

FEATURES OF THE FOOD STATUS OF THE MODERN STUDENT AT THE UNIVERSITY LEVEL

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Abstract. The analysis of anthropometrical data and of students' nutrition at University of Applied Sciences (Kaunas, Lithuania) and Yanka Kupala State University of Grodno (Grodno, Belarus) has been carried out; recommendations regarding organization of assessment system along with a specially designed computer programme to evaluate the actual situation of student nutrition have been provided in this paper. The programme design to analyse students' nutritional conditions is based on a number of indicators, including anthropometrical data, assessment of energy demand, assessment of nutritional status based on the profile of food consumption, frequency of meals consumed, an assessment of nutritional status based on the profile of nutrient consumption.

Keywords: students, computer program, nutrition, nutritional status.

Introduction

Regular surveys of health and nutritional status of different population groups indicate the existence of deficiencies of the major nutrients (protein, alimentary fibers (AF), vitamins, minerals, polyunsaturated fatty acids (PUFAs)), which can lead to a various nutritional diseases - cardiovascular, the digestive tract (DT), disturbances of functions of vision, etc. The prevalence of these diseases has increased in recent years. Furthermore, the students belong to the category of the population, which is characterized by low physical activity and increased neuro-emotional loads (stress), especially during the test and examination period, the presence of bad habits, malnutrition, the significantly decreased body's resistance to harmful environmental factors [1-3]. Moreover, there is insufficient information about the students from higher education institutions that provide professional and higher education; there are no data about a nutritional status of students, as well as a lack of information on application of innovative methods designed to assess functional properties and potential of a young organism, possibility to use corrective measures by optimizing nutrition. Thus, studying of features of the nutritional status of the modern student of a higher educational institution and development of information resource for these purposes is represented especially urgent task.

Methodology of research

A computer program for an assessment of the actual food "Analysis of a condition of nutrition"

(the method of the analysis of frequency of consumption of food, which describes the frequency of consumption of certain types of foods and dishes based on their volume or mass) has been designed for the collection, storage and processing personal data for an assessment of the particular food. A frequency method is used to determine the nutrition [4].

The research of the consumption of products is conducted taking into account an anthropometric data (height, weight, waist/hip index, body mass index), sex, age, the mode of work and rest.

The research is conducted by using a special collection of photos of products that serve for illustrative purposes. The photos of products and dishes represent the prepared dishes full-scale indicating their corresponding weight, as shown in Figure 1. In addition, the programme allows to create own dishes and a set of the products included in the photo album. Such approach allows to considerably minimise the risk of inadequate assessment of own food by the user. The programme also allows to create own meals and a set of products included in the album. This approach can significantly minimize the risk of inadequate assessment of the food.

This programme is specially designed to assess own nutrition and allows the user to:

- to enter personal data and create profiles, to print them;
- to store profiles in the database;
- to edit previously entered profiles;
- to create profiles on the reports.

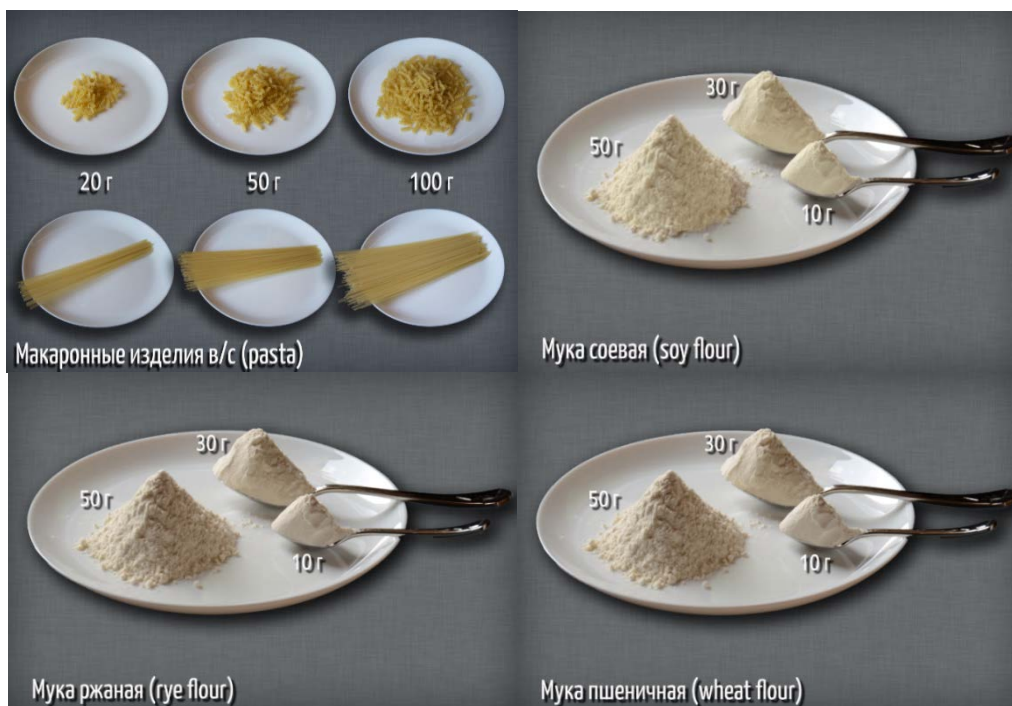


Figure 1. Example of food photographs

Profile of the programme is divided into 4 parts - the user's information, the calculation of daily energy consumption, frequency of consumption of food and creation of own dish.

1. The user profile is completed by the introduction of the personal data (name, gender,

date of birth) and anthropometric data (height, weight, waist/hip index). Example of the profile is shown in Figure 2. Then, the programme calculates the basal metabolic rate, BMI.

2. Go to View / Edit Profiles, with double click on the line with the selected questionnaire.

Figure 2. Example of the user's profile

3. The profile on physical activity is completed. Filling of a profile is performed as follows: Exhibited amount of time, time allotted for sleep, an educational and physical activity/work, driving, hygienic procedures, eating, rest and sports. The time allotted for training and work as opposite to time spent for reading and studying, performance of work. A five point scale is used to identify human activity throughout the day.

4. The profile is completed, considering the frequency and the number of meals consumed per day.

In the provided programme food is divided into the following functional groups: beans, nuts and seeds; auxiliary nutrients and flavour enhancers; fat

products; grain and processed products; confectionery; milk and dairy products; meat and meat products; drinks; vegetables, mushrooms and processed products; fish, seafood and processed products; fruit, berries and processed products; eggs and egg products; «my dishes».

Each group of products contains a large number of specific products. The programme has been widely distributed in order to carry out an objective assessment of a wide range of the products, commonly used in student's diet.

5. Filled "My dishes" section. Example of the "My dishes" section is shown in Figure 3.

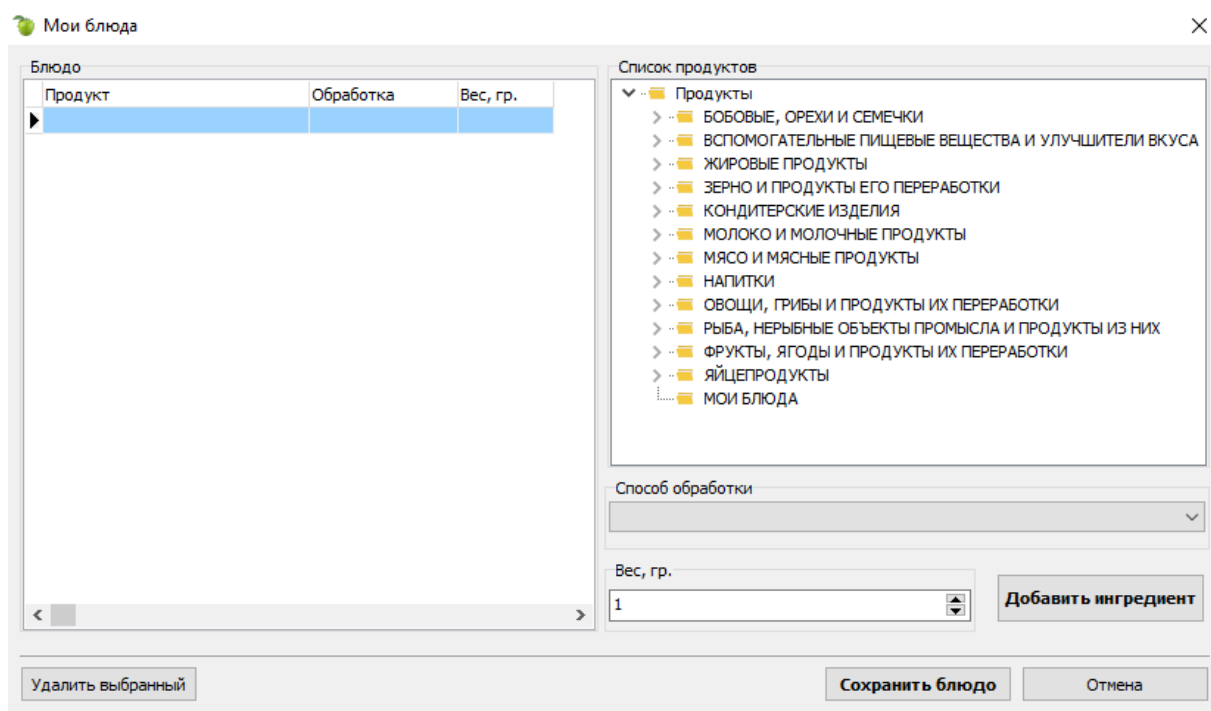


Figure 3. Example of the "My dishes" section

The user creates own dish, and the provided set of ingredients, choosing a necessary method of a thermal treatment (boiling, steaming, stewing, frying, baking) and weight of products.

Example of filling of the profile considering the frequency and the number of consumption of the products per day.

In the beginning the user selects meal time: a breakfast, a lunch (the second breakfast), a dinner, an afternoon snack, the first supper and the second supper. Then user selects the group of products, for example, grain and processed products. This group contains 3 subgroups of products – grains, cereals, processed products and flour. In one of this subgroups, for example, cereals, nutrition assessment is conducted according to the category as follows: buckwheat, corn, oat grain, oat-flakes,

oat flour, millet cereal, rice, pearl-barley, barley, semolina, wheat cereals.

When the product is chosen from the list, the user gets the information regarding the size of one regular portion in grams or ml. To facilitate the weight characteristics of the products in the process of entering data for each product, images of these products are displayed on screen (all photos are copyrighted) full size (for a 15-inch screen) and their weight is indicated (Figure 1). Thus, the user enters data into the programme based on the frequency and weight of one portion from 558 types of products listed.

Statistical analysis of the data was performed using Microsoft Office Excel 2007 processor, statistics package Statistisa 6.0 and with a set of applications [5].

Results of Research

In total 100 students from University of Applied Sciences (Kaunas, Lithuania) and Yanka Kupala State University of Grodno (Grodno, Belarus) took part in the research, the average age of the respondent was 19.8 ± 2 years.

Results of a programme:

Ф.И.О.: Иванов Иван Иванович Дата рождения: 12.03.1991 Пол: мужской Рост: 180 Вес: 90 ИТМ: 27,78 (избыточная масса тела (предожирение)) Окружность талии: 75 см Окружность бедер: 82 см КФА: 1,58 (Очень низкая физическая активность) Основной обмен: 1833,2 ккал Потребность в энергии: 2000 ккал Фактическое потребление энергии: 2550 ккал Рабочая прибавка: 716,8 ккал Идеальное соотношение Б:Ж:У: 1:1,2:4,6 Реальное соотношение Б:Ж:У: 1:1,3:7 Отношение талия/бедра: Повышенный риск для здоровья

Figure 4. Example of the Basic report

After having entering data, that takes an average of 45-90 minutes, including the time for measuring height, weight, waist, hips, creation of dishes, etc. the analysis of a condition of nutrition of the person is automatically conducted in accordance with the software. Results of the analysis are presented in the report. Example of the report is shown in Figure 4.

The Basic report contains the following data:

- passport, anthropometrical data;
- coefficient of physical activity;
- Assessment of energy demand and its actual consumption;
- Assessment of nutritional status
- Assessment of nutrition on the profile of nutrient consumption (average value of the use of all products in gram/day).

Typical or normal nutritional status has been identified for the majority of the students that participated in the research –82.1%, superfluous status – 1.8%, insufficient – 6.1%. The optimal nutritional status has not been detected in this group of respondents. Table 1 presents students' nutritional status. The data are preliminary and require further investigation by increasing the number of students surveyed.

Table 1 – Students' nutritional status

Assessment of nutritional status	Yanka Kupala State University of Grodno (70 students)	Kauno Kolegija/University of Applied Sciences (30 students)
Normal BMI 18,5-25	81.5 % (57 students)	83% (25 students)
Optimal BMI	–	–
Superfluous BMI >25	11.5 % (8 students)	7 % (2 students)
Insufficient BMI ≤18,5	7 % (5 students)	10 % (3 students)

Conclusions

Assessment of students' nutritional status based on the profile of nutrient consumption showed that along with the general tendencies of nutrition (for example, a lack of alimentary fibers, vitamin A in the diet), excess of the total fat and saturated fatty acids have been identified.

Thus, assessment of nutritional status is based on a complex of indicators: anthropometrical (BMI, height, weight, constitution type, a waist/hip index) and the research aims to assess students'

nutritional status including consumption of food and a number of meals, and a profile of products consumed.

This computer programme allows to reliably analyse nutrition status, to identify compliance of energy intake with body needs, metabolism and energy obtained from food; to identify the adequacy of food balance in percentage expression, the possibility to make corrections regarding types of food, and the list of basic nutrients; to identify the risk of possible diseases and optimize the solutions to these problems.

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