Evaluation of selected dietary habits among students of Medical University of Bialystok

Ocena wybranych zwyczajów żywieniowych studentów Uniwersytetu Medycznego w Białymstoku

Kamila Kulesza[A–D], Małgorzata Elżbieta Zujko[A,E], Anna Maria Witkowska[A,E,F]

Department of Food Biotechnology, Medical University of Bialystok, Białystok, Poland

A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation;
D – writing the article; E – critical revision of the article; F – final approval of the article

Pielęgniarstwo i Zdrowie Publiczne, ISSN 2082-9876 (print), ISSN 2451-1870 (online) *Piel Zdr Publ.* 2019;9(1):33–39

Address for correspondence
Kamila Kulesza
E-mail: kamilakulesza91@gmail.com

Funding sources
None declared

Conflict of interest
None declared

Received on April 12, 2018
Reviewed on July 4, 2018
Accepted on July 9, 2018

Abstract

Background. Rational nutrition promotes health and good condition of the whole body. It is considered as an important factor in the prevention of diseases, especially civilization diseases. Medical universities and their students are associated with high level of knowledge of health protection. One of the key elements of disease prevention is adequate nutrition, especially in the early stages of life.

Objectives. The aim of this study was to evaluate selected dietary habits among students of the Medical University of Bialystok.

Material and methods. The study was conducted on a group of 94 students aged 19–25. An anonymous questionnaire, food frequency questionnaire and a 24-hour dietary recall were used as research methods. The elements of descriptive statistics and the Mann–Whitney *U* test were used to analyze the data.

Results. The majority of respondents (87%) were characterized by healthy weight. The analysis showed that the nutrition of most of the students was consistent with dietary recommendations. The positive aspects of their dietary habits included consuming adequate amounts of meals daily and regular consumption of breakfasts. When snacking between meals, young people usually were choosing healthy products. They consumed appropriate amounts of fluids, often quenching their thirst with water. The most frequent dietary flaw was the insufficient frequency of eating fish, raw vegetables and legumes. There was a statistically significant higher carbohydrate intake in the group of women compared to men.

Conclusions. In conclusion, this study shows that the students of the Medical University of Bialystok demonstrate a good knowledge of the principles of rational nutrition.

Key words: diet, nutrition, medical university

This is a translated article.
Please cite the original Polish-language version as
Kulesza K, Zujko ME, Witkowska AM. Ocena wybranych zwyczajów żywieniowych studentów Uniwersytetu Medycznego w Białymstoku. *Piel Zdr Publ.* 2019;9(1):33–39. doi:10.17219/pzp/93097

DOI
10.17219/pzp/93097

Streszczenie

Wprowadzenie. Racjonalne żywienie pozwala na zachowanie pełni zdrowia i dobrej kondycji organizmu. Wyższe uczelnie medyczne oraz osoby na nich studiujące kojarzone są z wysoką świadomością zasad ochrony zdrowia. Jednym z kluczowych elementów prewencji chorób, w szczególności chorób cywilizacyjnych, jest prawidłowe żywienie, szczególnie we wczesnych okresach życia.

Cel pracy. Celem niniejszej pracy była ocena wybranych zwyczajów żywieniowych studentów Uniwersytetu Medycznego w Białymstoku.

Materiał i metody. Badaniem objęto 94-osobową grupę studentów w wieku 19–25 lat. Metodę badania stanowił anonimowy kwestionariusz ankiety oraz kwestionariusz częstotliwości spożycia i wywiadu 24-godzinnego. Do analizy danych wykorzystano elementy statystyki opisowej oraz test *U* Manna–Whitneya.

Wyniki. Przeważająca część respondentów (87%) charakteryzowała się prawidłową masą ciała. Analiza wykazała, iż sposób żywienia większości z nich był zgodny z obowiązującymi rekomendacjami. Do pozytywnych aspektów diety badanych osób należało m.in. spożywanie odpowiedniej liczby posiłków w ciągu dnia oraz regularne jedzenie śniadań. Podjadając pomiędzy posiłkami, młodzi ludzie wybierali najczęściej zdrowe przekąski. Badani wypijali odpowiednią ilość płynów, często zaspokajając pragnienie wodą. Do najczęściej popełnianych błędów należała natomiast niewystarczająca częstotliwość spożycia ryb, surowych warzyw oraz nasion roślin strączkowych. Odnotowano istotnie statystycznie wyższe spożycie węglowodanów w grupie kobiet w porównaniu z grupą mężczyzn.

Wnioski. Podsumowując, można stwierdzić, iż zasady racjonalnego żywienia są dobrze znane studentom Uniwersytetu Medycznego w Białymstoku.

Słowa kluczowe: dieta, żywienie, uczelnie medyczne

Background

The basic function of food is to provide the body with the right amount of energy and nutrients necessary for proper functioning. Balanced meals eaten at regular intervals allow the use of genetically determined predispositions for both physical and mental development.[1] This issue seems particularly relevant for young people entering adult life. University studies is a time of intensive intellectual work, struggling with new challenges and stressful situations. Students' lifestyles and diet are not without significance. To a large extent, they determine the current state of physical and mental health and influence the functioning in the near and distant future. They play a key role in the prevention of chronic non-communicable diseases.[2]

Medical universities and their students are associated with high awareness of healthcare principles. One of the key elements of disease prevention is proper nutrition, especially in the early stages of life. In view of these aspects, the aim of the study was to assess the eating habits of medical university students.

Material and methods

The study was conducted on a group of 94 students of the Faculty of Health Sciences of the Medical University of Bialystok. Respondents were aged 19–25 years. Women represented 80% of the study group. The participants agreed in writing to take part in the study and had the opportunity to withdraw at any stage.

Survey method consisted of an anonymous questionnaire, food frequency questionnaire and a 24-hour dietary recall. The classification of respondents based on body mass index (BMI) was made according to World Health Organization (WHO) guidelines.[3] The data were analyzed using elements of descriptive statistics and the Mann–Whitney *U* test.

Results

Analysis of the respondents' BMIs showed that the vast majority of students (87%) had a normal body weight. Overall, 8% of the respondents were overweight and only 1% were obese. Four percent of the respondents were underweight.

Although dietary habits can be very individual, they are similar in particular age and social groups. An important element of rational nutrition is, apart from the selection of the right amount and proportion of nutrients, the correct distribution of nutrients over meals at an appropriate time interval. This allows for efficient work of the digestive tract and regulates metabolism. The most desirable model is to eat 4–5 meals during the day at relatively fixed times. Given the recommendations, it can be concluded that the majority of students met these assumptions in terms of the number of meals eaten per day (Fig. 1). According to our own research, 80% of the respondents consumed >4 meals every day, with ¾ starting the day with breakfast (Fig. 2).

Numerous studies indicate similar trends observed among students; in some groups, 3 meals per day were indicated most often.[4–5] At the same time, our own research showed that over 40% of people consumed meals irregularly, 1/3 had 3–4-hour intervals, and every 4th person applied intervals shorter than 3 h. Studies by Kardjalik et al. show that the problem of irregular eating habits is significant among young people. Only every 10th person assessed their eating habits as regular.[6]

An issue related to the frequency of meals is eating between them. As much as 26% of the respondents admitted to daily snacks, more than half (56%) responded that

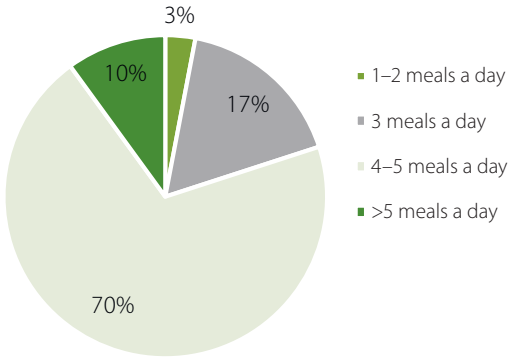

Fig. 1. Number of meals consumed daily

Ryc. 1. Liczba posiłków spożywanych w ciągu dnia

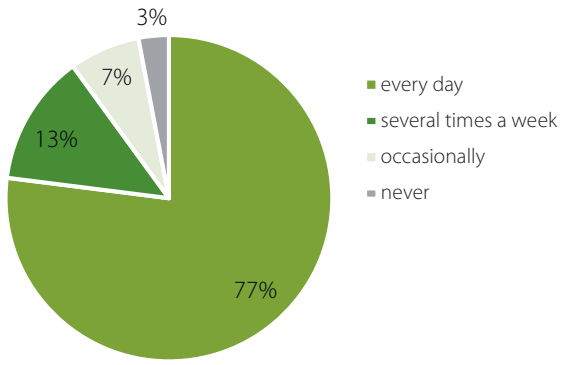

Fig. 2. Frequency of eating breakfast

Ryc. 2. Częstość spożywania śniadań

they snack on "several times a week" (Fig. 3). It is satisfactory that products most frequently eaten as snacks were fruit (69%), followed by yoghurt and other dairy products (59%). Students reached for sweets and sandwiches at a similar frequency (37% and 32% respectively; Fig. 4).

While considering the dietary habits of students, the quantity and quality of the liquids they drink should also be mentioned. Most of the respondents estimated this value at 1.5–2 L per day, i.e., in accordance with current recommendations. The most common drink indicated by the respondents was water (94% of respondents), followed by tea (61%) and coffee (38%). A positive trend is that only 5% of people studied have regularly reached for sweetened drinks (Fig. 5).

Wachowiak and Steinka[7] show similar satisfactory practices in the group of young people. Other results were obtained by Rodziewicz-Gruhn and Połacik,[8] who conducted research in a group of students from a non-medical university. They show that only every 3rd respondent reached for water every day. The percentage of people consuming sweetened drinks was also higher, while relatively lower coffee consumption was recorded.

Conducted research also took into account the frequency of consumption of food products which are the main source of energy, protein or vitamins and minerals. According to the recommendations for consumption of individual food products, healthy people should reach for cereal products made from whole wheat flour. According to our own research, the consumption of white and whole wheat bread among students was similar, with a slight advantage in favor of dark flour products. Whole wheat bread was chosen by 9% of students even several times a day. At the same time, a small consumption of

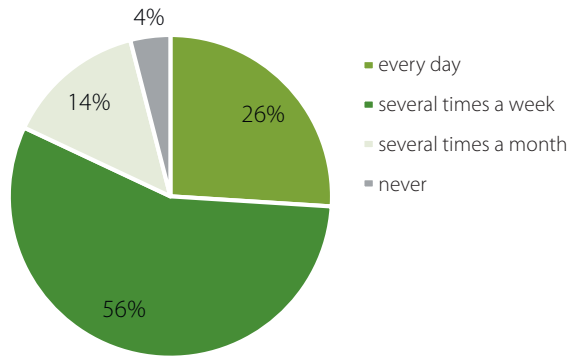

Fig. 3. Frequency of snacking between meals

Ryc. 3. Częstość pojadania między posiłkami

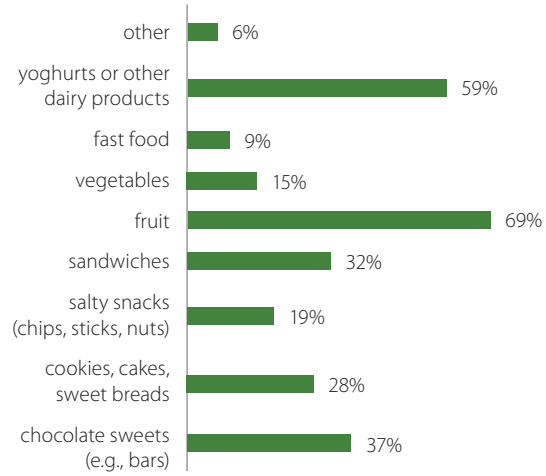

Fig. 4. The most frequently chosen snacks (a multiple choice question)

Ryc. 4. Przekąski najczęściej wybierane przez badanych (pytanie wielokrotnego wyboru)

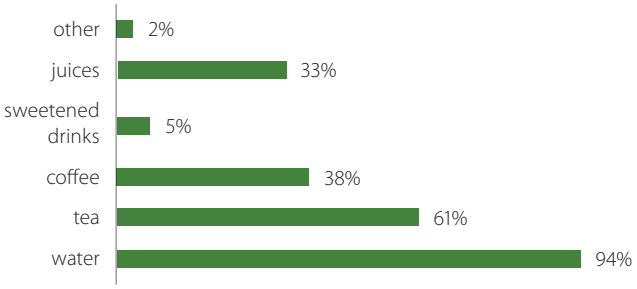

Fig. 5. The most frequently consumed drinks (a multiple choice question)

Ryc. 5. Napoje najczęściej wybierane przez badanych (pytanie wielokrotnego wyboru)

sweet breads was recorded. Among other cereal products, the respondents were more likely to use fine groats, white rice and light pasta than coarse groats and brown rice. Cereals and bran were consumed by 39% of respondents at least several times a week (Table 1).

In a study by Stefańska et al. in 2011, students of the same medical university chose white and sweet bread slightly more often than whole wheat bread and coarse groats.[9] The results obtained in this analysis may indicate a gradual improvement in young people's awareness of the choice of bakery products. However, in the case of groats, rice and pasta, the respondents preferred finer and more purified types.

A balanced diet of a young adult should consider the sources of complete protein, necessary for the efficient functioning of the body and maintenance of proper bone structure or enzymatic activity. From the products which are a good source of exogenous amino acids, the examined students chose mainly milk and poultry, and pork meats. The consumption of the last 2 product groups is similar, with a slight predominance of poultry products. The consumption of fish was reported in most cases (53%) as several times a month. Almost 1/10 of the students did not eat fish or eggs at all (Table 2).

Research by other authors has shown similar values and trends among young consumers.[9] The analysis of Szczodrowska and Krysiak revealed a much greater popularity of poultry in comparison to pork among the academic youth.[10] This does not reflect the general trend of meat consumption in Poland, because despite the increase in the consumption of poultry over the past few years, pork remains the species eaten in the greatest quantity in our country.[11] Other studies have noted a slightly higher frequency of poultry meat, pork and fish intake among young people.[8,9,12]

An important aspect of a rational diet is the consumption of adequate amounts of plant products, especially raw vegetables. Vegetables contain many vitamins, especially vitamin C, β-carotene and folic acid. They are a valuable source of mineral compounds such as calcium, magnesium and potassium, as well as dietary fibers. At the same time, due to their high water content, they are low in calories and should therefore be consumed daily. The analysis showed that the majority of young people reached for vegetables regularly and those were more often raw vegetables; however, only a small group of respondents (13%) declared following the recommended intake of vegetables several times a day. Cooked vegetables were eaten less frequently. It should also be noted that legumes were consumed several times a month, i.e., according to the recommendations, by less than half of the respondents, while 13% ate them never or almost never (Table 3).

In the research on nutrition of students of the Medical University of Lublin, Szponar and Krzyszycha observed higher values of vegetable intake, where 1/4 of the women and 13% of men declared to reach for vegetables 2–3 times a day.[13] Similarly, Stefańska et al. analyzed the

Table 1. Frequency of cereal products consumption

Tabela 1. Częstotliwość spożycia produktów zbożowych

Consumption frequency	White bread [%]	Whole wheat bread [%]	Sweet breads [%]	White groats, rice, pasta [%]	Coarse groats, brown rice [%]	Cereals, bran [%]
Several times a day	7	9	1	–	–	2
Once a day	21	18	1	4	3	17
Several times a week	30	43	23	34	22	20
Several times a month	17	20	33	49	29	31
Once a month or less	12	9	29	10	33	19
Never or almost never	13	1	13	3	13	11

Table 2. Consumption frequency of food providing high-quality protein

Tabela 2. Częstotliwość spożycia produktów dostarczających pełnowartościowego białka

Consumption frequency	Milk [%]	Pork meat and cold cuts [%]	Poultry meat and cold cuts [%]	Fish [%]	Eggs [%]
Several times a day	10	2	3	–	–
Once a day	35	15	22	–	2
Several times a week	30	40	50	21	47
Several times a month	10	18	14	53	46
Once a month or less	9	16	4	18	4
Never or almost never	6	9	6	7	1

nutritional behavior of female students of the Medical University of Białystok and obtained much higher values of raw vegetables intake – nearly 40% of the respondents declared their consumption several times a day.[9] Głodek et al. found a tendency for less frequent consumption of the discussed products by students of food technology and human nutrition faculties at the University of Rzeszów.[14]

In our study, the average percentage of protein content in the food energy value of the whole diet was determined at 19% in both women and men. The percentage of fat was 27% in the women's diet and 31% in men's diet. The percentage of energy from carbohydrates was 59% for women and 52% for men (Table 4).

A statistically significant relationship between the percentage of carbohydrates in the food energy value of the diet and gender was observed at the significance level of $p = 0.009$.

According to the standards adopted for the Polish population, protein in an adult's diet should provide 10–15% of the total energy intake.[15] The average value of energy derived from proteins was found in our study at the level of 19% for both genders. No low supply of this ingredient in relation to consumption standards was observed, but it is worrying that the maximum recorded values of energy from proteins reached almost 40%. Malara and Lutosławska noted that the diet of young people ensured the correct level of energy supply from protein consumed (14% of total energy).[16] However, other authors found, as in this paper, that the intake of this ingredient exceeded the norm.[17,18]

Fats should provide 20–35% of the total energy from the food consumed. The analysis of the students' diet showed that the average value of energy from fats was in accordance with the accepted standards. The observed range of minimum and maximum values (13–50%) may, however, be of some concern, especially as no deviation from the norm in terms of energy derived from fats was found in studies by other authors.[17,18]

Statistically significant differences in carbohydrate intake between women and men have been observed, with a higher proportion recorded in women's diet. In both cases, these values fell within the norm, which ranges from 50% to 70% of the total energy value of the diet for

Table 3. Frequency of potatoes, vegetables and legumes consumption

Tabela 3. Częstotliwość spożycia ziemniaków, warzyw i roślin strączkowych

Consumption frequency	Potatoes [%]	Raw vegetables [%]	Cooked vegetables [%]	Legumes [%]
Several times a day	–	13	2	–
Once a day	6	30	18	1
Several times a week	32	29	44	6
Several times a month	43	22	28	31
Once a month or less	12	5	6	49
Never or almost never	7	1	2	13

Tabela 4. Procentowy udział białka, tłuszczu i węglowodanów w wartości energetycznej diety oraz spożycie błonnika przez badanych

Table 4. Percentage contribution of protein, fat and carbohydrates to the intake of energy, and the intake of fiber

Dietary components		Women ($n = 75$)	Men ($n = 19$)	*p*-value
Proportion of protein in the diet [%]	*M*	19	19	0.629
	min.	11	13	
	max.	37	36	
Proportion of fat in the diet [%]	*M*	27	31	0.067
	min.	13	18	
	max.	47	48	
Proportion of carbohydrates in the diet [%]	*M*	59	52	0.009*
	min.	37	34	
	max.	79	69	
Fiber consumption [g]	*M*	18	25	0.060
	min.	8	9	
	max.	37	59	

n – sample size; *M* – mean; *min.* – minimal value; *max.* – maximal value.

* Statistically significant value.

adults. Also, in this case, the analysis of dietary recalls revealed significant deviations from average values, outside the norm. In the works of other authors, carbohydrate intake among young adults fell within the norm, however, oscillating at its lower limit at the level of 50% of calorific value of the diet.[16–18]

According to current dietary standards, sufficient dietary fiber intake for persons aged 19–30 years is 25 g per day.[15] This allows to maintain efficient intestinal motility, and proper development of intestinal microflora, and helps to regulate blood glucose and cholesterol levels. Our own study showed that the average dietary fiber intake was 18 g for women and 25 g for men, which may indicate a low proportion of its food sources in the diet. The recorded minimum values did not even reach 10 g per day.

Conclusions

Among the students surveyed, the following dietary errors and lifestyle irregularities were observed:
– eating at irregular intervals and the associated episodes of eating between them;
– unsatisfactory consumption rate of fish, fruit and vegetables, especially raw ones;
– low dietary fiber intake.

Positive aspects of the students' diet included:
– eating the proper number of meals during the day and eating breakfast regularly;
– eating fruit, yoghurt and dairy products between meals, instead of sweets and salty snacks;
– drinking an appropriate amount of fluids, frequently satisfying thirst with water and a low proportion of sweetened drinks in the total fluid intake;
– the respective average percentage of protein, fat and carbohydrates in the energy value of the diet.

Students in the study group were highly aware of proper dietary behaviors.

ORCID iDs

Kamila Kulesza https://orcid.org/0000-0001-9635-1419
Małgorzata Elżbieta Zujko https://orcid.org/0000-0002-0410-3539
Anna Maria Witkowska https://orcid.org/0000-0002-0092-3409

References

1. Jarosz M. *Praktyczny podręcznik dietetyki*. Warsaw, Poland: Instytut Żywności i Żywienia; 2010.
2. Ponczek D, Olszowy I. Styl życia młodzieży i jego wpływ na zdrowie. *Probl Hig Epidemiol*. 2012;93(2):260–268. http://www.phie.pl/pdf/phe-2012/phe-2012-2-260.pdf. Accessed on February 14, 2019.
3. World Health Organization. http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi. Accessed on February 14, 2019.
4. Rasińska R. Nawyki żywieniowe studentów w zależności od płci. *Now Lek*. 2012;81(4):354–359. http://www.nowinylekarskie.ump.edu.pl/uploads/2012/4/354_4_81_2012.pdf. Accessed on February 14, 2019.
5. Seń M, Zacharczuk A, Lintowska A. Zachowania żywieniowe studentów wybranych uczelni wrocławskich a wiedza na temat skutków zdrowotnych nieprawidłowego żywienia. *Piel Zdr Publ*. 2012;2(2):113–123. http://www.pzp.umed.wroc.pl/pl/article/2012/2/2/113/. Accessed on February 14, 2019.
6. Kardjalik K, Bryła M, Maniecka-Bryła I. Zachowania zdrowotne związane z odżywianiem oraz występowanie nadwagi i otyłości w grupie studentów. *Probl Hig Epidemiol*. 2012;93(1):71–79. http://www.phie.pl/pdf/phe-2012/phe-2012-1-071.pdf. Accessed on February 14, 2019.
7. Wachowiak N, Steinka I. Ocena nawyków żywieniowych młodych konsumentów z województwa pomorskiego. *Zeszyty Naukowe Akademii Morskiej w Gdyni*. 2014;86:110–122.
8. Rodziewicz-Gruhn J, Połacik J. Diagnoza nawyków żywieniowych studentów różnych kierunków studiów w Akademii im. Jana Długosza w Częstochowie. *Prace Naukowe Akademii im. Jana Długosza w Częstochowie – Kultura Fizyczna*. 2013;12(2):173–191. http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-44c4c18d-bc2d-4ec4-bc4b-8748f21fbc27/c/173-191.pdf. Accessed on February 14, 2019.
9. Stefańska E, Ostrowska L, Radziejewska I, Kardasz M. Zwyczaje żywieniowe studentek UMB w zależności od sytuacji ekonomiczno-społecznej. *Roczn PZH*. 2011;62(1):59–63. http://wydawnictwa.pzh.gov.pl/roczniki_pzh/zwyczaje-zywieniowe-studentek-umb-w-zaleznosci-od-sytuacji-ekonomiczno-spolecznej?lang=pl. Accessed on February 14, 2019.
10. Szczodrowska A, Krysiak W. Analiza wybranych zwyczajów żywieniowych oraz aktywności fizycznej studentów łódzkich szkół wyższych. *Probl Hig Epidemiol*. 2013;94(3):518–521.
11. Główny Urząd Statystyczny. Rocznik statystyczny rolnictwa. Warsaw, Poland: Zakład Wydawnictw Statystycznych; 2013:334. https://stat.gov.pl/obszary-tematyczne/roczniki-statystyczne/roczniki-statystyczne/rocznik-statystyczny-rolnictwa-2013,6,7.html. Accessed on February 14, 2019.
12. Cieślik E, Siembida A, Cieślik I, Zaglaniczna K. Świadomość żywieniowa spożywania ryb i przetworów wśród mieszkańców województwa małopolskiego. *Bromat Chem Toksykol*. 2014;47(1):49–56. http://ptfarm.pl/pub/File/Bromatologia/2014/BR%201-2014%20s_%20049-056(1).pdf. Accessed on February 14, 2019.
13. Szponar B, Krzyszycha R. Ocena sposobu odżywiania studentów Uniwersytetu Medycznego w Lublinie w roku akademickim 2007–2008. *Bromat Chem Toksykol*. 2009;42(2):111–116. http://ptfarm.pl/download/8,6,96,3,2. Accessed on February 14, 2019.
14. Głodek E, Gil M, Rudy M, Pawlos M. Ocena częstotliwości spożycia przez studentów wybranych źródeł błonnika pokarmowego. *Roczn PZH*. 2011;62(4):409–412. http://agro.icm.edu.pl/agro/element/bwmeta1.element.dl-catalog-0a746c50-b1c9-437d-9590-8c224827ad5f/c/09_RPZH_vol_62_nr_4-2011_409.pdf. Accessed on February 14, 2019.
15. Jarosz M, ed. *Normy żywienia dla populacji Polski*. Warsaw, Poland: Instytut Żywności i Żywienia; 2017.
16. Malara M, Lutosławska G. Aktywność fizyczna i zwyczaje żywieniowe a profil lipidowy osocza młodych mężczyzn i kobiet. *Roczn PZH*. 2010;61(4):405–412. http://wydawnictwa.pzh.gov.pl/roczniki_pzh/aktywnosc-fizyczna-i-zwyczaje-zywieniowe-a-profil-lipidowy-osocza-mlodych-mezczyzn-i-kobiet?lang=pl. Accessed on February 14, 2019.
17. Stefańska E, Ostrowska L, Radziejewska I, Kardasz M. Sposób żywienia studentów Uniwersytetu Medycznego w Białymstoku w zależności od miejsca zamieszkania w trakcie studiów. *Probl Hig Epidemiol*. 2010;91(4):585–590. http://www.phie.pl/pdf/phe-2010/phe-2010-4-585.pdf. Accessed on February 14, 2019.
18. Smorczewska-Czupryńska B, Ustymowicz-Farbiszewska J, Cymek P, Dubiel J, Karczewski J. Analiza wartości energetycznej całodziennych racji pokarmowych (CRP) studentek UM w Białymstoku oraz zawartości w nich podstawowych składników odżywczych. *Bromat Chem Tokykol*. 2009;42(3):714–717. http://ptf.content-manager.pl/pub/File/bromatologia_2009/bromatologia_3_2009/BR3%20s.%200714-0717.pdf. Accessed on February 14, 2019.