

Assessment of protein-energy and mineral nutritional status of soldiers serving in the Cavalry Squadron of the Polish Armed Forces Representative Battalion

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Summary:

Introduction: Representative Battalion of the Polish Army is a military unit, which soldiers participate in all official state, military, religious and patriotic ceremonies during the year. Soldiers of the Cavalry Squadron form a sub-unit of the Representative Battalion of the Polish Army and participate in the state ceremonies as well.

Aim of the work: The aim of the work was to assess the protein-energy and mineral nutritional status of soldiers serving in the Cavalry Squadron of the Polish Armed Forces.

Methods: The aim of this study was to assess the nutritional status of students of selected higher education institutions: The Main School of Fire Service (SGSP), Maria Skłodowska - Curie University of Warsaw, (UWMSC) and the National School of the Pope John Paul II in Biała Podlaska (PSWBP) as well as regular soldiers under the age of 30 years, serving in the chemical armies. The study involved the assessment of nutritional status of totally 741 young people, while 81.4% were male and 18.6% female. Assessment of nutritional status was based on the results of anthropometric measurements.

Results: Assessment of nutritional status was done on the basis of the body mass index (BMI) value. Measurements of the following parameters: body height, weight, arm circumference and thickness of 4 selected skin folds. Values of body weight and height were the basis for calculation of the BMI. Based on the BMI value subjects were classified to the following groups: standard weight, overweight and obese. Assessment of the bone mineral density was carried out by the densitometric method on a non-prevailing upper limb forearm bone, using the EXA 3000 apparatus, and bone calcification was evaluated based on the T-score value..

Results: Average BMI was 24.9 ± 3.2 kg/m². The standard BMI was found among 60% of examined soldiers, and overweight was found among 36% of men. Only one person was obese.

Standard bone calcification was found among 75% of examined. The T-score value characteristic for osteopenia was found among 20,8% of examined men while 4,2% of subjects indicated values characteristic for osteoporosis.

Conclusion: As a part of obesity and osteoporosis prophylaxis, it is appropriate to conduct training on nutritional health among soldiers serving in the Cavalry Squadron of the Polish Armed Forces.

Key words: nutritional status, body mass index, overweight, obesity.

Introduction

The Representative Battalion of the Polish Army is a military unit, which soldiers participate in all official state, military, religious and patriotic ceremonies during the year. From 2009 the Cavalry Squadron has been a part of the Representative Battalion of the Polish Army, which was formed in 2000 and has been continuing the 1000-year tradition of the Polish Cavalry. Just as before, so now, cavalry accompanies Polish President as military guard of honour during public ceremonies and accompanies his foreign visitors coming with an official visit to Warsaw. In addition, they participate in parades, festivities and other ventures. The Cavalry Squadron inherits thousand-year-old tradition of the Polish cavalry, especially from their predecessors from cavalry sub-units serving in the Second Polish Republic and in the post-war period [1,2]. Service and training program in the Cavalry Squadron, regardless of general military training, includes many hours of drill on horseback, what requires excellent physical condition and very good health, and therefore a good nutritional status of lancers.

Nutritional status is a resultant of energy and nutritional values of food ration used in alimentation and energy burden of man, and its assessment allows determination of nutrition correctness. Nutritional status disorders result from energy and/or nutrients deficiency, or are result of overfeeding, so too much energy supply with a daily food ration. In the first case we are dealing with low body mass, while overfeeding leads mostly to obesity and its adverse health effects. Both malnutrition and overfeeding resulting, among others, from improper nutrition, not only worsens human well-being, but is also a health and social problem related to limited possibility to do many professions, including soldier profession [3]. In connection with professionalization of the Polish Army and individual way of soldiers' feeding, it is necessary to monitor current soldiers' nutrition status, as part of diet-dependent metabolic diseases prevention.

The aim of the work was to assess overweight and obesity occurrence and to estimate mineral nutritional status of lancers serving in the Cavalry Squadron of the Polish Armed Forces Representative Battalion.

Material and methods

Total of 25 men, lancers from the Cavalry Squadron of the Polish Army underwent the examination. The protein-energy and mineral nutritional status of all of them was determined. Based on the measurements of body mass and body height the BMI index was calculated. Obtained BMI values were the basis to classify examined subjects, in accordance with the Ferro-Luzzi classification [4] to the following groups: standard weight (BMI 18.5 – 24.9 kg/m²), overweight (BMI 25.0 – 29.9 kg/m²) and showing features of obesity (BMI > 30 kg/m²). Measurements of selected skinfolds thickness: on biceps, triceps, under scapula and over iliac, were done as well. Percentage fat content in the body was calculated by the Durnin and Womersley method [5]. Fat content of 10 – 20% was assumed as standard [6].

Assessment of mineral nutritional status was done based on the examination of bone mineral density, which was performed by densitometric method (dual energy x-ray absorptiometry-DEXA) on a non-prevailing upper limb forearm bone, using the EXA 3000 apparatus. Bone calcification was evaluated based on the T-score value, where the average value and standard deviation in a group of young adults, regardless of the age of the patient was adopted as a reference value. The T-score value higher than -1 was adopted as a standard, which means that it is not lower than 1 standard deviation below the average value, the T-score between -1 and -2.5 was characteristic for osteopenia, while the value below -2.5 was characteristic for osteoporosis [7].

Results and discussion

The average age of examined cavalry lancers amounted to 26.5 ± 4.0 (20 – 38 years old). Among the subjects 79,1% was secondary educated, 16,7%—vocational and 4,2% university educated. Most of these men (66,7%) came from villages and 33,3% from cities of different size. Average body height of examined amounted to $179,8 \pm 5,8$ (166,4 – 89, 2 cm) cm, average body mass was $80,4 \pm 12,3$ kg (61,2 – 104,3 kg). Calculated, based on the body height and weight, the BMI value allowed classification of examined soldiers to the groups presented in Table 1.

Table 1: Overweight and obesity occurrence among soldiers serving in the Cavalry Squadron (in %)

Value of BMI (kg/m ²)	Percentage of examined soldiers
Norm (18,5 – 24,9)	60
Overweight (25,0 – 29,9)	36
Obesity (>30,0)	4.0

It was found that 40% of lancers revealed energy-protein nutrition disturbances, resulting from overfeeding.

While interpreting the BMI results fat content in the body should be taken also into account, because high BMI value does not always indicate obesity occurrence. In athletic people, especially ones going in for weight training, large body mass usually results from large muscle mass and not from high fat content. Hence, in case of huge muscle mass and short height, assessment of the nutritional status based on the BMI result may be false positive and testify to obesity occurrence, which really doesn't exist. It testifies to muscle overweight that is favourable from the health point of view. Total fat content in the body is determined by measuring thickness of the skinfolds. The thickness of selected skinfolds and fat content are shown in Table 2.

Table 2: Thickness of skinfolds, percentage fat content and lean body mass

Parameter	
Skin fold thickness on biceps (mm)	2.54±0.45
Skin fold thickness on triceps (mm)	2.82±0.46
Skin fold thickness under scapula (mm)	15.3±6.43
Skin fold thickness over iliac (mm)	23.79±10.2
Percentage fat content	16.72±4.4
Lean body mass (kg)	66.6±7.9

Comparison of an average fat content among examined lancers of 16.7% and BMI value of 24.9 kg/m² indicates that these values are included within the norm (10 – 20% for fat and 18.5 – 24.9 kg/m² for BMI).

The results of research of nutritional status of Polish soldiers carried out for many years indicate permanent occurrence of overweight and obesity [8].

Occurrence of nutritional status disorders among soldiers serving in the Cavalry Squadron that result from overfeeding were observed in smaller percentage of subjects than in other types of troops and military services (Table 3) [9, 10, 11, 12].

Table 3: Percentage of overweight and obesity occurrence among soldiers of different military units

Military unit BMI value (kg/m ²)	Chemical troops n-123	Military aircraft crew n-172	Medical aircraft crew n-57	Flight engineers n-44	Navigators n-28
Norm (18,5 – 24,9)	50	53.2	26.7	31.0	24.3
Overweight (25,0 – 29,9)	43.7	41.6	53.3	44.9	54.1
Obesity (>30,0)	6.3	5.2	20.0	24.1	21.6

In connection with physical burden resulting from the military training process and from performing tasks related to specificity of the service and the type of military unit, good mineral nutrition status is very important. Maximum bone calcification, known as the peak bone mass, is found between 25 and 35 years old, and so in the age bracket the examined soldiers are. Standard bone calcification was found among 75% of examined, mineralization characteristic for osteopenia demonstrated 20.8% and osteoporosis features—4.2% of subjects. Better bone calcification was found among previously examined soldiers of the Polish Army chemical troops and medical aircraft crews i.e. doctors and rescuers.

Table 4: Bone calcification among soldiers serving in the Cavalry Squadron, chemical troops and medical aircraft crew (in %)

Military unit T- Score value	Cavalry Squadron n- 25	Chemical troops n-32	Medical aircraft crew – doctors n- 15	Medical aircraft crew – rescuers n- 42
T >-1	75	80.8	86.6	85.7
-1 >T>-2,5	20.8	16.2	6.7	14.3
T<-2,5	4.2	2.5	6.7	-

Epidemiological studies carried out in many centres in Poland indicate occurrence of nutritional deficiencies, among others, calcium deficiencies leading to adverse changes in bone mineraliza-

tion and often causing osteopenia or osteoporosis [13]. Analysis of distributions of daily calcium intake along with a diet indicate that 70% of daily food rations Poles eat characterise too small calcium content [14, 15].

Conclusions

- 1) Occurrence of excessive body mass of different degree testifies to unbalanced nutrition of lancers.

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