

## EVALUATION OF SELECTED DIETARY BEHAVIOURS OF STUDENTS ACCORDING TO GENDER AND NUTRITIONAL KNOWLEDGE

Katarzyna Zaborowicz<sup>1\*</sup>, Jolanta Czarnocińska<sup>1</sup>, Grzegorz Galiński<sup>1</sup>,  
Paulina Kaźmierczak<sup>1</sup>, Karolina Górską<sup>1</sup>, Paweł Durczewski<sup>1</sup>

<sup>1</sup>Poznan University of Life Sciences, Department of Human Nutrition and Hygiene,  
Wojska Polskiego street 31, Poznan, Poland

### ABSTRACT

**Introduction.** Nutrition is a factor influencing physical and mental fitness. In this study we examine the lifestyle of university students and its impact on nutritional errors.

**Objective.** To evaluate the dietary behaviours of students taking into account gender and nutritional knowledge.

**Material and methods.** Using a QEB questionnaire, we were able to evaluate dietary behaviours and nutritional knowledge of respondents. Our analysis was conducted on data obtained from 456 students.

**Results.** We found that nutritional knowledge for women was 34.7% satisfactory and 34.7% good. In contrast, nutritional knowledge for men varied, amounting to 40.2% satisfactory and 25.1% good. The number of meals and their regular consumption did not depend on gender or the nutritional knowledge of students, however, significant differences were recorded for the types of snacks they eat. A greater number of women than men snacked on sweets and biscuits, nuts and seeds, while in the case of salty snacks an opposite trend was observed. A higher level of nutritional knowledge correlated with the number of students snacking on fruit and vegetables instead of salty snacks. Moreover, it was observed that health-promoting behaviours such as not adding sugar to beverages and not adding salt to dishes were more common with women and individuals with a higher level of nutritional knowledge.

**Conclusions.** Women more frequently snack on sweets, biscuits, nuts and seeds. More men snack on salty snacks, add sugar to beverages and add salt to dishes. Individuals with insufficient nutritional knowledge more frequently snack on salty snacks rather than fruit. Students with insufficient nutritional knowledge more often commit nutritional errors.

**Key words:** *dietary behaviours, students, nutritional knowledge, gender*

### STRESZCZENIE

**Wprowadzenie.** Prawidłowe żywienie jest głównym czynnikiem wpływającym na zachowanie zdrowia oraz sprawności fizycznej i umysłowej. Czynnikiem ten nabiera szczególnego znaczenia w przypadku młodzieży akademickiej, z powodu wielu błędów żywieniowych, wynikających ze zmiany stylu życia studiującej młodzieży.

**Cel.** Ocena wybranych zachowań żywieniowych studentów w zależności od ich płci i wiedzy żywieniowej.

**Material i metody.** Badania przeprowadzono wśród 456 studentów, wykorzystując kwestionariusz QEB, który umożliwił ocenę zachowań żywieniowych i wiedzy żywieniowej respondentów.

**Wyniki.** Wykazano, iż po 34,7% kobiet charakteryzowało się dostateczną i dobrą wiedzą żywieniową. Odsetki dla mężczyzn były różne, wynosząc odpowiednio 40,2% i 25,1%. Liczba posiłków i regularność ich spożywania nie zależały od płci i wiedzy żywieniowej studentów. Odnotowano istotne różnice w rodzaju pojadanej żywności. Więcej kobiet niż mężczyzn pojadało cukierki i ciastka, orzechy i nasiona, a w przypadku słonych przekąsek zaobserwowano sytuację odwrotną. Wraz ze wzrostem poziomu wiedzy żywieniowej zwiększała się liczba studentów pojadających owoce i warzywa, zaś malała w odniesieniu do słonych przekąsek. Zaobserwowano ponadto, że zachowania prozdrowotne związane ze słodzeniem napojów i dosalaniem potraw dotyczyły przede wszystkim kobiet i osób o większej wiedzy żywieniowej.

**Wnioski.** Kobiety częściej pojadają cukierki, ciastka, orzechy i nasiona. Więcej mężczyzn pojada słone przekąski, słodzi napoje i dosala potrawy. Osoby o niedostatecznej wiedzy żywieniowej rzadziej pojadają owoce, a częściej słone przekąski. Studenci popełniają błędy żywieniowe, których podłożem może być niewystarczająca wiedza żywieniowa.

**Słowa kluczowe:** *zachowania żywieniowe, studenci, wiedza żywieniowa, płeć*

\*Corresponding author: Katarzyna Zaborowicz, Uniwersytet Przyrodniczy w Poznaniu, Katedra Higieny Żywności Człowieka, Poznan University of Life Sciences, Department of Human Nutrition and Hygiene, Wojska Polskiego street 31, 60-624 Poznan, Poland, phone: +48 61 8466057, Fax: +48 61 8487332, e-mail: [kasiazet@up.poznan.pl](mailto:kasiazet@up.poznan.pl)

## INTRODUCTION

Adequately balanced diets and regular physical activity are factors that benefit mental and physical health [12, 14]. Previous reports have evaluated the nutritional habits and behaviours of young individuals, as well as the errors they make concerning food and nutrition. Young people, including students, are individuals particularly at risk of the consequences of inappropriate dietary behaviours. It is believed that university students commit many nutritional errors due to changes in lifestyle. This may include moving away from the family home, irregular meals, long hours spent studying, frequently taking part-time jobs, and their willingness to make the most of life while they are young. Therefore, students are more likely to pay less attention to the amounts and quality of food they consume. A student's diet may include energy-packed products, such as chocolate bars, chocolates, biscuits, as well as fried products or fast food. They also tend to use instant foods, in which preparation takes only minutes.

A lifestyle containing nutritional errors and limited physical activity can cause a deterioration of health [13, 17]. It is also observed that young women striving to attain a desirable figure start to apply restrictive diets, thus eliminating nutritionally valuable foods from their daily menus. A highlighted issue related to poor mental and physical health is the insufficient basic knowledge of food and nutrition among some young people. More than a decade ago, the family home was the only source of nutritional knowledge. It was parents, most frequently the mother, who were responsible for the selection of food products and preparation of dishes, passing on their knowledge and modifying eating habits in their children. The curricula of elementary or secondary schools only occasionally included nutrition education. Thus the present-day generation of students may have insufficient knowledge and awareness concerning food

and nutrition, which otherwise would help them apply a proper model of nutrition [7].

The aim of this study was to evaluate selected dietary behaviours of students, including the number of meals, snacking or types of snacks, taking into account their gender and nutritional knowledge.

## MATERIAL AND METHODS

The survey was conducted with the participation of 456 students, including 277 women and 179 men. The mean age of respondents was 23 years old. Respondents were selected in an arbitrary manner with the subject area of studies adopted by students as the inclusive criterion. One third of students studied humanities, one third life and the other third engineering sciences. A large proportion of respondents lived in the country (36%), towns with 20,000 -100,000 inhabitants (30%), lived with their families (68%) and defined their financial situation as average (69%) (Table 1).

The survey was conducted using the Questionnaire of Eating Behaviour (QEB), developed by the Team of Behavioral Determinants of Nutrition, the Committee of Human Nutrition Sciences of Polish Academy of Sciences, which was the basis for the new version of the questionnaire denoted with the acronym KomPAN [2]. The questionnaire made it possible, among other things, to evaluate selected dietary behaviours and nutritional knowledge of students. Dietary behaviours were evaluated using closed questions, while nutritional knowledge was assessed using 26 true or false questions concerning food and nutrition. One point was awarded for a correct answer. Next, the points were added, and on the basis of the score, respondents were classified to one of three groups. The groups with insufficient (0-10 points), satisfactory (11-15 points) and good (16-26 points) nutritional knowledge were identified, comprising 32.2%, 36.9% and 30.9% respondents. Re-

Table 1. Characteristics of population in students sample

Parameters	Total	Women	Men
Sample size	456	277	179
Age (in full years)	23.1	22.9	23.3
<i>Residence (% sample)</i>			
village	36.0	34.7	38.0
town <20 thousand inhabitants	19.1	19.1	19.0
town 20-100 thousand inhabitants	30.0	32.8	25.7
city >100 thousand inhabitants	14.9	13.4	17.3
<i>Living conditions (% sample)</i>			
alone	14.7	14.4	15.1
with family	67.5	67.2	68.2
with multi-generation family	17.8	18.4	16.7
<i>Financial situation evaluated by respondents (% sample)</i>			
below average	11.2	7.9	16.2
average	68.6	76.6	56.4
above average	20.2	15.5	27.4

Table 2. Nutritional knowledge among students depending on their gender

Parameters	Total	Women	Men	p
<i>Categories of nutritional knowledge (% sample)</i>				
insufficient	32.2	30.6	34.6	NS
satisfactory	36.9	34.7	40.3	
good	30.9	34.7	25.1	
Standard of nutritional knowledge (score)	13.1	13.6	12.3	<0.01

NS - not statistically significant

sults were verified statistically using three tests: *Chi*<sup>2</sup>, *Kolmogorov-Smirnov* and *Kruskal-Wallis*.

## RESULTS

Table 2 presents the results concerning nutritional knowledge of students. Among women 34.7% respondents had equally satisfactory and good knowledge. Among men 40.3% respondents had satisfactory nutritional knowledge, while 25.1% had good nutritional knowledge. A significantly higher standard of nutritional knowledge, in terms of the score, was recorded in the case of women, while average nutritional knowledge of all female and male students turned out to be satisfactory.

Statistical analysis showed no significant differences in nutritional behaviours of the respondents, such as the number of meals, their regular consumption as well as the incidence and frequency of snacking with consideration to gender or nutritional knowledge of students (tables 3-4). In contrast, statistically significant differences were observed in the type of snacks they

ate. Significantly more women than men consumed sweets and biscuits (57.6% vs. 45.5%) as well as nuts and seeds (11.1% vs. 3.7%), while more men than women declared the consumption of salty snacks (26.1% vs. 14.3%). It was also shown that a greater number of men than women add sugar to hot beverages and add salt to served dishes.

The results show statistically significant differences in snacking on fruit and vegetables in a standard of nutritional knowledge dependent manner. As many as 59% individuals with good nutritional knowledge snacked on fruit. Slightly fewer respondents, almost 54%, with satisfactory nutritional knowledge also declared snacking on these products. Almost 23% of the participants with good nutritional knowledge snacked on vegetables. Moreover, it was observed that approximately 28% of individuals with insufficient nutritional knowledge snacked on salty snacks. These percentages were markedly lower among individuals with satisfactory and good nutritional knowledge.

Analysis also showed statistically significant differences in the percentage of individuals who added sugar to hot beverages. Notably, the greatest number,

Table 3. Dietary behaviour of students depending on their gender

Parameters	Total	Women	Men	p
Number of meals	3.78	3.76	3.80	NS
<i>Eating meals (% sample)</i>				
irregular	34.6	32.1	38.6	NS
regular, but only some	50.7	52.0	48.6	
regular	14.7	15.9	12.8	
<i>Snacking (% sample)</i>				
no	23.0	21.7	25.1	NS
yes	77.0	78.3	74.9	
Snacking frequency	0.98	0.95	1.03	NS
Snacking on fruit (% sample)	51.0	52.5	48.5	NS
Snacking on vegetables (% sample)	14.8	12.9	17.9	NS
Snacking on yoghurts/cheese (% sample)	38.8	35.9	43.3	NS
Snacking on sweets/biscuits (% sample)	53.0	57.6	45.5	<0.05
Snacking on salty snacks (% sample)	18.8	14.3	26.1	<0.01
Snacking on nuts/seeds (% sample)	8.3	11.1	3.7	<0.05
<i>Adding sugar to hot beverages (% sample)</i>				
no	38.6	44.8	29.0	<0.001
yes, one teaspoon	32.9	32.8	33.0	
yes, at least two teaspoons	28.5	22.4	38.0	
<i>Adding salt to dishes (% sample)</i>				
no	47.0	52.0	39.1	<0.05
yes, but only sometimes	40.1	36.1	46.4	
yes	12.9	11.9	14.5	

NS - not statistically significant

Table 4. Dietary behaviour of students depending on their knowledge on nutrition

Parameters	Insufficient	Satisfactory	Good	p
Number of meals	3.66	3.78	3.89	NS
eating meals (% sample)				
irregular	38.8	34.5	30.5	NS
regular, but only some	45.6	50.6	56.0	
regular	15.6	14.9	13.5	
Snacking (% sample)				
no	19.7	23.2	26.2	NS
yes	80.3	76.8	73.8	
Snacking frequency	1.00	0.97	0.97	NS
Snacking on fruit (% sample)	41.0	53.5	59.0	<0.05
Snacking on vegetables (% sample)	12.8	10.1	22.9	<0.05
Snacking on yoghurts/cheese (% sample)	35.9	40.3	40.0	NS
Snacking on sweets/biscuits (% sample)	53.8	58.9	44.8	NS
Snacking on salty snacks (% sample)	28.2	17.8	9.5	<0.01
Snacking on nuts/seeds (% sample)	10.3	7.8	6.7	NS
Adding sugar to hot beverages (% sample)				
no	43.5	33.9	39.0	<0.01
yes, one teaspoon	21.1	36.9	40.4	
yes, at least two teaspoons	35.4	29.2	20.6	
Adding salt to dishes (% sample)				
no	37.4	51.2	51.8	<0.01
yes, but only sometimes	42.2	39.3	39.0	
yes	20.4	9.5	9.2	

NS - not statistically significant

almost 44% respondents, who did not add sugar to hot beverages, were individuals with insufficient nutritional knowledge. Among individuals with satisfactory nutritional knowledge, slightly below 34% respondents did not add sugar to hot beverages, while good nutritional knowledge accounted for 39%. Over 50% of individuals in the satisfactory and good nutritional knowledge groups did not add salt to served dishes while individuals with insufficient nutritional knowledge was approximately 37%.

## DISCUSSION

The results presented in this study corroborate a number of other reports. The subject of dietary behaviours among different age groups has recently become a hot area of study. As previously shown, poor nutritional habits are influenced by socioeconomic factors such as professional and financial status of parents, their educational background, cultural or religious customs or the role of family [8]. This is observed together with the different components of university student life: irregular lifestyle, resulting among other things from the timetable of classes at the university; a change in residence; a lack of student cafeterias; stress; a hectic lifestyle; jobs taken during non-class time; inappropriate habits and eating behaviours adopted from their family homes; meeting energy requirements by consuming energy-packed snacks or the use of stimulants [16]. *Ansari et al.* [1] in their study recorded that women in Poland consume

sweets and biscuits more frequently than men, but they also consume fruit, salads and vegetables more often. *Kowalska* [10] in her study observed that a frequent problem among students is connected with irregular consumption of meals, particularly breakfast. It was also shown that women ate four meals a day more often than men. Our study confirm the results of *Kowalska*, that it is women rather than men who more frequently consume fruit and sweets. Investigations conducted at the Silesian University of Medicine in Katowice by *Likus et al.* [11] showed that almost 1/2 students snacked between meals. This study showed that among university students, individuals that have a habit of snacking may be as high as 75%. Female and male students of the Wrocław University of Life Sciences were asked about their dietary preferences concerning salty dishes and the frequency of adding salt to served dishes. Male students more frequently preferred salty dishes – approximately 53% of the group in comparison to female students – approximately 31%. Every third male student declared adding salt to served dishes. Among female students, as many as 79% respondents did not add salt to served dishes [19]. In addition, this study confirmed the fact that men more frequently prefer salty dishes and add salt to served dishes than women. Also *Frąckiewicz et al.* [5] observed among other significantly higher intake of dietary fiber (by 25%), potassium (by 21.3%) and NaCl (by 31.1%) in obese participants than in people with adequate body mass. In study of *Kosicka-Gębska* and *Gębski* [9] only 1% of respondents claimed that they do not consumed salty snacks. Among the people

consuming them, 27% did so with a frequency of once a week, and 26% - 2-3 times a month. Also in study of *Czerwińska* and *Czerniawska* [4] was observed that the mean sodium intake exceeded many times the recommendations. Men added more salt to meals than women, and they also ate salty products more often. The main source of sodium was salt added during preparation of meals (women) or processed food (men). *Cieślik* et al. [3] in their study pointed to the barely satisfactory standard of nutritional knowledge among secondary school students, which results among other things from inadequate nutrition education. Those authors also reported that girls had a better nutritional knowledge than boys, which is confirmed by our current study. This may be connected with the fact that many young women value appearance and fitness and thus have tendencies to implement specific diets. *Gacek* [6] found a positive effect of nutrition education on selected nutrition parameters among female students. Female respondents showed an improvement in dietary behaviours, particularly in terms of regularity of meals, as well as avoidance of fast food. *Rasińska* [15] published results indicating the standard of knowledge and eating habits among students. Studies showed that respondents despite of their knowledge on principles of appropriate nutrition do not apply them in their everyday lives. Moreover, they are fully aware that their behaviour concerning nutrition may have a negative effect on their health. Young people, most frequently indicated a lack of time and inconvenient timetables as the cause of this situation. The above mentioned studies confirmed also that women follow principles of appropriate nutrition more frequently than men. Also in a study by *Wyka* and *Żechalko-Czajkowska* [19] the standard of nutritional knowledge of female students was very low.

This study and the analysis of literature sources indicate that the nutritional errors reported in many studies constitute a group of factors increasing the risk of civilization diseases [7, 10, 11, 16]. At present, these diseases pose one of the greatest health problems, especially in more economically developed and rapidly developing countries such as Poland [18]. This again confirms that it is necessary to publicise knowledge on food and nutrition in different social groups. Additional knowledge about the habits and dietary behaviours of specific groups will lead to ways for improved health.

## CONCLUSIONS

1. Students from the study group have a low standard of nutritional knowledge. As few as 1/3 of university students have a good standard of knowledge on food and nutrition.
2. Women from the study group more frequently than men snack on sweets and biscuits as well as nuts and

seeds. Men more frequently snack on salty snacks, add salt to served dishes and add sugar to hot beverages.

3. Respondents with a poorer nutritional knowledge snack less frequently on fruit and vegetables, and snack more frequently on salty snacks, add salt to served dishes and add sugar to hot beverages.
4. Students from the study group were found to make nutritional errors as a result of insufficient nutritional knowledge.

## Conflict of interest

*The authors declare no conflict of interest.*

## REFERENCES

1. *Ansari W.E., Stock C., Mikolajczyk R.T.*: Relationships between food consumption and living arrangements among university students in four European countries - A cross-sectional study. *Nutr J* 2012;11:28.
2. Beliefs and Eating Habits Questionnaire. Available from: [http://www.knozc.pan.pl/images/Kwquestionariusz\\_KomPAN.pdf](http://www.knozc.pan.pl/images/Kwquestionariusz_KomPAN.pdf)
3. *Cieślik E., Siembida A., Kuś A., Folcik A., Kopeć A.*: Influence of nutritional education of high school students on prevention of nutrition-related diseases. *Probl Hig Epidemiol* 2014;95(4):927-933 (in Polish).
4. *Czerwińska D., Czerniawska A.*: Sodium intake including salt as its source in selected Warsaw population. *Rocz Panstw Zakl Hig* 2007;58(1):205-210 (in Polish) [PMID: 17711112 <http://www.ncbi.nlm.nih.gov/pubmed/17711112>].
5. *Frąckiewicz J., Hamulka J., Wawrzyniak A., Górnicka M.*: Students nutrients intake and risk of cardiovascular diseases. *Rocz Panstw Zakl Hig* 2009;60(3):269-274 (in Polish) [PMID: 20063698; <http://www.ncbi.nlm.nih.gov/pubmed/20063698>].
6. *Gacek M.*: An attempt to evaluate the education of nourishment among female students of Academy of Physical Education in Cracow. *Now Lek* 2007;76(1):25-28 (in Polish).
7. *Gutkowska K., Ozimek I.(eds).*: Behaviour of young consumers in the food market. SGGW, Warszawa 2008;24-41 (in Polish).
8. *Jarosz M., Wolnicka K., Kłosowska J.*: Environmental factors associated with prevalence of overweight and obesity among children and adolescents. *Post Nauk Med* 2011;9:770-777 (in Polish).
9. *Kosicka-Gębska M., Gębski J.*: Salty snacks in the diet of young consumers. *Bromat Chem Toksykol* 2012;45(3):733-738 (in Polish).
10. *Kowalska A.*: Nutrition habits of students of University of Economics in Wrocław. *Rocz Panstw Zakl Hig* 2010;61(3):277-282 (in Polish) [PMID: 21365864; <http://www.ncbi.nlm.nih.gov/pubmed/21365864>].
11. *Likus W., Milka D., Bajor G., Jachacz-Łopata M., Dorzak B.*: Dietary habits and physical activity in students from the Medical University of Silesia in Poland. *Rocz Panstw*

- Zakl Hig 2013;64(4):317-324 [PMID: 24693717; <http://www.ncbi.nlm.nih.gov/pubmed/24693717>].
12. Łaszek M., Nowacka A., Gawron-Skarbek A., Szatko F.: Negative behavior patterns of students. Part II. Physical activity and eating habits. *Probl Hig Epidemiol* 2011;92(3):461-465 (in Polish).
  13. Malara B., Góra-Kupilas K., Joško J.: Nutrition and other elements of lifestyle of students of the Silesian University of Technology – a preliminary report. *Zdr Publ* 2006;116(1):132-134 (in Polish).
  14. Pilch W., Janiszewska R., Makuch R., Mucha D., Palka T.: Rational nutrition and its influence on health. *Hygeia Public Health* 2011;46(2):244-248 (in Polish).
  15. Rasińska R.: Dietary habits of students depending on the gender. *Now Lek* 2012;81(4):354-359 (in Polish).
  16. Szczuko M., Seidler T.: Nutrition mode and nourishment status of WUT students in Szczecin as compared to different academic centres in Poland. *Rocz Panstw Zakl Hig* 2010;61(3):295-306 (in Polish) [PMID: 21365867; <http://www.ncbi.nlm.nih.gov/pubmed/21365867>].
  17. Uramowska-Żyto B., Kozłowska-Wojciechowska M., Jarosz A., Makarewicz-Wujec M.: Dietary and lifestyle habits of university students in Poland-empirical study. *Rocz Panstw Zakl Hig* 2004;55(2):171-179 (in Polish) [PMID: 15493350; <http://www.ncbi.nlm.nih.gov/pubmed/15493350>].
  18. Walentukiewicz A., Łysak A., Wilk B.: Assessment of students' nutrition in context of prevention of civilization diseases. *Probl Hig Epidemiol* 2014;95(3):772-777 (in Polish).
  19. Wyka J., Żechałko-Czajkowska A.: Nutritional knowledge, lifestyle and food groups intake in the group or the first year students of Agricultural University in Wrocław. *Rocz Panstw Zakl Hig* 2006;57(4):381-388 (in Polish) [PMID: 17713201 <http://www.ncbi.nlm.nih.gov/pubmed/17713201>].

Received: 10.08.2015

Accepted: 15.12.2015