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DIFFERENCES IN DIETARY PATTERNS OF SECONDARY SCHOOL STUDENTS BY DEMOGRAPHIC AND LIFESTYLE CHARACTERISTICS

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Dietary patterns represent a set of many distinctive, jointly occurring characteristics that describe a diet that shows a relationship to health. They are subject to change and show a relationship with the socio-economic situation and lifestyle. The aim of the study was to assess the variation in dietary patterns of secondary school students from Wroclaw due to their demographic and lifestyle characteristics. A cross-sectional study using a survey questionnaire was conducted in June 2022 among 262 high school students from Wroclaw. The FFS scale, which was adapted from the KomPAN questionnaire, was used to assess the frequency of consumption of 32 food groups. Demographic characteristics were assessed using questions about gender, age, place of residence, type of school and school division number. Lifestyle characteristics asked about physical activity, time spent in front of media devices, time spent sleeping, frequency of bathing and brushing teeth, and smoking and alcohol consumption. Based on the frequency of food consumption, 3 dietary patterns were identified. The Chi2 test was used to assess the significance of differences between variables. The study group was characterized by "prudent," "imprudent" and "junk" dietary patterns. Male gender and attendance at a technical school exacerbated the occurrence of "imprudent" and "junk" dietary patterns. Female gender and lyceum attendance exacerbated the occurrence of "prudent" dietary patterns. Other demographic characteristics did not impact differentiation of the identified dietary patterns. Too little or too much sleep, alcohol consumption and smoking exacerbated the incidence of "imprudent" and "junk" dietary patterns. Other lifestyle characteristics did not impact differentiation of the identified dietary patterns. Further research on assessing the relationship between dietary patterns and demographic characteristics and lifestyles of schoolchildren will increase knowledge about it and allow it to be included in the educational and intervention programs being developed.

Keywords: dietary patterns, secondary school students, demographic characteristics, lifestyle characteristics

Introduction

Over the past 25 years, nutritional epidemiology has seen a paradigm shift from the study of nutrients and foods toward dietary patterns (DP) (Meyer and Jacobs, 2025). Dietary patterns represent a set of many distinctive, jointly occurring characteristics that describe how people eat (Hu, 2002). Dietary patterns are therefore a complex construct involving many features of nutrition, including the amount and combinations of foods, nutrients and food products, and interactions between dietary components (Kant, 2010; Wirfält et al., 2013; Wingrove et al., 2022). In addition, they may include dietary habits and preferences and lifestyle features (dietary-lifestyle patterns) (Wądołowska et al., 2018; Lonnie and Wądołowska, 2020; Lonnie et al., 2022).

There are three main ways to identify dietary patterns:

1. patterns constructed on the basis of available knowledge (so-called predefined, also known as diet quality indicators);
2. patterns constructed on the basis of the dataset's own characteristics (so-called empirically based);
3. patterns constructed on the basis of both methods simultaneously (so-called hybrid) (Kant, 2010; Wirfält et al., 2013; Wingrove et al., 2022).

Diet quality indices include the Diet Quality Index (DQI), the International Diet Quality Index (DQI-I), the Healthy Eating Index (HEI), the Alternative Healthy Eating Index (AHEI), the Healthy Diet Index (HDI, pHDI), the Unhealthy Diet Index (nHDI), the DASH Dietary Index (DASH score) and the Mediterranean Dietary Index (MDS or MD score), which comes in many regional variations and adaptations, such as Polish-aMED (Wądołowska, 2023).

Among the dietary patterns based on empirical data, the "prudent" and "western" patterns have so far been most commonly identified (Hu, 2002; Tucker, 2010; Imamura et al., 2015), as well as the "traditional" dietary pattern, i.e., the pattern specific to the country where the study was conducted (Gubbels et al., 2013; Krusińska et al., 2017). These most commonly described dietary patterns are also identified among young people.

To date, dietary patterns have been used as a comprehensive and "alternative" means of assessing nutrition to evaluate the risk of cardiovascular disease, obesity, impaired glucose tolerance and diabetes, cancer, male infertility, and mortality (Aljuraiban et al., 2020; Danielewicz et al., 2020; Hawrysz et al., 2020; Kadam et al., 2021; Lonnie et al., 2022).

Dietary patterns change over time, as they are related to a person's life cycle and the environment in which he or she functions, as well as many other disturbing factors, such as gender, age, socioeconomic status, lifestyle, health status, etc. (Kowalkowska et al., 2020; Talegawkar et al., 2021; Vapsäläinen, Lindström et al., 2023; Sandri et al., 2024). The study's own hypothesis indicates that the dietary patterns of secondary school students vary due to their lifestyles. Hence, the aim of the study was to assess the variation in dietary patterns of secondary school students from Wroclaw due to their lifestyle characteristics.

Material and Methods

The cross-sectional study was conducted in June 2022 among 262 students aged 15–21 at two secondary schools in Wroclaw. The study used arbitrary sampling, i.e., all students at these schools were asked to participate in the survey. Only students who gave informed consent to participate were allowed to complete the questionnaire. The survey was conducted in accordance with the Declaration of Helsinki (World..., 2013).

A survey questionnaire was used in the study

The food frequency scale (FFS), consisting of questions about the frequency of consumption of 32 food groups, was adapted from the KomPAN questionnaire (2020). Food consumption was assessed using a 6-point ordinal scale with a response cafeteria:

1. several times a day,
2. once a day,
3. several times a week,
4. once a week,
5. several times a month,
6. once a month or less often.

Based on the declared frequency of food consumption, dietary patterns were distinguished.

The socio-demographic characteristics of the study group were assessed based on questions about gender, age, place of residence, type of school and the number of the branch at the school the respondents attended. Based on these characteristics, table 1 presents the socio-demographic characteristics of the study group.

Table 1 Socio-demographic characteristics of the study group

Variables		Sample size	
		N = 262	%
Gender	women	172	65.6
	men	90	34.4
Age	16 years and under	85	32.4
	17 years	88	33.6
	18 years and over	89	34.0
Place of residence	Village	83	31.7
	city <100 thousand inhabitants	68	25.9
	city >100 thousand inhabitants	111	32.4
Type of school	technical school	61	23.3
	Lyceum	201	76.7
Branch number in the school	class 1	41	15.6
	class 2	53	20.3
	class 3	146	55.7
	class 4 and 5	22	8.4

Lifestyle characteristics of respondents were assessed through questions about:

A/ Physical activity on weekdays and in leisure time with a response cafeteria:
   1. low, at least 70% of my time is spent sitting or lying down;
   2. moderate, I spend about 50% of my time sitting or lying down and about 50% of my time moving or doing various physical activities;
   3. high, I spend at least 70% of my time moving or doing various physical activities.

B/ Average total time spent on weekdays or on days off (weekends, holidays, etc.) in front of the TV, computer and smartphone, with a cafeteria of responses:
   1. 3 hours or less,
   2. 3 to 5 hours,
   3. 5 to 7 hours,
   4. 7 hours or more.

C/ Average time spent sleeping on weekdays and during leisure time (weekends, holidays, etc.), with a cafeteria of answers:
   1. 7 hours or less per day,
   2. more than 7 hours a day.

D/ Bathing/showering frequency, with a cafeteria of responses:
   1. several times a day,
   2. once a day,
   3. once every two days or less frequently.

E/ Frequency of brushing teeth, with a cafeteria of answers:
   1. after each meal,
   2. twice a day,
   3. 1 time per day,
   4. less than once a day.

F/ Smoking, at least once a week, with a cafeteria of responses:
   1. no,
   2. yes.

G/ Alcohol consumption, at least once a week, with a cafeteria of responses:
   1. no,
   2. yes.

As part of the statistical analysis, categorical variables are presented as count (N) and percentage of sample (%). A significance level of $p < 0.05$ was considered significant for all tests used.

Based on the frequency of consumption of 32 food groups, a factor analysis was conducted using principal component analysis (PCA) to identify dietary patterns (factors). The rotation of the factors was performed by means of an orthogonal transformation (Varimax). The number of factors was based on the following criteria: components with an eigenvalue of 1, scree plot test, and the interpretability of the factors. Variables (frequency of consumption of particular food groups) were considered as factor loadings if the correlation coefficient took a value of at least 0.4. Factor selection was confirmed by the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, which was 0.749, and Bartlett's test of sphericity, which showed significance at the $p < 0.001$ level. The identified dietary patterns explained 61.2% of the total variance (Table 2). Within each dietary pattern (factor) there were 3 categories created from the tercile distribution of regression coefficients (Table 3). The categories identified are:

1. tercile (low pattern severity),
2. tercile (moderate pattern severity),
3. tercile (high pattern severity).

A Chi-square test was used to assess the association between the identified dietary patterns and demographic and lifestyle characteristics.

Statistical analysis was performed using IBM SPSS Statistics for Windows, version 29.0 (IBM Corp., Armonk, NY, USA).

Results and Discussion

Table 2 shows the correlation between the frequency of consumption of each food group and the identified dietary patterns. These patterns have been described as 'imprudent' (factor 1), 'prudent' (factor 2) and 'junk' (factor 3).

The "imprudent" dietary pattern was dominated by light bread; fried foods; butter; milk, including fermented and sweetened dairy drinks; cold cuts, including sausages; meat dishes; and sweets. The "prudent" pattern was characterized by frequent consumption of: wholemeal bread; coarse-ground groats; fermented dairy drinks, cottage cheese; egg dishes and snacks; legume dishes; fruits; vegetables; and canned vegetables, fruit, pickled and pickled

vegetables. The "junk" pattern included: fast food; powdered or ready-made soups, e.g., from a can; canned meats; canned and processed vegetables and fruits; vegetable or vegetable-fruit juices; sodas; and energetizing drinks (Table 2).

In previous studies, a 'healthy' or 'prudent' dietary pattern has been characterized by frequent consumption of, vegetables, fruits, legumes, and high-fiber breads and vegetable oils (Balder et al., 2003; Engeset et al., 2005; Berg et al., 2008; Engeset et al., 2014; Fredericsen et al., 2020), which, in the case of the study group, can be largely referred to the factor also called the 'prudent' pattern. The dietary pattern often identified in the Nordic and Baltic countries was the 'western' or 'sweet' pattern, which usually consisted of foods considered unhealthy, such as fried potatoes, fast food, meat products, sweets and sugar-sweetened soft drinks (Balder et al., 2003; Berg et al., 2008; Engeset et al., 2014; Petrenya et al., 2019). This type of pattern can largely be identified with the 'imprudent' and 'junk' pattern in this study.

Linking a dietary pattern high in vegetables, fruits, whole grains, fish, low-fat dairy and legumes and low in red and processed meats, sugar-sweetened beverages, sugary foods and refined grains to beneficial health outcomes such as reduced risk of cardiovascular disease, type 2 diabetes, obesity, cancer, osteoporosis and premature death (Vapsäläinen, Lindström et al., 2023) indicates that the 'prudent' pattern identified in this study may reduce the risk of these diseases in the study group. A 'imprudent' and 'junk' pattern can have the opposite effect.

Table 2 Table of factor loadings after Varimax rotation

Food group	Principal component		
	factor 1	factor 2	factor 3
Light bread, e.g. wheat, rye, mixed wheat-rye, toasted bread, rolls, croissants	0.434855	-0.166026	-0.004697
Wholemeal bread	-0.082369	0.454121	0.157147
White rice, plain pasta or small groats, e.g. semolina, couscous	0.057752	0.182175	-0.052132
Buckwheat groats, oatmeal, whole grain pasta or other coarse groats	-0.064737	0.555572	-0.000586
Fast food (e.g. hot dogs, casseroles, pizza, fries, burgers, etc.)	0.288159	-0.271860	0.459521
Fried foods (meat, flour)	0.629935	-0.164353	0.071415
Butter as an accompaniment to bread or dishes, for frying, baking, etc.	0.429181	-0.019411	-0.189100
Lard as an accompaniment to bread or dishes, for frying, baking, etc.	0.315673	0.057499	0.334614
Oils or margarines or blends of butter with margarine, as an additive to bread or dishes, for frying, baking, etc.	0.321805	0.165760	0.078490
Milk (including flavored milk, cocoa, coffee on milk)	0.420103	0.181678	0.097967
Fermented milk drinks, e.g. yoghurt, kefir (natural, flavored)	0.410292	0.489239	0.068341
Cottage cheese (including homogenized cheese, granulated cheese, cottage cheese desserts)	0.363016	0.510040	0.044577
Yellow cheeses (including processed and blue)	0.392526	0.191564	0.081955
Cured meats, including sausages, wieners	0.632826	-0.060838	0.123480
Dishes made from so-called red meat, e.g. pork, beef, veal, mutton, lamb, game	0.578031	0.036468	0.242630
Dishes made from so-called white meat, e.g. chicken, turkey, rabbit	0.618423	-0.026746	0.152409
Fish dishes and snacks	0.234454	0.375372	0.371094
Egg dishes and snacks	0.394937	0.439615	0.014697
Legume seed dishes, e.g. beans, peas, soya, lentils	-0.180619	0.538678	0.114419
Potatoes (not including chips or crisps)	0.393185	0.019765	0.046809
Fruit	0.023560	0.637689	-0.147607
Vegetables	-0.042085	0.709546	-0.114463
Sweets, e.g. biscuits, cakes, bars and other confectionery products	0.419476	-0.042010	-0.114535
Powdered or ready-made soups, e.g. canned, jarred, thickened (not including frozen soups)	0.063892	0.003663	0.660170
Meat preserves	0.084063	0.084712	0.628267
Preserved vegetables or fruit, pickled or pickled vegetables	-0.133131	0.494009	0.407876
Fruit juices	0.273744	0.020807	0.391790
Vegetable or fruit and vegetable juices	-0.055059	0.287078	0.428425
Sweetened hot drinks such as tea, coffee, herbal or fruit infusions	0.244423	-0.020541	0.169015
Carbonated or non-carbonated drinks such as Coca-Cola, Pepsi, Sprite, Fanta, orangeade, lemonade	0.319884	-0.405380	0.514516
Energy drinks, e.g. Red Bull, Tiger, Black Horse, Burn, 2 KC or others	-0.084354	-0.261348	0.522311
Water, e.g. mineral or others	0.013015	0.389968	-0.308713
Variance Explained (%)	34.6	16.8	9.8
Total Variance Explained (%)	61.2		

The relationship of the identified dietary patterns to selected demographic characteristics of the study group is shown in Table 3. Gender and school type have been shown to differentiate the severity of identified dietary patterns. There was no association of the intensity of dietary patterns with age, place of residence, and branch number in the school.

Men were more likely to have a high intensity of the "imprudent" and "junk" pattern. Women were more likely to have a high intensity of the "prudent" pattern. An inverse relationship was shown for low intensity of these patterns. Many authors of nutrition studies point to numerous irregularities in the diet of schoolchildren (Woźniak et al., 2016; Decyk-Chęciel, 2017; Mendyk et al., 2017). These abnormalities are especially related to under-consumption of vegetables and fruits, milk and dairy products, and over-consumption of fast food, sweets, salty snacks and sweetened beverages (Woźniak et al., 2016; Decyk-Chęciel, 2017; Mendyk et al., 2017). The literature notes that these abnormalities more often affect boys than girls (Woźniak et al., 2016; Mendyk et al., 2017), which also corroborates the results of this study.

Technical school students were more likely to have a high intensity of the "imprudent" and "junk" pattern; lyceum students were more likely to have a high intensity of the "prudent" pattern. An inverse relationship was shown for low intensity of these patterns. The scientific literature reports that school type can determine differences in diet. Technical school students more likely to have unfavorable eating behaviors than lyceum students (Jakubik, 2025). This may be due to a number of factors, i.e., lower nutritional awareness, poorer lifestyle characteristics, lower socioeconomic status, and lower parental education of technical rather than general education students (Decyk-Chęciel, 2017; Jakubik, 2025).

The association of the identified dietary patterns with selected lifestyle characteristics of the study group is shown in Table 4. Time spent sleeping on weekdays (school days), smoking and drinking alcohol were shown to differentiate the severity of identified dietary patterns. There was no association of the severity of dietary patterns with physical activity on weekdays and non-study days; time spent in front of the TV, computer and smartphone on weekdays and non-study days; time spent sleeping on non-study days; and frequency of bathing/showering and brushing teeth.

The results of the sleep duration analysis presented in this study indicate that both too short (7 hours or less per day) and too long (more than 7 hours per day) sleep duration were associated with increased adverse dietary patterns. Reducing the amount of time spent sleeping each day resulted in a high intensity of the 'imprudent' pattern, a moderate intensity of the 'prudent' pattern and a low intensity of the 'junk' pattern, which is comparable to the results obtained by Kruger et al. (2014), who showed a close relationship between short sleep duration and the consumption of low-quality food. Respondents who were exposed to a sleep deficit were more likely to consume fast food and also showed lower consumption of fruit and vegetables. Similar results were obtained by Stalmach et al. (2016), who investigated the relationship between sleep duration and health behaviors among middle school students. They showed that normal sleep duration, when juxtaposed with a state of sleep restriction, significantly reduces the likelihood of consuming highly processed foods. In addition,

Table 3 Distribution of the sample in relation to the tercile distribution of dietary pattern severity with selected demographic characteristics (%)

Variables	Total		Dietary patterns and their severity								
			"imprudent"a			"prudent"b			"junk"c		
	N	(%)	low	moderate	high	low	moderate	high	low	moderate	high
N (%)	262 –	– (100.0)	88 (33.6)	86 (32.8)	88 (33.6)	88 (33.6)	87 (33.2)	87 (33.2)	87 (33.2)	87 (33.2)	88 (33.6)
Gender[a, b, c]											
Women	172	65.6	35.2	32.4	31.5	31.0	33.4	37.4	38.4	32.7	32.0
Men	90	34.4	31.6	33.1	34.7	36.8	32.9	21.3	31.6	36.8	37.0
Age											
16 years and under	85	32.4	33.9	32.6	33.0	32.9	33.3	33.0	34.0	32.8	32.9
17 years	88	33.6	33.7	32.9	33.6	33.5	33.2	33.4	33.4	33.4	33.5
18 years and over	89	34.0	33.2	33.1	34.2	33.9	33.0	33.7	33.0	33.9	34.3
Place of residence											
Village	83	31.7	34.4	32.9	33.0	34.2	33.4	33.9	34.6	33.0	32.9
City <100 thousand inhabitants	68	25.9	33.2	33.0	34.2	33.4	33.2	33.3	33.1	33.4	33.9
City >100 thousand inhabitants	111	32.4	33.7	32.7	33.6	33.1	33.1	32.8	32.1	33.2	33.7
Type of school[a, b, c]											
Technical school	61	23.3	31.2	33.6	37.7	37.1	32.5	26.6	29.9	33.8	38.0
Lyceum	201	76.7	37.1	32.1	30.6	29.8	35.5	40.6	38.2	32.0	29.7
Branch number in the school											
Class 1	41	15.6	34.2	32.9	31.0	34.1	33.0	32.8	34.4	33.8	34.0
Class 2	53	20.3	33.0	32.8	34.0	33.7	33.2	32.9	32.8	33.7	34.0
Class 3	146	55.7	33.2	32.2	33.8	33.2	33.4	33.3	33.0	33.0	33.2
Class 4	22	8.4	33.8	32.7	33.6	33.0	33.7	33.8	32.7	32.7	32.6

a, b, c – varying the intensity of dietary patterns, taking into account selected lifestyle characteristics (Chi^2 test, p <0.01)

Table 4 Distribution of the sample in relation to the tercile distribution of dietary pattern severity with selected lifestyle characteristics (%)

Variables	Total		Dietary patterns and their severity								
			"imprudent"[a]			"prudent"[b]			"junk"[c]		
	N	(%)	low	moderate	High	low	moderate	high	low	moderate	high
N (%)	262 -	- (100.0)	88 (33.6)	86 (32.8)	88 (33.6)	88 (33.6)	87 (33.2)	87 (33.2)	87 (33.2)	87 (33.2)	88 (33.6)
Physical activity on weekdays											
Small	73	27.9	37.0	31.5	31.5	37.0	35.6	27.4	38.4	24.7	36.9
Moderate	133	50.8	31.6	34.6	33.7	36.8	33.9	29.3	31.6	36.8	31.6
High	56	21.3	33.9	30.4	35.7	21.4	28.6	50.0	30.4	25.7	33.9
Physical activity in leisure time											
Small	62	23.7	33.9	37.1	29.0	43.5	33.9	22.6	30.6	29.0	40.4
Moderate	129	49.2	35.7	35.7	28.6	27.9	36.4	35.7	36.4	36.4	27.2
High	71	27.1	29.6	23.9	46.5	35.2	26.8	38.0	29.6	31.0	39.4
Average total time spent on weekdays in front of TV, computer and smartphone											
3 hours or less	82	31.3	28.0	35.4	36.6	23.2	31.7	45.1	39.0	29.3	31.7
3 to 5 hours	85	32.4	38.8	40.0	21.2	36.5	35.3	28.2	30.6	41.2	28.2
5 to 7 hours	62	23.7	29.0	21.0	50.0	37.1	32.3	30.6	33.9	25.8	40.3
7 hours or more	33	12.6	42.4	30.3	9	45.5	33.3	21.2	24.2	36.4	39.4
Average total time spent on days off in front of TV, computer and smartphone											
3 hours or less	46	17.6	34.8	28.3	36.9	28.3	26.1	45.6	41.3	21.7	37.0
3 to 5 hours	69	26.3	37.7	26.1	36.2	18.8	40.6	40.6	33.3	43.5	23.2
5 to 7 hours	62	23.7	32.3	37.1	30.6	33.9	40.3	25.8	29.0	37.1	33.9
7 hours or more	85	32.4	30.6	37.6	31.8	48.2	25.9	25.9	31.8	28.2	40.0
Average time spent sleeping on weekdays[a, b, c]											
7 hours or less per day	186	71.0	33.9	30.1	36.0	32.3	35.5	32.2	34.4	33.3	32.3
more than 7 hours a day	76	29.0	32.9	39.5	27.6	36.8	27.6	35.6	30.3	32.9	36.8
Average time spent sleeping during leisure time											
7 hours or less per day	23	8.8	21.7	34.8	43.5	43.5	21.7	34.8	39.1	13.0	47.9
More than 7 hours a day	239	91.2	34.8	32.6	32.6	3	34.3	33.1	32.6	35.2	32.2
Bathing/showering frequency											
Several times a day	25	9.5	40.0	20.0	40.0	28.0	20.0	52.0	28.0	40.0	32.0
Once a day	195	74.4	34.9	31.8	33.3	32.8	37.4	29.8	35.4	34.4	30.2
Once every two days or less often	42	16.1	23.8	45.2	30.0	40.5	21.4	38.1	26.2	23.8	50.0
Frequency of tooth brushing											
After each meal	10	3.8	50.0	10.0	40.0	20.0	40.0	40.0	30.0	20.0	50.0
2 times a day	202	77.1	36.1	30.7	33.2	29.7	33.7	36.6	36.6	34.7	28.7
1 time per day	41	15.6	19.5	43.9	36.6	56.0	22.0	22.0	22.0	34.1	43.9
Less than once a day	9	3.5	22.2	55.6	22.2	33.3	66.7	0.0	11.1	11.1	77.8
Smoking (at least once a week)[a, b, c]											
No	210	80.2	31.9	34.8	33.3	30.0	33.8	36.2	35.8	35.2	29.0
Yes	52	19.8	40.4	25.0	34.6	48.1	30.8	21.2	23.1	25.0	51.9
Alcohol consumption (at least once a week)[a, b, c]											
No	208	79.4	34.6	34.6	30.8	31.3	32.7	36.0	37.0	34.1	28.9
Yes	54	20.6	29.6	25.9	44.5	42.6	35.2	22.2	18.5	29.6	51.9

[a, b, c] – varying the intensity of dietary patterns, taking into account selected lifestyle characteristics (Chi^2 test, $p < 0.01$)

Theorell-Haglöw et al. (2020) confirmed in their study that short sleep duration combined with poor sleep quality is associated with poor adherence to a healthy diet and regularly consumed meals. According to a study by Patel and Hu (2012), sleep restriction, by affecting the inhibition of leptin levels, as well as increasing ghrelin production, results in an impaired sensation of satiety and hunger, which is related to providing the body with an increased intake of often processed products with a high energy value. In addition to the negative effects resulting from the sleep deprivation that occurs, the results presented in this study clearly show that significant nutritional disorders can also be caused by an excess of sleep. Similar observations were made by Kant and Graubard (2014), who demonstrated that the proportion of energy provided from basal rations and snacks was disturbed in long-term sleepers. Respondents preferring supernormal sleep time consumed more processed foods of low quality and nutritional value. In addition, people who slept for long periods of time compared with normative sleepers consumed lower amounts of dietary fiber, the proportion of which in the diet was considered a marker of dietary quality. Similar conclusions were reached by Chaput et al. (2008), who additionally estimated that too much time spent sleeping per day increased the risk of developing obesity by 21% relative to people sleeping the correct amount of time. In contrast, van den Berg et al (2008) indicated that older people have a higher risk of obesity as a result of too much sleep, by up to 193%.

Cigarette smoking among young people has a significant impact on their dietary choices. Cigarette smokers often experience reduced appetite and taste disturbances, which can lead to unhealthy eating habits. The results of this study report the impact of cigarette smoking on riskier eating behaviors among respondents. In the group of tobacco users, a significantly higher increase in the dietary pattern of 'junk' was observed. According to a study by Al-sheyab and Alomari (2018), adolescents who reported smoking reported relatively higher consumption of unhealthy foods and fizzy drinks, as well as skipping breakfast more often. Furthermore, in an analysis by Wilson et al. (2005), young smokers were significantly less likely to consume vegetables, milk and dairy products than non-smokers. The use of nicotine products has a significant effect on metabolism causing an appetite suppressing effect and seemingly facilitating the weight control process, however, as outlined in the study by Al-sheyab and Alomari (2018), smokers do not, on average, consume less food than non-smokers.

Alcohol consumption among adolescents significantly influences the dietary patterns presented by this group. This is often accompanied by the consumption of high-calorie snacks, rich in fats and sugars, leading to increased energy intake and unhealthy weight gain. In the survey, an increase in the severity of "imprudent" and "junk" patterns was observed in adolescents who consumed alcohol. In their case, this was associated with a greater choice of highly processed foods, with low health value and often with pro-inflammatory potential. A scientific publication by Breslow et al. (2010), which reported on the correlation between alcohol consumption and diet quality in the US adult population, found a significant relationship between alcohol consumption and reduced meal regularity and additional deterioration in meal quality, despite the same paper's low assessment of the overall nutritional status of Americans. Alcohol users were characterized by significantly lower consumption of fruit and vegetables and more frequent consumption of fatty meat products and sugar-sweetened drinks.

Conclusion

A statistically significant relationship was shown between the identified dietary patterns and selected demographic and lifestyle characteristics of secondary school students. Male gender, attendance at a technical school, inadequate sleep time, smoking and alcohol consumption were associated with an "imprudent" and "junk" dietary pattern. Female gender, lyceum attendance, adequate sleep time, avoidance of smoking and alcohol consumption were associated with "prudent" dietary patterns. As mentioned earlier, attendance at a technical school, as well as the male gender, was associated with unfavorable lifestyle characteristics, including diet, which may be due to the poorer socio-economic situation and lower knowledge of technical students and their parents. Attending lyceum, female gender was associated with more favorable lifestyle characteristics, including diet, which in turn may be a result of the higher knowledge and awareness of lifestyle and nutrition of high school students, their better socio-economic status and the better knowledge of their parents. In conclusion, it can be said that educational programs and psychological support in the school environment, should address health education to a greater extent, especially in vocational schools. Such activities can improve the knowledge, health awareness and lifestyle behavior of young people.

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