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Lifestyle of junior high school pupils in the Lesser Poland region of the 21st century from the point of view of eating habits

> *Physical health and psychological well-being of a human are closely related to one another.*
>
> Avicenna

Introduction

In modern times human health is one of the most valuable goods. It stems from the fact that the average life expectancy among humans tends to increase, which is why it is important that a long lifetime is not only a period of pain and suffering, but also of joy and health. In order to have long but also healthy life, people have to learn how to take care of it. According to the proverb "*You can't teach an old dog new tricks*", the awareness of a healthy lifestyle should be instilled in pupils from their earliest years. This is why information on healthy lifestyle appears in school curricula, television programmes, and teenage magazines. In the Curriculum for Biology in the 3rd stage of education, under the category of the aims of general education (The knowledge of conditions for human health), the following requirements were defined: "A pupil analyses the correlation between his own behaviour and being healthy (proper diet, physical activity, preventive screening)......" In the topics of education (Digestive system and eating), the following aims were presented: "A pupil:
– presents the role of fibre in proper functioning of the digestive system and justifies the need of regular eating of fruit and vegetables;
– presents the role and consequences of deficiency of some vitamins (A, C, B_6, B_{12}, folic acid, D), minerals (Mg, Fe, Ca) and essential amino acids in human organism;
– explains why it is important to have a well-balanced diet adjusted to organism needs (age, health, lifestyle and physical activity, time of the year, etc.) and enumerates the benefits of healthy eating habits;
– calculates the body mass index and presents and analyses the consequences of a bad diet for health (obesity or underweight and their results)."

Research

One could think that with such an omnipresent promotion of a healthy lifestyle, pupils should know its rules and apply them on an everyday basis. In order to verify the above hypothesis, a research among 111 pupils aged 11–16, living in the Lesser Poland Voivodship concerning their lifestyle was carried out. The research included all the aspects of teenagers' lifestyle: eating habits, leisure time activities, hobbies and interest, and the system of values. This article presents in detail teenagers' lifestyle from the point of view of eating habits; the remaining aspects will be discussed in subsequent articles.

In particular, answers to the following problem questions were tried to be found out:
1. Do pupils go to school in the place where they live?
2. Is the population structure of teenagers in town and village the same?
3. What are teenagers' eating preferences and what do they depend on? Are there any vegetarians among junior high school pupils?
4. What is the body mass index (BMI) of the pupils taking part in the research? What factors influence their BMI?
5. Do pupils know the rules of a healthy lifestyle and apply them in their life?

In order to answer the above research questions, it was decided to verify the following research hypotheses:
1. Pupils go to school in the place where they live.
2. The urban sample differs from the rural sample in terms of the structure of: sex, BMI, age, school class.
3. The BMI among junior high school pupils has a normal value. The BMI depends on the place of living.
4. The eating preferences of teenagers are in accordance with the healthy lifestyle rules.
5. The eating preferences of teenagers depend on their sex and place of living.
6. There are no vegetarians among junior high school pupils.
7. The BMI depends on sex.
8. The BMI depends on the eating preferences of teenagers.
9. Junior high school pupils know the rules of a healthy lifestyle and apply them in their life.

Materials and methods

In order to assess the lifestyle of teenagers, a survey was conducted among 111 pupils of junior high schools in the Lesser Poland Voivodship, living both in urban as well as rural areas.

Table 1 presents a detailed description of samples.

Tab. 1. The sample description – place of living and sex

sex	place of living			
	town		village	
	N	%	N	%
woman	18	62.1	33	40.2
man	11	37.9	49	59.8

Survey questions concerning the lifestyle of junior high school pupils were conducted with the help of the Internet questionnaire within the options provided by Google Documents. The Google questionnaire is a tool that makes it possible to gather information electronically in a rapid and comfortable manner. The questionnaire consisted of general questions (age, sex, class, school location, place of living, height, weight) and 21 questions of the proper questionnaire. The advantage of the "Google questionnaire" consists in the automatic transfer of answers given by respondents to a spreadsheet as well as the creation of charts and diagrams within the so-called "summary of answers" option. The research was conducted over eight weeks, from 1st November 2012 till 22nd December 2012.

The empirical distributions of variables (features) for teenagers living in rural areas and teenagers living in towns were checked by means of the χ^2 test. The χ^2 test for independence was used to verify correlations between features in question. The strength of correlation between dependent features was measured with the help of the φ correlation coefficient (for a fourfold table) and the V Cramer's coefficient (for a cross tabulation: 2 x 3). Moreover, a test analysis of features' independence in the samples under investigation required to combine categories of features initially adopted in the survey into larger sub-classes as expected numbers were significantly lower than the required 5 (according to some authors 10; see Wołek 2006). For each feature larger sub-classes were given in parenthesis (Tab. 2).

Tab. 2. Categories of variables and sub-classes used to analyse the test χ^2

Category of variables	Grouped sub-classes
fast food	every second week or more often; every few months;
beverages	*often* covers: (every day, twice a week, once a week) *occasionally*: (every second week - every few months)
fruit, vegetables, eggs and dairy products, meat, wholemeal bread, sweets	every day (daily) not every day (several times a week or never)
eating during breaks at school	sandwich; other: sweets, doughnuts, pretzels, fruit, yoghurt
BMI	norm different from the norm (underweight, overweight)

With the help of the χ^2 test the hypothesis that the variables are independent was verified for each variable. Zero hypotheses were falsified at the level of relevance

α = 0.05. All calculations were made with the help of the software STATISTICA version 7.1.

Research results

Hypothesis 1: Pupils go to school in accordance with their place of living (town – town; village – village). In order to verify the above hypothesis, the χ^2 test for features' independence was carried out (Tab. 3).

Tab. 3. The results of testing the hypothesis that features are independent

Dependent variable Independent variable	Pearson's χ^2	df	p	ML χ^2	df	p	Statistical result	φ correlation coefficient;
school location vs place of living	38.779	1	0.00000	35.645	1	0.00000	features are dependent	0.591

Pupils living in villages go to schools situated in villages, while pupils living in towns go to schools in towns. Due to the above, urban and rural samples with relation to the place of living or school location can be assumed in analyses. Variables are dependent.

Hypothesis 2: The urban sample differs from the rural sample in terms of the structure of: sex, BMI[1], age, school class. With the help of the χ^2 test, hypotheses that the empirical distributions being compared are statistically consistent were verified (Tab. 4).

Tab. 4. Results of testing the hypothesis that distributions are statistically consistent in both samples

Feature	Sample	Pearson's χ^2 ML χ^2 Yates' χ^2 *	df	p	Statistical result
age [14 and below; 15 and above]	place of living: town vs village	9.979 9.311	1	0.002 0.002	distributions are not statistically consistent
sex [W/M]		4.109 4.118	1	0.043 0.042	distributions are not statistically consistent
BMI [norm, different from the norm]		4.897 4.666	1	0.027 0.031	distributions are not statistically consistent
school class [1,2,3]		11.282 10.374	2	0.004 0.006	distributions are not statistically consistent at the limit of statistical significance

Explanations: Pearson's χ^2, ML (Maximum Likelihood) χ^2, * Yates' χ^2 (calculated for cross tabulations; **2 x 2**, when numbers in sub-classes are small, less than 10 (according to some authors – less than 5 – was also applied in the above analysis) – values of statistics χ^2; df – degrees of freedom; p – test probability.

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[1] In the analysis of the data received the value of BMI (i.e. *Body Mass Index*) was calculated according to the formula: BMI = body weight [kg] / height2 [m2] and the following interpretation of BMI was adopted: <18 und Lifestyle of junior high school pupils... erweight; 18–25 norm; 25.01 – 30 overweight; >30.01 obesity.

As it turned out that the samples being analysed differ from one another in terms of the structures of variables, in further analyses the correlation of variables (in two samples: urban, rural) was analysed separately.

The distribution of BMI in samples being analysed was different from the norm. The most numerous is the class of normal BMI (similar results were obtained in research by: Ponczek & Olszowy 2012). However, in both samples, urban and rural, a shift of BMI towards underweight is to be noticed.

Hypothesis 3: The eating preferences of teenagers are in accordance with the healthy lifestyle rules. There are no vegetarians among junior high school pupils.

Results and conclusions

Tables 5–9 present the results of a detailed analysis of teenagers' eating preferences in the context of the weekly and annual frequency of eating selected products: the urban and rural sample, and the type of products eaten during breaks at school.

Tab. 5. The weekly frequency of eating selected products, the urban sample

product	never		less often than once a week		once a week		twice-four times a week		every day		sex
	N	%	N	%	N	%	N	%	N	%	W/M
fruit	1	5.6	1	5.6	3	16.7	5	27.8	8	44.4	W
	1	9.1	1	9.1	1	9.1	3	27.3	5	45.5	M
vegetables	1	5.6	1	5.6	4	22.2	8	44.4	4	22.2	W
	2	18.2	0	0.0	2	18.2	3	27.3	4	36.4	M
sweets	2	11.1	3	16.7	2	11.1	8	44.4	3	16.7	W
	0	0.0	0	0.0	1	9.1	2	18.2	8	72.7	M
eggs and dairy products	0	0.0	1	5.6	3	16.7	6	33.3	8	44.4	W
	1	9.1	0	0.0	1	9.1	1	9.1	8	72.7	M
meat	1	5.6	1	5.6	0	0.0	8	44.4	8	44.4	W
	0	0.0	0	0.0	1	9.1	2	18.2	8	72.7	M
bread	1	5.6	7	38.9	2	11.1	4	22.2	4	22,2	W
	2	18.2	2	18.2	0	0.0	0	0.0	7	63.6	M

On the basis of the results presented above it can be said that in the urban sample fruit is eaten on an everyday basis by 44% of women (W) and 46% of men (M), while in the rural sample by 64% of W and 39% of M. On average it constitutes a half of the population, which seems to be a very low result, taking into consideration the low price of fruit in Poland. 45% of W and 36% of M in towns eat fruit 1–4 times a week, while in the rural sample it is 36% of W and 50% of M. In town, fruit is eaten less than once a week by about 6% of W and 9% of M, and in villages by 6% of M, while all women in villages eat fruit at least once a week. 6% of W and 9% of M in town and

4% of M in villages declare not to eat fruit at all. The results obtained are alarming as fruit should be the most basic source of vitamins for pupils, who are still growing.

Even lower results were obtained with reference to vegetable consumption. Only 22% of W and about 66% of M in town eat vegetables every day, while in villages – over 50% of women and 25% of men. These are not satisfying quantities, especially bearing in mind that in Poland there are many vegetables that are cheap and easy to prepare. The situation is a bit better when it comes to the "average" vegetable consumption: 67% of W and 46% of M in town and 43% of W and 65% of M in villages eat vegetables 1–4 times a week. 6% of W in town and 3% of W and 8% of M in villages eat vegetables less frequently than once a week. None of the men from the urban sample declared such an infrequent consumption of vegetables. 6% of W and 18% of M in town and 2% of M in villages declare not to eat vegetables at all. All women from the rural sample eat vegetables, at least occasionally.

Tab. 6. The weekly frequency of eating selected products, the rural sample

product	never		less often than once a week		once a week		twice-four times a week		every day		sex
	N	%	N	%	N	%	N	%	N	%	W/M
fruit	0	0.0	0	0.0	2	6.1	10	30.3	21	63.6	W
	2	4.1	3	6.1	6	12.2	19	38.8	19	38.8	M
vegetables	0	0.0	1	3.0	2	6.1	12	36.4	18	54.5	W
	1	2.0	4	8.2	9	18.4	23	46.9	12	24.5	M
sweets	1	3.0	2	6.1	6	18.2	17	51.5	7	21.2	W
	0	0.0	5	10.2	9	18.4	18	36.7	17	34.7	M
eggs and dairy products	0	0.0	0	0.0	4	12.1	12	36.4	17	51.5	W
	0	0.0	5	10.2	5	10.2	13	26.5	26	53.1	M
meat	0	0.0	0	0.0	4	12.1	17	51.5	12	36.4	W
	1	2.0	1	2.0	6	12.2	13	26.5	28	57.1	M
bread	0	0.0	2	6.1	5	15.2	12	36.4	14	42.4	W
	3	6.1	9	18.4	8	16.3	5	10.2	24	49.0	M

In comparison to fruit and vegetables, which pupils do not eat very often, the majority of pupils (especially boys) enjoy eating sweets. 17% of W and as many as 75% of M from the urban sample, as well as 1/5 of W and 2/3 of M from the rural sample eat sweets every day. In the urban sample, 50% of W and 27% of M, and in the rural sample, 70% of W and 50% of M eat sweets at least once a week. It can be said that a considerable population of pupils eats sweets very often. 17% of W from the urban sample eat sweets less frequently than once a week, while men eat sweets at least once a week. The results for the rural sample are: 6% of W and 10% of M respectively. Only 11% of W in towns and 3% of W in villages do not eat sweets at all.

Proteins are the elementary building material for humans, which is why the intake of proteins and meat in the period of a child's rapid growth, e.g. the period of junior high school, should constitute an important element of their diet.

In the research conducted the consumption of eggs and dairy products is as follows: 44% of W and 75% of M in towns, and half of W and M in villages eat them every day. It can be said, then, that about a half of the population of junior high school pupils provides their organisms with a necessary daily intake of proteins and calcium. 50% of W and 18% of M from the urban sample as well as 50% of W and 37% of M from the rural sample eat proteins at least once a week. 6% of W from towns and 10% of M from villages eat dairy products less frequently than once a week. All women and men from the rural sample eat dairy products, while 1/10 of M from towns does not eat dairy products at all. What is worrying is the fact that about 10% of the population declare not to eat proteins at all or to eat them very infrequently (in this age group the percentage of children allergic to proteins should be lower than 3–4%).

The results concerning meat consumption are quite similar to the ones of dairy products consumption. Meat is eaten every day by 44% of W and 75% of M in towns, and by 33% of W and 57% of M in villages. It can be said, then, that men are more "carnivorous." 44% of W and 27% of M in towns and 2/3 of W and 39% of M in villages eat meat at least once a week. All men in towns and all women in villages eat meat at least once a week. 6% of W in towns and 2% of M in villages eat meat less frequently than once a week or declare not to eat meat at all. It can be concluded that the percentage of vegetarians among pupils taking part in the research is very low.

When it comes to the consumption of wholemeal bread, it can be said that 22% of W and 66% of M in towns and almost 50% of W and M in villages eat wholemeal bread every day. 33% of W in towns and 50% of W and 25% of M in villages eat wholemeal bread at least once a week. 6% of W and 18% of M in town and 6% of M in villages declare not to eat wholemeal bread at all. All women in villages eat wholemeal bread. The remaining respondents eat it less frequently than once a week. It can be said that the majority of pupils choose healthy bread for their meals.

The subsequent tables show the consumption of "junk food", that is fast food and sweet carbonated beverages among pupils.

Tab. 7. The annual frequency of eating selected products, the urban sample

product	every day		several times a week		once a week		every second week		every six months		once a year		sex
	N	%	N	%	N	%	N	%	N	%	N	%	W/M
fast food	0	0.0	1	5.6	0	0.0	3	16.7	12	66.7	2	11.1	W
	2	18.2	0	0.0	0	0.0	6	54.5	2	18.2	1	9.1	M
sweet carbonated beverages	2	11.1	0	0.0	3	16.7	8	44.4	3	16.7	2	11.1	W
	9	81.8	0	0.0	2	18.2	0	0.0	0	0.0	0	0.0	M

Tab. 8. The annual frequency of eating selected products, the rural sample

product	every day		several times a week		once a week		every second week		every six months		once a year		sex
	N	%	N	%	N	%	N	%	N	%	N	%	W/M
fast food	0	0.0	1	3.0	3	9.1	14	42.4	12	36.4	3	9.1	W
	0	0.0	1	2.0	3	6.1	14	28.6	25	51.0	6	12.2	M
sweet carbonated beverages	8	24.2	6	18.2	4	12.1	13	39.4	2	6.1	0	0.0	W
	15	30.6	8	16.3	12	24.5	10	20.4	3	6.1	1	2.0	M

It turns out that during a year, 18% of M from towns eat fast food every day; the remaining respondents, regardless of their place of living and sex, do not eat fast food every day. 20% of W and 50% of M from towns as well as 50% of W and 37% of M from villages eat fast food every second week or more often. 80% of W and 27% of M from towns and 45% of W and 63% of M from villages eat fast food every 6 months or less frequently. It can be concluded that boys living in towns are most often "enchanted" by the magic of fast food and eat it more frequently than the remaining part of the population. 1/10 of W and 4/5 of M from towns and 1/4 of W and 1/3 of M from villages drink sweet carbonated beverages every day. 61% of W and 20% of M from towns, as well as 70% of W and 61% of M from villages drink sweet carbonated beverages every second week or more often. 28% of W from town and 6% of W and 8% of M from villages drink such beverages every 6 months or less frequently. All men from towns taking part in the survey declare to drink sweet carbonated beverages at least once a week. In this case we may also point to the unhealthy tendency that occurs mostly among boys from towns.

The next table shows what types of meals pupils eat during breaks at school.

Tab. 9. Meals eaten by pupils during breaks at school

place	town		village		sex
product	N	%	N	%	W/M
nothing	2	11.1	1	3.0	W
	1	9.1	1	2.0	M
sandwich, roll, pretzel	6	33.3	20	60.6	W
	6	54.5	28	57.2	M
doughnut, sweets	2	11.1	5	15.2	W
	1	9.1	9	18.4	M
sandwich, doughnut, sweets	2	11.1	3	9.1	W
	1	9.1	6	12.2	M
sandwiches, fruit	0	0.0	3	9.1	W
	0	0.0	1	2.0	M
other	6	33.3	1	3.0	W
	2	18.2	4	8.2	M

Analysing these results, it can be said that when pupils are at school they most often eat bread: 33% of W and 50% of M from towns and 60% of W and 57% of M from villages have a sandwich, roll, or pretzel during a break. 10% of W and M from towns as well as 15% of W and 18% of M from villages eat sweets at school. 10% of respondents eat sandwiches and fruit regardless of their sex and place of living. Pupils from towns do not eat fruit at school, and only 10% of W and 2% of M from villages eat it at school. About 10% of W and M from towns do not eat breakfast at school, while these results for villages are 3% of W and 2% of M. The remaining respondents eat other meals, e.g. crisps. Taking into consideration the time spent at school by junior high school pupils, their second breakfasts seem to be insufficient; they contain too many sweets and too little fruit; none of the pupils mentioned vegetables as their second breakfast.

What was also checked (with the use of the χ^2 test), was whether the eating preferences in the samples under investigation depend on sex and place of living (Tab. 10).

Tab. 10. The results of testing the hypothesis that features are independent

| Variable sex [W/M] vs Variables:	Pearson's χ^2 ML χ^2 Yates'χ^2 *	df	p	Statistical conclusion	φ correlation coefficient; *V Cramer's	Sample
How often do you eat fast food? [every second week or more often; every few months]	7.180 7.376	1	0.007 0.007	features are dependent	0.498	city
How often do you drink sweet carbonated beverages? [often, occasionally]	14.399 18.621	1	0.0002 0.0000	features are dependent	0.705	city
How often do you eat sweets? [every day; not every day]	9.114 9.385 *6.888	1	0.003 0.002 *0.009	features are dependent	0.561	city
How often do you eat fruit? [every day; not every day]	4.878 4.928	1	0.027 0.026	features are dependent	0.244	village
How often do you eat vegetables? [every day; not every day]	7.678 7.673	1	0.006 0.006	features are dependent	0.306	village

Explanations: Pearson's χ^2, ML (Maximum Likelihood) χ^2 – value of test statistics; *Yates' χ^2 (calculated for cross tabulations 2 x 2, when numbers in sub-classes are small, less than 10 (according to some authors – less than 5 – was also applied in the above analysis) df – degrees of freedom; p – test probability. Pearson's correlation coefficient φ is used for a four-fold table, *V* Cramer's coefficient is used for cross tabulations, in this case *2 x 3*.

COMMENT: By applying the *V* coefficient we acquire full comparability between cross tabulations sized *w* x *k* and the measure φ for four-fold tables (Wołek 2006).

The analysis of the data received made it possible to state that generally speaking, eating preferences do not depend on the place of residence.

However, some features are interdependent and show quite strong or weak strength of relation. Among teenagers living in towns, a strong correlation between eating fast food and sex was noticed. Boys eat fast food every second week or more often, while girls only once every few months. There is also a very strong correlation between drinking sweet carbonated beverages and sex. Boys drink those beverages often, while girls occasionally. Quite a strong correlation between eating sweets and sex was also noticed. Boys eat sweets every day. It can be said that junior high school boys living in towns have definitely more negative eating habits than their female schoolmates.

Among teenagers living in villages only a weak correlation between eating fruit and vegetables and sex was observed – girls eat fruit and vegetables every day, while boys eat them definitely less frequently. Generally speaking, it can be stated that in some selected aspects junior high school girls prefer more healthy eating habits than their male schoolmates. However, it is not a constant tendency concerning all aspects of eating – one may speak here of selected, individual preferences.
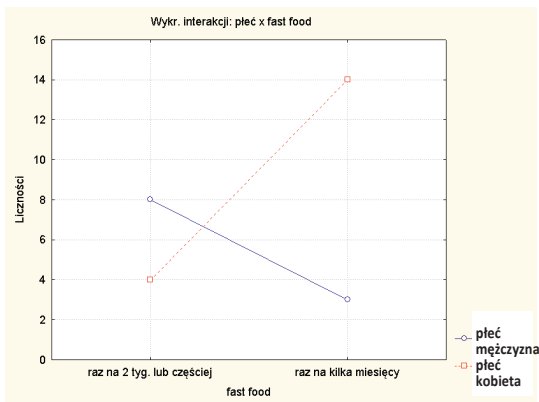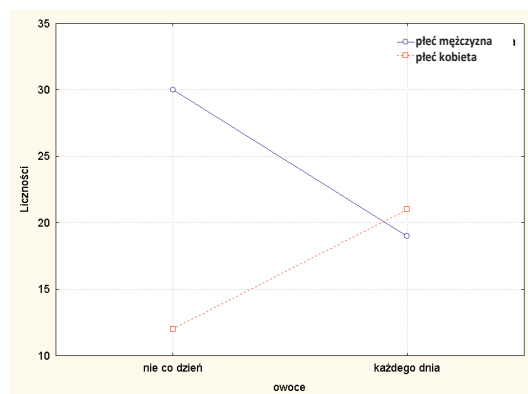

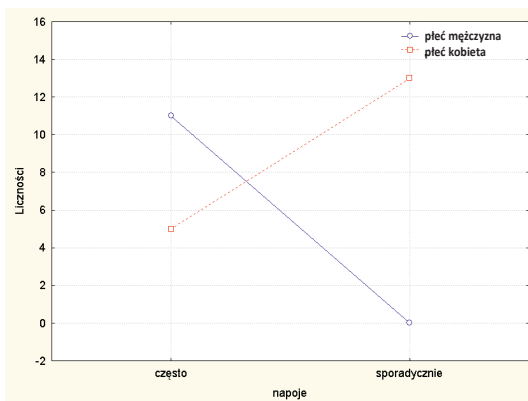Graph of interaction: eating fast food vs sex (urban sample)
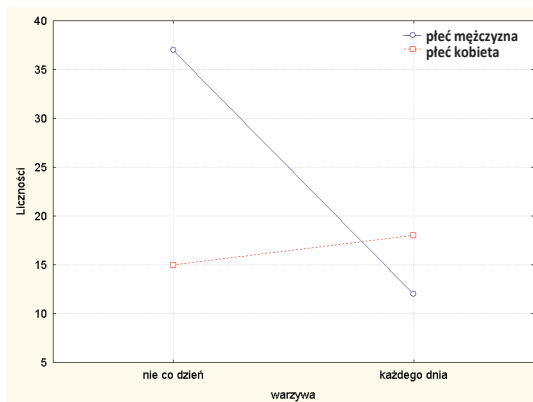
Graph of interaction: eating vegetables vs sex (rural sample)
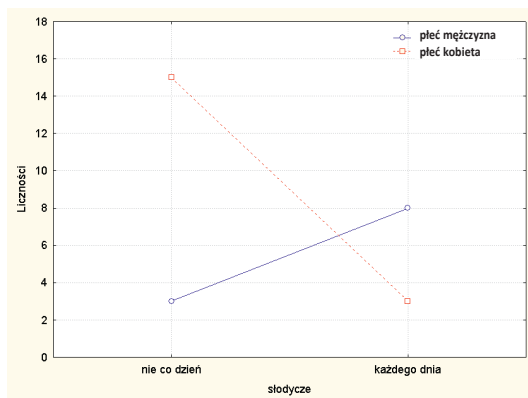
Graph of interaction: eating sweets vs sex (urban sample)

Graph of interaction: eating fruit vs sex (rural sample)

Graph of interaction: drinking sweet carbonated beverages vs sex (urban sample)

Hypothesis 4: The BMI depends on the eating preferences of teenagers and sex.

The results of the conducted research on BMI did not prove any correlation with eating habits of teenagers in both samples (urban, rural). It is possible that this correlation is more complex and other variables, such as lifestyle, also influence BMI. This is why it seems that this correlation requires detailed, additional analyses. The research also did not prove any correlation between BMI and sex of the pupils under investigation.

Conclusions

Comparing the research results to information to be found in the "Curriculum", it can be stated that in everyday life pupils do not take care of the rules of healthy diet. Generally speaking, their meals have insufficient amount of fruit and vegetables and pupils eat too much fast food and drink sweet carbonated beverages.

Pupils from towns taking part in the research most enjoy eating (every day): women– fruit, dairy products, and meat, 45% each; men – sweets, dairy products, and meat, 73% each. In rural areas pupils most enjoy eating (every day): women – fruit 64%, vegetables 55%, and dairy products 52%; man – dairy products 53% and meat 57%. It can be stated that the diet of junior high school pupils both in towns and villages primarily consists of dairy products and meat, with the exception that girls additionally complement this diet with fruit. The results obtained are in line with other research of this type (see Ponczek, Olszowy 2012):

Tab. 11. Percentage of pupils eating given foodstuffs every day

Respondents	eggs and dairy products	meat	fruit	sweets	bread	vegetables
pupils from towns in the Lesser Poland Voivodship:	55.2%	55.2%	44.8%	37.9 %	37.9 %	27.6%
pupils from villages in the Lesser Poland Voivodship:	52.4%	48.7%	48.9%	29.2%	46.4%	36.6%
pupils from the Kuyavian-Pomeranian Voivodship	47.1%	35.6%	20.2%	34.6%	32.7%	28.8%

It can be concluded that despite the present-day fashion for a healthy lifestyle and information on this subject that is to be found in the Curriculum, nutritional mistakes made by junior high school pupils are noticed, for example teenagers too often drink sweet carbonated beverages or eat products with high energy value and relatively low nutrition value. It may be a matter of concern in the aspect of health and physical fitness of pupils taking part in the research. Despite the fact that during the research the BMI among junior high school pupils turned out to be standard, in the long run such a diet creates favourable conditions for obesity. This is why eating fruit and especially vegetables as a valuable source of vitamins should be popularised.

Summary

During the research it was found out that:

– Pupils go to school in the place where they live.
– The urban sample differs from the rural sample in terms of the structure of: sex, BMI, age, school class.
– Eating preferences of teenagers are not in line with the healthy lifestyle and only in few cases was it established that there is a correlation between teenagers' eating habits and sex and place of residence. There are a few vegetarians among junior high school pupils.
– The value of BMI does not depend on sex or eating preferences of teenagers.

Literature

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Lifestyle of junior high school pupils in the Lesser Poland region of the 21st century from the point of view of eating habits

Abstract

Lifestyle determines health to a large extent. It is necessary to pay special attention to health education of young people to help them in the formation of proper attitudes towards health. Healthy lifestyle developed among young people will affect their health as adults and their children's health in the future.

Key words: lifestyle, health education, attitudes

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