4.98		4.96		5.01	0.67
26 Sitting on a weekend day (hours)		7.44		7.36		7.57	0.36

* - significant variation at $p < 0.05$

fall into the moderate physical activity category, while the majority of Indian students fall into the high and moderate physical activity categories.

The achieved values of IPAQ continuous scores representing total weekly physical activity level based on energy dimensions of the Lebanese Universities' students at the level of 2970.5 MET/min/week in males, and 2719.5 MET/min/week in females, are lower than the ones found in youth students surveyed by the same questionnaire in European Visegrad countries (Ewelina Niżnikowska et al., 2019), 7291 MET/min/week for males, and 6200 MET/min/week for females respectively. These values are also lower than the ones obtained in the comparative study (Bergier et al., 2018) between the Visegrad countries (5588.5 MET/Min/week) compared to their counterparts in Ukraine (4233.4 MET/min/week). However, the total values of weekly physical activity of the Lebanese Universities' students are higher than the ones obtained in the Indian students' study 2348 MET/min/week (Padmapriya et al.,

2013). Continuous scores of physical activity based on metabolic equivalent were noticeably lower in Lebanese women 2719.5 MET as compared to men 2970.5 MET, which is a similar finding in students from the other countries (Pedisi et al., 2014; Pengpid & Peltzer, 2013; Zhao et al., 2011; Troiano et al., 2008).

The inactivity level reported in the Lebanese students (46.5%) was higher compared to Indian students (24.0%). Many studies reported that physical inactivity is highest among the youngest age group (Dong et al., 2004). This prevalence of physical inactivity in the Lebanese students' sample (46.5%) does not classify them as inactive students or very sedentary samples. These inactive participants are considered within the 17.0% (n=105) of low physical activity who did not satisfy the criteria of high or moderate physical activity levels and who achieved below three days of doing vigorous intensity activity and at least obtaining 3000 MET/min/week, or moderate intensity level of physical activity obtaining at least 600 MET/min/week, or five days of

walking activity for a minimum of 30 minutes per day for more than 10 minutes at a time.

Except in three sectors where significant differences were discovered, all IPAQ questions reported in (Table 3) revealed equal capacity of physical activity between genders. In the transportation domain, traveling in a motor vehicle presents an average of (5.18 days/week) for males and (4.71 days/week) for females, indicating a significant difference and P-value of 0.001. The transportation domain also represents a second significant difference in the time of walking from place to place between males (32.13 min/day) and females (27.55 min/day), with a P-value of 0.017. The Domestic and Garden domain represents the third significant difference between genders and is indicated in time of vigorous activity around the home. Males showed an average of (51.23 min/day), while females showed (41.48 min/day), and P-value is 0.015.

The distribution of physical activity across all IPAQ domains indicated much lower physical activity for Lebanese participants in work-related activity domains (41.0%) than in leisure activity domains (52.3%), household and garden (53.8%), and transport activities (67.2%). However, Indian students were mostly active in transport

activities (91.1%), and in second place are working activities with 84.6%, in third place leisure time with 67.0% and, finally, in fourth place household and gardening with 63.7%.

The lowest domain contribution to total physical activity was found in transport activities (727 METS); while the domain that contributed most was that of leisure activities (1781 METS). Men accomplished more physical activity at the work domain than women did (180.85 MET/min/week vs 176 MET/min/week with a P-value of 0.932). In the transport domain, men also had a higher activity level (376.44 MET/min/week for men versus 343.73 MET/min/week for women). Home and garden domain also reflected domination for men in higher activity levels (793.6 MET/min/week vs. 740.44 MET/min/week). In the leisure-time domain, men have also accomplished more physical activity than women did (951.5 MET/min/week vs. 829.74 MET/min/week). The average time spent sitting for the whole sample was 6.23 daily hours (43.6 hours/week). Men's average sitting time is 6.16 hours/day while women revealed 6.29 hours/day with no statistically significant differences (P = 0.385). Cycling activities resulted in the lowest weekly activity scores with 8.34 min/week (50 METS) for

Table 3. The weekly quantitative dimension of physical activity in particular domains by gender (in minutes) and (METS-min/week)

NO.	Domain	Males		Females		Test	
		Mean	MET-Min/Week	Mean	MET-Min/Week	Z	P
1	Work-related Physical Activities (1647 MET-min/week)						
	Vigorous	48.2	385.6	47.5	380	-0.03	0.97
	Moderate	13.65	54.6	13.5	54.0	-0.11	0.91
	Walking	119	392.7	115	379.5	-0.10	0.92
	Total	180.85	832.9	176	813.5		
2	Transportation - Related Activity (727 METS-min/week)						
	Motor Vehicle	264.3	264.3	249.8	249.8	-0.64	0.52
	Cycling	8.34	50.0	9.23	55.0	-0.04	0.97
	Walking	103.8	342.54	85.1	280.83	-1.71	0.09
	Total	376.44	656.84	343.73	583.63		
3	Home-Related Activities (1534 METS-min/week)						
	Vigorous around Home	56.4	451.2	43.1	344.8	-1.59	0.11
	Moderate around home	60.1	240.4	68.61	274.44	-0.75	0.45
	Moderate at Home	25.5	102.0	30.3	121.2	-0.79	0.43
	Total	142.0	793.6	142.01	740.44		
4	Leisure Time-related Activities (1781 METS-min/week)						
	Vigorous	44.2	353.6	38.0	304.0	-0.69	0.49
	Moderate	62.6	250.4	55.7	222.8	-0.65	0.51
	Walking	105.3	347.49	91.8	302.94	-0.78	0.42
	Total	212.1	951.49	185.5	829.74		
5	Sitting (min/week)						
	During the Weekdays	297.6	297.6	300.6	300.6	-0.17	0.86
	During the Weekends	441.6	441.6	454.2	454.2	-0.93	0.35
	Total	739.2	739.2	754.8	754.8	-0.87	0.38

* - significant variation at p<0.05; Z-value of the Mann-Whitney U test

males and 9.23 min/week (55 METS) for females with a total average of 9 min/week (52.5 MET-min/week).

Comparison of physical activity by gender revealed that Lebanese male and female students were equally active (53.4% females, 53.8% males), while previous studies showed domination of males on females in physical activity. (Suchomel et al., 2008; Mynarski et al., 2014; Wojciechowski & Bergier, 2016). This is most likely owing to women's roles in Lebanese society, as Lebanon is known for its feminist movements active throughout the Arab world, where Lebanese women have made significant progress toward long-term emancipation goals. Women in Lebanon represent a healthy and well-educated population with significant accumulated skills and human capital that must be generated for economic recovery (Salti & Mezher, 2020).

Lebanese Physical Education students (n=122, 20.3%) exhibited a significant difference in leisure-time activity engagement (89.7%), particularly athletic activities, compared to other specialties (43.0%). This is most likely owing to their study curriculum and program requirements, which include practical fitness training and frequent high-intensity physical activities, which necessitate higher anthropometric parameters and fitness capacities than students in other university specializations. The subject of study and its specificity should be remembered as one of the deciding variables of students' physical activity (Popovych et al., 2016; Stepien et al., 2014).

The average time spent sitting by Lebanese students is 6.23 hours per day (43.6 hours per week), which is consistent with the study of Loginov et al. (2015), who found that general university students spend around 50 hours per week seated and technical University students spend about 44 hours. Another study, which used accelerometers rather than IPAQs to assess physical activity and inactive time among students, found that they spent an average of 458.6 minutes per day engaging sedentary activities, which equated to approximately eight hours per day and 54 hours per week. As a result, the overall validity of the method evaluation used in this study is confirmed (Oyeyemi et al., 2017).

In general, weekly physical activity levels for Lebanese university students who show an average of 139 minutes of vigorous physical activity per week and 165 minutes of moderate physical activity per week meet the World Health Organization's guidelines and recommendations. According to the WHO, adults aged 18 to 64 should engage in at least 150 minutes of moderate-intensity aerobic physical activity per week, or 75 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate and vigorous-intensity physical activity per week (WHO, 2006).

There are a few limitations in our research. To begin with, the number of students in various fields of expertise was not equal, which could have influenced the results subjectively. This could, however, be attributable to the quantity of students in each field of study. Some fields are completely full, while others are completely vacant. Second, the study's cross-sectional methodology makes it difficult to determine if the observed relationships are causal. Furthermore, students self-reported their physical activity, which could lead to bias or underestimating of results by the respondent.

IPAQ, on the other hand, is a frequently used technique for determining physical activity and sitting time. Because it is inexpensive, simple, and non-invasive, it may be utilized in large study populations (Rosenberg et al., 2008; Chathuranga et al., 2016; Papathanasiou et al., 2009; Mynarski et al., 2009; Bandeira et al., 2015). Numerous research have demonstrated its validity and reliability (Rosenberg et al., 2008; Hagstromer et al., 2006; Craig et al., 2003; Kim et al., 2013).

Future research on Lebanese college students' lifestyles and physical activity should, however, include more objective measurement methods, such as personal interviews. Further physical activity studies in Lebanon should study differences depending on age stages, occupational sections, personal and family income, and other socioeconomic aspects to enhance the most effective physical activity support techniques.

CONCLUSION

We may conclude that male and female Lebanese college students were equally active, with a little supremacy for males, based on the total physical activity ratings of the life domains.

The female students had a normal BMI, whereas the male students were overweight. Although Lebanese University students satisfy the World Health Organization's (WHO) requirements and recommendations for weekly physical activity, this level is still lower than other European and international standards when compared to similar data. The majority of Lebanese students reported a moderate level of physical activity, while a quarter reported a high level, and the remainder were classified as low or sedentary. Leisure activities were the domains that contributed the most to total physical activity among Lebanese students, followed by work-related activities, home and gardening, and transportation-related activities. Physical education students participated in more physical exercise than students in other classes did. As a result, the current research may necessitate recommendations, facilities, and services for physical education classes in the undergraduate curriculum, as well as extracurricular outdoor activities.

Conflict of Interest

The authors declare no conflicts of interest.

REFERENCES

- Bandeira, F.M., Freitas, M.P., Laszlo, M. et al. (2015). Mode of administration does matter: comparability study using IPAQ. *Revista de Educação Física*. 21(4): 370–4, <https://doi.org/10.1590/S1980-65742015000400005>
- Bauman, A., Ainsworth, B.E., Sallis, J.F., et al. (2011). The descriptive epidemiology of sitting. A 20-country comparison using the international physical activity questionnaire (IPAQ). *American Journal of Preventive Medicine*, 41(2): 228–35, <https://doi.org/10.1016/j.amepre.2011.05.003>
- Bergier, J., Tsos, A., Popovych, D., et al. (2018). Level of and factors determining physical activity in stu-

- dents in Ukraine and the Visegrad Countries. *International Journal of Environmental Research and Public Health*, 15(8): 2-12, <https://doi.org/10.3390/ijerph15081738>
- Booth F.W., Roberts C.K., Laye M.J. (2012). Lack of exercise is a major cause of chronic diseases. *Comprehensive Physiology*, 2(2):1143-211. doi:10.1002/cphy.c110025. PMID: 23798298; PMCID: PMC4241367
- Booth, M.L. (2000). Assessment of Physical Activity: An International Perspective. *Research Quarterly for Exercise and Sport* 71(2): 114–20. <https://doi.org/10.1080/02701367.2000.11082794>
- Bray, S.R., Born, H.A. (2004). Transition to university and vigorous physical activity: Implications for health and psychological well-being. *Journal of American College Health*. 52(4): 181–188. <https://doi.org/10.3200/JACH.52.4.181-188>
- Chathuranga, R., Chathurani, S., Priyanga, R., et al. (2016). Physical inactivity among physiotherapy undergraduates: exploring the knowledge-practice gap. *BMC Sports Science, Medicine, and Rehabilitation*, 8(39): 2-9. <https://doi.org/10.1186/s13102-016-0063-8>
- Craig, CL., Marshall, A., Sjoström, M. et al. (2003). International Physical Activity Questionnaire: 12 country reliability and validity. *Medicine and Science in Sports and Exercise*, 35(8):1381–95. DOI: 10.1249/01.MSS.0000078924.61453.FB
- Crombie, A.P., Ilich, J.Z., Dutton, G.R., et al. (2009). The freshman weight gain phenomenon revisited. *Nutrition Reviews*. 67(2): 83–94. <https://doi.org/10.1111/j.1753-4887.2008.00143.x>
- Dong, L., Block, G., Mandel, S. (2004). Activities Contributing to Total Energy Expenditure in the United States: Results from the NHAPS Study. *International Journal of Behavior, Nutrition, and Physical Activity*, 1(4):2-11. doi: 10.1186/1479-5868-1-4.
- Gaedtke, A., Morat, T. (2015). TRX suspension training: a new functional training approach for older adults - Development training control and feasibility. *International Journal for Exercise Science*, 8(3): 224-233. PMID: 27182415; PMCID: PMC4833470.
- Global health risks mortality and burden of disease attributable to selected major risks, (2009). Geneva, World Health Organization. [Online] Available:https://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf (March 9, 2020)
- Greco E.A., Pietschmann P., Migliaccio, S. (2019). Osteoporosis and Sarcopenia Increase Frailty Syndrome in the Elderly. *Front Endocrinol (Lausanne)*. 10(25): 2-11. doi: 10.3389/fendo.2019.00255. PMID: 31068903; PMCID: PMC6491670
- Hagströmer, M., Oja, P., Sjöström, M. (2006). The international physical activity questionnaire (IPAQ): a study of concurrent and construct validity. *Public Health and Nutrition*. 9(6):755–62. Doi: 10.1079/phn2005898.
- Hair, J., Anderson, R., Tatham, R., et al. (1988). *Multivariate Data Analysis*, 5th ed.; Prentice-Hall, Inc., Upper Saddle River, NJ, US.
- Hamidiyeh, M., Naserpour, H., & Chogan, M. (2021). Change in Erector Spinae Muscle Strength and Kyphosis Angle Following an Eight Weeks TRX Training in middle-age Men. *International Journal of Aging, Health, and Movement*, 3(1):13-20. Retrieved from <http://www.ijahm.com/index.php/IJAHM/article/view/18>
- Hernelahti, M., Kujala, U., Kaprio, J. (2004). Stability and change of volume and intensity of physical activity as predictors of hypertension. *Scandinavian Journal of Public Health*. 32(4):303-9. Medline: 15370771. <https://doi.org/10.1080/14034940410024167>
- Hunt, J., Eisenberg, D. (2010). Mental health problems and help-seeking behavior among college students. *Journal of Adolescent Health*, 46(1): 3–10. <https://doi.org/10.1016/j.jadohealth.2009.08.008>
- International Physical Activity Questionnaire (IPAQ). *IPAQ Research Committee*. (2005). [Online] Available: www.ipaq.ki.se. (April 20, 2020)
- International Physical Activity Questionnaire (IPAQ) scoring Protocol, (2005). [Online] Available: <https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWVpbX0aGVpcGFxfGd4OjE0NDgxMDk3NDU1YWRIZTM> (April 19, 2020)
- Janssen I.(2007). Physical activity guidelines for children and youth. *Canadian Journal for Public Health*. 98(2): 109–121. <https://doi.org/10.1139/H07-109>
- Kim, Y., Park, I., Kang, M. (2013). Convergent validity of the international physical activity questionnaire (IPAQ): meta-analysis. *Public Health Nutrition*. 16(3):440–52. Doi:10.1017/S1368980012002996
- Kohl, HW. (2001). Physical activity and cardiovascular disease: evidence for a dose response. *Medicine and Science in Sports Exercise*. 33(6):472- 83. DOI: 10.1097/00005768-200106001-00017
- Kwan, M.Y., Cairney, J., Faulkner, G.E., et al. (2012). Physical activity and other health-risk behaviors during the transition into early adulthood: A longitudinal cohort study. *American Journal of Preventive Medicine* 42(1): 14–20. <https://doi.org/10.1016/j.amepre.2011.08.026>
- Lee, IM., Paffenbarger, RS. (2000). Associations of light, moderate, and vigorous intensity physical activity. *The Harvard Alumni Health Study. American Journal of Epidemiology*. 151(3): 293–99. <https://doi.org/10.1093/oxfordjournals.aje.a010205>
- Loginov, SI., Nikolaev, A.Yu., Vetoshnikov, AYu., et al. (2015). Physical activity of students of two universities in Surgut according to international questionnaire IPAQ. *Theory and Practice of Physical Culture and Sport*, [Online] Available: <http://www.teoriya.ru/en/node/4097> (April 20, 2020)
- Matthews, CE., Chen, KY., Freedson, PS., et al. (2008). Amount of time spent in sedentary behaviors in the United States 2003-2004. *American Journal of Epidemiology*, 167(7):875–81. <https://doi.org/10.1093/aje/kwm390>
- Mynarski, W., Rozpara, M., Nawrocka, A., et al. (2014). Physical activity of middle age adults aged 50–65 years in view of health recommendations. *European Review*

- of *Aging and Physical Activity*, 11(1): 141–147. DOI 10.1007/s11556-014-0138-z
- Mynarski, W., Rozpara, M., Czapla, K., et al. (2009). Aerobic capacity of students with different levels of physical activity as assessed by IPAQ. *Journal of Human Kinetics* 21(1): 89–96. DOI 10.2478/v10078-09-0011-8
- Niżnikowska E., Bergier J., Bergier B., et al. (2019). Study and evaluation of physical activity of youth from Visegrad Countries in relation to the WHO recommendations. *Roczniki Państwowego Zakładu Higieny*; 70(2): 155–160. <https://doi.org/10.32394/rpzh.2019.0065>
- Niżnikowska, E., Stępień, E. (2015). Physical activity of the students from universities in Biała Podlaska in their free time according to the chosen faculties. *Health Problems of Civilization*. 2(9): 13–18. [Online], Available: <https://pdfs.semanticscholar.org/8d33/d63fae1aa6dba366f791fae3f27bd48b83c3.pdf> ((April 20, 2020)
- Oyeyemi, AL., Muhammed, S., Oyeyemi, AY., et al. (2017). Patterns of objectively assessed physical activity and sedentary time: are Nigerian health professional students complying with public health guidelines? *PLoS One*, 12(12): 2–14. <https://doi.org/10.1371/journal.pone.0190124>.
- Padmapriya, K., Krishna, P., Rasu, T. (2013), Prevalence and patterns of physical activity among medical students in Bangalore, India. *Electronic Physician*, 5(1): 606–610. DOI: 10.14661/2013.606-610.
- Papathanasiou, G., Georgoudis, G., Papandreou, M., et al. (2009). Reliability measures of the short international physical activity questionnaire (IPAQ) in Greek young adults. *Hellenic Journal Cardiol*, 50(4): 283–94. [Online], Available: https://hellenicjcardiol.org/archive/full_text/2009/4/2009_4_283.pdf (April 2020)
- Pediši, C.Ž., Rakovac, M., Bennie, J., et al. (2014). Levels and correlates of domain-specific physical activity in university students: Cross-sectional findings from Croatia. *Kinesiology*, 46(1): 12–22. DOI: 796.035-057.87:001.891(497.5)
- Pengpid, S., Peltzer, K. (2013). Physical inactivity and associated factors among university students in South Africa. *African Journal for Physical Health Education, Recreation and Dance*, 19(1): 143–153. <https://hdl.handle.net/10520/EJC133608>
- Popovych, D.V., Bergier, J., Sopel, O.M., et al. (2016). Physical activity levels in female students of Ternopil State Medical University. *International Journal of Medicine and Medical Research.*, 2(2): 37–41. <https://doi.org/10.11603/ijmmr.2413-6077.2016.2.7032>
- Qualtrics Experience Management. (2021). Determining sample size: how to make sure you get the correct sample size. (Online) Available: <https://www.qualtrics.com/uk/experience-management/research/determine-sample-size/?rid=ip&prevsite=en&newsite=uk&geo=LB&geomatch=uk> (June, 2021)
- Rosenberg, D.E., Bull, F.C., Marshall, A.L., et al. (2008). Assessment of sedentary behavior with the international physical activity questionnaire. *Journal of Physical Activity and Health*, 5(1): 30–44. <https://doi.org/10.1123/jpah.5.sl.s30>
- Salti, N., Mezher, N. (2020) Gender Responsive Recovery in Lebanon, UN Women Lebanon Publications, Beirut. [Online] Available: www.unwomen.org. https://www.unwomen.org/-/media/field%20office%20arab%20states/attachments/publications/2020/06/macro%20economic%20policy%20recommendations%20_final%20english%20design.pdf?la=en&vs=5558 (April 19, 2020)
- Sigmundová, D., El Ansari, W., Sigmund, E., et al. (2011). Secular trends: A ten-year comparison of the amount and type of physical activity and inactivity of random samples of adolescents in the Czech Republic. *BMC Public Health*. 26: 731. [Online], Available: <https://bmcpublihealth.biomedcentral.com/track/pdf/10.1186/1471-2458-11-731.pdf> (April 2020)
- Sousa, G.R., Silva, D.A.S. (2017). Sedentary behavior based on screen time: prevalence and associated sociodemographic factors in adolescents. *Ciencia & Saude Coletiva Journal*, 22(12): 4061–72. <https://doi.org/10.1590/1413-812320172212.00472016>
- Stepien, E., Bergier, B., Bergier, J., et al. (2014). edzy poziomem aktywności fizycznej studentów PSW w Białej Podlaskiej a kierunkiem ich studiów. *Polish Journal for Sport Medicine*, 30(4): 189–198. DOI: 10.5604/1232406X.1122191
- Steptoe, A., Wardle, J. (2001). Health behavior, risk awareness and emotional well-being in students from Eastern Europe and Western Europe. *Social Science and Medicine*, 53(12): 1621–1630. [https://doi.org/10.1016/S0277-9536\(00\)00446-9](https://doi.org/10.1016/S0277-9536(00)00446-9)
- Suchomel, A., Sigmundova, D., Frömel, K. (2008). The role of physical activity in the lifestyle of the inhabitants of the Liberec region. *Human Movement*, 9(1): 19–26. DOI: 10.2478/v10038-008-0003-x
- Sun, F., Norman, I.J., While, A.E. (2013). Physical activity in older people: a systematic review. *BMC Public Health*. 13(1):1-7. Doi: 10.1186/1471-2458-13-449
- Troiano, R.P., Berrigan, D., Dodd, K.W., et al. (2008). Physical activity in the United States measured by accelerometer. *Medicine and Science in Sports and Exercise*, 40: 181–188. DOI: 10.1249/mss.0b013e-31815a51b3
- Williams, J.R. (2008). The declaration of Helsinki and public health, *Bulletin of World Health Organization*, 86(8): 650-652, DOI: 10.2471/BLT.08.050955.
- Wojciechowski, L., Bergier, M. (2016). Physical activity of the Biała Podlaska prison staff and its conditioning factors. *Health Problems of Civilization*, 10: 47–56. <https://doi.org/10.5114/hpc.2016.61366>
- World Health Organization. (2006). WHO Regional Office for Europe, Physical activity and health in Europe: evidence for action, WHO Library Cataloguing in Publication Data, Fact sheet no. 385, 2015. [Online] Available: <http://www.who.int/mediacentre/factsheets/fs385/en/> (April 20, 2020).
- World Health Organization. (2002). The world health report: reducing risk, promoting healthy life. Geneva: World Health Organization. p. 61
- Yaakoub, N., Badre, L. (2012). Education in Lebanon, Statistics in Focus, 03:6-7 (Online) Available: <http://www.>

cas.gov.lb/images/PDFs/SIF/CAS_Education_In_Lebanon_SIF3.pdf (June, 2021)

Zhao, G., Ford, E.S., Li, C., et al. (2011). Physical activity in U.S. older adults with diabetes mellitus: Preva-

lence and correlates of meeting physical activity recommendations. *Journal of the American Geriatrics Society*, 59(1): 132–137. <https://doi.org/10.1111/j.1532-5415.2010.03236.x>