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Nutrition and physical activity behaviors in 16-18 -year-old adolescents in Tirana

Orkida Kosta[1*], Ortensia Kosta[2]

[1] Sports University of Tirana, Faculty of Movement Sciences, Tirana, Albania.

[2] University of Medicine, Faculty of Medicine, Tirana, Albania.

* Correspondence: Orkida Kosta; okosta@ust.edu.al

ABSTRACT

Being overweight or obese is a sign of nutritional issues in teenagers. An imbalance between adolescent physical activity and dietary consumption contributes to overweight. The aim of this study was to ascertain the effects of dietary variations and physical activity on adolescents' nutritional status. This particular research employed a cross-sectional design framework. The study involved 510 adolescents aged 16 to 19 years who were in a school in Tirana. A questionnaire intended to assess health-promoting activities was filled out by adolescents and was based on two subscales of the HPLP II. The ANOVA test was used to analyze the statistical data. The findings indicated a statistically significant difference in nutritional intake between adolescents with normal nutritional status and those with a higher nutritional status, with a p-value of ($p<0.05$); however, statistically significant difference was observed in nutritional intake and physical activity levels between the two groups of adolescents, as indicated by p-value of ($p>0.05$). There is a difference in consumption, and we can deduce variations in dietary consumption and physical activity based on teenagers' nutritional status. The nutritional status and dietary nutrient intake of adolescents should be monitored from an early age. It is important to maintain regular exercise to prevent nutritional issues that may lead to non-communicable diseases.

KEYWORDS

Adolescents; Nutrition; Physical Activity; Gender; Parents' Education

1. INTRODUCTION

Obesity during early adolescence is a significant public health problem that has a number of adverse consequences such as increasing the risk of developing type 2 diabetes, hypertension, atherosclerosis and premature cardiovascular disease (Kumar & Kelly, 2017). Recent international and national reports have pointed to the growing epidemic of obesity among school-age children, particularly in the last three decades among children aged 6–19 years (Garner et al., 1996).

Physical activity represents a well-known approach for the prevention and treatment of cardio-metabolic diseases (Sarzynski et al., 2022). Nutritional requirements during the growth of children and adolescents are regarded as critical factors affecting their physical development and also influencing their health status in the future life. It has been shown that both nutritional habits and nutrients intake may, at least partly, prevent some chronic civilization diseases such as obesity, atherosclerosis, hypertension, or osteoporosis (WHO, 2016; Ng et al., 2014; Sahoo et al., 2015).

Obesity, including its increasing worldwide prevalence of childhood obesity, is considered a major public health problem not only in the developed countries, but also in the developing regions of the world. Although the underlying mechanisms of obesity epidemics among children and adolescents are complex, there are still two important pathogenic factors responsible for excessive weight gain during growth: nutritional habits and inadequate physical activity. An increased caloric intake leading to positive energy balance is usually the result of inappropriate dietary regimen (e.g., over-eating, irregular food consumption or meal frequency, diets rich in simple carbohydrates, more fat, especially saturated fats, and fiber deficits) as well as low levels of physical activity. Therefore, the principle of obesity management in adolescence is targeted to achieve negative energy balance, both quantitative and qualitative dietary modifications, and a considerable increase in physical/sports activities (Han et al., 2010; Spruijt-Metz, 2011; Cecchini et al., 2010). Identification of the time pattern of rising obesity is hampered by the absence of prior data on overweight and obesity rates in Albania. Nonetheless, there is cause for concern because both genders' BMIs have significantly increased during the past ten years.

The aim of this study is to examine the relationship between several demographic variables affecting nutrition and physical activity in adolescents of Tirana.

2. METHODS

The sample included 510 adolescents from all middle schools in Tirana. Among participants, 310 were females (61.2 %), and 198 were males (38.8%). Data were collected using the two subscales of the Health-Promoting Lifestyle Profile (HPLP-II) questionnaire (Walker et al., 1995). The

dependent variables in the study were the scores obtained on the subscales: nutrition (mean score) and physical activity (mean score). Gender and age (school level) were considered to be independent research variables. The children's lifestyle was assessed by two subscales of the HPLP questionnaire, one subscale related to diet (9 questions) and the other related to physical activity level (8 questions) (Walker et al., 1995). The statements from the subscales relate to different habits regarding physical activity and diet. An example of an item from the diet subscale is, "I chose a low-fat diet." An example of an item from the physical activity subscale is "I participate in a planned exercise program (e.g., sports or dance)." For each statement offered, the respondent could choose one of the four responses offered: Never—1, Sometimes—2, Often—3, or Routinely—4. The subscale score is calculated as the respondent's average score obtained after dividing the total score by the number of questions in each subscale (Walker et al., 1995). The survey was conducted in the classrooms from February to September 2023 after gaining approval from the principal. Adolescents filled out the questionnaires on the Google Platform form. The children completed the questionnaires on the Google Form platform.

Descriptive statistics were used to process the research data. The mean and standard deviation (SD) were calculated for the nutrition and physical activity subscales. The deviation of the results from the normal distribution at the borderline of significance was tested using the Kolmogorov–Smirnov test on the whole sample at the $p < 0.05$ statistical significance level. Test-t was used to determine the differences between the groups, as some variables were found to deviate from the normal distribution. All data were processed using the statistical program IBM SPSS version 20.

3. RESULTS

In this part, the findings of the research study, carried out with (N=510) participants, will be presented. The analyses and results are organized according to the objectives of the study, in order to achieve them. Also, the results in this chapter will be presented in order according to the objectives of the study. Table 1 shows participants' demographic characteristics.

Table 1. Description of the sample according to demographic variables

	n	**Percentage %**	**95% Confidence inteval**	
Gender	510			
Female	312	61.2	57.6	64.8
Male	198	38.8	35.2	42.4
Level	510			
10(16 y)	130	25.5	21	29.5
11(17 y)	189	37.1	32.6	41.6
12(18 y)	191	37.5	33.5	42.5
Father ´s education	510			

Incomplete primary	2	.4	-0.1	0.9
Complete primary	70	13.7	11.2	16.2
Complete secondary	244	47.8	45.3	50.3
Complete higher	194	38.0	35.5	40.5
Mother ´s education	507			
Incomplete primary	0	0	0	0
Complete primary	56	11.0	7.8	14.2
Complete secondary	200	39.4	36.2	42.6
Complete higher	251	49.5	46.3	52.7

The total number of respondents is 510. More females, 61.2% (n=312) than males 38.8% (n=198), completed the questionnaire. The adolescents were divided according to their grade: 25.5% (n=130) are in tenth grade: 37.1% (n=189) are in eleventh grade and 37.5% (n=191) are in twelfth grade. Regarding the fathers' education only 0. 4% (n=2) have a father without school: 13.7% (n=70) have fathers with low education, 47.8% (n=244) have fathers with secondary education and 194 of them (about 38.0%) have fathers with higher education. Regarding mothers' education, 11.0 % (n=56) have mothers with low education: 39.4% (n=200) have mothers with secondary education: 49.5% (n=251) have mothers with higher education (Table 1). The item analysis in Table 2 presents the gender differences in nutrition and physical activity scores.

Table 2. Analysis of descriptive statistic and differences between the gender in nutrition and physical activity scores

Variable	**F**	**n= (312)**	**M**	**n= (198)**		
	Mean	**SD**	**Mean**	**SD**	**t**	**p**
Nutrition	22.92	4.73	25.17	5.38	-4.951	0.000
Physical Activity	20.07	5.31	24.22	5.66	-8.364	0.000

Note. *n:number of subjects; F:female; M:male; SD:standard deviation; KSp: level of statistical significance in Kolmogorov–Smirnov test; p—level of statistical significance in Mann–Whitney U test*

Nutrition: for females (n=198), the mean nutrition score is 22.92 with a standard deviation (SD) of 4.73, for males (n=312), the mean nutrition score is 25.17 with an SD of 5.38. The t-statistic is -4.951, and the p-value is 0.000, indicating a statistically significant difference in nutrition scores between genders. Specifically, males tend to have higher nutrition scores compared to females. For females (n=198), the mean physical activity score is 20.07 with an SD of 5.31, for males (n=312), the mean physical activity score is 24.22 with an SD of 5.66. The t-statistic is -8.364, and the p-value is 0.000, indicating a statistically significant difference in physical activity scores between genders. In this case, males tend to have higher physical activity scores compared to females. In both nutrition and physical activity, there are significant gender differences, with males having higher mean scores than

females. These findings suggest variations in nutritional habits and physical activity levels between the two genders within the sample. Table 3 presents descriptive statistics and correlations between the items of HPLP.

Table 3. Descriptive statistics and correlations between the items of HPLP

Variables		Min	Max	Mean	SD	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
Nutrition	510	12.00	38.00	23.7961	5.11264	0.335	0.108	-0.342	0.216
Eat breakfast	510	1	4	2.67	1.065	-0.044	0.108	-1.299	0.216
Chose a diet that is low in fat	510	1	4	2.32	0.848	0.437	0.108	-0.347	0.216
Limit use of sugars and food containing sugar	510	1	4	2.41	0.882	0.408	0.108	-0.570	0.216
Eat 6–11 servings of bread and cereal each day	510	1	4	1.88	1.035	0.921	0.108	-0.385	0.216
Eat 2–4 servings of fruit each day	510	1	4	2.60	0.947	0.224	0.108	-1.044	0.216
Eat 3–5 servings of vegetables each day	510	1	4	2.40	0.869	0.499	0.108	-0.473	0.216
Eat 2–3 servings of milk, cheese, and yogurt each day	510	1	4	2.64	1.024	-0.041	0.108	-1.185	0.216
Eat up to 2–3 servings of the meat and eggs each day	510	1	4	2.51	1.024	0.090	0.108	-1.129	0.216
Read labels to identify nutrients, fats, and sodium content	510	1	4	2.25	1.024	0.308	0.108	-1.042	0.216

Note. **Skewness: Measures how data is distributed asymmetrically. Positive skewness means data is skewed to the right (long tail on the right), while negative skewness means it's skewed to the left (long tail on the left). Zero skewness indicates a symmetric distribution, Mean, Standard deviation Kurtosis.*

These statistics provide an overview of the distribution of nutrition practices for the study sample. The mean score for nutrition practices is about 23.80, with a standard deviation of about 5.11. The Skewness of the data is positive (0.335), different from normal, and the Kurtosis is negative (-0.342), indicating that the distribution may be somewhat skewed but is not exceptional (Table 3). Table 4 shows the descriptive statistics and correlations between the items of Moderate-to-Vigorous Physical Activity (MVPA).

Table 4. Descriptive statistics and correlations between the items of MVPA

						Skewness		Kurtosis	
	n	**Min**	**Max**	**Mean**	**SD**	**Statistic**	**Std. Error**	**Statistic**	**Std. Error**
Physical Activity	510	10.00	36.00	21.6863	5.81236	0.385	0.108	-0.560	0.216
Follow a planned exercise program	510	1	4	2.19	1.112	0.381	0.108	-1.233	0.216
Exercise vigorously for 20 or more minutes at least three times a week	509	1	4	2.57	1.073	0.010	0.108	-1.271	0.216
Take part in MVPA * 30–40 min, 5 or more times a week	510	1	4	2.03	1.103	0.712	0.108	-0.861	0.216
Take part in recreational physical activities	510	1	4	2.27	0.961	0.400	0.108	-0.755	0.216
Do stretching exercises at least 3 times per week	510	1	4	2.18	1.041	0.436	0.108	-0.990	0.216
Get exercise during usual daily activities	510	1	4	2.93	0.909	-0.440	0.108	-0.670	0.216
Check my pulse rate when exercising	508	1	4	1.79	0.926	0.969	0.108	-0.029	0.216
Play active games with my friends	507	1	4	2.79	0.935	-0.180	0.108	-0.959	0.216
Spend time with my family being active	509	1	4	2.97	1.047	-0.592	0.108	-0.911	0.216

These statistics provide an overview of the distribution of physical activity practices in the study sample physical activity. The mean of physical activity is about 21.69, with a standard deviation of about 5.81. The skewness of the data is positive (0.385), different from normal, and the kurtosis is negative (-0.560), indicating that the distribution may be somewhat skewed but is not exceptional. For each element of physical activity, the table shows the recorded minimum and maximum, mean, standard deviation, skewness, and kurtosis. These descriptive data are important to understand how diversified the nutritional and physical activity practices are in the group of participants and what kind of distribution they have (Table 4). Table 5 presents the descriptive analysis related to the differences in the level of nutrition and physical activity depending on the grade.

Table 5. The descriptive analysis related to the differences in the level of nutrition and physical activity depending on the grade

						95% Confidence Interval for Mean			
	Variable	**N**	**Mean**	**Std. Deviation**	**Std. Error**	**Lower Bound**	**Upper Bound**	**Min**	**Max**
	10(16 y)	130	24.49	5.073	.44497	23.6119	25.3727	14.00	35.00
Nutrition	11(17 y)	189	23.44	5.100	.37100	22.7179	24.1816	12.00	38.00
	12(18 y)	191	23.66	5.132	.37135	22.9324	24.3974	13.00	36.00
	Total	510	23.79	5.112	.22639	23.3513	24.2409	12.00	38.00
	10(16 y)	130	22.29	5.672	.49751	21.3080	23.2766	12.00	34.00
Physical activity	11(17 y)	189	22.37	6.082	.44247	21.5028	23.2485	11.00	36.00
	12(18y)	191	20.59	5.487	.39709	19.8084	21.3749	10.00	33.00
	Total	510	21.68	5.812	.25738	21.1806	22.1919	10.00	36.00

The tenth grade mean nutritional level is 24.49, with a standard deviation of 5.073, the mean level of physical activity is 22.29, with a standard deviation of 5.672. In eleventh grade, the mean nutritional level is 23.44, with a standard deviation of 5.100, the average level of physical activity is 22.37, with a standard deviation of 6.082. In twelfth grade, the mean nutritional level is 23.66, with a standard deviation of 5.132, the mean level of physical activity is 20.59, with a standard deviation of 5.487. For all groups together, the average nutritional level is 23.79, with a standard deviation of 5.112. For all groups together, the average level of physical activity is 21.68, with a standard deviation of 5.812. These data show that there are differences in the level of nutrition and physical activity depending on the school class. Nutrition and physical activity levels have little variation between classes, but all classes have similar means for both variables. Analysis of descriptive data related to the differences in the level of nutrition and physical activity depending on the fathers´ education is presented in the table below (Table 6).

Table 6. Analysis of descriptive data related to the differences in the level of nutrition and physical activity depending on the fathers´ education

						95% Confidence Interval for Mean			
		n	**Mean**	**S D**	**S E**	**Lower Bound**	**Upper Bound**	**Min**	**Max**
	Incomplete primary	2	17.50	.707	.50000	11.1469	23.8531	17.00	18.00
Nutrition	Complete primary	70	20.12	3.247	.38819	19.3542	20.9030	12.00	28.00
	Complete secondary	244	24.73	3.925	.25133	24.2426	25.2328	15.00	36.00

	Complete higher	194	24.00	6.269	.45012	23.1122	24.8878	13.00	38.00
	Total	510	23.79	5.112	.22639	23.3513	24.2409	12.00	38.00
Physical activity	Incomplete primary	2	21.50	2.121	1.50000	2.4407	40.5593	20.00	23.00
	Complete primary	70	19.08	3.429	.40989	18.2680	19.9034	11.00	30.00
	Complete secondary	244	22.27	5.964	.38183	21.5225	23.0267	11.00	35.00
	Complete higher	194	21.88	6.094	.43759	21.0235	22.7497	10.00	36.00
	Total	510	21.68	5.812	.25738	21.1806	22.1919	10.00	36.00

The data are divided into four different categories of fathers´ education, including an incomplete primary. For this group, the mean nutritional level is 17.50, with a very low standard deviation of 0.707, the mean physical activity level is 21.50, with a standard deviation of 2.121. For fathers with complete primary the average nutritional level is 20.12, with a standard deviation of 3.247, the average level of physical activity is 19.08, with a standard deviation of 3.429.For fathers with complete secondary education, the average level of nutrition is 24.73, with a standard deviation of 3.925, the average level of physical activity is 22.27, with a standard deviation of 5.964. The complete higher education fathers have an average level of nutrition 24.00, with a standard deviation of 6.269, and an average level of physical activity is 21.88, with a standard deviation of 6.094. For all groups together, the average nutritional level is 23.79, with a standard deviation of 5.112 and the average level of physical activity is 21.68, with a standard deviation of 5.812 (Table 6). Table 7 presents the analysis of descriptive data related to the differences in the level of nutrition and physical activity depending on the mothers´ education

Table 7. Analysis of descriptive data related to the differences in the level of nutrition and physical activity depending on the mothers´ education

						95% Confidence Interval for Mean			
		n	**Mean**	**SD**	**Std. Error**	**Lower Bound**	**Upper Bound**	**Min**	**Max**
Nutrition	Complete primary	56	21.35	3.45584	.46181	20.4317	22.2826	16.00	29.00
	Complete secondary	200	22.52	4.43032	.31327	21.9022	23.1378	12.00	35.00
	Complete higher	251	25.39	5.44351	.34359	24.7177	26.0711	13.00	38.00
	Total	507	23.81	5.12117	.22744	23.3678	24.2614	12.00	38.00

Physical activity	Complete primary	56	19.73	3.84467	.51377	18.7025	20.7618	12.00	38.00
	Complete secondary	200	19.91	5.42115	.38333	19.1541	20.6659	12.00	30.00
	Complete higher	251	23.53	5.93918	.37488	22.7955	24.2722	10.00	35.00
	Total	507	21.68	5.82714	.25879	21.1760	22.1929	10.00	36.00

The data are divided into four different categories of mothers´ education, including an incomplete primary. For this group, there is no incomplete primary. For mothers with complete primary the average nutritional level is 21,35 with a standard deviation of 3.4, the average level of physical activity is 19,73, with a standard deviation of 3.84.For mothers with complete secondary education ,the average level of nutrition is 22,52, with a standard deviation of 4,43, the average level of physical activity is 19.91, with a standard deviation of 5,42. The complete higher education mothers have an average level of nutrition 25,39, with a standard deviation of 5,44, and an average level of physical activity is 23,53, with a standard deviation of 5,93. For all groups together, the average nutritional level is 23.81, with a standard deviation of 5.12 and the average level of physical activity is 21,68, with a standard deviation of 5,82 (Table 7).

4. DISCUSSION

This study analyzed the correlates of physical activity and nutrition habits in adolescents, highlighting the influence of demographic. The findings of this review were consistent with those of previous studies on factors influencing physical activity and nutrition habits in adolescents. Differences in physical activity habits among adolescents of different sexes have been observed before (Armstrong et al., 2011; Drenowatz et al., 2010; Kopcakova et al., 2014), which may be attributed to differences in the selection of physical activity, methods, and attitudes among adolescents of different sexes. A significant statistical difference was found in physical activity participation between male and female adolescents, with girls reporting significantly lower levels of participation than boys (Carayanni et al., 2021). The boys are more frequently participated in physical activity, including outdoor sports activities, more frequently than girls, with a significant difference between both sexes (Carayanni et al., 2021; Kaya et al., 2010; Zach et al., 2013) as our research also revealed. Boys reported better physical activity, which is consistent with Yanez- Silva et al. (2014). In that study, males also had higher physical activity scores than women.

Age plausibly plays a more notable role in shaping physical activity behaviors and that the likelihood of sustained participation in a particular activity decreases throughout adolescence

(Bélanger, 2009), which is consistent with previous findings of health-promoting exercise habits that diminished once individuals reach adolescence (Aarts et al., 1997); as our research also revealed indicated a clear negative correlation between physical activity levels and age in both boys and girls; those who were classified as inactive had a significantly higher mean age, whereas those who were sufficiently active exhibited the lowest mean age (Dos Santos et al., 2014). Additionally, Kim et al. (2007) revealed that physical activity habits among adolescents in Mozambique showed a decreasing trend with age. Our data analysis indicates that the ages of physical activity and nutrition depend on the school class (ages of adolescents). There is minimal difference in physical exercise and nutrition between level and ages.

Kim et al. (2007) suggested that physical activity levels can be influenced by support from multiple sources, including parents, teachers, friends, and classmates. Especially, the role of parents was crucial in the development of physical activity among adolescent girls, who helped them in developing an interest in initiating and sustaining physical activity (Piéron & Ruiz-Juan, 2013). Conversely, another study contended that adolescents whose family members, specifically their parents and siblings, had never been physically active, were more likely to refrain from engaging in regular physical activity (Cvetkovic & Cvetkovic, 2021). Adolescents with higher-education parents, especially mothers, performed better in our study as it related to food intake than teenagers with parents who were less educated. Promoting healthy lifestyles through regular physical activity and proper nutrition in childhood and adolescence while taking professional preventive measures to reduce over weight/obesity is critical to public health. Regular physical activity should be part of a daily life, combined with an appropriate diet (Cvetkovic & Cvetkovic, 2021). Adolescents from high-income families seem to have better lifestyle profiles (Spear & Kulbok, 2001). Highly-educated parents seems to pass their cultural capital to their children, helping them to adopt healthy behaviors and school values (Spear & Kulbok, 2001). The evidence has also shown that poverty affects people's abilities to adopt healthy lifestyles (Winkleby et al., 1992). For example, high-fat, energy-dense diets are cheaper and more affordable than diets based on lean meats, fish, fresh vegetables, and fruit. This may explain in part why the highest obesity rates are found in populations with highest poverty rates and the least education (Drewnowski & Specter, 2004).

5. CONCLUSIONS

The tendency for individualities to present their own views in a more positive light may affect the generalizability of the findings. Thus, experimental and longitudinal studies should be conducted in the future. Examining the goods of healthy cultures and nutrition habits on physical exertion in larger and different sample groups may increase the generalizability of the findings likewise, conducting this type of study in different artistic surrounds may help to identify the influence of artistic factors. By addressing other variables that may impact physical exertion, unborn exploration could explore further associations about adolescents' healthy living through physical exertion. With the help of this questionnaire, we may evaluate physical activity and nutrition based on a variety of demographic factors. It is noteworthy that there exists a beneficial association between physical exercise and nutrition; nevertheless, this relationship requires substantial support from the academy and family perfect for these young people. By increasing these young people's awareness now, we can prevent many affections later.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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