



ASSESSMENT OF KNOWLEDGE ABOUT THE ENERGY VALUE OF SELECTED MEALS BY THE HELICOPTER EMERGENCY MEDICAL SERVICE (HEMS) TEAM

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Introduction: Introduction: An appropriate level of nutrition knowledge resulting in proper eating is one of the components of health behaviours. The profession of both paramedics and pilots should involve taking greater care of one's health. The aim of this study was to assess the Polish Medical Air Rescue paramedics and pilots' nutrition knowledge with respect to the energy value of selected meals present in the daily diet.

Methods: The assessment of the energy value of selected foods was carried out among all Polish Helicopter Emergency Medical Service (HEMS) pilots and paramedics (66 pilots, 65 paramedics) aged 27-59. Their nutritional status was assessed based on the results of anthropometric tests. The HEMS team's knowledge about the energy value of selected foods was assessed based on the author's photographs of meals. The meals energy value was calculated using the applicable Polish tables of foods' nutritional value and content.

Results: The assessed group was characterized by a high share of overweight and obese persons. According to BMI, 34.6% of the tested persons had normal range body mass, 44.9% were overweight, and 20.5% were obese. An analysis of the respondents' answers showed that on average they overestimated energy value of six out of the seven presented meals. The overestimation concerned mainly the energy value of supper (over 215 kcal) and snack I (over 283 kcal). Those were meals including fast food, sweets and stimulants.

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Conclusions: The HEMS team's knowledge about the energy value of meals was unsatisfactory. The level of nutrition knowledge was independent of a person's profession, education, sex, and BMI. Nutrition education and healthy lifestyle programs should be implemented in the examined group.

Keywords: knowledge about energy value, Polish Medical Air Rescue, overweight, obesity

INTRODUCTION

An appropriate level of knowledge about nutrition, and the resulting proper diet is one of the components in health-promoting behaviors [9,17]. The profession of both paramedics and pilots should involve taking greater care of one's health. Both occupations require high mental and physical fitness in order to be able to act efficiently in stressful conditions. The fitness depends on numerous factors, one being proper nutrition. A well-balanced diet ensures wellness, facilitates recovery processes, provides protection against illnesses and improves the performance of the organism [4,5,16]. A condition of a well-balanced diet, apart from a proper supply of nutrients is a proper supply of calories. In order to maintain the body's energy balance, the quantity of the energy supplied to the organism must be equal to the spent energy [6]. Illnesses related to disorders of energy balance are a serious health problem. More than 1 billion adults and 100 million children in the world suffer from obesity or overweight [2]. Limiting calorie intake in the daily food ration, and thus generating a negative body's energy balance, is one of the crucial components of body weight reduction. Persons with excessive body weight are particularly encouraged to pay attention to the energy value of individual products and meals as well as to estimate the daily calorie intake [3]. Therefore, increasing the level of knowledge about nutrition is an important tool for stimulating proper eating behaviors, which prevent overweight and obesity [7]. However, as numerous studies prove, knowledge about nutrition does not always translate into eating habits and behaviors [17,5,15]. For instance, despite high social awareness and introduction of a variety of nutrition programs in Great Britain, its obesity rates continue to grow [10].

It is assumed in the study below that HEMS paramedics and pilots should be characterized by a high level of knowledge about nutrition due to their profession.

The aim of this study is to assess the Polish Medical Air Rescue paramedics and pilots' knowledge about nutrition with respect to the energy value of selected meals present in the daily diet.

MATERIAL AND METHODS

The assessment of the energy value of the selected meals was carried out among all Polish Helicopter Emergency Medical Service (HEMS) pilots and paramedics (66 pilots, 65 paramedics) at the age of 27-59. The majority of the respondents were men, while women constituted 3.8% (they were present only among paramedics).

Their nutritional status was assessed based on the results of anthropometric tests. Height and body weight were measured, which was the ground for calculating the height- and weight-based Body Mass Index (BMI), which was then interpreted according to the WHO classification [21].

The HEMS team's knowledge about the energy value of the selected meals was assessed based on the authors' photographs of meals: breakfast, lunch, dinner, high tea, supper and two snacks. The composition and energy value of the presented meals are included in Tab. 2.

The energy value of the meals was calculated based on the applicable Polish food composition and nutrition tables [8]. In order to analyze the results more precisely, the answers obtained from the HEMS team were divided into three categories: answer within the standard, answer below the standard and answer above the standard. An answer within the standard was considered one constituting $\pm 10\%$ of the correct value. Answers below the standard were below this range, while answers above the standard were above this range. Four questionnaires were not subject to statistical analysis due to incomplete answers.

The STATISTICA 10.0 PL program was used for statistical analyses; the value of the statistical significance was assumed at the level of $p < 0.05$. Average values, standard deviation, median, minimum and maximum values were calculated. Normal distribution was examined using the Shapiro-Wilk test, while the U Mann-Whitney and Kruskal-Wallis non-parametric tests were applied for comparing the energy value of meals depending on the profession, education, and BMI. Relations between the analysis of answers by categories (a correct answer, an answer below the standard

and above the standard) and the above variables were checked with the chi-square test.

Tab. 1. Description of the examined group.

| Variable | | Results | |
|---------------------|-------------|---------------|-----|
| Age [in years] | X ± SD | 42.8 ± 9.6 | |
| | (min – max) | 27.0 – 59.0 | |
| Body weight [in kg] | X ± SD | 86.2 ± 14.7 | |
| | (min – max) | 59.9 – 140.1 | |
| Height [in cm] | X ± SD | 178.1 ± 5.8 | |
| | (min – max) | 164.0 – 195.0 | |
| BMI | X ± SD | 27.1 ± 4.2 | |
| | (min – max) | 19.7 – 42.9 | |
| Sex: | (%); n | | |
| women | | 3.14 | 4 |
| men | | 96.85 | 123 |
| Profession: | (%); n | | |
| pilot | | 53.5 | 68 |
| paramedic | | 46.5 | 59 |
| Education: | (%); n | | |
| higher | | 70.9 | 90 |
| secondary | | 29.1 | 37 |
| Place of residence: | (%); n | | |
| town/city | | 81.9 | 104 |
| village | | 18.1 | 23 |

X – average value; SD – standard deviation; % – percentage of respondents; n – number of respondents

RESULTS

The examined population was composed of 127 employees of the Helicopter Emergency Medical Service, 53.5% of whom were pilots and 46.5% were paramedics. The group under assessment was characterized by a high share of overweight and obese persons. BMI was proper in the case of only 34.6% of the tested persons, while 44.9% of them were overweight, and 20.5% were obese. Overweight and obesity were more common among pilots (60.2%) than among paramedics (38.5%). The majority of the respondents had higher education and came from towns/cities. A detailed description of the group in terms of somatic and demographic characteristics is presented in Tab. 1.

In analyzing the average values of the answers provided by the respondents when estimating the energy value of meals, it was found that they overestimated the energy value of six out of the seven presented sets (Tab. 2). The average answer below the correct value was provided only in the case of lunch. The respondents' most significant overestimations concerned the average energy value of supper (by over 215 kcal) and snack I (by over 283 kcal), that is meals consisting of fast food, sweets and stimulants. The respondents estimated the energy value of breakfast with the highest accuracy. The ranges presented in Tab. 2. (min - max) prove, however, a considerable diversity of the answers given by the respondents.

Tab. 2. Assessment of the calorific value of individual meals.

| Presented meals | Correct answer [kcal] | Average answer provided by the respondents | Median | Range | |
|---|-----------------------|--|---------|-------------|----------|
| | | (X ± SD) (n=127) | | (min - max) | |
| Breakfast (2 slices of brown bread with butter, a poultry cabanos sausage, an egg, a tomato) | 473 | 507.6 ± 341.7 | 450.0 | 30.0 | 2 000.0 |
| Lunch (a bilberry bun, an apple) | 444 | 352.1 ± 208.5 | 300.0 | 30.0 | 1 200.0 |
| Dinner (a minced poultry cutlet, potatoes, beetroots, apple juice) | 675 | 800.3 ± 703.3 | 700.0 | 150.0 | 7 000.0 |
| High tea (3 pancakes with cottage cheese) | 472 | 557.3 ± 490.3 | 450.0 | 60.0 | 4 500.0 |
| Supper (pizza, beer) | 1,045 | 1 260.6 ± 1,362.6 | 950.0 | 115.0 | 14 000.0 |
| Snack I (5 chocolate covered marshmallows, coffee with a teaspoon of sugar) | 284 | 567.8 ± 984.1 | 350.0 | 40.0 | 10 500.0 |
| Snack II (3 Jaffa cakes) | 168 | 261.9 ± 458.3 | 150.0 | 15.0 | 4 500.0 |
| Total | 3 560 | 4 307.7 ± 4156.6 | 3 390.0 | 510.0 | 43 150.0 |

X – average value; SD – standard deviation; n – number of respondents; min – minimum; max – maximum

The analysis of answers in individual categories (answers within the standard, answers below the standard, answers above the standard) showed that the answers within the standard were given by the smallest percentage of the respondents (from 13% to 24.4% depending on the presented meal). Nearly half of the respondents underesti-

Tab. 3. Estimation of the calorific value of individual meals by answers within the standard, answers below the standard and answers above the standard (N=127).

| Presented meal | Answers within the standard | Answers below the standard | Answers above the standard |
|-----------------------------|-----------------------------|----------------------------|----------------------------|
| Breakfast (473 kcal) | | | |
| N | 28 | 62 | 37 |
| Percent | 22 | 48.8 | 29.1 |
| X ± SD | 488.6±20.9 | 275.6±95.3 | 910.8±364.4 |
| (min – max) | 450 – 500 | 30 – 400 | 550 – 2,000 |
| Lunch (444 kcal) | | | |
| N | 17 | 82 | 28 |
| Percent | 13.4 | 64.6 | 22 |
| X ± SD | 425.9±29.2 | 231.4±91.1 | 660.7±176.0 |
| (min – max) | 400 – 480 | 30 – 380 | 500 – 1,200 |
| Dinner (675 kcal) | | | |
| N | 27 | 49 | 51 |
| Percent | 21.3 | 38.6 | 40.2 |
| X ± SD | 668.5±50.3 | 385.5±113.5 | 1 268.6±911.6 |
| (min – max) | 600 – 750 | 150 – 550 | 800 – 7,000 |
| High tea (472 kcal) | | | |
| N | 21 | 62 | 44 |
| Percent | 16.5 | 48.8 | 34.6 |
| X ± SD | 481.0±24.9 | 302.9±95.5 | 952.3±659.9 |
| (min – max) | 450 – 500 | 60 – 400 | 550 – 4,500 |
| Supper (1,045 kcal) | | | |
| N | 21 | 62 | 44 |
| Percent | 16.5 | 48.8 | 34.6 |
| X ± SD | 1 033.3±63.9 | 663.6±206.7 | 2 210.2±1 978.9 |
| (min – max) | 950 – 1,150 | 115 – 900 | 1,200 – 14,000 |
| Snack I (284 kcal) | | | |
| N | 16 | 32 | 79 |
| Percent | 12.6 | 25.2 | 62.2 |
| X ± SD | 286.9±15.4 | 179.0±51.8 | 782.2±1 199.4 |
| (min – max) | 260 – 300 | 40 – 250 | 320 – 10 500 |
| Snack II (168 kcal) | | | |
| N | 31 | 43 | 53 |
| Percent | 24.4 | 33.9 | 41.7 |
| X ± SD | 150.0±0.0 | 87.6±25.7 | 468.9±657.3 |
| (min – max) | 150 – 150 | 15 – 120 | 200 – 4 500 |

X – average value; SD – standard deviation; n – number of respondents; min – minimum; max – maximum

mated the energy value of breakfast, high tea, and supper (Tab. 3). The majority of the respondents (64.6%) underestimated the energy value of lunch, too. Snack I (coffee with a teaspoon of sugar and 5 chocolate covered marshmallows) turned out to be the meal the energy value of which was most frequently overestimated (62.2%). The overestimated values of snack I arose from the fact that the majority of the respondents did not know that the energy value of coffee is very low (9 kcal/100g – Kunachowicz et al.), which resulted in a significant overestimation of the energy value of the whole presented meal.

No relation between indications of the energy value of meals as well as answers in the categories (answers within the standard, answers below the standard, answers above the standard) and profession, education and state of nutritional status as per BMI ($p>0.05$) was observed.

DISCUSSION

Maintaining a good psychophysical condition by the HEMS team is indispensable for pursuing this profession. Undertaking health-promoting behaviors, including compliance with appropriate dietary recommendations, prevents absence from work due to illnesses, reduces health care costs, and increases the operating efficiency of individuals and entire organizations [12].

The Polish Medical Air Rescue population is characterized by a low knowledge about the energy value of meals. Merely one in four examined persons provided an answer within the standard. It is particularly worrying as excessive body weight was found in more than 65% of the tested persons from the group under analysis. It was proved in the Polish National Multi-Centre Health Survey (Wieloośrodkowe Ogólnopolskie Badanie Stanu Zdrowia Ludności) (2010) that Poles' knowledge about nutrition is at a very low level, which is consistent with the obtained results of the authors' research. It was expected that paramedics, due to their medical education, would be characterized by better knowledge about nutrition than pilots. However, no statistically significant differences as to the level of knowledge between the groups were found ($p>0.05$). The authors' results are confirmed by other researchers, who proved that health behaviors, including eating behaviors, of paramedics do not differ from health behaviors in the control group in a statistically significant manner [11]. A low level of knowledge about nutrition was also recorded in other groups, such as military volunteers [4], athletes [18], so persons

who should take care of proper nutrition and have knowledge in this respect. In contrast, the study by Kayapinar and Savas [5] found that the level of knowledge about nutrition among police officers was satisfying although it did not translate into eating behaviors in that group. In the authors' research, education of the respondents did not determine their level of knowledge about the energy value of the presented meals either. Similar results were obtained in the study by Bleich and Pollack [1], which was conducted on 663 adults in the United States of America.

Like in the authors' research, no significant differences between the level of knowledge about nutrition and the BMI value were stated in the study by O'Brien and Davies [10] as well as Bleich and Pollack [1]. O'Brien and Davies [10] imply also that the deficit of knowledge about nutrition is not the most important factor in overweight and obesity prevention. Yet it was proved in the study by Shimokawa [14] that a higher level of knowledge about nutrition contributed to reducing calorie intake, which directly prevents excessive body weight gains. Additionally, the researcher proved that the level of such knowledge differs among overweight persons and those with proper body weight. Like in the study by Shimokawa [14], a relationship between the respondents' BMI and

their knowledge about nutrition was proved in the study by Shah et al. [13]. The higher the BMI of the examined persons, the more commonly they overestimated the size of the food portions presented in the study, with the relationship being statistically significant (p within the range from 0.1 to 0.3 depending on the meal).

Sex can be also one of the factors determining the level of knowledge about nutrition. It was stated in the study by York-Crowe et al. [22] that women were characterized by a higher level of knowledge about nutrition in comparison to men. Hence, the low level of knowledge about nutrition in the analyzed group can be explained by the fact that the vast majority of the examined HEMS team were men.

CONCLUSIONS

1. The HEMS team's knowledge about the energy value of meals was unsatisfactory.
2. The level of knowledge about nutrition was independent of a person's profession, education, sex, and BMI.
3. It is worth implementing nutrition education and healthy lifestyle programs in the examined group.

AUTHORS' DECLARATION:

Study Design: Agata Gaździńska, Mariusz Wyleżoł; **Data Collection:** Agata Gaździńska, Paweł Jagielski, Robert Gałązkowski; **Manuscript Preparation:** Agata Gaździńska, Mariusz Wyleżoł, Paweł Jagielski; **Funds Collection:** Robert Gałązkowski. The Authors declare that there is no conflict of interest.

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