

Laura Karnai<sup>1</sup>  
László Szöllősi  
Andrea Bauerné  
Gáthy  
István Szűcs

## ATTITUDES OF DEBRECEN UNIVERSITY STUDENTS TOWARDS HEALTHY LIFE BASED ON THEIR DIETARY HABITS

**Article info:**  
Received 10.08.2019  
Accepted 20.07.2020

UDC – 005.311  
DOI – 10.24874/IJQR15.01-07



**Abstract:** *Our consumption habits affect our body from childhood on, changes in eating habits can lead to various eating disorders and cause problems, especially in adulthood. For this reason, we need to pay attention to what we eat and drink throughout our lives, as a close correlation is observed between consumed foods and health. The primary purpose of the study is to survey the daily eating habits of Debrecen students, to compare their regularity and composition in terms of quality in order to reveal any correlations between the BMI-based categories and the quality of consumption. In order to examine this aspect, we conducted a questionnaire survey among 500 students of the University of Debrecen. There is a significant relationship between body mass index and food groups only in the case of coffee, but there is no correlation between the degree of obesity of Debrecen students and the frequency of food consumed.*

**Keywords:** *BMI-index; Consumer behaviour; Healthy diet; Hungary; Young people.*

### 1. Introduction

Unhealthy nutrition and a sedentary lifestyle have become the most significant risk factors for the total population of the Earth and are therefore a priority in international specialized research (Törőcsik, 2007). All these facts pose new challenges to the food industry, which requires the development and production of foods which, due to their health-protecting effect, slow down the spread of civilization diseases that plague society. As a result, there is an increasing number of food products on store shelves that not only have outstanding taste but also a positive effect on health. Examples include the increase of certain minerals (e.g. Mg, Ca), reducing energy by reducing sugars or fat, or by using spices and vitamins beneficial to health in what is known in the

technical literature as functional foods (Szakály, 1994; Biró, 2004; Hawkes, 2004). Functional foods are gaining market share from year to year and are increasingly becoming the driving force for the food industry (Menrad, 2003; Piskóti et al., 2006). The reason for this development is that people increasingly believe that the food they consume directly contributes to the maintenance and improvement of their health (Young, 2000; Mollet & Rowland, 2002; Barna, 2007; Mendis et al., 2011). The close relationship between food consumption and health was already known in ancient times. In 400 BC, Hippocrates said "Let food be thy medicine and medicine be thy food." (Szöllősi et al., 2017).

Today, one's diet is basically determined by the habits, rules, social values and beliefs of the narrower and wider environment. In

<sup>1</sup> Corresponding author: Laura Karnai  
Email: [karnai.laura@econ.unideb.hu](mailto:karnai.laura@econ.unideb.hu)

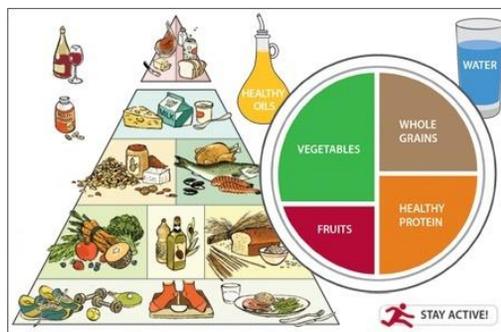
order to get the changed and overturned eating habits back into the right course, it would be important to spread health-conscious nutrition to the general public, where healthy and health-preserving (functional) foods could play a major role (Barcs & Jenes, 2017). With all this information, consumers in developed countries are increasingly concerned with maintaining their health, gaining more information about healthy lifestyles, and seeking to prevent disease and the deterioration of their health rather than cure (Enser, 2001). As a result, today, due to the constant changes, it is often a problem that people do not know what is recommended and not recommended to eat, or what is meant by healthy nutrition.

It is important to clarify the fact that healthy eating does not mean eating foods that are commonly known as healthy, since most of the foods on the market today are considered healthy. Hidvégi et al. (2015) stated: “A healthy diet means the regular consumption of a variety of foods and beverages in appropriate proportions and quantities, with sufficient variety. This will minimize the risk of disease. A healthy diet should contain the right amounts of energy-efficient nutrients (proteins, fats, carbohydrates) and non-energy nutrients (vitamins, minerals, and trace elements). Try to diversify your diet, using as many raw materials and trying as many cooking methods as possible” (Hidvégi et al., 2015, p. 39). However,

nutrition and food security are closely linked, which in recent decades has caused consumer confidence to shake as a result of various food scandals. Consuming “unsafe foods” poses a health risk and that is why WHO is constantly striving to make safe food available to all (Bánáti, 2011; WHO, 2019).

According to researchers, a healthy diet is based on physical activity and regular meals and that it is the quality and not the quantity of foods that a healthy and balanced daily diet is based on. Basically, there is "no good and bad food", only "the right amount" and one can distinguish between good and bad diets accordingly. However, there are foods of which nutrition science recommends consuming more, and some others of which less is recommended (Szakály, 2004 and Zsarnóczay, 2009 cit. Szöllősi et al., 2017). One of the most common forms of illustrating nutrition recommendations is the food pyramid, which classifies foods into four different nutritional groups from a nutritional point of view, supplemented by regular eating and exercise, which form the basis of the entire diet.

The basic principle of a healthy diet is that the body receives the right amount of essential nutrients. The essence of the pyramid is that one needs to have a good and balanced diet with the right combination of different nutrients to maintain health (Figure 1).



**Figure 1.** Healthy diet pyramids and healthy eating plate (Harvard School of Public Health, 2013; Rang, 2016)

The diet is based on fiber-rich cereals, which are essential from the aspect of health. Instead of refined flour, white rice and white bread, it is preferable to eat whole grain pasta or brown rice. Meals include lots of vegetables and fruits, as well as whole grains, seeds, and healthy fats, which should be included several times a week in one's meals, which should be as diverse as possible. In addition, healthy sources of protein, such as white meat or fish instead of red meat, should be preferred. Compared to other foods, sweets and fats have the lowest recommended levels of consumption (Rodler, 2005; Balázs, 2010; Huszka, 2012). When examining nutrition, it is important to note that many other factors, such as food sensitivity, food allergies, or even beliefs, influence the regular or less regular consumption of foods considered to be appropriate in the technical literature. Christianity in the European culture does not impose prohibitions on food consumption, but some other cultures pose major restrictions on certain foods, especially meats (De Boer et al., 2016; Vida & Szűcs, 2016).

It is important to emphasize that many diet pyramids have been published in recent decades, and the most widely cited recommendation is the US Department of Agriculture (USDA) diet pyramid, first released in 1992 and revised in 2005.

The diet pyramid was updated in the form of MyPlate in 2011. The pyramid is structured in a way that the most important food groups in our diet are located at the bottom, and as we move towards the summit, the recommended consumption frequency of the foods (e.g. fats, oils, sweets) is decreasing (Welsh et al., 1992; Ruini et al., 2015). The 2005 concept is more than a guideline, since in essence, the basic principles have not changed in the last 30 years, but they carry a different message. The plate concept also helps in practical implementation by showing what is on our plate and illustrating the healthy proportion of bread and cereals,

vegetables, fruits, proteins and dairy products and their recommendations for daily eating (Haven et al., 2006). In addition to the basic pyramid, the special Mediterranean food pyramid has an increasing popularity. This pyramid developed in 1990 and it is based on Mediterranean foods, such as fruits, vegetables, cereals, olive oil, beans, legumes, nuts, seeds, herbs and spices, as well as fish and fish products. Because of their prominent role in health-conscious lifestyles, fish and seafood are a prominent item and they are recommended to be consumed several times a week. Poultry, eggs, yogurt and dairy products are less frequently recommended, while red meat and sweets are less suggested to be consumed even less often (Bach-Faig et al., 2011; Davis et al., 2015).

Our diet and healthy lifestyle are heavily influenced by parenting, that is, parents' exemplary behaviour and attitudes towards a healthy lifestyle, which develops mainly at a young age. At the same time, young people (18-30) can do much more for their health and to maintain their health (Berke et al., 2012). At the international level, it is a major problem that the increasing proportion of illness in the case of young people is related to their diet and lifestyle (Taylor et al., 2015; Decosta et al., 2017). An increasing amount of research is proving that eating habits in young people are leading to more severe health problems, such as overweight, diabetes, cardiac disease, circulatory problems, the increasingly often mentioned gastrointestinal diseases, and possibly cancer, which are further exacerbated by lack of exercise, smoking and alcohol consumption (McGinnis et al., 2006; Szakály, 2011; Ramsden et al., 2016; Trautwein et al., 2018). In Hungary, the obesity rate is extremely high among the general population, which can be observed increasingly among young people. In addition to hereditary predisposition, overnutrition is primarily caused by poor diet sedentary lifestyle. In Hungary, one in

two people is considered to be overnourished, according to the WHO's Body Mass Index (BMI), based on which a person is considered to be obese if his/her BMI is above 30 kg/m<sup>2</sup> (Népegészségügyi, 2015). Attitudes towards sport are also low in society, as in the Northern Great Plain the share of the respondent with an indirect attitude is only 13.3% (Bácsné et al., 2018). For this reason, a healthy and balanced diet, i.e., adequate quality and quantity of nutrients, as well as regular exercise and the related motivation and awareness raising are key issues (Marjainé et al., 2012). Almost one third of the 18-29 age group can be considered as followers of the current trends, i.e., they are more likely to be led to environmentally conscious and healthy eating (Szakály et al., 2017). These facts make it necessary to assess and get to know the nutritional habits of university students (between the ages of 20 and 30), since the examination of the health consciousness of this age group has a prominent role both at the national and international level. The topicality of this issue is due to the hectic eating style resulting from the fast-paced lifestyle in the current accelerated world. People between the ages of 20 and 30 are already independent decision makers about their own meals, i.e., they have unique and independent food consumption habits (Marty et al., 2018). At the same time, they presumably do not yet feel responsible for preserving their own health, since most of them have not yet suffered from a serious illness, except for those suffering from food sensitivity. This age group tends to eat for the sake of pleasure and the tastes and their food preferences are greatly influenced by fashion and advertisements (Lude & Prügl, 2018). Food is not only a source of nutrients for them, it is also becoming a status symbol (Papp & Lugosi, 2018).

The primary purpose of this study is to survey the extent to which the daily eating habits of students in Debrecen follow the recommendations of the diet pyramid of foods required for health conscious and

proper nutrition compiled by dietitians, with particular regard to the frequency and quality of meals. The following research questions were formulated in relation to the objective:

- What is the eating frequency of the university students of Debrecen?
- What ingredients are consumed and how often do students consume them?
- Is there a relationship between student nutrition practice and BMI index based on weight and height?

Tasks assigned to responding to these questions:

- Assessing and evaluating students' daily food consumption habits.
- Calculation and comparison of BMI index with different food categories.

## 2. Material and Methods

As a first research step, secondary data and information was collected, during which we performed the collection, processing and systematisation of the related technical literature sources. The most relevant, up-to-date and relevant sources were analysed for the research topic, examining Hungarian and international models and research findings. In addition to the secondary research, primary data collection and processing was also performed.

### 2.1. Sample

The performed qualitative methods primarily focused on exploring causal relationships and they provided sufficient information for a further quantitative survey. During the quantitative research, we used the most common technique to acquire information, i.e., the questionnaire survey among the students of the University of Debrecen. Data were collected between March and June 2019. Our research focused mainly on the study period, as we believe that this period is significant for the students and regularity can

also be better observed. Both the online questionnaire survey and the offline sampling method (personal, paper-based questionnaire) were used, while trying to target students who have different knowledge of the basics of health-conscious eating. The reason for choosing the

questionnaire survey method is due to several reasons, the main factor of which is that students are active Internet users and they need to use the online interface in their daily activities, but printed questionnaires were also needed to facilitate easier completion.

**Table 1.** Social and demographic background of the sample

Criterion	Division of the Sample	
	N	%
The number of respondents		
Total	500	100.0
Gender		
Male	219	43.8
Female	281	56.2
Education		
Full time	412	82.4
Part time	88	17.6
Settlement		
Capital	8	1.6
Township	226	45.2
City	131	26.2
Small town (population between 2000 and 10 000 people)	38	7.6
Village (population less than 2000 residents)	97	19.4
Subjective income		
Have regular financial problems	6	1.2
Sometimes cannot make ends meet	17	3.4
Just enough to live on, but cannot save	144	28.8
Can live on it, but can save little	188	37.6
Can live on it very well and can also save	145	29.0

The sample size was 500 (n = 500), in which the distribution of the number of students by faculty and, in particular, their gender distribution reflects the headcount data issued by the Education Office of the University of Debrecen. Participation in the survey was voluntary, however, in order to ensure the student population of the faculties and gender representation, the quota sampling of  $\chi^2(13) = 1.921; p \approx 1.0 > 0.05$  was used. As of March 15, 2019, the university had 24,480 students, including all full-time, part-time, PhD, and specialised advanced training students in the 14 faculties

(Table 1). Through quantitative surveying, the results obtained by sampling can be projected to the entire surveyed population. However, due to the exploratory nature of our research and the fact that we examined the homogeneous group of the University of Debrecen, the conclusions drawn from our findings can only be applied to the dietary habits of students at the University of Debrecen. It is our emphasised goal to create different and well-defined groups based on the dietary habits and attitudes of the students of Debrecen.

## 2.2. Questionnaire

The main part of the questionnaire focuses on measuring the frequency of consumption of different foods (based on the categories of the food pyramid). In terms of frequency, we used a seven-step scale, where the options "never" and "daily" represented the two extreme values of the scale. Special mention was made of the meals in between the main meals, their location and frequency with regard to both foods and drinks. At the end of the questionnaire, socio-demographic background variables (gender, age, height, weight, education, type of settlement, housing, monthly income) were surveyed and segmentation was performed accordingly, such as gender or BMI index. The data obtained during the questionnaire research were processed with a mathematical-statistical analytical software (SPSS 23.0). The data was recorded immediately after the questionnaire survey and the filtering out of data entry errors, i.e., outliers (data cleaning process). We used basic descriptive statistical methods (minimum, maximum, mean, standard deviation) to process the obtained data.

## 2.3. BMI index

Body Mass Index (BMI) is a widely used statistical method to measure the extent of obesity and to thereby identify potential health risks, using the ratio of body mass and height (Formula 1). The method is based on dividing the body weight expressed in kilograms by the square of height expressed in meters. However, this method may distort the result in the case of different physiques. The method has been criticized due to the fact that even individuals with above-average lean muscle mass may be classified as overweight (Keys et al., 1972).

(Formula 1)

$$BMI = \frac{\text{body weight (kg)}}{\text{height squared (m)}^2}$$

For the sake of ease, the extent of obesity can be divided into 4 groups by the uniform categorization of the obtained values (Table 2).

**Table 2.** Categorisation of body mass index (BMI) (WHO, 2019)

Women	Men	Evaluation
<18.5		underweight
18.6-24	18.6-25	normal
24.1-28.9	25.1-29.9	overweight
29<	30<	obese

It is important to note that the values in this table are for the adult age range and are subject to change in children and the elderly. In our study, we examined whether there is a difference in the frequency of consumption between different food categories in the case of different BMI categories, especially with regard to gender.

## 3. Results

### 3.1. Examination of the food categorisation of the questionnaire

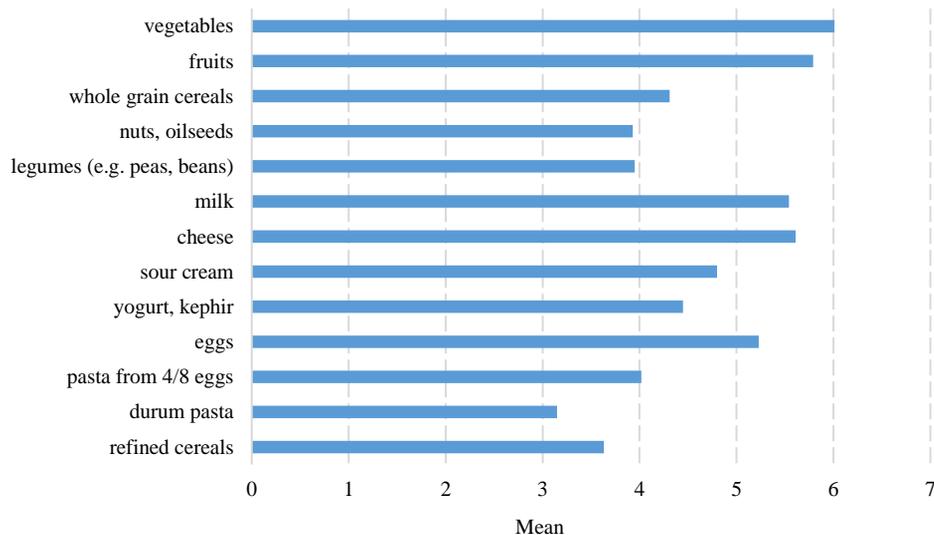
The results obtained during the quantitative survey are close to the nutritional structure considered appropriate by nutritionists. However, it is important to note that in this case, the consumption frequencies were established on a seven-step scale, where we looked at the regularity between the two extreme consumption values of "never" and "daily" (Figure 2).

According to the technical literature, in order to keep a proper diet, the most commonly consumed food groups are fruits, vegetables, healthy oils and whole grains, as these foods should be consumed at least three times a day. The obtained results showed that students consumed vegetables and fruits during meals 2-3 times a week on average, and there was no one who never consumed vegetables and fruits (vegetable standard deviation: 1.10, mode: daily; fruit standard deviation: 1.13, mode: 2-3 times a week).

There is no significant difference in terms of gender, but women are more likely to consume vegetables and fruits than men.

The importance of healthy fats and oils was undetectable and they are consumed several times a year (standard deviation: 1.67, mode: monthly). In the case of whole grain cereals, the different opinions of respondents were distributed among the range of potential answers with almost the same response rate (standard deviation: 1.98, mode: 2-3 times a week). Students consume nuts and legumes mostly twice a week and none of them eat these foods weekly (nuts standard deviation: 1.52, mode: weekly; legume standard deviation: 1.34, mode: weekly). The next category is milk and dairy products, which, according to our research, appear between once and 2-3 times a week on average

(standard deviation: 1.71; mode: daily), mainly with coffee, which is mainly (64.7%) observed in women. In addition, the consumption different cheese products are also significant (average: 2-3 times a week; standard deviation: 1.31; mode: 2-3 times a week). When examining this food category, it can be observed that 40% of the respondents consume this product on a daily basis, and another 21.6% consume it several times a week. Milk consumption is mainly concentrated on cow's milk purchased from stores, and only 33.8% of those surveyed consume other dairy products of plant origin, e.g. rice milk, however, very rarely (average: less than monthly; standard deviation: 1.53; mode: never). Cheese is consumed predominantly (41.6%) 2-3 times a week, while sour cream is consumed less often.



**Figure 2.** Nutrition criteria of students based on the questionnaire survey (N=500)  
 (Note: averages 1- never; 2- less often than once a month, 3- once a month; 4- once in two weeks  
 5- weekly; 6- 2-3 times a week; 7- daily)

Eggs are a significant part of protein intake, and most students (67.2%) consume it weekly, while a fairly low proportion, 7.4% (3.7 people) never consume them (standard deviation: 1.26; mode: 2-3 times). Sugar is consumed daily, as approximately 33.6% of respondents eat sugar and only 4.6% (2.3

persons) avoid it. Again, sugar is mainly consumed as the flavouring of coffee and tea in such high proportions on a daily basis by both women (mean: 5.25) and men (mean: 5.29), but sweets, in the form of cakes or candies, are consumed monthly.

It is important to note that this data collection examined frequency and analysed each meal separately. As a result, it can also be stated that regular coffee drinkers consume mainly coffee, with milk and sugar, which has become their daily routine, so we

realized high values in terms of these factors. This is also supported by the results of Bryan et al., (2012), according to which coffee consumption is mainly done by adding milk and sugar.

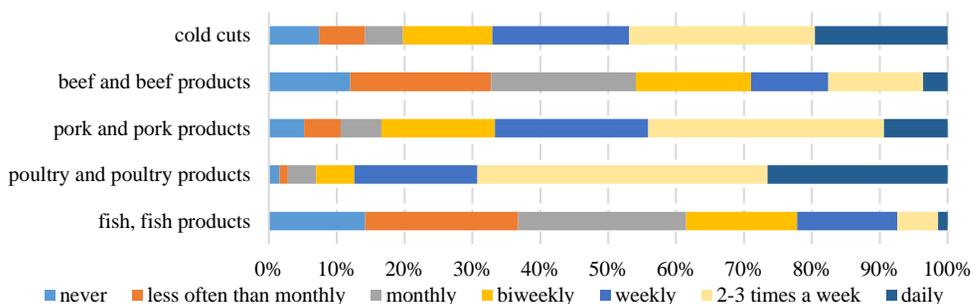


Figure 3. Students' meat consumption characteristics (N=500)

More than half (61.6%) of the respondents do not consume fish and fish products on a monthly basis, and only 1.4% (7 persons) indicated that they eat these products daily. In terms of gender, men (mean: 3.33) are slightly more likely to consume seafood and pond fish than women (mean: 3.06). Meat consumption, as a worldwide trend, has the highest frequency in the case of poultry and meat products (2-3 times a week on average), with 69.4% of those surveyed consuming poultry in some form weekly or even on a daily basis (standard deviation: 1.25; mode: 2-3 times a week) (Figure 3).

As regards the consumed beverages, compared to the recommended 2.5 liters of daily fluid intake, the average liquid intake of the majority (51.1%), including soup and other liquids, is 2 liters per day, with 12.8% (6.4 persons) consuming more than 3 liters per day. 50.7% of those completing the questionnaire consume sugary, carbonated soft drinks very rarely or 1-3 times a month, and 4.6% drink such beverages daily, which shows a positive picture for the whole population. Alcohol is quite common in this age group, as 24.8% of the students surveyed drink beer once a week or more often, and

almost the same amount of students (23.4%) do not drink alcohol at all (standard deviation: 1.72 mode: never). In addition, the highest proportion of wine and pálinka (brandy) (31.2% wine, 39.4% brandy) was found in the category of less often than once per month. Sweet liqueurs are a less favoured alcoholic beverage for this age group, as the range of answers shift even more towards never or very rarely, with 81.0% never consuming such beverages or drinking them less often than monthly. In the case of caffeine-containing beverages, we observed a high consumption of coffee, as 47.8% of respondents consume coffee daily, and 69.8% drink coffee once or several times a week, including daily consumption. In contrast, 6.0% of the respondents drink energy on a daily basis and 37.4% do not drink it at all (standard deviation: 1.93; mode: never).

### 3.2. Comparing BMI index and food groups

According to technical literature sources, both our health status and body weight are influenced by how much we pay attention to ourselves and our diet. When examining the

body mass index of the examined population based on consumption parameters, it can be concluded that, the BMI index of the respondents was 23.72 on average (min: 16.73; max: 42.97) and normal body weight is observed in the case of women (mean: 22.51; min: 16.73; max: 42.97), while men tend to be slightly overweight (mean: 25.21; min: 17.16; max: 40.56).

During the evaluation of the obtained results, we also aimed to examine those groups of foods for obesity that are consumed at least once a week, according to the previously presented values. 69.6% of women who consume vegetables on a daily basis are in the normal body weight class, but even 41.2% of overweight people consume some form of vegetables on a daily basis. In contrast, 44.2% of men consuming vegetables daily belong to the normal body weight category and 41.6% belong to the overweight category, but no significant correlation can be observed in either case. The majority of men who consume fruit daily are in the obese category, while those in the underweight category consume fruit less often than once per day. For those who fall into the obese category despite consume fruit daily, it can be observed that their consumption of sweets and repeated consumption of biscuits can be found on a daily basis. 74.5% of women in the normal weight group consume fruit more often than the average, but overweight people (49.1%) mainly incorporate fruits into their meals 2-3 times a week. In the case of poultry meat and meat products, 71.6% of women with normal body weight and 82.1% of overweight women consume more than the average. In contrast, 37.5% of underweight men consume poultry products 2-3 times a week, while the amount of daily consumers is the highest in the normal body weight category (51.7%). Pork is not consumed at all by underweight men, but 50.0% of those in this category eat such food at least 2-3 times a week, while the highest proportion of daily pork consumers were observed in the overweight category (47.6%). In the case of

women, the proportion of those who consume pork daily is higher in the normal body weight class (76.9%), and very low among overweight women (2 people). 61.5% of those with normal body mass index and 70.5% of overweight people consume pork and pork products once per week or more often. 68.8% of women who consume eggs on a daily basis are of normal weight, while those in the underweight category eat eggs mostly (28.6%) once per week. In the case of men, those belonging to the underweight category do not consume this main source of protein at all, while those with normal body weight (45.5%) and overweight men (42.4%) represent a high proportion of those consuming eggs on a daily basis. Similar values can be observed in the case of milk and cheese as men consume more than 50% above the average in all categories, and high values were obtained for the frequency of 2-3 times a week, which is also the case for women. In the case of sour cream, the average frequency of consumption is close to and below the average for both women and men. Women and men in the underweight category do not consume sour cream on a daily basis, and women tend to be below the average compared to men's respective average value. Sugar intake and a healthy diet are closely linked, as excessive sugar intake can lead to obesity. 35.8% of women surveyed who consume sugar daily can be classified in the normal category based on their body mass index, but 39.2% of overweight people consume sugar daily and 33.3% consume sugar 2-3 times a week for the purpose of flavouring. The obtained results also show the same tendency in men, as 37.0% of normal weight people use it in their meals daily.

Foods consumed at least once a week also include coffee, which shows a significant association between BMI index in men, showing that there is a relationship between body mass index categories and the frequency of coffee consumption ( $\chi^2$  test,  $p < 0.05$ ; Cramer's V coefficient = 0.252). Based on the results obtained, the proportion

of normal-weight consumers whose coffee consumption is above average (54.6%) is higher than that of overweight people (55.5%). However, 38.6% of those in the underweight category drink coffee daily. In the case of women, 62.9% of the daily consumers are of normal weight and those in all four categories consume more than 50% more coffee above the average (underweight: 57.1%; normal: 63.6%; obese: 52.4%; overweight: 70.6%).

#### 4. Conclusions and Recommendations

Regarding consumed foods, it can be concluded on the basis of the quantitative research findings that the eating habits of the students of Debrecen differ from those considered healthy at one or two points but do not show any drastic values. The results of the population survey questionnaire are much closer to the healthy diets defined by professionals in terms of frequency. Examining the components of the different meals, sweets were highly represented, which shows high sugar consumption. The reason for this phenomenon is the frequent consumption of caffeine-containing drinks (coffee, tea). Based on the available data, it became evident that the high milk and sugar consumption of the students of Debrecen was mainly observed during coffee consumption. Respondents consume coffee several times a day, but very low consumption was shown for energy drink, even though it is considered to be a substitute of coffee by many. As regards these drinks, the majority of respondents do not use natural sweeteners, such as honey, but sugar. The rising popularity of natural sweeteners is a particularly important criterion for a healthy lifestyle. In addition to irregular eating habits, the low amount of fluid intake is problematic, as the average daily intake of 1.8-2 liters/person is below recommended levels, even though this value varied from 0.7 liter to 3 liters daily among

the respondents, with only 15% consuming less than 2 liters of liquid and 33.9% consuming 3 liters or more per day. In the case of total consumption, sugary soft drinks appear with a higher value in addition to water, and only a small part are energy drinks. Another method of promoting fluid intake is that, in addition to the total fluid intake, fluid supplementation in the form of a greater amount of soup should be emphasised, as the optimal amount of fluid intake is essential for the proper functioning of the body.

Nutrition has a significant impact on body weight, which, according to the BMI index, can be categorized as overweight for men on average and normal for women. This means that, in order to maintain body weight and maintain a healthy life, women should not take in more energy than a certain amount per day, or they should increase their physical activity. In the case of men, the majority should pay particular attention to developing the proper body weight in order to avoid health problems in the future. A comparison of food intake once a week or more often and the body mass index shows a significant relationship between men and coffee alone, but its potency is not significant. Consequently, the frequency of consumption of different foods and the degree of obesity categorized on the basis of the BMI index do not correlate with each other and it cannot be stated that overweight students in Debrecen consume foods high in sugar that is less beneficial to their health.

The main contribution of the presented article consists of the consumer habits of the university students of Debrecen. Furthermore, its significance lies in the fact that it examines one of the most significant age groups in terms of adulthood, which has become increasingly come to the front in various international and domestic researches. The reason is that this age group already makes an independent decision about their own meals. It was important for us to examine the extent to which members of this

age group can be considered health conscious.

The article may be limited by its research focus on just one selected university in Hungary, so we can only generalize based on the obtained data. In the future will be subservient to compare a similar survey at other similar higher education institutions and to compare findings, even at the international level, as there may be significant differences in the health status of countries and regions. However, the survey has not further examined in the amount of consumption and the time elapsed between meals, proportion of cooked dishes and raw foods, in the future it will be useful to examine these factors as well in order to form a comprehensive picture of consumption.

## 5. Summary

Altogether, the collected and analysed data suggest that the eating habits of the studied age group differ slightly in frequency from the nutritional structure considered to be healthy by technical literature sources. In the

qualitative survey, the most commonly consumed foods on average were vegetables and fruits, milk and cheese, and even eggs (average: 2-3 times a week). In terms of frequency, the lowest mode of respondents, i.e. "never", was observed for durum pasta, while honey is consumed less often than once per month. Based on the obtained results, the structure of consumption is based on regular meals and a slight quality problem is observed, which is due to the fast meals between classes in the study period. The results show that there is no significant difference in the frequency of consumption, except in the case of foods high values.

There is a significant relationship between BMI index and food groups only in the case of coffee. In other cases, there is no correlation between the degree of obesity of Debrecen students and the frequency of food consumption.

**Acknowledgment:** The work/publication is supported by the EFOP-3.6.1-16-2016-00022 project. The project is co-financed by the European Union and the European Social Fund.

## References:

- Bach-Faig, A., Berry, E. M., Lairon, D., Reguant, J., Trichopoulou, A., Dernini, S., ..., & Serra-Majem, L. (2011). Mediterranean Diet Pyramid Today. Science and Cultural Updates. Mediterranean Diet Foundation Expert Group. *Public Health Nutrition*, 14(12A), 2274-2284.
- Bácsné Bába, É., Fenyves, V., Szabados, Gy., Pető, K., Bács, Z., & Dajnoki, K. (2018). Sport Involvement Analysis in Hungary, in the North Great Plain Region. *Sustainability*, 10(5), 16-29. doi: 10.3390/su10051629.
- Balázs, A. (2010). Gyógynövények szerepe az elhízás megelőzésében és kezelésében [Role of phytotherapy in the prevention and treatment of obesity]. *OrvosiHetilap*, 151(19), 763-773.
- Bánáti, D. (2011). Consumer response to food scandals and scares. *Trends in Food Science & Technology*, 22(2-3), 56-60.
- Barcs, J., & Jenes, B. (2017). Funkcionális élelmiszerek növekvő népszerűsége – a hazai cereáliapiac fogyasztói megítélése [Growing demand for functional foods – the customer perception of the domestic cereal market]. *Táplálkozás marketing*, 4(1-2), 23-37. doi:10.20494/tm/4/1-2/3.
- Barna, M. (2007). *A táplálkozás és az egészség szempontjai az élelmiszeripar fejlődésében [Aspects of nutrition and health in the development of the food industry]*. The future of the food industry. Budapest: ÉFOSZ.

- Berke, Sz., Huszka, P., Laki-Lukács, A., & Iglói, N. (2012). Az egészséges életmód és a testmozgás megítélése kaposvári fiatalok körében [Perception of a healthy lifestyle and exercise among the young people of Kaposvár]. *Entrepreneurial and Economic Trends in the Carpathian Basin Volume I*. (ed.: Fejér-Király, G. & Lázár, E.). Csíkszereda: StátusKiadó, 86-97.
- Biró, Gy. (2004). Új funkcionális élelmiszer alkotórészek – A rosszindulatú daganatok és az oxidatív degradáció [New functional food ingredients - Malignancies and oxidative degradation]. *Édesipar*, 50(4), 137-146.
- Bryan, J., Tuckey, M., Einöther, S. j. L., Garczarek, U., Garrick, A., & De Bruin, E. A. (2012). Relationships between tea and other beverage consumption to work performance and mood. *Appetite*, 58(1), 339-346. doi:10.1016/j.appet.2011.11.009.
- Davis, C., Bryan, J., Hodgson, J., & Murphy, K. (2015). Definition of the Mediterranean Diet; A Literature Review. *Nutrients*, 7(11), 9139-9153.
- De Boer, J., & Aiking, H. (2018). Prospects for Pro-Environmental Protein Consumption in Europe: Cultural, Culinary, Economic and Psychological Factors. *Appetite*, 121, 29-40. doi:10.1016/j.appet.2017.10.042.
- DeCosta, P., Møller, P., Frøst, M. B., & Olsen, A. (2017). Changing Children's Eating Behavior – A Review of Experimental Research. *Appetite*, 113, 327-357. doi:10.1016/j.appet.2017.03.004.
- Enser, M. (2001). „Hústermékek az egészséges táplálkozás szolgálatában” Beszámoló a hústudomány és Technológia 46. Nemzetközi Kongresszusáról [“Meat products for a healthy diet”. Report on the 46th International Congress of Meat Science and Technology]. *A Hús*, 11(1), 9-30.
- Harvard School of Public Health (2013). *Healthy Eating Plate*. Retrieved on May, 25, 2019, from: [https://www.shape.hu/27778\\_egeszseges\\_taplalkozasi\\_piramis\\_a\\_harvard\\_kutatoitol](https://www.shape.hu/27778_egeszseges_taplalkozasi_piramis_a_harvard_kutatoitol) and <https://www.hsph.harvard.edu/nutritionsource/healthy-eating-plate/>
- Haven, J., Burns, A., Britten, P., & Davis, C. (2006). Developing the Consumer Interface for the MyPyramid Food Guidance System. *Journal of Nutrition Education and Behavior*, 38(6), 124-135.
- Hawkes, C. (2004). Nutrition labels and health claims: the global regulatory environment. *World Health Organization*, 1-88.
- Hidvégi, P., Kopkáné Plachy, J., & Müller, A. (2015). *Az egészséges életmód [A healthy lifestyle]* (ed.: Hidvégi P.). Eger: Eszterházy Károly Főiskola, Sporttudományi Intézet.
- Huszka, P. (2012). Néhány gondolat a 13-14 éves korosztály táplálkozási szokásairól. „A marketing újtrendjei” [Some thoughts on eating habits for 13-14 year olds. „New marketing trends”]. *A Kautz Gyula Gazdaságtudományi Kar és a Regionális- és Gazdaságtudományi Doktori Iskola konferenciája*, Győr, 2012.12.11. 236-253.
- Keys, A., Fidanza, F., Karvonen, M. J., Kimura, N., & Taylor, H. L. (1972). Indices of relative weight and obesity. *J Chronic Dis*, 25(6), 329-343.
- Lude, M., & Prügl, R. (2018). Why the Family Business Brand Matters: Brand Authenticity and the Family Firm Trust Inference. *Journal of Business Research*, 89(August), 121-134. doi:10.1016/j.jbusres.2018.03.040.

- Marjainé Szerényi, Zs., Zsóka, Á., Kocsis, T., & Széchy, A. (2012). A fiatalok fogyasztási és életmódbel szokásai a környezetneveléstükrében [Consumption and lifestyle habits of young people in the light of environmental education]. *Új Pedagógiai Szemle*, 62(11-12), 15-36.
- Marty, L., Chamberon, S., Nicklaus, S., & Monnery-Patris, S. (2018). Learned pleasure from eating: An opportunity to promote healthy eating in children? *Appetite*, 120, 265-274. doi:10.1016/j.appet.2017.09.006.
- McGinnis, J. M., Appleton Gootman, J., & Kraak, V. I. (2006). Food marketing to children and youth. Threat or Opportunity. Washington: The National Academies Press.
- Mendis, S., Puska, P., & Norrving, B. (2011). Global Atlas on Cardiovascular Disease Prevention and Control. *World Health Organization*, Geneva, 2011. Retrieved on May, 20, 2019 from: [http://whqlibdoc.who.int/publications/2011/9789241564373\\_eng.pdf](http://whqlibdoc.who.int/publications/2011/9789241564373_eng.pdf)
- Menrad, K. (2003). Market and marketing of functional food in Europe. *Journal of Food Engineering*, 56(2-3), 181-188.
- Mollet, B., & Rowland, I. (2002). Functional foods: At the frontier between food and pharma. *Current Opinion in Biotechnology*, 13(1), 483-485.
- Népegészségügyi (2015). *Észak-Magyarországi Regionális Népegészségügyi jelentés 2015 [Northern Hungary Regional Public Health Report 2015]*. Retrieved on May, 25, 2019, from: [www.kormanyhivatal.hu/.../Regionalis...Jelentes\\_2015.pdf](http://www.kormanyhivatal.hu/.../Regionalis...Jelentes_2015.pdf)
- Papp, A., & Lugasi, A. (2018). Finom, egészséges és népszerű – gasztronómiai kihívások gyermek-és fiatalok között [Delicious, healthy and popular - gastronomic challenges for children and adolescents]. In: *A magyar gyermekek és fiatalok életmódja: táplálkozás, testmozgás és lélek (Szerk.: Antal, E., Pilling, R.)*, TÉT Platform Egyesület, 2018.
- Piskóti, I., Nagy, Sz., & Kovács, A. T. (2006). Fogyasztómagatartás a funkcionális élelmiszerek piacán [Consumer behavior in the functional food market]. *Marketing Kaleidoszkóp*, Miskolc, 117-127.
- Ramsden, C. E., Zamora, D., Majchrzak-Hong, S., Faurot, K. R., Broste, S. K., Frantz, R. P., ..., & Hibbeln, J. R. (2016). Re-Evaluation of the Traditional Diet-Heart Hypothesis: Analysis of Recovered Data from Minnesota Coronary Experiment (1968-73). *BMJ*, 353 i1246. doi:10.1136/bmj.i1246.
- Rang, V. (2016). Food Pyramid. Retrieved on June, 02, 2019, from: <https://viralrang.com/food-pyramid/>
- Rodler, I. (ed.) (2005). *Újtápanyagtáblázat [New food composition table]*. Budapest: Medicina Könyvkiadó Rt.
- Ruini, L. F., Ciati, R., Pratesi, C. A., Marino, M., Principato, L., & Vannuzzi, E. (2015). Working Toward Healthy and Sustainable Diets: The “Double Pyramid Model” Developed by the Barilla Center for Food and Nutrition to Raise Awareness about the Environmental and Nutritional Impact of Foods. *Frontiers in Nutrition*, 2(9). doi:10.3389/fnut.2015.00009.
- Szakály, Z. (2011). *Táplálkozásmarketing [Nutrition Marketing]*. Budapest: Mezőgazda Kiadó.
- Szakály, Z. (1994). Korszerű állati eredetű alapélelmiszerek piacképességének vizsgálata [Investigation of the marketability of modern basic foodstuffs of animal origin]. *Kandidátusi Értekezés*, Kaposvár: PATE, Állattenyésztési Kar, 1-200.
- Szakály, Z. (2004). Táplálkozási dilemmák és az élelmiszerek fejlesztésének világstratégiai irányai [Dilemmas of nutrition and world strategic trends of development of foodstuffs]. *Élelmiszer, Táplálkozás és Marketing*, 1(1-2), 1-11.

- Szakály, Z., Popp, J., Kontor, E., Kovács, S., Pető, K., & Jasák, H. (2017). Attitudes of the Lifestyle of Health and Sustainability Segment in Hungary. *Sustainability*, 9(10), 1-16. doi:10.3390/su9101763.
- Szöllősi, L., Molnár, Sz., Molnár, Gy., Horn, P., & Sütő, Z. (2017). A tojás, mint alapvető és funkcionális élelmiszer táplálkozás-élettani jelentősége [Nutritional significance of eggs as a basic and functional food]. *Táplálkozásmarketing*, 4(1-2), 7-22. doi:10.20494/TM/4/1-2/2.
- Taylor, C. M., Wernimont, S. M., Northstone, K., & Emmett, P. M. (2015). Picky/Fussy Eating in Children: Review of Definitions, Assessment, Prevalence and Dietary Intakes. *Appetite*, 95, 349-359. doi:10.1016/j.appet.2015.07.026.
- Törőcsik, M. (2007). *Food-trendek és trendi vásárlói csoportok [Food trends and trendy customer groups]*. Budapest: Akadémiai Kiadó.
- Trautwein, E. A., Koppenol, W. P., de Jong, A., Hiemstra, H., Vermeer, M. A., Noakes, M., & Luscombe-Marsh, N. D. (2018). Plant Sterols Lower LDL-Cholesterol and Triglycerides in Dyslipidemic Individuals with or at Risk of Developing Type 2 Diabetes; a Randomized, Double-Blind, Placebo Controlled Study. *Nutrition and Diabetes*, 8(1), 1-13. doi:10.1038/s41387-018-0039-8.
- Vida, V., & Szűcs, I. (2016): Társadalmi-kulturális kérdések és a tradíciók szerepe a sertéshúsfogyasztásban [The role of socio-cultural issues and traditions regarding pork consumption]. *Táplálkozásmarketing* 3(2), 79-89. doi:10.20494/TM/3/2/6.
- Welsh, S., Davis, C., & Shaw, A. (1992): Development of the Food Guide Pyramid. *Nutrition Today*, 27(6), 12-23.
- World Health Organization (2019): *Nutrition and food security*. Retrieved on June, 02, 2019, from: [https://www.who.int/foodsafety/areas\\_work/nutrition/en/](https://www.who.int/foodsafety/areas_work/nutrition/en/)
- Young, Y. (2000). Functional foods and the European consumer. In: Functional foods. II. Claims and evidence. (ed.: Buttriss, J. & Saltmarsh, M.), London, UK: The Royal Society of Chemistry. 25-34.
- Zsarnóczay, G. (2009). A vöröshúsok szerepe a táplálkozásban [The role of the red meats in human nutrition]. *Élelmiszer, Táplálkozásés Marketing*, 6(1-2), 51-58.

---

**Laura Karnai**

University of Debrecen,  
Faculty of Economics and  
Business,  
Debrecen, Hungary  
[karnai.laura@econ.unideb.hu](mailto:karnai.laura@econ.unideb.hu)

**László Szöllősi**

University of Debrecen, Faculty  
of Economics and Business,  
Debrecen, Hungary  
[szollosi.laszlo@econ.unideb.hu](mailto:szollosi.laszlo@econ.unideb.hu)

**Andrea Bauerné Gáthy**

University of Debrecen, Faculty  
of Economics and Business,  
Debrecen, Hungary  
[bauerne.gathy.andrea@econ.unideb.hu](mailto:bauerne.gathy.andrea@econ.unideb.hu)

**István Szűcs**

University of Debrecen,  
Faculty of Economics and  
Business,  
Debrecen, Hungary  
[szucs.istvan@econ.unideb.hu](mailto:szucs.istvan@econ.unideb.hu)

---