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Dietary habits and their impact on the health of youth from secondary schools in Ostrołęka

Nawyki żywieniowe i ich wpływ na zdrowie wśród młodzieży z ostrołęckich szkół ponadgimnazjalnych

Summary
The aim of this study was to analyze eating habits and to assess the relationship between the extent of BMI, sex, place of residence, type of school and eating habits of the youth from Ostrołęka`s secondary schools. The study included 715 students (351 girls and 364 boys) from Ostrołęka`s secondary schools (Mazowieckie voivodship). The study was conducted in January, in the school year 2011/2012. To assess dietary habits an anonymous questionnaire was used. The survey consisted of 54 closed questions. The analysis used only the part of the questionnaire, concerning behavior, eating habits and the imprint. The students responded to questions such as regularity of the meals, snacking between the meals, consumption of fast-foods, vegetables and fruits, sweets and drinking soda, but not in the "light" version. Imprint included questions on sex, age, place of residence and the type of school. In addition, students could subjectively assess their weight and height, from which BMI was calculated. Statistical analysis was performed using the statistical package Statistica v. 10.0. The normality of distribution was verified with the Shapiro-Wilk test. Results of the analysis allowed for the use of mean ($\overline{x}$), standard deviation (SD) and, consequently, the application of χ^2 test, assuming the level of significance at $\alpha < 0.05$. The analyzes showed that there is a relationship between BMI, gender and type of school. Young people often ignored afternoon tea in their diet, and most commonly eat lunch and dinner. Obese students often snack between meals. Young people give up eating vegetables and fruit for snacks, sodas, and fast-foods. Relationship was found between gender, type of school and regularity of meals, eating between meals, eating fruits and vegetables and consumption of highly processed foods.

Key words: eating habits, youth, secondary school, Ostrołęka

Streszczenie
Celem pracy była analiza nawyków żywieniowych oraz ocena związku pomiędzy zakresem BMI, płcią, miejscem zamieszkania oraz typem szkoły a zwyczajami żywieniowymi młodzieży z ostrołęckich szkół średnich. Badaniem objęto 715 uczniów (351 dziewcząt i 364 chłopców) klas I- III ostrołęckich szkół ponadgimnazjalnych (województwo mazowieckie). Badanie przeprowadzono w roku szkolnym 2011/2012, w styczniu. Do oceny nawyków żywieniowych wykorzystano anonimowy kwestionariusz ankiety. Ankieta liczyła 54 pytania o charakterze zamkniętym. W analizie wykorzystano pierwszą część ankiety: zachowania i zwyczaje żywieniowe oraz metryczkę. Uczniowie odpowiadali na pytania dotyczące m.in. regularności spożywanych posiłków, pojadania między

posiłkami, spożywania żywności typu Fast-food, warzyw i owoców, słodyczy oraz picia napojów typu coca-cola, ale nie w wersji „light". Metryczka zawierała pytania dotyczące m.in. płci, wieku i miejsca zamieszkania oraz typu szkoły do jakiej uczęszczają uczniowie. Ponadto uczniowie mogli subiektywnie ocenić swoją wagę i wzrost, na podstawie których obliczono BMI. Analizę statystyczną wykonano przy zastosowaniu pakietu statystycznego Statistica v. 10.0. Normalność rozkładu zweryfikowano testem Shapiro-Wilka. Wyniki analizy pozwoliły na zastosowanie wartości średniej ($\overline{x}$) i odchylenia standardowego (SD), a w efekcie zastosowania testu χ^2, przyjmując poziom istotności $\alpha<0,05$. Przeprowadzone analizy wykazały, że istnieje zależność między BMI a płcią i typem szkoły. Młodzież najczęściej w swojej diecie pomija podwieczorek, a najregularniej spożywa obiad i kolację. Otyli uczniowie to grupa, która najczęściej pojada między posiłkami. Młodzież rezygnuje z jedzenia warzyw i owoców na rzecz słodkich przekąsek, napojów gazowanych oraz żywności typu Fast-food. Stwierdzono związek między płcią i typem szkoły a regularnością spożywanych posiłków, pojadaniem między posiłkami, jedzeniem warzyw i owoców oraz spożywaniem żywności wysokoprzetworzonej.

Słowa kluczowe: nawyki żywieniowe, młodzież, szkoła średnia, Ostrołęka, województwo mazowieckie

Introduction

Eating habits are one of the most important factors that affect human health. These behaviors are formed during adolescence, in the years 10-12 for girls, and 12-14 for boys. Adolescence is a very difficult and very important stage in their lives, especially among young people. At that time, the girls acquire body-fat, which for many, is a nuisance and a cause for lack of acceptance of one`s body, resulting in attempts to reduce weight by using weight loss diets. Among boys, in turn, increases the proportion of lean body mass. It changes the way of thinking, which in turn leads to the emergence of formed personality. Young age favors the acquisition, formation and consolidation of different behaviors, including eating behavior. There may be also complexes concerning different parts of the body, and thus, the lack of acceptance of their own appearance (Saracen, 2010; Pilch et al. 2011; Kozłowska-Shabbir, 1996, Wanat et al. 2011; Tomaszewska et al. 2012; Fallon, Ackard, 2002).

The main task of rational nutrition is to supply the body with all the necessary nutrients. Regularity of meals, as well as snacking habits, consumption of highly processed and high-fat foods is also important (Gawęcki, Mossor-Pietraszewska, 2004).

Youth does not pay particular attention to eating nutritious meals. They often reach for high-calorie products such as candy bars, cakes, sweet drinks and fast foods (Pilch et al. 2011). This is mainly the lifestyle of young people. Most of the time is spent on seating in front of the computer. In addition, these young people eat in a hurry, in order to return to the interrupted activity, as soon as possible (Turkle, Kiesler, 1997).

For many years, Poland has seen a steady increase in the prevalence of chronic non-communicable diseases. This includes mainly cardiovascular disease, obesity, type 2 diabetes and certain cancers (Suliga, 2010). Over the past twenty-five years, anorexia and bulimia, have begun to focus the main attention of the society. Both of these diseases has been officially recognized as an eating disorders. The main role in the formation of both

disorders is attributed to cultural and environmental factors. Other factors contributing to the occurrence of eating disorders are peers and mass media advertising, which create the ideal of fitness. Youth, which is devoid of critical thinking and rebelling against authority, often try to take drastic weight reduction. Knowledge of the factors, that contribute to the formation of eating disorders and consequently form irregular eating habits, is necessary for the development and implementation of educational programs aimed at eliminating these negative habits. It is important to form the correct pattern from the earliest years, as this will result in normal development and functioning of the body in adulthood (Saracen, 2010; Tomaszewska et al. 2012).

Aim of the study

The aim of this study was to analyze eating habits and to assess the relationship between the extent of BMI, sex, place of residence, type of school and the eating habits of young people from Ostrołęka`s secondary schools.

Materials and methods

The study included 715 students (351 girls- 49% and 364 boys- 51%) from Ostrołękas`s secondary schools. The study was conducted in January, in the school year 2011/2012. To assess dietary habits, a questionnaire was used, developed in the Department of Medicine and Environmental Epidemiology in Zabrze, Medical University of Silesia in Katowice. The survey consisted of 54 closed, single choice questions.

The questionnaire was divided into four parts: behavior and eating habits, socio-cultural factors, disorders of the digestive and other systems, imprint. The analysis used the first part of the survey and imprint. The students responded to questions such as regularity of meals, snacking between meals, eating fast-foods, vegetables and fruits, sweets and drinking soda, but not in "light" version. Imprint included questions on sex, age, place of residence and the type of school. In addition, students could subjectively assess their weight and height, which were calculated on the basis of BMI (Body Mass Index = weight [kg] / (height)^2 [m]). To assess the nutritional status of students four ranges of BMI were established: underweight (<16.0 - 18.49 [kg/m^2]), standard (18.5 - 24.99 [kg/m^2]), overweight (25.0 - 29 , 99 [kg/m^2]) and obesity (30.0 - 40.0 ≥ [kg/m^2]).

Statistical analysis was performed using the statistical package Statistica v. 10.0. The normality of distribution was verified with the Shapiro-Wilk test. Results of the analysis allowed for the use of the mean ($\overline{x}$), standard deviation (SD) and, consequently, the application of χ^2 test, assuming the level of significance at $\alpha < 0.05$.

Results

The study involved 715 students from high school, technical and vocational school in Ostrołęka. The study included 351 girls (49%) and 364 boys (51%). There were 246 (34%) high school students, 116 (16%) vocational school students, and 353 (50%) technical school students. The average age of the high school students was 17.1 (± 0.79) years, vocational school students 17.5 (± 0.85) years and 17.2 (± 0.90) years for technical school students. Fifty-one percent of the students indicated city as a place of residence, and 49% came from the rural areas.

Firstly, the BMI was calculated and compared in groups of men and women living in urban and rural areas, depending on the type of school. The results are shown graphically in Figures 1, 2 and 3.

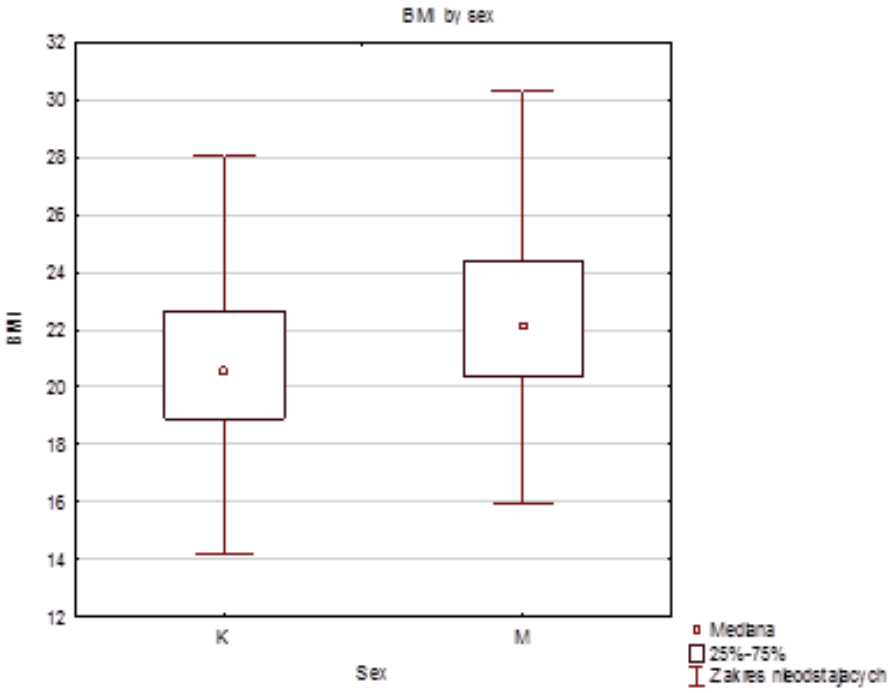

Fig. 1 Average BMI in women and men.

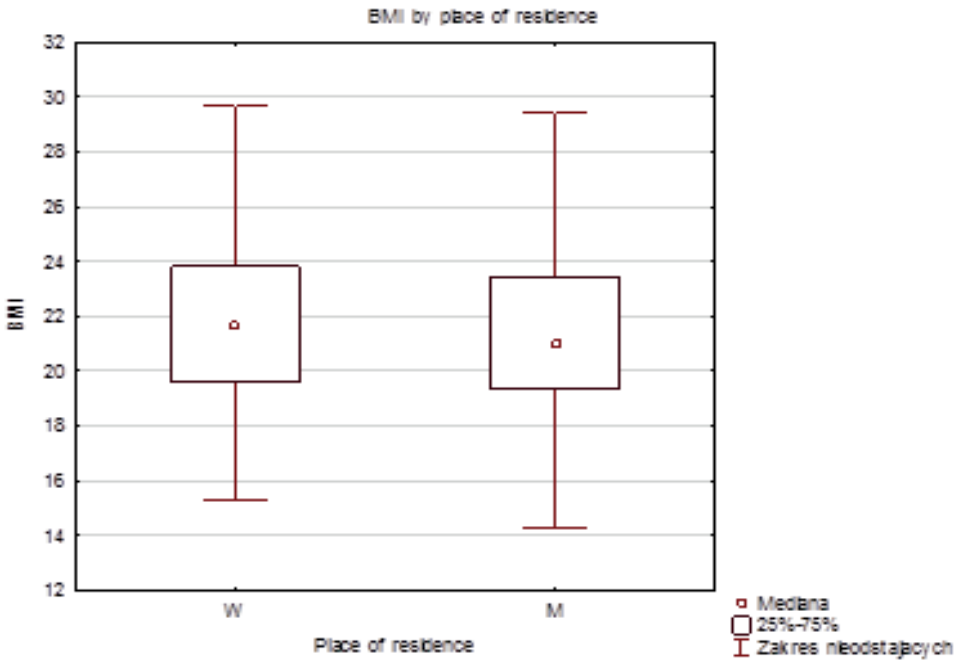

Fig. 2 Average BMI depending on place of residence.

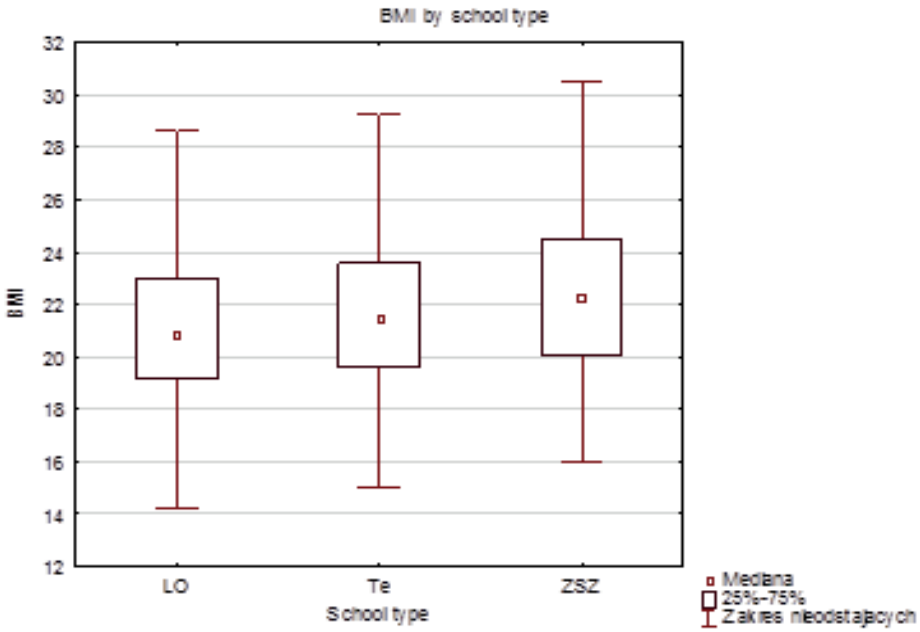

Fig. 3 Average BMI depending on type of school.

Average BMI in girls was 20.96 ± 2.95 [kg/m^2], while among boys the value was higher, at 22.66 ± 3.30 [kg/m^2]. The relationship between BMI and sex was highly statistically significant (p = 0.000). Mean BMI among students living in the city was 21.62 ± 3.34 and at countryside 22.02 ± 3.15. These differences are not statistically significant (p > 0.05). On average, a higher BMI was observed among vocational school (VS) students 22.65 ± 3.61, the mean BMI of high school (HS) students was 21.44 ± 3.32 and technical school (TS) students 21.82 ± 3.02. BMI between groups was statistically different (p < 0.05).

Tab. 1 Average BMI among men and women depending on the type of school and place of residence.

Type of school										
Group		HS* N=246			TS* N=353			VS* N=116		
		n	$\bar{x}$	±SD	n	$\bar{x}$	±SD	n	$\bar{x}$	±SD
Females	City	89	20,50	3,24	77	21,09	3,15	19	21,04	2,81
	Country	59	20,74	2,59	98	21,19	2,69	9	23,07	2,95
Males	City	59	22,63	3,59	72	22,40	3,21	36	22,64	3,03
	Country	39	22,84	3,11	106	22,55	2,88	52	23,16	4,20

Mean values of BMI in the studied groups are different. The highest value was observed among girls living in rural areas and studying in vocational schools and among boys who were students of the above type of school, living in rural areas as well as in the city. These values were successively for girls 23.07 ± 2.95 and for boys from the countryside 23.16 ± 4.20 and the city 22.64 ± 3.03. On the other hand, among girls living in the city, average BMI values were higher in students from technical schools 21.09 ± 3.15.

Tab. 2 Numbers depending on the extent of gender-specific BMI.

Trait		Standard N= 533		Underweight N= 75		Overweight N= 90		Obese N= 17	
		n	%	n	%	n	%	n	%
Sex	Females	262	37	55	8	30	4	4	0,5
	Males	271	38	20	3	60	8	16	1,5

In the studied group, normal weight was noted among 37% of girls and 38% of boys. Underweight was more common in women (8%) than in men (3%). The overweight was observed twice as likely in males (8%) than girls (4%). Obesity was noted in 0.5% of women and 1.5% of men.

Tab. 3 Numbers depending on the range of BMI and place of residence.

Trait		Standard N= 533		Underweight N= 75		Overweight N= 90		Obese N= 17	
		n	%	n	%	n	%	n	%
Place of residence	City	257	36	43	6	45	6	7	1,5
	Country	276	39	32	4	45	6	10	1,5

Among the youth, the largest percentage accounted for standard weight. Slightly more students with normal body weight were observed among those identified as the residents of rural areas, respectively 39% and 36%. Underweight was more often observed in the urban population (6%) than among rural youth (4%). Overweight and obesity were spread evenly, both in the city and in the countryside and were respectively 6% and 1.5%.

Tab. 4 Numbers, depending on the range of BMI and type of school.

Trait		Standard N= 533		Underweight N= 75		Overweight N= 90		Obese N= 17	
		n	%	n	%	n	%	n	%
Type of school	HS	179	25	36	5	26	4	5	0
	TS	270	38	31	4	46	6	6	1
	VS	84	12	8	1	18	3	6	1

By examining the relationship between BMI and the type of school, it is worth noting that no obese high school students were found. Only 1% of vocational school students were underweight and obese, and just 1% of students in technical schools were obese. The largest proportion of

adolescents with normal body weight was observed among technical school students (38%) and lowest among students in vocational schools (12%). Underweight occurred most frequently among high school students, while overweight among technical school students (6%).

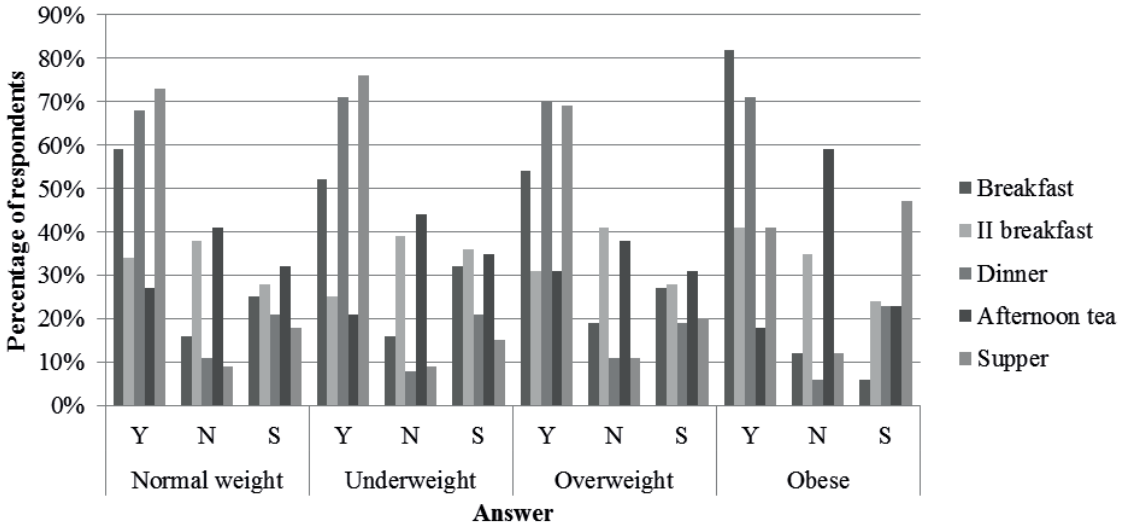

Fig. 4 Percentage of students who regularly eat basic meals, depending on the BMI.

The relationship between BMI and regularity of meals was examined. Statistical analysis showed that there is no relationship between the two variables ($p > 0.05$). Most frequently overlooked meal among young people was the afternoon tea (41%), youth most often ate dinner (69%) and supper (72%). Underweight students often overlooked afternoon tea (44%) and second breakfast (39%), the least overlooked meals were dinner (76%) and lunch (71%). The same was true in students who were overweight. Dinner and supper were consumed respectively by 69% and 70%, while 41% and 38% of students do not ate the second breakfast and afternoon tea. Obese youths was a group that is least likely to give up breakfast (82%) and dinner (71%), and consume afternoon tea the least regularly (59%).

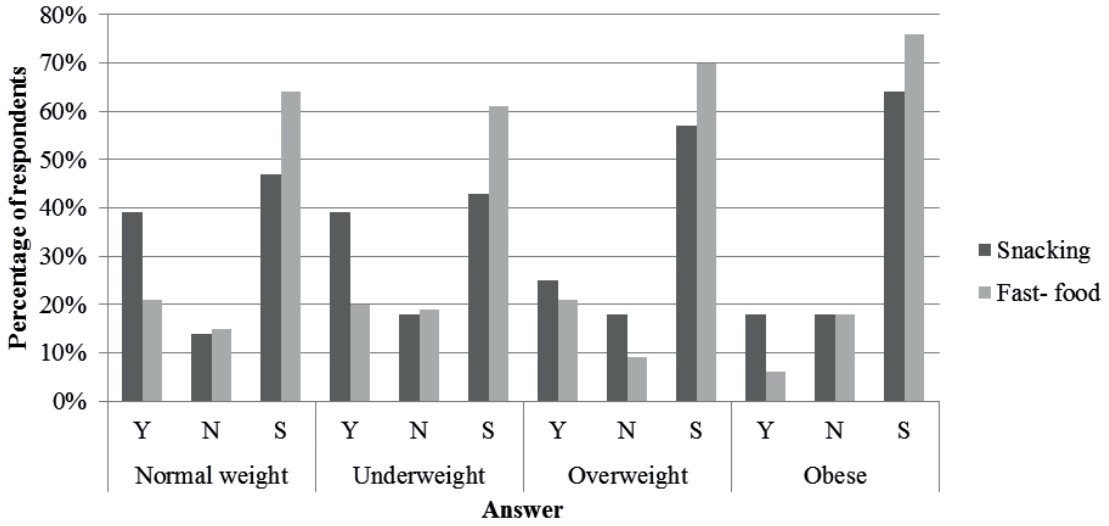

Fig. 5 Percentage of pupils snacking between meals and eating fast-foods, depending on the scope of the BMI.

The relationship between BMI and snacking between meals and consumption of fast-foods was analyzed. In this case there was no statistically significant difference between the two variables ($p > 0.05$), 39% and 21% of students with standard weight admit to snacking and eating fast-foods. Similar values could be seen in underweight students. In the case of adolescents, who were overweight, 25% admit to snacking between meals and 21% said they eat highly processed foods. As many as 64% of students with obesity admit to occasional snacking and only 6% eat fast foods. Overall, one in five people admit to eating highly processed foods, and less than 40% to snacking between main meals throughout the day.

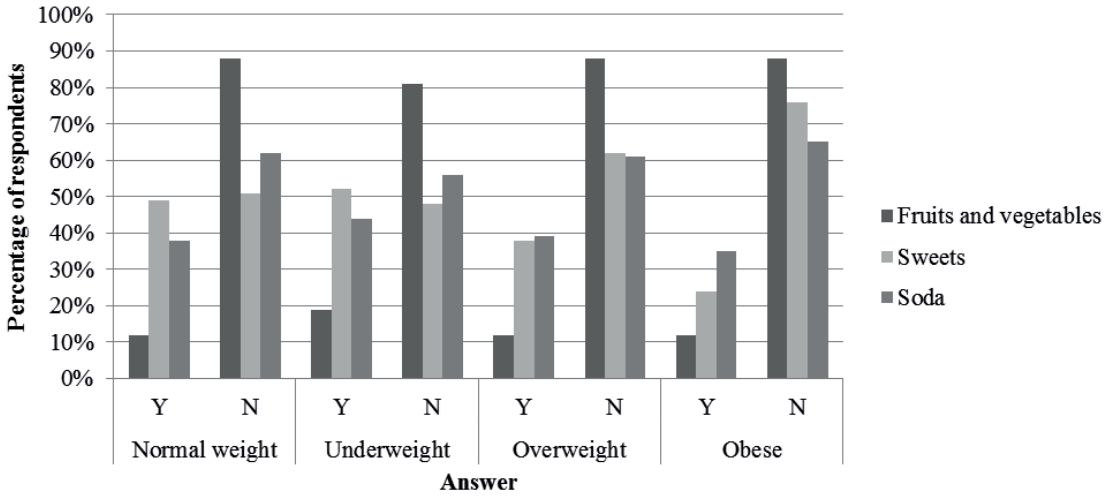

Fig. 6 Percentage of pupils eating selected food groups according to BMI.

Another relationship that has been subjected to an analysis was consumption of selected groups of food products, compared to BMI. Statistically significant relationship was found between the variables, BMI and eating sweets (candy bars, cookies, chips) ($p = 0.04$). There was no statistically significant difference between BMI and eating fruits and vegetables and drinking soda, but not in "light" type. Young people are reluctant to eat vegetables and fruits. About 13% of students in all groups declared reaching for above products. Young people preferred sweets (47%). Obese pupils most often abandon sweet snacks and sugary drinks, accordingly- 76% and 65%, underweight students were least likely to abandon these products- 48% and 56%. Overweight and standard weight young people resigned from eating sweets and drinking soda in similar percentages.

In addition, correlations between gender, place of residence, type of school, range of BMI and regularity of meals, snacking between meals, eating fast-food type of food, vegetables and fruits, sweets and drinking soda, but not in "light" version were analyzed. The analysis revealed a number of dependencies. There is a relationship between sex and eating breakfast ($p = 0.02$). The relationship between eating lunch, afternoon tea, dinner ($p = 0.000$), snacking between meals, eating fruits and vegetables, fast-foods and drinking sugary drinks and sex are highly statistically significant ($p = 0.000$). The relationship between type of school and the consumption of the second breakfast, afternoon tea, dinner, and fast-foods differ significantly ($p < 0.05$). There was also the confirmed relationship between place of residence and eating second breakfast, sweets, fruits and vegetables ($p < 0.05$).

Disscussion

Analyses showed that there were no obese students among high school students, however, being underweight was more common in this particular group. Underweight and obesity was a rare phenomenon among young people studying in vocational schools. Normal body weight occurred among the vast majority of technical students.

In 2010, 100 high school students were tested in Szydłowiec (Mazowieckie province). On the basis of BMI, it was observed that 58% of junior high school students had normal weight. Underweight was found in 31% of the students, while every tenth student was overweight. Underweight was more common in girls, while overweight in boys (Wanat et al. 2011).

In 2011, a similar study was conducted among high school students in Rumia in Pomorskie province. The 695 students aged 13 - 15 years were examined. The study showed that nearly 60% of girls and 72% of boys had BMI within the standard range. Underweight was found in 35% of girls and just over 18% of boys. Obesity was more common among boys (9%) than their female colleagues (5%). Obesity was found in 1% of girls and 1.5% of boys (Tomaszewska et al. 2012).

Also, these same studies showed some dependencies. As many as 95% of girls and 58% of boys would like to have a silhouette of a less than normal weight. Thus, the "very dissatisfied" or "dissatisfied" with their body weight female students were less than 53% and in boys were 24% (Tomaszewska et al. 2012). Similar studies were carried out in foreign centers. Roy studies have shown that the level of satisfaction and acceptance of own body of 9 - year-olds is 55%, over the years, satisfaction decreases, thusly in adolescents 13 - year amounts to only 42%, while a 16 - year 40% (Roy, 2003). Studies conducted in Australia among younger children aged 8 - 12 years showed that half of girls and a third of boys wanted to have a slim and sleek silhouette (Rolland et al. 1997). The research by Bellerose et al. showed that girls, more than boys, attempt at reduction of weight. Every third girl took steps at weight loss (Bellerose et al. 2001 and 2002). According to Sirolli 40% of young people, especially girls, aim to have a "perfect figure" (Sirolli, 2006). Other data obtained by Daee et al. in 2002 shows that as much as 41% to 66% of teenage girls and 20% to 31% of boys intentionally limited eating meals (Daee et al. 2002).

The results obtained in the present study and the review of the literature indicate that the observed behavior of young people in adult life can result in large deficits not only in nutrients, but also energy, which may result in abnormal development of the body and the formation of inappropriate dietary patterns.

The relationship between BMI range and regularity of meals was examined. Young people often skipped in their diet afternoon tea, while most often ate lunch and dinner. Statistical analysis showed a relationship between school and regularity of meals.

In 2010, an anonymous survey was conducted on a group of 100 students, aged 13 - 15 years who were high school students in Chełmek in the Malopolska province. More than half of the students do not consume breakfast (56%). Children often ate four meals a day (60%). Five meals a day ate just 9% of the surveyed students (Wanat et al. 2011).

Also in 2010, in the previously mentioned study, conducted among high school students in Szydłowiec, it was noted that as many as 54% of young people know to eat breakfast before going to school. Every third student remembered about the second breakfast (Wanat et al. 2011).

Similar studies were carried out on a group of 3108 students aged 15 - 19 years of vocational schools and technical schools. The study included a total of 19 schools from Radom, Warsaw and Ciechanów. The statistical analysis showed that vocational school and high school students ate more meals than technical school students. High school students dropped out breakfast more often than their colleagues in other types of schools. Young people rarely opted out of lunch and dinner (Saracen, 2010).

Our study shows that young people from all types of schools rarely skip lunch and dinner in their diets. The first breakfast usually is eaten by technical school students (29%) and least likely by vocational school students (8%). The second breakfast is often forgotten by youth from technical schools (17%). Only 1% of students from vocational school admit that they eat lunch and dinner. The afternoon tea is usually remembered by technical (13%) and high school students (8%).

The relationship between BMI range, type of school and snacking between meals, consumption of fast-foods, eating sweets, fruits and vegetables and drinking sugary drinks was analyzed. It is worth noting that over 60% of students with obesity admit to snacking between meals, but only 6% of the students declared eating fast foods. Among all students, less than 40% is snacking between meals and every one in five of them eat highly processed foods. Children rarely reach for fruit and vegetables, they are more likely to opt for sweets (47%). Frequently young people with obesity reach for the chips, chocolate bars, biscuits, sweets and fizzy drinks, while those with underweight avoid these types of products. The highest percentage of young people who admit to snacking between meals was noted among technical students (16%) and lowest in vocational school (3%). Also, young people from technical schools claimed, that their diet does not consist mainly of fruits and vegetables (44%). Sweets and sweet drinks are also groups of food products that are the preferred choice among technical school students, 22% and 19%. Only 9% of vocational school students admit that they reach for Coca-Cola type drinks. High school students and vocational school students were groups that rarely reach for fast-foods (5%). Twice as many students choose highly processed foods.

As mentioned earlier, surveys carried out in 2010 in Chełmek shows that fast food snacks and sugary drinks find their way among rations of young people several times a week (33%). It is worth noting that 70% of teens admit that you are drinking sodas at a rate of one liter per day (Fallon, Ackard, 2002).

Szydłowiec junior high school students know that they should not eat snacks between meals (53%), and the spacing between the main meals should be 3 - 4 hours (Wanat et al 2011).

It was noted that among young people from secondary schools from Radom, Warsaw and Ciechanów, 2.6% do not consume vegetables at all, 47% eat them regularly and 24% admitted to eating vegetables every day. However, no differences between students from different types of schools were identified (Saracen, 2010).

Our study have shown that more and more of a problem is not only skipping main meals of the day, but also snacking among them. Youth eat sweet high-calorie snacks. They give up eating vegetables and fruit for candy bars, chips, cookies, sweet drinks or fast-foods (Kunachowicz, 1998). This is due to the way of life led by young people, with a computer being the focal point in the young man's life. Eating habits change, young

people eat high-calorie products in a hurry to "kill" the hunger, then quickly returning to the interrupted activity. They lead a sedentary lifestyle, which may result in rapid weight gain. In the future, this may result in a lack of acceptance of their appearance, resulting in attempts to rapidly reduce their weight. The problem is not only obesity, particularly among young girls, but also excessive dieting (Orzock, 1999; Turkle, Kiesler, 1997).

It is important to accurately recognize the eating habits of students in order to be able to conduct effective nutrition education. Well-planned prevention program can bring great benefits. Awareness of young people about the rational nutrition and of the risks that accompany negative eating patterns should be raised.

Conclusions

1. There is a relationship between BMI, gender and type of school. In boys and vocational school students the average BMI values were higher.
2. There is the relationship between gender, type of school, regularity of meals, snacking between meals, eating fruits and vegetables and consumption of fast-foods.
3. Youth often ignored afternoon tea in their diet, and most often ate lunch and dinner.
4. Students refrained from eating vegetables and fruit for sugary snacks, sodas and highly processed foods.
5. Obese youth is a group that usually snacks between meals.

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