

## ANALYSIS OF THE ENERGY REQUIREMENT AND OF THE ENERGY RECEPTION OF THE CADETS FROM VASIL LEVSKI NATIONAL MILITARY UNIVERSITY

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**Abstract:** *The mission of Vasil Levski National Military University is to develop the cadets in moral, mental and physical aspects, to incorporate them to the ideals of patriotism, duty and honor, to form them as personalities and leaders with developed leaders' competences, capable of developing and implementing the scientific knowledge, to direct public and special structures during peacetime and crises, to participate in national or multi-national projects for keeping of security, peacekeeping and development of the society.*

*Aim of the research: The aim of the research is to determine the values of the energy requirement and of the taken proteins, fats and carbohydrates from a balanced nutrition of the Cadets at Vasil Levski National Military University.*

*The general hypothesis of the research is to confirm the existence of significant disproportions between the consumed energy requirement and the actually taken energy and nutrients through the given to the Cadets food during the process of their training at Vasil Levski National Military University.*

**Keywords:** energy requirement, military training, nutrients

### 1. Introduction

According to the leading specialists in the sphere of nutrition hygiene all persons need one and the same sorts of food substance (nutrients), yet in different quantities, whereby various factors have influence on the physiological needs of nutrient. Among them are: age, physical activity, body proportions, body contents, growth status, particular genetic features, health status, physiological state of women (pregnancy and lactation), climate.

Simultaneously with that, the needs of nutrients and energy of the different groups of the population are grounded by the corresponding norms and regulations, which have different names in the different

countries[1, 4]. Such a document valid in the Republic of Bulgaria is Regulation Nr. 23/19.07.2005 of the Ministry of Healthcare, which determines the physiological norms for nutrition of the population in Bulgaria. The physiological norms for nutrition of the population include the recommended values of food intake and the recommended intervals for food intake.

The implementation of the physiological norms for nutrition aims at satisfaction of the physiological requirements, at achievement of a normal growth and development and at the creation of precondition for a durable good health of the population. These norms are used for

determination of the national policy for nutrition of the population, for evaluation of the individual food intake and of the nutrient intake of groups of population, for elaboration of recommendations for a healthy nutrition of individuals and of groups of population, for planning and control of the organized nutrition of groups of the population [6, 7]. In this aspect, these norms represent a starting point for determination of the contents of the 24-hours ration of the military personnel, because there is no other familiar contemporary specialized research of the Armed Forces.

Nutrition is one of the most important factors, which determine the health of the servicemen. The proper nutrition insures a normal development of the military personnel; encourages the prevention of diseases, prolongs the life expectancy, increases the effectiveness and creates conditions for an adequate adaptation to the environment.

An important stage of the rationalization of decisions, connected with the intake of nutrients and energy of the Cadets is an examination of the energy intake and of the nutrient status of the students at the National Military University. This is so, because through the definition of the intakes it becomes possible to discover the made alimentary violations and the food unbalances. Together with that, the food status and its unbalance are ground for a possible link to some diseases, the general evaluation and the determination of guidelines and recommendations for overcoming the discrepancies.

## **2. Main stages of the research**

The main stages of the implemented methodology for determination of the 24-hours energy requirement lie in:

1: Determination of the method for calculation of the daily energy requirement. Within this stage an examination of the methods for measuring of the energy

requirement was conducted and the method, offered by the Food and Agricultural Organization, the World Health Organization and the University of the United Nations, which was adapted to the specificity of the activity of the Military University, was chosen as the most suitable method for the particular conditions.

2: Analysis of the methods for measuring of the time expenditures and selection of the suitable methods under the particular conditions. From the carried out examinations of the methods for studying of the time expenditures and the specificity of the educative process the conclusion was imposed, that the most suitable method to apply while studying the 24-hours time expenditure, is the method of chronometry.

3: Preliminary study of the basic events, included in the time distribution during the 24-hours period. As a result of the analysis a diagram was made of the organization and of the structure of the 24-hours period of the Cadets at "Vasil Levski" National Military University, according to the time distribution.

4: Analysis of the duration of the specific events of the time distribution of the 24-hours period. During the period from 02.05.2017 to 12.05.2017 a group chronometry of the duration of the specific events, characterized as work activity, from the time distribution during the 24-hours period at "Vasil Levski" National Military University, was carried out.

5: Determination of the physical activity norm (PAN) for each sort of physical activity, based on an analysis and recommendation of the Food and Agricultural Organization, for each activity of the Cadets at "Vasil Levski" National Military University was fixed a PAN.

6: Performance of an individual chronometry during the period from 15.05.2017 to 19.05.2017.

7: Analysis of the obtained results.

## **3. Analysis of the obtained results**

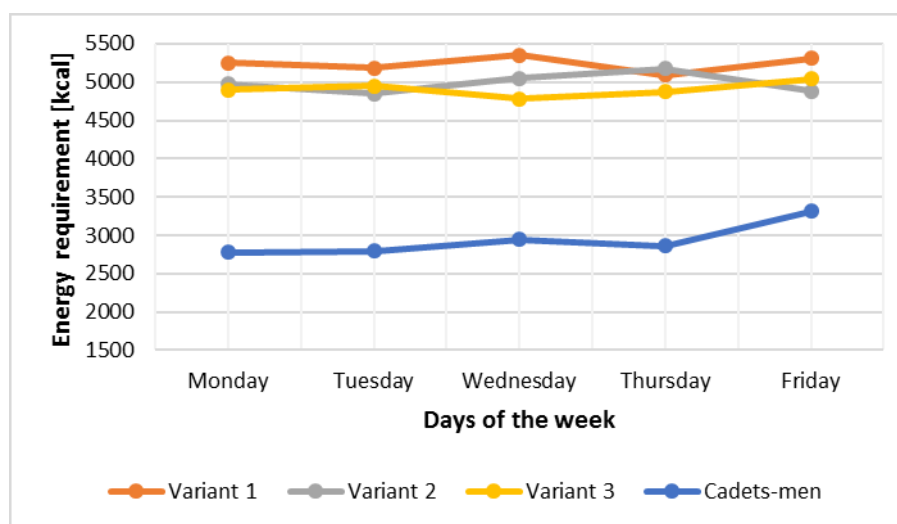
The average secured energy intake

according to the different nutrition variants of the Cadets exceeds significantly the measured energy requirement for the period. For the men the excess is within the limits from 1965.5 to 2295.5 kcal/ daily or from 167% up to 175%. For women the excess is within the limits from 2844 up to 3174 kcal/ daily or from 238% up to 254%.

The secured energy requirement from the prepared food of the different variants of the weekly menu and the actually expended energy requirement for the male and female Cadets during the period from 15.05.2017 to 19.05.2017 are shown in details at Table 1 and Figure 1 and 2.

*Table 1 Energy requirement during the period 15.05.2017 - 19.05.2017*

Days of the week Energy requirement	Mon- day	Tues- day	Wed- nesday	Thurs- day	Fri- day	Average deviation	Standard deviation $\sigma$
Weekly menu - variant 1	5247	5182	5354	5088	5312	5237	106
Weekly menu - variant 2	4977	4851	5053	5172	4883	4987	130
Weekly menu - variant 3	4901	4947	4779	4871	5038	4907	95
Cadets-men	2788	2798	2946	2864	3312	2941	216
Cadets-women	1974	1982	2073	2019	2268	2063	121



*Figure 1: Secured and actually expended energy requirement by Cadets-men during the period 15.05.2017 - 19.05.2017*

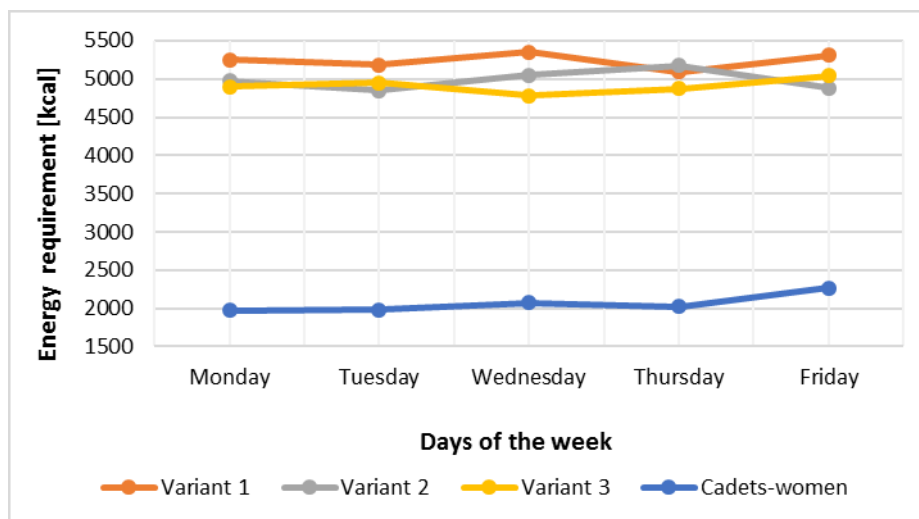


Figure 2: Secured and actually expended energy requirement by Cadets-women during the period 15.05.2017 - 19.05.2017

The covering of the energy and substantial standards for a balanced nutrition of proteins, fats and carbohydrates for one feeding day is owed to the higher secured energy intake according to the different variants of weekly menu [2]. The energy

and substantial standards for a balanced nutrition of one Cadet and the secured energy requirement, according to the different variants of weekly menus during the period 15.05.2017 - 19.05.2017 are shown at Table 2.

Table 2 Energy and substantial standards for a balanced nutrition of one Cadet for one feeding day

Energy and substantial norms	Unit	Norm	Variant of the weekly menu		
			1	2	3
Intake of proteins	Gram	168,5	178,5	178,2	177,5
Including animal	Gram	74,4	102,7	108,3	108,4
Intake of fats	Gram	173,5	221,7	211,3	202,1
Including plant	Gram	86,2	94,4	100,4	94,6
Including animal	Gram	34,7	127,3	110,9	107,5
Intake of carbohydrates	Gram	555,1	596,7	559,3	561,9

The percentage correlation of the intake of carbohydrates demonstrates a totally different vision of the balanced nutrition of the Cadets. The actual intake of common carbohydrates is below the lower limit of the recommended intake ranges for the

intake of common carbohydrates (50%), while its average reading is 46.5 %. Figure 3 shows the daily intake of carbohydrates and the recommended intervals for intake – lower and higher limits of the Cadets during the examined period.

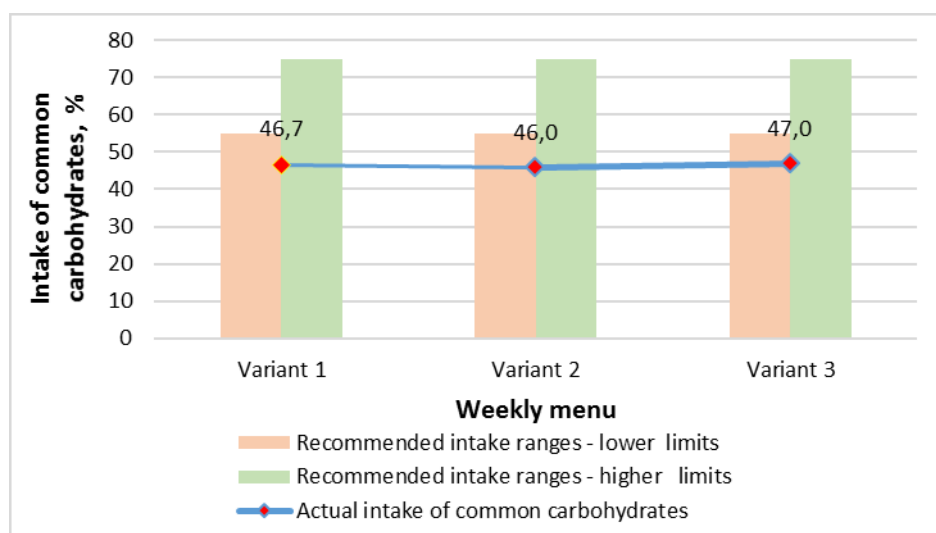


Figure 3: Daily intake of carbohydrates and the recommended intervals for intake

The average intake of fats in the food is considerably higher than the upper limit of the recommended intake intervals for common fats (30%). The average reading of the intake of fats in the food exceeds by 9 % the upper limit of the recommended

interval for the intake of common fats. Figure 4 shows the daily intake of fats and the recommended intake intervals – lower and higher limits during the examined period for the Cadets, studying at “Vasil Levski” National Military University.

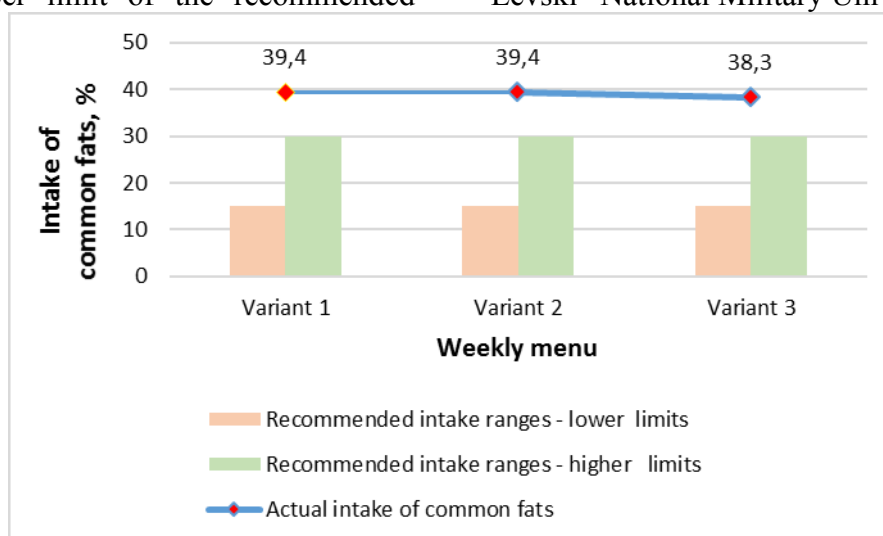


Figure 4: Daily intake of fats and recommended intake intervals

The energy, secured by the common protein represents averagely 14.5% of the total daily energy intake. This value lies close to the lower limit (15%) of the recommended ranges of common protein intake. This way

the examined variants of weekly menus correspond to the recommendations of the Regulation form physiological norm of nutrition of the Bulgarian population for the intake of common protein. (Figure 5).

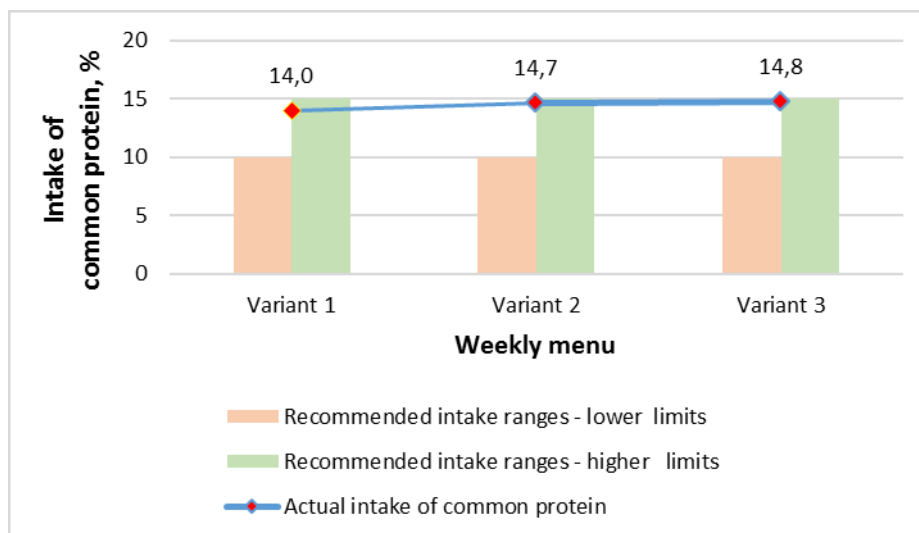


Figure 5: Daily intake of protein and recommended intake intervals

As we can see from the particular analysis, the energy requirement of the Cadets varies in too wide ranges. This is determined mainly by the specific character of the loadings and the climatic conditions [3].

If it's possible to track out the daily energy requirement during the whole year, we shall establish that during the bigger part of the year, the variation is within comparatively small ranges and only during some stated periods of time the energy requirement reaches high levels [2]. These periods of high energy consumption are connected with the implemented curriculum at "Vasil Levski" National Military University and are predetermined by the approved curricula for the different military specializations. During definite preparation stages of the Cadets, they are able to determine also high levels of energy consumption during the whole week. In order to observe the recommendations about a rational nutrition, i.e. the calorific food value to correspond to the value of the required energy, it's necessary to elaborate a new basic food ration and nutritional extras, which would cover the increased energy requirement due to big physical loadings, tactical trainings, field trainings etc.

The determination of the nutrition needs based on the consumed energy, doesn't give a complete answer about the contents of the optimal alimental ration. The major factor,

which determines the rationality of nutrition, is the quality contents of food. Yet of big importance is not the absolute quantity of the separate needed for the normal functioning nutrient substances, but their quality characteristic and their balanced mutual proportions [5].

#### 4. Conclusions

The conducted research imposes the following conclusions:

1. The average secured energy intake according to the different nutrition variants of the Cadets exceeds significantly the measured energy requirement for the period. For cadets-men the excess is by up to 175%, for cadets-women the excess is by up to 254%.
2. During the evaluation of the intake of common carbohydrates significant discrepancies in the norms for physiological needs of common carbohydrates were established. The actual intake of common carbohydrates of the Cadets is below the lower limit of the recommended range of carbohydrates intake.
3. The main violation of the physiological needs of fats is the considerably higher average intake of fats with the food, higher than the recommended intervals for intake of common fats. The average reading of the fats intake with the food exceeds by 9 % the higher limit of the recommended ranges of common fats intake.

4. The energy, secured by common protein corresponds to the recommendations of the Regulation for physiological norms for nutrition of the Bulgarian population for the

common fat intake. The established value is close to the higher limit of the recommended intervals of common protein intake.

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