

Analysis of nutrient intake values and nourishment status of college students

Doctorial thesis

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Introduction

With the consistent increase of the number of students in higher education, the boundary line between adolescence and adulthood seems to shift. A phase of life is emerging during which the dimensions of becoming an adult unfold according to a staggered pattern. Sociologists tend to call the period that wedges between adolescence and adulthood a post-adolescent phase. Accordingly, modern societies have witnessed a gradual separation between moments of becoming sexually mature, growing up and becoming an employee.

Proper nourishment is vital for the young adults because they tend to develop life-long habits in this age and their way of life shall significantly influence their future health status. Young adults frequently lead a fairly hectic life, neglect the development of appropriate eating habits. For example, omission of taking proper breakfast is characteristic of this age and is particularly true to students intending to continue their studies. Short sleep and rest periods, having convivial evenings and nights, irregular periods of learning and eating are characteristic of the university years.

At the same time, the same students are expected to become persons of great attainments and to form the future community of intellectuals and to set good example to others. Their role in contributing to the prevention of nutrition-related diseases is vital also for the next generations.

Growing attention worldwide has been paid during the past years to the examination of inadequate nutritional habits which can influence the development of the human body and the future quality of life, from the moment of conception to achieving adulthood. Thorough domestic and international research of the group of young adults (of age between 19 and 25) examined by me has scarcely been conducted. Although this age group belongs officially to the class of adults, some special features (e.g. they attend institutions of higher education or they work or learn and assume a job) justify that this part of the population be subjected to particular scrutiny. In particular, students of higher education deserve special attention and targeted nutritional recommendations should be developed because their way of life, nutritional habits and possibilities differ from those of any other adult age groups.

Various international studies focused on the age group of young adults deserve our attention, e.g. a team consisting of international research fellows examined in 1997 the patterns of the way of life and dietary habits of young adults of several nations (US, Dutch and French). In 2000, Soriano et al. analyzed the dietary habits of Spanish university students. In 2004, Greek researchers examined the dietary habits of medical students (by means of 24-

hour-recall) attending the University of Crete. Since 1987, the nutrient intake of Swedish medical students has been regularly monitored as an integral part of the curriculum.

From among the research projects carried out in Hungary, should be mentioned the “First Hungarian Representative Nutrition Survey” made between 1985 and 1988 concerning the target group of Hungarian adults selected by me. It was repeated in the frame of the “Second National Nutrition Survey” carried out between 1992 and 1994, using a smaller sample of citizens. In 2001 and 2003, a National Population Health Survey was completed. In 2005, the specific age group chosen by me was surveyed by analyzing the nutrient intake habits of the medical and chemistry students. Most recently, a National Survey of Nutritional and Alimentation Status and a dietary survey controlled by MÉBIH (Hungarian Food Safety Authority) was completed in 2009.

The above mentioned surveys were focused on the analysis of proper nourishment, nutrient intake and food consumption patterns. The adequacy of nourishment is most frequently established by the following anthropometric measurement methods: Body Mass Index (BMI) which is suitable for establishing underweight, obesity and the normal nutritional status. Evaluation of data related to the waist-to-hip ratio or the abdominal circumference provides information regarding the type of obesity. Data regarding the body composition is provided by a device based on the principle underlying the Bioelectric Impedance Analysis and designed to scrutinize one’s body composition.

The following methods can be applied in the course of nutritional-epidemiological studies: 24-hour recall, taking of a food record (most frequently, it spans 3 days), food frequency questionnaire and drawing up a diet history.

Objectives

My examinations were focused on exploring the nutrient intake and nutritional status of students attending institutions of higher education (laying particular emphasis on making distinction between health care students specializing in different studies) and attempting to influence their eating habits via education. I inquired in the subject looking for answers to the following questions:

- What is the degree of balance vs. imbalance between the individual nutrient intake values of the participants involved in the examination?
- Whether the nutrient intake values of dietetic students (assuming to have more detailed knowledge in nutritional science) are more favorable than those recorded in case

of students specializing in physiotherapy, nursing fields or the students of Budapest University of Technology and Economics?

- Shall I recognize significant differences between the results achieved by the various methods used to establish the nutritional status (BMI, BIA, abdominal circumference)?
- How high is the prevalence of obesity in the examined population, although the examined persons shall, at a high degree of probability, belong to the category of normal nutritional status, due to their age.
- How much is the difference I can establish regarding the nutritional status of the examined groups, i.e. the proportion of dietetic and physiotherapist students shall exceed that of the registered nurse and engineer students in the 'normal' category?
- How efficiently were the members of the examined groups made acquainted with the principles of healthy nourishment during their general and secondary education?
- Whether students of faculties other than dietetic science will be satisfied with the number of nutrition-related lesson-hours and the quality of the related curriculum?
- Apart from the dietetic students, the students of which faculties shall most probably be prompted to alter their present eating habits, on the basis of the new knowledge gathered in higher education?

Methodology

When setting the objective of my work, I decided to examine 100 students from both the department of dietary science, physiotherapist and nursing, attending the Health Sciences Faculty of Semmelweis University and 100 students attending the Budapest University of Technology and Economics. In fact, 102 dietetic students, 84 physiotherapist students and 106 students specializing in other capabilities (e.g. nurses, public health and epidemiology inspector, health visitors and midwives) were examined, in addition to 72 would-be-engineer students. I removed from the preliminary list the participants who were older than 25 or pregnant at the time of initial data recording or consumed exceedingly much or little from some nutrient in the period of data processing. I established the participants' nutritional status using different methods, like BMI, body fat and muscle ratio and abdominal circumference measurement. The BMI figures were calculated using real values of height and weight. Initially, estimated height and weight data was recorded to calculate estimated BMI values. I measured the abdominal circumference using calibrated measuring tape. Body fat was established using

an OMRON BF500 device. The nutrient intake values were established on the basis of 24-hour recall data. The size of portions was specified using an album containing photos of plates of different sizes. Information regarding the efficiency of education was gathered using a questionnaire developed by me to contain both open and closed questions. Students specializing in dietetic science helped me to gather and record proper data.

I analyzed the nutrient intake values on the basis of 24-hour recall reports, using NutriComp nutrient calculation software. Statistical processing was completed using an SAS System for Windows (Release 9.1.3, Statistical Analysis System, SAS Institute Inc, Cary, NC, USA) program, descriptive statistical analyses and significance tests (exact chi-square test, variance analyses). I completed each statistical test at 5% significance level.

Results

In the present study, I examined the nutritional status and eating habits of young adults (between 19 and 25 years) and inquired their attitude towards listening to education on healthy alimentation. My research was more detailed and complex than any previous study made in the age group of young adults. Students specializing in dietetic science helped me to gather and record proper data because they had already acquired much experience during their studies in recording anthropometric and nutrient intake data.

The results of my nourishment status surveys allow for drawing the following conclusions:

- Based on their average BMI values (men: 24.25 kg/m², women: 22.09 kg/m²) they could be classified to the *normal BMI category*.
- I compared the *BMI values estimated by the participants with the actually measured ones*. The results suggest that *a part of them* (primarily, the overweight or slightly obese persons) *underestimated the real situation*.
- The average energy intake of the examined persons remained below the recommended level. *15.93% of the participants face overweight problems and 2.2% of them are obese*, most probably, due their low physical activity. *3.02% of the participants* were expressly *lean*.

- I used various methods to establish the participants' nutritional status. Since the results produced by these methods diverged, I would recommend *application of other methods, as well, to this age group in addition to the BMI method*, in order *to achieve more accurate results*.
- The Bioelectric Impedance Analysis (BIA) revealed that 59,62 %, 17.86 % and 12.09 % of the young adults belonged to the normal, high and very high body fat category. In other words, *even persons classified to the normal BMI category can face problems produced by higher body fat ratios*.
- On the basis of their abdominal circumference, *65.38 % of the participants are not exposed to risk of abdominal adiposity* or, in this context, of contracting any non-contagious but nutrition-related disease.

The analysis of the 24-hour recall reports allowed me to draw the following conclusions:

- According to the nutrient intake values, *the total energy intake remained below the recommended level*, in case of both genders.
- The analysis of the percentage distribution of nutrient ratios, the proteins achieved the top level in the diet, i.e. 15 E% (E = energy percentage), in case of both genders. Also the intake of fats exceeds 30 E%. The intake of carbohydrate remains below the recommended 55 E% level. The average added sugar consumption has grown just to the recommended value (i.e. 10 E%). Accordingly, the *nutritional mistakes* made already in this age *are identical with those characteristic of the entire Hungarian society*.
- The findings of my study confirm the need for paying more attention to *the optimum intake of the macro and micro nutrients* whose *imbalanced* and excessive or, vice versa, penurious consumption by both the adults and young adults has been suggested by every recent survey.
- *It is favorable* that according to the surveys broken down by faculties/departments showed better results in case of dietetic students, e.g. these students consumed significantly more food rich in dietary fiber than the students attending other faculties/departments.

- The intake of calcium and iron by women is *unfavorable*, similarly, the growing intake of sodium by young men accompanied by low intake of potassium makes detrimental effects and also the excessive consumption of cholesterol is characteristic of the male participants. Furthermore, mention should be made of the insufficient intake of vitamin B₁, vitamin B₂ and vitamin C, folic acid, pantone acid, retinol equivalent and vitamin D in case of both genders and the scarce intake of vitamin E by women.
- In the course of recording 24-hour recall data, the questioning dietetic expert had a *photo album* as to assist the examined person in identifying more accurately and easily the *size of portion of the consumed food* and aliments.
- Based on all the above information, I deem the compilation of *an age group specific recommendation* a viable possibility.

The answers to the education-related questionnaire allowed me to draw the following conclusions:

- The *dietetic students* were those who *altered more willingly their eating habits*.
- Similarly, the *dietetic students* constituted the group *most satisfied with the curriculum of subjects taught on the issue of healthy nutrition*.
- In my opinion, *it is favorable* that 77.3 % of the students of the Budapest University of Technology and Economics wished to learn more about healthy food and nutrition and 81.8% would be willing to alter their eating habits provided that they are offered appropriate courses on that subject.
- *Unfavorably*, those who failed to alter their eating habits despite their participation in educational courses, mentioned the lack of their persistence as primary reason.
- The present study suggests that *the willingness to alter someone's way of life and eating habits* does not vanish in the age of 13 or 14 but *this period can be prolonged to the end of young adulthood* (i.e. up to the period between 19 and 25 year).

The new results of my research efforts can be summarized as follows:

- The age group discussed here (i.e. young adults between 19 and 25) has not yet been examined *in such details and pursuing so many aspects*.
- The more accurate representation of the size of food portions using the 24-hour recall method (and the photo album) yielded more accurate information on nutrient intake; this method has not yet been applied *specifically to either age group*.
- I used several methods for establishing the participants' nutritional status (BMI, BIA, FFMI – Fat Free Mass Index, abdominal circumference measurements) and proved that also other methods need to be *applied (in addition to BMI) to the examined age group*, in order to obtain more *accurate* results.
- Differences can be observed *in the examined age group between the estimated and the actually measured BMI values*.
- Neither the content or quality of education provided *on the subject of healthy nutrition* to students specializing in health care nor its relationship with *their nutritional status or their eating habits* have been studied formerly.
- I recognized the *difference by university departments between the nutrient intake values* (in general, dietetic students achieved better results).
- The present study suggests that *the willingness to alter someone's way of life and eating habits* does not vanish in the age of 13 or 14 but *this period can be prolonged to the end of young adulthood* (i.e. up to the period between 19 and 25 year).
- Based on all the available information, I deem the compilation of *an age group specific recommendation* a viable possibility.
- The students involved in the research showed much interest in learning more about healthy life and nutrition. This age group is ready to accept alterations in the hope of improving their health and fitness. They would willingly participate in *educational programs* that could be implemented through a *co-operation of the institutions* of higher education.

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