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INFLUENCE OF DIETARY HABITS ON BODY COMPOSITION IN LEBANESE ACTIVE UNIVERSITY STUDENTS: A GENDER SPECIFIC ANALYSIS

VPLIV PREHRANSKIH NAVAD NA TELESNO SESTAVO PRI AKTIVNIH LIBANONSKIH UNIVERZITETNIH ŠTUDENTIH: ANALIZA PO SPOLU

ABSTRACT

Problem Statement: The unhealthy lifestyle behaviors that university students face comprising sedentary behaviors are associated with weight gain and obesity in this critical life age. Purpose: The purpose of the study is to explore the effect of dietary habits on body composition parameters in Lebanese Active University Students according to gender. Methods: A sample of 200 students from the Lebanese University, faculty of education, physical Education department were studied. The standardized Dietary questionnaire (Turconi et al., 2003) was used to assess the dietary habits of the participants. Body Composition was assessed using the method of multifrequency bioelectrical analysis. Five body composition parameters were assessed: Body Height, Body Mass, Body mass index, Percentage Body Fat mass, and percentage of Skeletal Muscle mass. Results: Lebanese Physical Education students showed satisfactory results and scored above average in the four sections of the nutrition survey. Regarding gender-based classification, males showed better scores in sections of dietary habits and nutrition knowledge, while females showed better scores in physical activity rated level, and nutrition beliefs. Regarding Body Composition, Lebanese students were found in normal body weight. The multiple regression analysis technique showed that the dietary habits factor has mild to moderate influence on body composition specifically on its three tested dependent variables: BM, BFM, and SMM. Conclusion: Findings support the need from educational and health authorities to develop and evaluate health-promotion and obesity-prevention programs for university communities especially for female gender with regular healthy lifestyle monitoring and standardized assessments.

Keywords: University students, Lifestyle, Dietary Habits, Health, Body Composition

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IZVLEČEK

Problem: Nezdrav življenjski slog, zaznamovan s sedečim vedenjem, s katerim se soočajo univerzitetni študentje, je povezan s pridobivanjem telesne mase in debelostjo v tem kritičnem življenjskem obdobju. Namen: Namen študije je raziskati vpliv prehranskih navad na parametre telesne sestave pri aktivnih libanonskih univerzitetnih študentih po spolu. Metode: Vzorec je vključeval 200 študentov z Libanonske Univerze, Fakultete za izobraževanje, oddelka za športno vzgojo. Za oceno prehranskih navad udeležencev je bil uporabljen standardiziran prehranski vprašalnik (Turconi et al., 2003). Telesna sestava je bila ocenjena z metodo multifrekvenčne bioelektrične analize. Ocenjenih je bilo pet parametrov telesne sestave: telesna višina, telesna masa, indeks telesne mase, odstotek telesnega maščevja in odstotek skeletne mišične mase. Rezultati: Libanonski študenti športne vzgoje so pokazali zadovoljive rezultate in dosegli nadpovprečne rezultate v vseh štirih delih prehranske ankete. Glede na razvrstitev po spolu so moški dosegli boljše rezultate v delih o prehranskih navadah in prehranskem znanju, medtem ko so ženske dosegle boljše rezultate v ravni telesne aktivnosti in prehranskih prepričanjih. Glede telesne sestave so bili libanonski študenti v območju normalne telesne mase. Multipla regresijska analiza je pokazala, da imajo prehranske navade blag do zmeren vpliv na telesno sestavo, zlasti na tri testirane odvisne spremenljivke: TM, TMF in SMM. Sklep: Ugotovitve podpirajo potrebo izobraževalnih in zdravstvenih oblasti po razvoju in oceni programov za promocijo zdravja in preprečevanje debelosti za univerzitetne skupnosti, zlasti za ženski spol, z rednim spremljanjem zdravega življenjskega sloga in standardiziranimi ocenami.

Ključne besede: univerzitetni študenti, življenjski slog, prehranske navade, telesna sestava

INTRODUCTION

Diet and physical activity significantly impact health, fitness, weight management, and chronic diseases prevention (Kljajevic et al., 2021). Obesity is caused by consuming more energy than needed, resulting in fat accumulation. Eating only enough to balance energy output daily can leave accumulated fat unchanged, leading to physical and psychological harm and reduced life expectancy (James, 2004).

Young adults in universities face challenges like adjusting to a new environment, study stress, time management issues, and a crowded schedule, leading to a lack of health awareness. They engage in unhealthy habits like meal skipping, snacking, fast food consumption, smoking, and excessive internet use (Ganasegeran et al., 2012). Sedentary activities (such as watching television, sitting, and computing) have also been associated with obesity and weight gain (Ganasegeran et al., 2012; Meyer et al., 2008).

Body composition analysis is a crucial screening method for controlling nutritional and health status, indicating changes in health and being a sensitive factor in biological understanding. (Wang et al., 1992; Ellis, 2000). Wang et al. (2004) stated, "Nutritional status, physical activity level, and disease state alter body cell mass, which in turn serves as a biomarker of these processes" (Wang et al., 1992; Wang et al., 2004; Ellis, 2000).

Poor dietary habits have become more prevalent among Arab children and adults over the years (Rahim et al., 2014). During the past few years, Lebanon has seen a nutritional shift in its eating habits, moving from the conventional Mediterranean diet to a fast food pattern. Young individuals in Lebanon have dietary patterns that are influenced by the fast-food sector. Young people are consequently growing more and more overweight and obese (FAO, 2010).

According to the findings of research conducted in various countries around the world, insufficient activity, a poor quality diet, and smoking are critical health concerns among college students (Irwin, 2004; Steptoe et al., 2002). Literature have confirmed that overweight has been highly detected in university settings (Deliens et al., 2015; Vella-Zarb et al., 2009; Yahia et al., 2016; Martins et al., 2021). To the best of our knowledge, only two Lebanese studies conducted on non-sport university students founded that the majority of those students have normal weight but low dietary habits (Assaf et al., 2019; Yahia et al., 2008).

Due to all the above, it can be concluded that there is a need for a study in which to identify the Dietary Habits and Body Composition profiles among the Lebanese active university students

and explore the effect of dietary habits on body composition parameters according to gender characteristics.

It could be hypothesized that Dietary Habits is an independent factor that statistically significantly affect the quality of body composition in Lebanese university students. Promoting general health and well-being in this demographic requires an understanding of the food preferences and body composition profiles of active university students in Lebanon. The study intends to understand the food preferences and body composition profiles of active university students in Lebanon, providing insights for interventions and educational programs to improve nutritional practices and physical fitness.

METHODS

Design of the Study

This research is an Applied Deductive Quantitative Research - Cross-sectional Descriptive study.

Sample Characteristics

The study sample consisted of Two hundred (200) sportive students, males (n= 100) and females (n=100) with a mean age of 22.1± 4.1 years. Participants have fully completed the online survey and did the anthropometric measurements. They were recruited from the faculty of education, physical education and sport major at the Lebanese university.

The inclusion requirements for the participants, who were of college age, included being enrolled full-time in the three years of the bachelor's degree programme. Any chronic illness, major injury, or disability that prevents one from participating in body composition assessments was an exclusion criterion. Students were chosen at random from the physical education and sport classes by the student affairs office.

Data Collection and Testing Procedures

Two steps were applied to collect relevant data. First of all, students had to fill out the Eating Habits questionnaires, then they had to complete the anthropometric and body composition measurements.

Step 1 – The study used a self-reported questionnaire (Turconi, 2003) to assess eating habits, focusing on food consumption frequency, Eating habits, physical activity, dietary beliefs, and nutrition knowledge. The questionnaire was administered through Google Forms, ensuring confidentiality and anonymity. The results showed acceptable reliability with Cronbach's alpha ranging from 0.55 to 0.75 and statistically significant Pearson correlation coefficients.

Step 2 – After questionnaires being filled out, body composition measurements, including body height, weight, body fat percentage, skeletal muscle mass, and body mass index have been measured using InBody 270 analyzer (Biospace Co. Ltd, Seoul, Korea. Participants stood on a scale with bare feet and hands, avoiding food or drink for at least 3 hours before the measurements to ensure accuracy.

Body mass had been measured to the nearest 0.1 kg with the subjects dressed in light clothing. Barefoot, standing height had been measured to the nearest 0.5 cm with a wall-mounted stadiometer.

Participants in this study gave their consent to participate. In order to confirm their involvement in the study, participants were requested to sign a consent form, which was completed by having them respond to an initial question on the questionnaire. Additionally, students were given the assurance that the data collected would be kept private and utilized only for scientific research.

The data have been collected during the 2021. The research protocol was recognized in the Declaration of Helsinki (World Medical Association, 2013) and it was approved by the Ethical Committee of The Faculty of Sports and Physical Education in the University of Belgrade under the number of 484–2 (Appendix 1).

Statistical Procedures

All of the statistical analyses were carried out using IBM's Statistical Package for the Social Sciences (SPSS, version 25). A significance level of $p < 0.05$ has been established. The measures of central tendency and variability in descriptive statistics are presented by the mean, standard deviation (SD), minimum, maximum (max), and coefficient of variation (cV%). Furthermore, for each of the two student samples, the significant differences in the food habits variables were ascertained using the Mann Whitney U test. Finally, to investigate the significant effects of dietary habits on body composition measures, the Multiple Regression Analysis (MRA) technique utilizing backward elimination was carried out.

RESULTS

Descriptive Statistics

Anthropometric Measurements and Physical Activity

Male students were, as predicted, typically taller and heavier than female pupils. It is evident that male students have greater values for the majority of BC characteristics, which adds to their higher total body mass. The exception is that women have a higher body fat percentage than men do (12.0% vs. 22.2%). Although females had a greater mean body fat percentage than males, both genders' values fell within the range of acceptable body fat percentages (10–20% for men and 18–28% for women) (InBody, 2018).The National Heart, Lung, and Blood Institute (1998) and Nuttal (2015) have defined the normal weight range as being occupied by the mean estimated BMI ranges for all study groups.

According to BMI values, the majority of examined students (82% male and 78% female) had normal weight (BMI in range of 18.50 and 24.99 kg/m2. Among the two sample groups, the BMI percentages were categorized as follows:

Sample one or Sport males (n=100) scored the following BMI percentages: (underweight level = 0%, Normal Weight level = 82%, overweight level = 18%, and obese = 0%).

Sample two or sport females (n=100) scored the following BMI percentages: (underweight level = 17%, Normal Weight level = 78%, overweight level = 5%, and obese = 0%)

The aforementioned results and all other results are shown in Tables 1 and 2.

Table 1: Body Composition Descriptive Statistics for Male PE and Sport students

Variable	Mean	SD	Min	Max	cV (%)
BH (cm)	177.0	0.07	159.0	199.0	3.8
BM (kg)	72.8	10.2	52.9	102.2	13.7
BMI	23.2	2.4	18.6	29.3	10.4
PBFM (%)	12.0	4.3	5.0	23.6	35.6
PSMM (%)	47.7	6.7	26.9	68.8	12.7

Notes. Table processed by the authors.

Table 2: Body Composition Descriptive Statistics for Female PE and Sport students

Variable	Mean	SD	Min	Max	cV (%)
BH (cm)	164	0.06	152	177	3.4
BM (kg)	56.4	7.0	42.3	73	12.5
BMI	20.9	2.3	15.9	27.7	10.9
PBFM (%)	22.2	5.8	11	35.4	27.6
PSMM (%)	33.3	3.4	25.5	42.0	8.1

Notes. Table processed by the authors

Regarding the Nutritional Habits assessment presented in table (3) placed in the tables' section, the Mann-Whitney U Test that measured the mean scores of the Nutrition Survey sections for both genders have found in general that in the first section (Dietary Habits), both genders scored satisfactory results with no significant difference in the mean of the section score (.228). Almost one third of the students reported frequent consumption of at least two portions of fruits per day (27% males, and 34% females) while females were healthier at consuming vegetables by 62% to 38% of males. Sweets/cakes at meals were occasionally consumed by students of both male and female genders (56% vs 57%, respectively) (p=.527). Regular three meals per day consumption was reported by 51% of the males and 59% of females.

Table 3: Mean Scores of the Nutrition Survey sections by Gender- Mann-Whitney U Test

Questionnaire Section	Scores	Males (100)	Females (100)	p value
Dietary Habits Total Score 52	Lowest	22.8	21.3	
	Mean	35.8	35.1	.228
	Highest	47	44.6	
Physical Activity and Lifestyle- Total Score 24	Lowest	9.0	11.5	
	Mean	16	16.2	.519
	Highest	19	18.1	
Dietary beliefs Total Score 12	Lowest	7.0	8.3	
	Mean	8.9	9.3	.031
	Highest	10	11.1	
Nutrition Knowledge Total Score 11	Lowest	5.4	2.0	
	Mean	6.7	6.3	.016
	Highest	9.0	10.1	

Notes. Table processed by the authors.

As for the Physical Activity section result, the gender based classification showed that both genders were equally active since male students (n=100) have scored a mean of 16 while females (n=100) had a mean score of 16.2 (p=.519). Around one third of male students (28% and 34%) rated their lifestyle from moderately active to very active respectively, while (49% and 24%) of female students rated their lifestyle from moderately active to very active respectively.

Regarding the Dietary Beliefs section, students showed sufficient comprehension of the meaning of a healthy diet, especially females with a clear significant difference (.039). The total score for this section was 12 and the mean score for females was 8.9 for males and 9.3 for females. Students responded correctly to the three questions related to the meaning of a healthy diet in both sample groups.

Finally, the total score for the nutritional knowledge section was 11 and the mean score for females was 6.3 and for males was 6.7 where there was a statistically significant difference in questions' responses between genders (p=.016). Males reported better nutritional knowledge on questions related to foods rich in dietary fibers, foods low in fat, foods rich in protein, different food substances containing energy, functions of vitamins and minerals, and on questions related to the "definition" of daily energy expenditure.

Multiple Regression Analysis: Predictions of Body Composition using Nutrition Measures

Based on the purpose of this study in examining the effect of dietary habits on body composition among Lebanese universities' students according to gender, the multiple regression analysis technique (MRA) using backward elimination was conducted to examine the significant impacts of dietary habits on body composition parameters.

Regarding examining the impact of nutrition on body composition, the independent variables of two sections of the dietary survey (Turconi et al., 2003) were used as predictors; frequency of food consumption including 10 variables, and Dietary habits including 13 variables. However, the dependent variables were the three major body composition parameters: Body mass (BM), Body Fat Mass (BFM), and Skeletal Muscle Mass (SMM).

Predictions that are presented below with relevant tables among the two student samples were chosen for only predictions carrying significant impact of independent variables on the dependent variable where the analysis of variance (ANOVA) determines a $p < 0.05$, R is above .5 indicating a moderate correlation between the variables, R^2 is above .25 indicating that the

predictor explains more than quarter of variability in the predicted variable, t values of all predictors are above 1.96, which indicates a significant impact on the dependent variable.

Sample 1 (Male Sport Sample)

In Sample one (Male sport students), neither the dietary habits nor the frequency of food consumption predicted body composition since all models including combination of variables of these two sectors extracted by multiple regression analyses using backward elimination showed that no significant impact of both independent variables on all three body composition variables BM, BFM, and SMM. The only significant impact on body composition in sample one was determined by Dietary habits variables on BFM.

A – Dietary Habits Predictors and BFM

In this category, the backward multiple regression analysis extracted 13 models to examine the impact of dietary habits on BFM. The best-fit model was model 6 including one to one and half liter of mineral water daily, beverages between meals, beverages at breakfast, two portions of fruit daily, diet content, one glass of milk or cup of yogurt daily, two portions of vegies daily, eating breakfast, $F_{(13, 86)} = 2.077$, $p < 0.05$, the $R^2 = .154$ which indicates that the model explains 15.4% of the variability in BFM. The analysis of variance (ANOVA) showed a p value of .046 in this model which is considered significant.

Sample 2 (Female Sport Sample)

In Sample two, the nutrition sections frequency of food consumption and dietary habits carried a significant impact on body composition. The multiple regression analyses using backward elimination in this sample showed significant impacts of few models in the independent variables on all three-body composition variables BM, BFM, and SMM.

A – Frequency of Food Consumption Predictors and BM

Seven models were extracted by backward multiple regression analysis in this category to examine the impact of frequency of food consumption on body mass. All seven models carried significant impact on BM according to the analysis of variance (ANOVA) p=.000. The best-fit model was model 4 including Pizzeria/week, sweets/week, fish/week, fatty meat/week, fried potato/week, legumes/week, cheese/week, $F_{(10, 89)} = 5698$, $p < 0.05$. The $R^2 = .296$ which indicates that the model explains 29.6% of the change or variance in BM.

B – Frequency of Food Consumption Predictors and BFM

In this category, backward multiple regression analysis extracted four models to examine the impact of frequency of food consumption on BFM. The best-fit model was model 3 including Pizzeria/week, eggs/week, sweets/week, fish/week, fatty meat/week, fried potato/week, fast food/week, $F_{(10, 89)} = 5.791$, $p < 0.05$, $R2 = .337$ which indicates that the model explains 33.9% of the variance in BFM. The analysis of variance (ANOVA) showed a p=.000 in this model indicating a significant impact on the dependent variable BFM.

C – Dietary Habits Predictors and BM

In this category, the backward multiple regression analysis extracted eight models to examine the impact of dietary habits on BM. The best-fit model was model 2 including one to one half liter of mineral water daily, cake/dessert at meals, beverages between meals, breakfast content, beverages at breakfast, two portions of fruit daily, diet content, three meals daily, diet type, one glass of milk or cup of yogurt daily, two portions of vegies daily, eating breakfast, $F_{(13, 86)} =6.013$, $p < 0.05$, the adjusted $R2 = .453$ which indicates that the model explains 45.3% of the variability in BM. The analysis of variance (ANOVA) showed a p value of .000 in all models.

D – Dietary Habits Predictors and BFM

In this category, the backward multiple regression analysis extracted eight models to examine the impact of dietary habits on BFM. The best-fit model was model 7 including one to one half liter of mineral water daily, cake/dessert at meals, beverages between meals, breakfast content, beverages at breakfast, one glass of milk or cup of yogurt $F_{(13, 86)} =9.742$, $p < 0.05$, the $R2 = .426$ which indicates that the model explains 42.6% of the variability in BFM. The analysis of variance (ANOVA) showed a p value of .000 in all 8 models.

E – Dietary Habits Predictors and SMM

In this category, the backward multiple regression analysis extracted eight models to examine the impact of dietary habits on SMM. The best-fit model was model 3 including One to one half liter of mineral water daily, cake/dessert at meals, beverages between meals, breakfast content, beverages at breakfast, two portions of fruit daily, three meals daily, diet type, one glass of milk or cup of yogurt daily, two portions of vegies daily, eating breakfast, $F_{(13, 86)} =3.876$, $p < 0.05$, the $R2 = .326$ which indicates that the model explains 32.6% of the variability in SMM. The analysis of variance (ANOVA) showed a p value of .000 in all 9 models indicating a significant impact of this model on SMM.

DISCUSSION

The purpose of the study is to explore the effect of dietary habits on body composition parameters in Lebanese Active University Students according to gender.

The study found that women's body fat mass percentage was higher than men's, but still within InBody's (2018) healthy range. This may be due to women being more self-conscious about their weight and body shape, and the desire for "thinness" in university settings (Sheldon et al., 2010; Ferguson et al., 2011). Moreover, and from a scientific perspective, this result could be attributed to the fact that men have more muscular mass and lean body mass due to their higher testosterone production. They have higher visceral fat and less subcutaneous fat. Women, however, have greater subcutaneous fat and less muscle mass due to hormonal factors (Gropper et al. 2011).

According to the National Heart, Lung, and Blood Institute (1998), the BMI ranges for both samples were 18.50–24.99 kg/m2, which is deemed normal. The BMI readings of men were greater than those of women. Students who are overweight or obese when they are younger have a higher likelihood of remaining obese as they age (National Research Council and Institute of Medicine, 2013; Strong et al., 2008).

In terms of PBFM, male students from Lebanon achieved higher averages (12%) than those from Poland (Gdansk) and Spain (Murcia), with male students from Madrid (Spain) coming in at 16.5%, Valencia (Spain) at 18.75%, and Valparaíso (Chile) at 22.73% (Lopez Sanchez, 2019). Furthermore, according to Dropsaj et al. (2015), the average BMI of Lebanese female students (20.9 kg/m2) was comparable to that of Serbian university of Belgrade female students (21.7 kg/m2). In addition, both of the Lebanese male student sample groups had appropriate percentages of skeletal muscle mass (PSMM), ranging from around 50%, which was greater than the percentage of male Abu Dhabi police officers (42.2%).

As for Dietary Habits, results showed that students of both genders have satisfactory results. The dietary habits survey (Turconi et al., 2003) addressed to both students' samples and included four sections (Dietary Habits, Physical Activity and Lifestyle, Dietary Beliefs, and Nutritional Knowledge) showed mean scores above averages in all sections.

The study by Yahia et al. (2016) found that American university students have healthier nutrition habits, better physical activity, dietary beliefs, and nutritional knowledge compared to Lebanese students. In Dietary Habits section, the Lebanese and American male students scored

similar average percentages (68.8%, and 67.3%). However, American female students scored higher average percentage (71.1%) than their Lebanese peers (67.5%). In the Physical Activity section, the American male students' average percentage (76%), and the female students' average percentage (70%), were higher than the Lebanese students' males and females scores (66.7%, and 67.5% respectively). In the Dietary Beliefs section, similar average percentages were scored by American and Lebanese male students (74.7%, and 74.2% respectively). However, American female students scored higher average percentage (82%) than the Lebanese females (77.5%). The final section in the nutrition survey was the nutrition knowledge. Lebanese students scored lower averages percentages also with (60.9%) for males, and (57.3%) for females, while the American students scored (68.8%) and (63.8%) for males and females respectively.

The study found that (27% of males, and 34% of females) of Lebanese students consume at least two portions of fruits daily, while 62% of females and 38% of males of males consume vegetables. This is lower than the result of (Yehia et al., 2016) study where almost half of American students consume at least two portions daily, especially females. Low fruit and vegetable consumption is associated with obesity (Lin & Morrison 2002; Cho et al., 2003; Tohill et al., 2004).

Results of (Yahia et al. 2016) study regarding daily breakfast intake percentages (53%) were lower than the Lebanese sample students (63%). However, the Lebanese and American university students' percentages scores regarding daily breakfast intake were lower than their Canadian university colleagues (89.3%) in the study of Lachance et al., (2010). Eating breakfast helps to lower dietary fat intake and minimize impulsive snacking (Schlundt et al., 1992; Yahia et al., 2008).

Regular three meals per day consumption was reported by around half of the Lebanese students (51% males, and 59% females. This result regarding this variable were higher than the American students' results (43% of males and 38% of females).

In Daily water consumption of at least 1–1.5 L, males had healthier dietary habits from females with clear significant differences. For instance, females showed (66%) and males showed (81%) with a gender significant difference (p= .019). In comparison to (Yahia et al., 2016) results regarding these dietary habits variable, same gender significant difference in the daily water consumption was established as more males, than females, reported daily water consumption of at least 1–1.5 L (p=.001).

In the Physical Activity and Lifestyle section, outcomes of this section indicated that the Lebanese students reported a high physically active lifestyle. In addition, the gender-based classification in this section showed that both genders were equally active.

Regarding the gender-based classification; most male students (79%) and almost all female students (99%) reported practicing physical activity during the entire year, 78% of males and (62%) of females reported practicing more than 4h per week. Around one third of male students (28% and 34%) rated their lifestyle from moderately active to very active respectively, while (49% and 24%) of female students rated their lifestyle from moderately active to very active respectively. As compared to the American students of Central Michigan University, half of American students reported being physically active but only about one-third of the students (33%) reported exercising more than 4h per week. Males were more active than females.

In the Dietary Beliefs section, results indicated that students have sufficient comprehension of the meaning of a healthy diet, especially females. These results are in line with other studies (Turconi et al., 2008; Croll et al., 2001) and suggest that students' comprehension of the meaning of healthy and unhealthy diet does conform to dietary guidelines (Dietary Guidelines Advisory Committee, 2010).

In the final section of (Turconi et al., 2003) questionnaire, the Lebanese students were determined with satisfactory nutritional knowledge, but male students reported better knowledge in areas like dietary fibers, energy, vitamins, minerals, and energy expenditure. This gender based results on nutrition knowledge section contrasts the results of (Yahia et al., 2016; Von Bothmer & Fridlund, 2005) who found that female students had a higher nutritional knowledge score than male students. Females, in general, are more likely than males to be interested in nutrition, weight control, and to make positive changes (Von Bothmer & Fridlund, 2005; Livingston et al., 2012).

The study examined the impact of dietary habits on body composition in two students' sample groups using the multiple regression analysis. Results showed that dietary habits have a mild to moderate impact on body composition, specifically on three dependent variables: body mass index (BM), body fat mass (BFM), and body mass index (SMM). In males, dietary habits had a mild impact on BFM, while in females, they had a moderate impact on BFM. The best-fit model, which included daily mineral water intake, breakfast content, and dairy consumption, explained 42.6% of the variability in BFM.

Our study results determined by the multiple regression analysis used for the purpose of examining the significant impacts of physical activity and dietary habits on body composition shared partial similarity with (Kukic & Dopsaj, 2017) study that defined the factors that influence the structure of the body composition in Abu Dhabi police workforce using the factorial analysis of variance. The authors founded that three independent factors influence body composition: Factor 1 – Physical Inactivity and Nutrition, Factor 2 – Physical Inactivity and Exercise, and Factor 3 – Sedentary Lifestyle. Our findings were consistent with the first factor of this study analysis, which considers that nutrition has a significant impact on body composition. In other words, it has been known that body composition is the result of various factors such as diet, stress, the amount of physical activity and other factors that are parts of daily habits (Kukic & Dopsaj, 2017).

CONCLUSION

The study found that the Lebanese University male students dominate body composition measurements, dietary habits and nutrition knowledge sections, while female students show superior results in dietary beliefs and physical activity and lifestyle sections.

Nutrition Habits had a mild to moderate impact on body composition, specifically on BM, BFM, and SMM. The research hypothesis considering that Dietary Pattern is an independent factor affecting body composition quality in Lebanese university students is accepted.

Future studies should involve larger samples from different regions, socio-economic backgrounds, academic specialties, and higher ages, and use objective measurement methods like personal interviews, physiological markers, calorimetry, and motion sensors.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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