Rocz Panstw Zakl Hig 2015;66(1):69-75

THE EFFECT OF GIRLS ATTITUDES TOWARDS THE HEALTH BENEFITS OF FOOD ON SELECTED DIETARY CHARACTERISTICS. THE GEBAHEALTH PROJECT

Katarzyna Zaborowicz[1], Jolanta Czarnocińska[1], Lidia Wądołowska[2], Joanna Kowalkowska[2], Marzena Jeżewska-Zychowicz[3], Ewa Babicz-Zielińska[4], Kamila Sobaś[2], Witold Kozirok[4]*

[1]Department of Human Nutrition and Hygiene, Faculty of Food Science and Nutrition, University of Life Sciences in Poznan, Poland
[2]Department of Human Nutrition, Faculty of Food Science, University of Warmia and Mazury in Olsztyn, Poland
[3]Department of Organization and Consumption, Faculty of Human Nutrition and Consumer Sciences, Warsaw University of Life Sciences - SGGW, Poland
[4]Department of Trade and Services, Eating Behaviour Research Group, Faculty of Entrepreneurship and Quality Science, Maritime University in Gdynia, Poland

ABSTRACT

Background. Dietary habits are formed at an early age and to a large extent they affect such nutritional behaviour in adulthood. Mothers in particular, influence family nutrition. In this respect, their knowledge, attitudes and behaviour about nutrition are responsible for the schooling of future generations. Many aspects of the link between food and health with nutritional behaviour in girls remain, however, unknown.
Objectives. To determine the effect of girls attitudes towards the health benefits of food on selected dietary characteristics.
Material and Methods. Study included 186 girls aged 13-21 years. Using a food frequency method the three dietary characteristics were obtained; food intake variety, fibre intake and fat intake, all of them expressed by a graded scale. Three validated questionnaires were used; FIVeQ, BSQFVF and BSQF. The girls attitudes towards the health benefits of food were rated from one of the survey's six parts, comprising of 8 statements from the Health and Taste Attitude Scale (HTAS) accordingly graded. Statistical analyses used logistic regression.
Results. The mean index of food intake variety was 28.7 foods/week (ranging 0–60), whilst the mean dietary intakes of fibre and fat were 16.7 points (0-36 range) and 18.2 points (0-52 range), respectively. Girls from the upper tertile with favourable attitudes on food health benefits had an odds ratio (OR) for adequate fat intake (<22 points) of 3.1 (95% CI: 1.28, 7.52; $p < 0.05$), as compared to those from the middle-neutral attitudes tertile, with an OR = 1.00. The ORs for the relatively high food intake variety and acceptable fibre intake were 1.05 in girls from the positive-upper tertiles, which were not significant.
Conclusions. The positive attitudes of girls towards the health benefits of food are conducive for making more favourable food choices and lowered dietary fat intake, however this did not significantly affect fibre intake nor food intake variety.

Key words*: girls, nutrition, attitudes, health*

STRESZCZENIE

Wprowadzenie. Nawyki żywieniowe są kształtowane w młodym wieku i w dużym stopniu decydują o zachowaniach żywieniowych w życiu dorosłym. Kobiety mają szczególny wpływ na sposób żywienia rodziny. Ich wiedza, postawy i zachowania względem żywności kształtują zachowania żywieniowe kolejnych pokoleń. Nie poznano wielu aspektów związku między postawami względem żywności i zdrowia a zachowaniami żywieniowymi dziewcząt.
Cel. Celem badań była analiza wpływu postaw dziewcząt względem walorów zdrowotnych żywności na wybrane cechy odżywiania.
Materiał i metody. Badaniami objęto 186 dziewcząt w wieku 13-21 lat. Metodą częstotliwości spożycia oceniono trzy cechy odżywiania: urozmaicenie spożycia żywności oraz spożycie błonnika i tłuszczów, które wyrażono w skalach punktowych. Wykorzystano trzy walidowane kwestionariusze: FIVeQ, BSQFVF i BSQF. Postawy dziewcząt względem walorów zdrowotnych żywności oceniono przy użyciu jednej z sześciu części (8 stwierdzeń) Skali Postaw Względem Zdrowia i Smaku (HTAS), przedstawiającej postawy w skali punktowej. W analizie statystycznej użyto regresji logistycznej.

***Corresponding author:** Katarzyna Zaborowicz, Department of Human Nutrition and Hygiene, Faculty of Food Science and Nutrition, Poznan University of Life Sciences, Wojska Polskiego 31, 60-624 Poznań, Poland
phone: +48 61 848 73 33, fax: +48 61 848 7332, e-mail: kasiazet@up.poznan.pl

Wyniki. Średni wskaźnik urozmaicenia spożycia żywności wynosił 28.7 produktów/tydzień (zakres: 0-60), średnie spożycie błonnika wynosiło 16.7 punktów (zakres: 0-36), a średnie spożycie tłuszczów 18.2 punktów (zakres: 0-52). Dziewczęta z górnego-pozytywnego tercyla postaw względem walorów zdrowotnych żywności miały iloraz szans odpowiedniego spożycia tłuszczów (<22 punktów) równy 3.10 (95%CI: 1.28; 7.52; p<0.05) w porównaniu z dziewczętami ze środkowego-neutralnego tercyla postaw (OR=1.00). Ilorazy szans dla względnie dużego urozmaicenia spożycia żywności i akceptowanego spożycia błonnika u dziewcząt z górnego-pozytywnego tercyla postaw wynosiły 1.05 i były nieistotne.
Wnioski. Pozytywne postawy dziewcząt względem walorów zdrowotnych żywności sprzyjały korzystniejszym wyborom żywności i mniejszemu spożyciu tłuszczów, lecz nie miały istotnego wpływu na spożycie błonnika i urozmaicenie spożycia żywności.

Słowa kluczowe: *dziewczęta, odżywianie dziewcząt, postawy, zdrowie*

INTRODUCTION

Girls and young women are recognised for belonging to a population group that are particularly vulnerable for having inappropriate eating habits and suffering from adverse health effects [28]. To a young body, nutrition is one of the most important environmental factors determining adequate development in terms of the physical, emotional and intellectual. Identifying and the sufficiently early correction of such nutritional errors, form the primary basis of any preventative action. Inappropriate nutrition at a young age significantly increases the risk of metabolic disease in adult life. The beneficial effects of such preventative measures are important to the health of the individual and society because women's health directly affects their reproductive health and that of subsequent generations [9, 11, 26, 28]. Food preferences, its consumption and nutritional behaviour to a large extent depend on the habits acquired in childhood and adolescence [12].

Women influence on family eating behaviour in a particular way. Their nutritional knowledge, attitudes and behaviour shape the nutritional behaviour of their succeeding offspring. Nutritional health concerns, attitudes and being pro-healthy depend on, amongst others, their knowledge, experience and awareness about health and the environment as well as the personal traits of the individual [4, 7, 9, 14, 24, 31].

By attitudes it is understood to mean a relatively stable structure of cognitive, emotional and behavioural processes in women towards their wards [8]. Nutritional indicators of attitude are knowing the principles of an adequate diet, the significance of nutrition and healthy eating in prevention and disease development, sentiments regarding eating, foods and tendencies for adopting defined nutritional behaviours. It has been shown that having nutritional knowledge significantly increases the consumption of fruit and vegetables but lowers intakes of fat [30]. European studies have found that women, the elderly and those better educated more frequently take care to eat healthily, whereas men are chiefly guided by taste and habits [25]. Women that possessed more knowledge on health and eating had more positive indicators towards nutrition [8].

The many aspects of food and health associated with nutritional behaviour in girls require more in-depth study. The study aims were to assess girl's attitudes about the health benefits of foods on selected dietary characteristics.

MATERIALS AND METHODS

The study was conducted as part of the GEBaHealth No. N N404 068540 pilot project.

Subject group

Consisted of 186 girls aged 13-21 years (Table 1) selected by convenience sampling. The sample recru-

Table 1. Sample profile

Characteristics	Category	n	Sample percentage (%)
Total		186	100
Age group	13-15 years	62	33
	16-18 years	66	36
	19-21 years	58	31
Region	Olsztyn	96	52
	Poznań	90	48
Mother's education	Primery/vocational	38	20
	Secondary	84	45
	Higher	64	35
Father's education	Primary/vocational	54	29
	Secondary	82	44
	Higher	50	27
Place of residence	Countryside	68	37
	Town ≤100,000 inhabitants	37	20
	Town >100,000 inhabitants	81	43
Self-reported economic status	Less than average	8	4
	Average	139	75
	Above average	39	21
BMI (kg/m^2)	Mean ± SD	20.8±2.7	

n – sample number ; SD – Standard Deviation

ited during 2011-12 from secondary and high schools in the Poznan and Olsztyn regions of Poland. Initially 190 subjects were gathered but 4 were removed due to incomplete data [19].

Assessing chosen dietary characteristics

Food consumption rates were based on assessing 3 aspects of nutrition as follows;

- Food intake variety as an important and overall measure of appropriate nutrition.
- Dietary fibre intake as a measure of eating pro-healthy foods.
- Dietary fat intake as a measure of eating foods not conducive to health especially when consumed in excess.

Three validated questionnaires were used for the assessment [6].

- Food Intake Variety Questionnaire, (FIVeQ).
- Block Screening Questionnaire for Fruit/Vegetable/Fibre Intake, (BSQFVF).
- Block Screening Questionnaire for Fat Intake, (BSQF), modified in-house.

Both block questionnaires had been shortened for the NHANES II study [17].

The FIVeQ questionnaire was validated by the test--retest procedure in a study on subjects over 65 years [18] and calibrated on young women subjects using a 7-day food record as a reference method (unpublished results). Consumption data on 63 food groups and their amounts was thus obtained using the FIVeQ over the last 7 days [18]. There were two reply categories to which scores were allotted ie. 'no' – 0 pts and 'yes' – 1 pt. The diversity of consumed foods was expressed by a food intake variety index (FIVeI) calculated as the number of food items eaten weekly (60 foods/week maximum), excluding the three alcoholic beverage groups; beers, wines and spirits. According to the FIVeI, consumption results were graded into the following categories: low (<20 foods/week), sufficient (20-29 foods/week), satisfactory (30-39 foods/week) and very good (≥40 foods/week).

Information on consumption rates were obtained using the BSQFVF questionnaire on 9 food groups which were the main sources of dietary fibre [27]. The rates were graded into 5 categories as follows; 'less than once weekly' – 0 pts, 'once weekly' – 1 pt, '2-3 times weekly' – 2 pts, '4-6 times weekly' – 3 pts and 'daily' – 4 pts. On the basis of summed totals, each person was graded according to their dietary fibre intake as follows; (1) very low (<20 pts), (2) insufficient (20-29 pts) and (3) sufficient (≥ 30 pts).

With the BSQF questionnaire, including the in-house use modifications, data was collected on normally found rates of consuming 13 food groups which are either fats in themselves or constituted important sources of dietary fats [27]. Intake rates were graded into 5 categories as follows; 'less than once monthly' – 0 pts, '2-3 times monthly' – 1 pt, '1-2 times weekly' – 2 pts, '3-4 times weekly' – 3 pts and '5 or more times weekly' – 4 pts. Dietary fat intakes were graded into the following numerical categories as follows; (1) very high (>27 pts), (2) high (25-27 pts), (3) moderately high (22-24 pts), (4) appropriate (18-21) and (5) most favourable (<18 pts).

Girls attitudes towards the health benefits of foods

These were assessed by one of the six Health Taste Attitude Scales (HTAS) regarding the health benefits of foods [22]. The scale is composed of 8 statements, each with 7 replies to choose from as follows; 'strongly disagree', 'disagree', 'rather disagree', 'neither agree nor disagree', 'rather agree', 'agree' and 'strongly agree'. Each answer was rated numerically in ascending magnitude, ie. from one to seven points, respectively. Four of the statements however were recoded so as to reflect positive increases in a given trait such that 'strongly disagree' was assigned 7 pts whilst 'strongly agree' had one pt. At the end, the points were added up ie. 8-56 pts and three categories of girls were identified based on their attitudes towards the health benefits of foods according to a tertile distribution as follows; (1) the bottom-negative tertile (≤31 points, 33% of sample); (2) the middle-neutral tertile (32-37 points, 34% of sample); (3) the upper-positive tertile (≥38 points, 33% of sample).

Statistical analysis

Summary statistics were calculated for dietary intakes of fibre and fat along with the food intake variety from the proportions of subjects according to the distribution of variables. These results were in part used for defining categories followed by logistic regression analysis.

The distributions of dietary fat and fibre intakes as well as food intake variety according to negative, neutral and positive attitudes towards the health benefits of food were compared by the chi^2 test. The *Kruskal-Wallis* test was used to compare mean values for the dietary characteristics.

The effect of attitudes towards the health benefits of food was assessed by logistic regression, which for each dietary characteristics subjects were divided into two categories according to the variables distribution and the summary statistical measures as well as the criteria established by those who developed the questionnaires. Subjects were differentiated into; (1) food intake variety levels; relatively high >34 foods/week or relatively low ≤34 foods/week, (2) dietary fibre intake levels; acceptable (≥20 pts) or non acceptable (<20 pts), (3) dietary fat intake levels; adequate (<22 pts) or non adequate (≥22 pts.)

According to attitudes towards the health benefits of consumed foods, girls from the upper-positive tertile or the lower-negative tertile had ORs showing relatively high food intake variety, acceptable fibre intake and adequate fat intake. For the middle-neutral tertiles a reference point of an OR=1.00 was adopted. From this, in terms of attitudes, the chances of incidence of favourable dietary characteristics (modeled incidence) were calculated in relation to the group with unfavourable dietary characteristics (reference level). The *Wald* statistic was used to evaluate the significance of the effects of these attitudes. The Statistica 9.0 PL StatSoft software was used for performing the statistics and significance levels were taken as being $p<0.05$.

RESULTS

The mean rate for the food intake variety was 28.7 foods/week (range 0-60), mean dietary fibre intake was 16.7 pts (0-36 range) and mean dietary fat intake was 18.2 pts (range 0-52); Table 2. The mean score for girls attitudes towards the health benefits of food was 34.1 pts, which was very close to the median of 34 pts. Significantly lower points for fibre intakes were seen in girls belonging to the lower-negative tertile for food health benefit attitudes (mean of 15.3 pts), compared to those from the middle-neutral tertile (17.2 pts) or from the upper-positive tertile (17.6 pts); Table 3. Girls from the upper-positive tertile consumed significantly less fat (mean 15.1 pts) than those from lower-negative tertile (19.5 pts) or the middle-neutral tertile (19.8 pts).

Table 2. Statistical measures of girls dietary characteristics and attitudes towards the health benefits of food

Characteristics	x	SD	Med	Min	Max	P33	P66
Food intake variety (foods/ week)	28.7	6.3	29	15	44	25	31
Fibre intake (pts)	16.7	5.2	16	4	35	14	18
Fat intake (pts)	18.2	6.1	18	3	35	16	21
Attitudes towards the health benefits of food (pts)	34.1	7.3	34	16	54	31	37

x – arithmetic mean, SD – Standard deviation, Me – Median, Min – minimum, Max – Maximum, P33 – percentile 33, P66 – percentile 66

Table 3. Dietary characteristics and attitude of girls towards the health benefits of food (mean ± SD)

Characteristics	Total	Tertiles for attitudes towards the health benefits of food		
		Lower-negative[1]	Middle-neutral[2]	Upper-positive
Sample number	186	62	63	61
Food intake variety (foods/ week)	28.7±6.3	27.7±6.6	29.2±6.2	29.3±6.6
Fibre intake (pts)	16.7±5.2	15.3±4.5^{A,B}	17.2±5.6^{A}	17.6±5.2^{B}
Fat intake (pts)	18.2±6.1	19.5±4.9^{A}	19.8±6.3^{B}	15.1±5.8^{A,B}

[1]≤31 pts, [2]32-37 pts, [3]≥38 pts, $^{A\text{-}A,\ B\text{-}B}$ Significant differences at $p<0.05$

Table 4. Dietary characteristics distribution according to girls attitudes towards the health benefits of food (%)

Characteristics	Total	Tertiles for attitudes towards the health benefits of food		
		Lower-negative[4]	Middle-neutral[5]	Upper-positive[6]
Sample number	186	62	63	61
Food intake variety[1]				
Low	6	8	5	7
Sufficient	48	56	44	43
Satisfactory	39	31	44	43
Very good	6	5	6	8
Fibre intake[2]				
Very low	72	81	68	67
Insufficient	26	19	29	31
Sufficient	2	0	3	2
Fat intake[3]				
Very high	8	6	14	2
High	5	6	6	3
Moderately high	16	24	14	10
Appropriate	25	26	33	16
Most favourable	46	37^{A}	32^{B}	69^{A,B}

[1]Low: <20 foods/week, Sufficient: 20-29 foods/week, Satisfactory: 30-39 foods/week, Very good: ≥40 foods/week, [2]Very low: <20 pts, Insufficient: 20-29 pts, Sufficient: ≥30 pts, [3]Very high: >27 pts, High: 25-27 pts, Moderately high: 22-24 pts, Appropriate: 18-21 pts, Most favourable: <18 pts, [4]≤31 pts, [5]32-37 pts, [6]≥38 pts, $^{A\text{-}A,\ B\text{-}B}$ Significant differences at $p<0.001$

Table 5. Odds ratios (OR) found for favourable dietary characteristics according to girls attitudes towards the health benefits of food.

Characteristics	Total	Tertiles for attitudes towards the health benefits of food		
		Lower-negative[4]	Middle-neutral[5]	Upper-positive[6]
Sample number	186	62	63	61
Relatively high food intake variety[1]				
Number of cases	58	16	21	21
Percentage of cases (%)	31	26	33	34
OR (95% CI)		0.70 (0.32; 1.52)	1.00	1.05 (0.50; 2.22)
Acceptable fibre intake[2]				
Number of cases	52	12	20	20
Percentage of cases (%)	28	19	32	33
OR (95% CI)		0.52 (0.22; 1.19)	1.00	1.05 (0.49; 2.25)
Adequate fat intake				
Number of cases	132	39	41	52
Percentage of cases (%)	71	63^{A}	65^{B}	$85^{A.B}$
OR (95% CI)		0.91 (0.44; 1.90)	1.00	3.10* (1.28; 7.52)

[1]>34 foods/week, [2]≥20 pts, [3]<22 pts, Numbers in brackets are 95% confidence intervals, [4]≤31 pts, [5]32-37 pts, [6]≥38 pts, Significant differences at: $^{A\text{-}A}p<0.01$, $^{B\text{-}B}p<0.05$, *$p<0.05$

The logistic regression and distribution analyses confirmed the differences in the fat intake results for girls' attitudes. The most favourable fat intakes were found in the girls with attitudes from the upper-positive tertile (69%), compared to those from the lower-negative tertile (37%) or the middle-neutral tertile (32%); Table 4. Furthermore, girls from the upper-positive tertile gave an OR for adequate fat intake (<22 pts) of 3.1 (95%CI: 1.28; 7.52; $p<0.05$), compared to the girls from the middle-neutral tertile (OR=1.0); Table 5. Insignificant ORs were found in girls from the upper--positive tertiles attitudes and the lower-negative tertiles for both the relatively high food intake variety and the acceptable fibre intake.

DISCUSSION

The study has demonstrated that girls with a positive attitude towards the health benefits of food has a favourable impact on making food choices for ensuring a significant source of dietary fat. There was no such association seen with food intake variety nor for dietary fibre intake. Girls with such positive attitudes had a 3 times higher chance of eating foods with lowered (and appropriate) fat content compared to those with neutral attitudes. Similar relationships between attitudes and fat intake have been seen in many other studies [20, 23, 32]. For instance studies from 2008 demonstrated that, irrespective of age, girls showed an interest in health that included appropriate nutrition [4]. These subjects reported that the correct principles of nutrition are achieved by eating foods enriched in vitamins, minerals and bifidobacteria along with having regular mealtimes, frequently eating fruit, introducing low fat foods into their diets and controlling the caloric value of their diets. A surprising outcome in the presented study was an absence of any link between having a positive attitude towards the health benefits of food with dietary fibre intake and the food intake variety. Like results were obtained by *Aikman* et al. [1], showing that such attitudes did not correlate with rates of food intake in both men and women. This lack of a relationship may be due concealment of true attitudes arising from the unwillingness of subjects to share their real beliefs and opinions [16]. It is also possible that people do not fully realise themselves what their attitudes are. However, if an given attitude is taken as certain, then making the wrong dietary choices may arise from a limited availability to foods despite having the aforementioned positive attitudes. Despite possessing appropriate knowledge and attitudes, adequate access to foods may be limited due to economic concerns or logistic problems, eg. a lack of time. It is also assumed that having a positive attitude regarding food is generally a good indicator for appropriate nutrition, when the attitude effect is more evident if account is taken of an average person's behaviour over long time periods instead of assessing a single behaviour.

Studies performed in the Polish Pomerania region showed that subjects' views on diets and their health effects were in accordance with the principles of healthy eating, although their attitudes were neutral [2]. Other studies reported similar findings when checking nutritional knowledge of high school students and its impact on lifestyle and risk of cardiovascular disease. Even though subjects had wide knowledge in such areas, there was no correlation observed with their pro--healthy nutritional behaviour [3]. Studies on students

also found that although they knew about the principles of healthy eating, their nutritional behaviour was inappropriate [20, 21]. Other studies however indicate that health concerns and awareness about the impact of diet on health increases with age and is most clearly obvious in the elderly and sick [13, 29]. Many studies related to attitudes and eating habits of the young from various regions of Poland stress the necessity of conducting nutritional education and promoting a healthy lifestyle [5, 10, 17]. Work by *Kearney* et al. [15] showed that levels of knowledge may affect eating behaviour in adulthood, however this knowledge does not necessarily translate into appropriate eating habits, as is often the case that people are unable to put this into practice. A further confounding factor, is the contradictory information relayed by the mass media resulting in lowered levels of trust for the general public audience. Nowadays, it is the Internet, TV and the daily press that are the main sources of knowledge on nutrition for the younger generation [24, 28]. It seems however, that just education alone will not bring about the required outcomes if it is not associated with promoting a healthy lifestyle subject to multi-stage evaluation. Given the above, it can be concluded that certain types of nutritional behaviour in girls and young women are a significant problem and may contribute towards a worse health state of our society.

Study strengths and weaknesses

The weakness of the study are the convenience sampling method and relatively small sample size. The sample was also not randomly taken, however the socio-economic and demographics status of the subjects matched that of the country as a whole. Advantages include the use of logistic regression. Calculating ORs are an indicator of how often a defined event occurs (beneficial dietary charcteristics) which allows sample size-dependent corrections to be made. This increases the power of the results thereby making them fit for making generalisations.

CONCLUSIONS

The positive attitudes of girls towards the health benefits of food are conducive for making more favourable food choices and lowered dietary fat intake, however this did not significantly affect fibre intake nor food intake variety.

Acknowledgements

This study was financed by the Ministry of Science and Higher Education as part of the GEBaHealth project No. N404 068540 running during 2011-13.

Conflict of interest

The authors declare no conflict of interest.

REFERENCES

1. *Aikman S.N., Min K.E., Graham D.*: Food attitudes, heating behavior, and the information underlying attitudes. Appetite 2006;47:111-114.
2. *Babicz-Zielińska E., Komorowska-Szczepańska W., Bardo Z.*: Attitudes and beliefs of young women toward a health-oriented diet. Probl Hig Epidemiol 2011;92:451-452 (in Polish).
3. *Bieżanowska-Kopeć R., Kopeć A., Leszczyńska T., Pisulewski P.M.*: Frequency and preferences of consumption of high-fat products by students of catering school in Krakow. Rocz Panstw Zakl Hig 2012;63(4):455-461 (in Polish)
4. *Cisek M., Gniadek A., Richter B., Chmiel I.*: Socio-cultural factors of health behaviour within a family. Annales UMCS, Sectio D Medicina 2004;59,14(68):360-364(in Polish).
5. *Czarniecka-Skubina E., Namysław I.*: Some selected elements of nutritional behaviours of secondary school children. Żywność Nauka Technologia Jakość 2008;6(61):129-143 (in Polish).
6. *Czarnocińska J., Jeżewska-Zychowicz M., Babicz-Zielińska E., Kowalkowska J., Wądołowska L.*: Food, nutrition and health attitudes as against to nutrition behaviors among girls and young woman in Poland. UWM, Olsztyn 2013(in Polish).
7. *Gacek M.*: Education level and selected nutritional behaviors of working men between age of 40 and 50. In: *Gutkowska K, Narojek L.* (eds): Food consumer and his behaviors under conditions of Polish membership in the European Union. SGGW, Warsaw 2005:37-42 (in Polish).
8. *Gacek M.*: Selected determinants of university students' attitudes toward nutrition. Probl Hig Epidemiol 2007;88(3):332-335 (in Polish).
9. *Gajewska M.*, *Zawieska D.*: Elementary schoolchildren nutritional behaviors in pupils' and their parents' opinion. Rocz Panstw Zakl Hig 2009;60(4):347-351 (in Polish)
10. *Głodek E.*, *Gil M.* Assessment if frequency of intake of selected sources of dietary fibre among female students of Rzeszow University. Bromat Chem Toksykol 2014:XLVII(1):18-24 (in Polish)
11. *Gronowska-Senger A.*: Nutrition, life style and health of the Poles. Żyw Człow Metab 2007;34:12-17(in Polish).
12. *Gutkowska K., Ozimek I.*(eds).: Behaviour of young consumers in the food market. SGGW, Warszawa 2008;24-41 (in Polish).
13. *Jeżewska-Zychowicz M. Babicz-Zielińska E. Laskowski W.*: Consumer at the novel foods market. SGGW Warszawa 2009 (in Polish).
14. *Jeżewska-Zychowicz M.*: Nutritional behaviors and their determinants. Publ. SGGW, Warsaw 2007 (in Polish).
15. *Kearney M., Jearney J.M., Dunne A., Gibney M.J.*: Sociodemographic determinants of perceived influences

on food choice in a nationally representative sample of Irish adults. Public Health Nutr 2000;3(2):219-226.
16. *Maison D.*: Latent consumer attitudes. Possible use of IAT method analysis. Gdańskie Wydawnictwo Psychologiczne, Gdańsk 2004 (in Polish).
17. *Maksymowicz-Jaroszuk J., Karczewski J.*: Assessment of nutritional behaviors and habits of junior high school students from the Bialystok area. Hygeia Public Health 2010;45(2):167-172(in Polish).
18. *Niedźwiedzka E., Wądołowska L.:* Accuracy analysis of the Food Intake Variety Questionnaire (FIVeQ). Reproducibility assessment among older people. Pakistan J Nutr 2008;7,3:426-435.
19. Polish people about their health and pro-health behaviours and activities. Report CBOSBS/110/2012 http://www.cbos.pl/SPISKOM.POL/2012/K_110_12.PDF (23.07.2013) (in Polish).
20. *Provencher V., Polivy J., Herman C.P.*: Perceived healthiness of food. If it's healthy, you can eat more! Appetite 2009;52:340-344.
21. *Rasińska R.*: Nutrition habits of university students depending on sex. Nowiny Lek 2012;81(4):354-359 (in Polish).
22. *Roininen K., Lähteenmäki L., Tuorila H.*: Quantification of consumer attitudes to health and hedonic characteristics of foods. Appetite 1999;33:71-88.
23. *Roininen K., Tuorila H.*: Health and taste attitudes in the prediction of use frequency and choice between less healthy and more healthy snacks. Food Qual Prefer 1999;10:357-365.
24. *Szczodrowska A.*, *Krysiak W.:* Assessent of the frequency of intake of selected food products and dishes and the level of food consumption consciousness among students of Lodz Universities. Bromat Chem Toksykol 2014;XLVII(1):25-31
25. The determinants of food choice. European Food Information Council (EUFIC REVIEW) 2005;17(4):1-7.
26. The European Health Report 2005. Public heath action for healthier children and populations. WHO 2005.
27. *Thompson F.E., Byers T.*: Dietary Assessment Resource Manual. J Nutr 1994;124:2245-2317.
28. *Wądołowska L., Danowska-Oziewicz M., Stewart-Knox B., de Almeida M.D.*: Differences between older and younger Poles in functional food consumption, awareness of metabolic syndrome risk and perceived barriers in health improvement. Food Policy 2009;34:311-318.
29. *Wądołowska L.*: Nutritional background of health-risk factors in Poland. UWM, Olsztyn 2010 (in Polish).
30. *Wardle J., Stephoe A., Oliver G., Lipsey Z.:* Stress, dietary restraint and food intake. J Psychosom Res 2000;48:195-202.
31. *Wyka J.*, *Grochowska-Niedworok E., Malczyk E., Misiarz M., Hołyńska K.:* Parental nutrition knowledge prevalence of overweight and obesity in children of primary school. Bromat Chem Toksykol 2012;XLV(3):680-684
32. *Zandstra E.H., de Graaf D., van Staveren W.A.*: Influence of health and taste attitudes on consumption of low- and high-fat foods. Food Qual Prefer 2001;12:75-82.

Received: 09.07.2014
Accepted: 02.11.2014