

## Healthy Diet and Regular Physical Activities for Support Endurance and Fitness

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**Abstract:** Balanced diet and regular physical activities are essential for support health status, physical fitness and endurance, and decrease the risk of health disorders and morbidity. Balanced diet that cover physiological requirements and needs is a very important for support physical fitness and improve the quality of recovering processes after physical load. Knowledge and skills of individuals allow making good and right choice of daily essential nutrients and keeping optimal health status and improve physical endurance. The aim of the study to analyse cadets' daily dietary habits and knowledge in nutritional education on the base of questionnaire and elaborate adapted to respondents. Cadets' daily dietary habits and knowledge in nutritional education analysed on the base of questionnaire that elaborated and adapted to respondents of study group. The study group included 73 persons of both gender (male N= 65, and female N= 7) in aged from 20 years until 35 years. Questionnaire included 22 questions about daily dietary habits, menu planning, nutrients levels, food products consumption, and composition. Only 30.5 % of respondents interested into eating adapted dietary patterns and follow to dietary recommendations. Supervision of dietary habits, water consumption, dietary patterns are essential for health capacity support done by 73.6% of respondents. Quality and quantity characteristics of dietary patterns are essential for support physical and mental activity. Balanced and moderate diet is essential for improving working capacities, diminished fatigue, improve concentration capacities and support mental activity as a result provide wellbeing and welfare of individuals.

**Keywords:** balanced diet, dietary education, dietary habits.

### Introduction

Balanced diet and regular physical activities are essential for support health status, physical fitness and endurance, and decrease the risk of health disorders and morbidity (de Ridder et al., 2017, Vašek et al., 2019). Active physical training during study period in National Defence academy pointed topicality of nutritional adequacy that is a personal responsibility of cadets. Balanced diet that cover physiological requirements and needs is a very important for support physical fitness and improve the quality of recovering processes after daily physical load. Knowledge and skills of individuals allow making good and right choice of daily essential nutrients and keeping optimal health status and improve physical endurance (Yu et al, 2018; Lutz et al., 2019; Cole et al., 2021; Wardle et al.,2021). Military personnel in daily service have full self-responsibility for self-nutrition education and healthful diet promoting: take meal in right time, in adequate energy quantity and balanced nutrients' patterns (Pograjc et al., 2010; Teo et al., 2017; Schlinkert et al., 2020). The energy allowance of diet designed to maintain healthy level of body mass and readiness to fulfil moderate physical activity level's tasks. Energy consumption depended on mode of physical load, its intensity and duration, individual body size. Recommended daily nutrients intake level variate among individuals and depended upon age, anthropometric parameters' (body mass, height etc.) and levels of physical activity (Lim, 2018). Nutrients composition for moderately active individual in aged above 18 years prescribed by nutritional allowances and standards (WHO, 2015). Adequate adult dietary intake included main nutrients patterns proteins, fat and carbohydrates. Proteins composed 20% of daily dietary energy requirements in kcal volume or 0.8 g per 1 one kg of body mass. Deficiency of proteins lead to limited physical fitness and working capacity as well cognitive and mental functions. Fat provides energy for cell and tissue activities and metabolic processes. Fat has vital importance for support vitamins absorption and mineral substances balance; maintain working capacity, cognitive functions (Farina et al., 2020). Fat dietary patterns optimized cardiovascular, digestive, locomotor system activities as well mental function Kullen et al.,2016; LaFountain et al.,2019, Dyal et al.,2022). Fat composed 20 - 30 % of the daily dietary energy requirements in kcal for physical active individuals (Teo et al, 2017). Carbohydrates used as energy resource and composed 50-60 % of daily dietary energy volume in kcal. Carbohydrates transformed in energy of body processes and used for reserve formation in liver and in

muscles (Zariņš et al, 2018). The balanced and healthy diet with combined carbohydrates allows to keep high-level of concentration and mental activity (Lutz, 2019). Healthy diet included complex of micronutrients that covered physiological requirements of nearly healthy active military person (calcium, phosphorus, iron, ascorbic acid, iodine, fluoride, sodium etc.). Balanced and moderate diet is essential for improving working capacities, diminished fatigue, improve concentration capacities and support mental activity as a result provide wellbeing and welfare of individuals (O'Leary et al., 2021; Carlson et al, 2013). Balanced diet gives energy resources for daily activities and provide optimal level of working capacities and adaptation to various external factors. Planned balanced diet before physical load exercises allow to increase physical fitness through impact on glycogen level in muscle tissues. Adaptation of diet after physical exercises is necessary for restoring glycogen reserves and improve renewal processes in body. NATO Standard AMedP-1.11 (NATO Standard..., 2013) and RTO Technical Report (Nutrition Science and..., 2010) proposed special nutrition standards for military operation. Therefore the diet that adapted for military personnel according NATO recommendations should include proteins 15-20 % of dietary energy volume or 1,2-1,4 g per kg of body mass, carbohydrate 50-60 % of daily dietary energy volume in kcal, and fat 25-30 % of dietary energy volume. The purpose of the study was to analyse cadets' daily dietary habits and knowledge in nutritional education on the base of questionnaire and elaborate adapted for respondents' recommendation for improving knowledge and skills of individuals that allow making good and right choice of daily essential nutrients and keeping optimal health status and improving physical endurance.

### Methodology

The research question was: What dietary support do cadets need? The cadets' daily dietary habits and knowledge in nutritional education analysed on the base of questionnaire that elaborated and adapted to respondents of study group. The study was conducted in 2021. The study group included 73 persons of both gender (male N= 65, and female N= 7) in aged from 20 years until 35 years. Respondents in age group from 20 until 24 years composed 60,0 %, 26,1% of respondents were in aged from 25 until 29 years, and 13,8% of respondents were in aged from 30 until 35 years. Respondents had experience in military service from 24 months until 60 months. Questionnaire included 22 questions about daily dietary habits, menu planning, nutrients levels, food products consumption, and composition.

### Results and Discussion

Daily dietary habits depended on level professional physical activities as well individual anthropometric characteristics. Assessment of anthropometric parameters - height in male respondents' group revealed that 58.5 % of respondents had body height parameters in the interval from 181cm until 190 cm. The body mass parameters' variations of respondents were wider, for 49 % of respondent body mass were found in interval from 80 kg until 95 kg. Respondents with body mass parameters from 65 until 80 kg composed 36.9% of research group. The body mass parameters above 96 kg until 116 kg fixed for 13.8% of respondents.

The female respondent group include seven individuals. The six female respondents were in aged from 21 year until 23 year and the one female respondent was 31 year old. The body height for six female respondents varied from 167 cm until 173 cm, and the one female respondent was 162 cm tall. The parameters of body mass for female –respondents were in the interval from 60 kg until 66 kg, and one female respondent has body mass 52 kg.

Assessment of questionnaire data shown that the largest part of respondents (75%) had meal three times in day, 52.8% of respondents choose and prepared products for mealtime themselves, but the rest part of respondents (47.2%) used public dietary facilities.

Knowledge of nutritional needs and importance of dietary allowance for support health status and fitness capability allowed maintaining individual daily essential nutrients intake, adapted dietary habits to special climate (environment temperature) and level of physical load. Questionnaire data revealed that 66.7% of respondents coordinated their daily eating habits to the level of physical activity and load as well to activities in special environment, but the rest part of respondents (33.3%) did not pay attention to external factors and did not adapted daily eating habits to the level of physical load. Correct and adapted dietary support of body physiological requirements and menu planning maintain

the physical fitness and physical working capacities. Physical fitness level evaluated annually during physical test exercises that is compulsory part of military training process. Results of physical tests (in scale of ten balls) allowed to classified respondents into groups that reflected physical fitness. The tests with excellent and distinction results passed 72.2 % of respondents. The good and very good results in sports tests shown 16.6% of respondents, and 11.1 % of respondents get results with satisfactory evaluation. The largest part of respondents has opinion (knowledge, self-experience, information resources) that healthy diet was essential support for physical fitness. The 63 % of respondents of study group added in daily meal dietary supplements. The vitamins used as additional dietary supplement by 33,7% of respondents of study group, the extra-proteins also were frequently used as dietary supplement by 20,9% of respondents of study group. The energetics, creatinine – contained substances used as dietary supplement (Figure 1) in daily dietary intake, but 27.9 % of respondents did not use any dietary supplements.

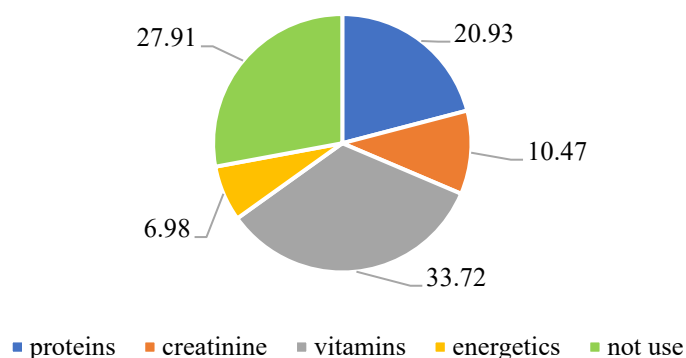


Figure1. Variants of dietary supplements in meal (in %) in daily dietary intake

Diet quality and nutrition status are important for optimal health and military performance. Weight control procedure as well body composition maintenance is the first step is individual responsibility of respondents to control and follow dietary recommendation Assessment and control of body mass parameters provided 65.3 % of respondents.

Questionnaire given possibility to analyse daily dietary intake of nutrient pattern proteins, carbohydrates and fat (in %), selected vitamins and minerals (Figure 2).

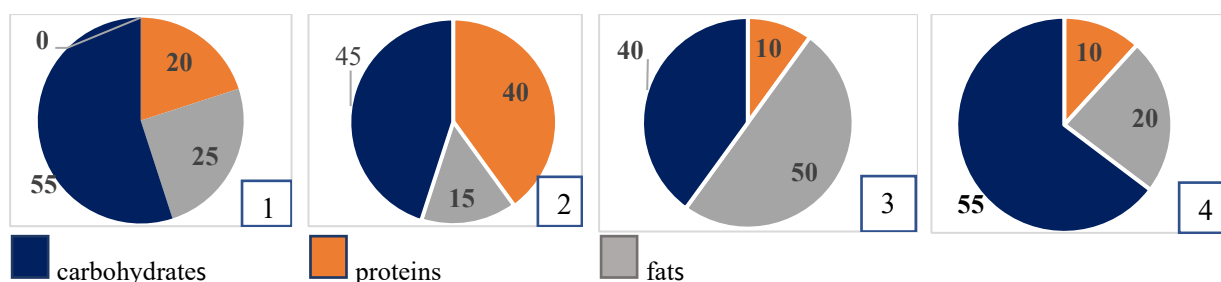


Figure 2. Variants of nutrient pattern (in %) in daily dietary intake

Balanced and adapted diet covered energy requirement of body physiological / biochemical processes in specific physical activity level with definite physical load level. Nutrient standards included patterns in following proportions: fat (25%), proteins (20%), and carbohydrates (55%). According results of questionnaire (Figure 3) only 30.1% of respondents follow to dietary recommendations that guaranty keeping health capacity, welfare and physical working capacities.

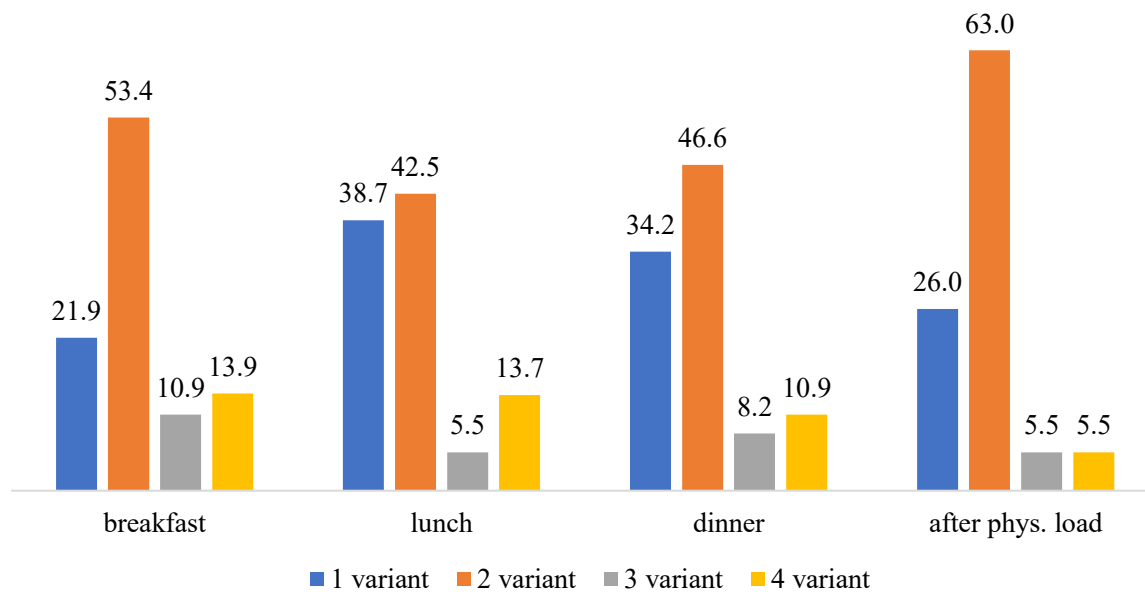


Figure 3. Daily dietary intake variants by respondents (in %) in mealtimes

Balanced and adequate nutrition enhanced tactical performance of military personnel. According NATO recommendation dietary intake for military personnel involved in field exercises in cold environment should contained 4700 kcal for male and 4100 kcal for female, that distributed between proteins (17%), carbohydrates (58%) and fat (25%), that optimized performance and support mission readiness. Dietary intake for military personnel during field exercises in warm environment should consumed meal with declined energetic volume 4000 kcal for male and 3400kcal for female in compassion to the dietary intake in kcal in cold environment. Dietary intake during training military base should contained 3800 kcal for male and 3200 kcal for female, but meal energetic volume capacity should correspond to 2800 kcal for male and 2400mkcal for female during regular studies in military base. Nutrients might help **optimize** cognitive and physical performance for the military personnel. A well-planned diet provided enough protein to promote muscle repairing after intensive physical load. The carbohydrates provided about 70-80 % of energy consumption during intensive physical load. Each person has responsibility to control pre-event meal and post -event meal quantity and quality that is an important part of preparation to exercise` physical load level. Amount of carbohydrates in diet should increase during one week advance the physical load, as well carbohydrates used in post- exercise period for restoring reserves. Carbohydrates should take directly after exercise that restored glycogen capacity. The fat used as energy resources during light and moderate physical load, as well they served as energy providers during long-term moderate physical load and given 25% -30% of total energy volume. Questionnaire results allow to characterized quality of the daily meal. Fruit and berries were resources of minerals and vitamins, 52.8% of respondents consumed them daily. Vegetables maintained **good hydration**, provided **vitamin** and **antioxidant** content and are **source of minerals**. **37.5% of respondents used vegetables daily**. **Fish is a good protein source** as well added value of omega-3 fatty acids, that have a positive impact on health and performance, 29,2% of respondents used fish daily. Water drinking helps to show tactical performance and prevent dehydration. Drinking water before, during and after exercise is very important. 84.7% of respondents used water. Milk products is a good resource for calcium content, and also high in protein and a great source of electrolytes for rehydration.26,4% of respondents used milk products daily.

Individual responsibility and authority are the nutritional education, getting knowledge about balanced diet, to accept, to follow and to adapt dietary intake to specific environment and physical activity level. About 63 % of respondents took in account dietary recommendations with high protein composition, the diet with 40% of proteins, 15% of fat, and 45% of carbohydrates. Such diet is not balanced diet, but it given support for renewal processes after strength training exercises. There were also 5.5 % of respondents that used diet with high fat composition, and 5.5 % of respondents that daily

use diet with high carbohydrates composition. Such choice did not given complete support for keeping health status and physical working capacities in long-term period. Questionnaire data indicated importance of interference to improve information packet, knowledge and practical skill in dietary support of physical working capacities of respondents.

## Conclusions

Balanced and adapted to physical load diet should be daily responsibility of respondents, the next military officer, whose daily activities connected with high physical load exercises. The military studies and training process give physical and mental challenge for individual. The individual responsibility is following to recommendation concerning balanced diet that adapted to physical load. Only 30.5 % of respondents interested into eating adapted dietary patterns and follow to dietary recommendations. Quality and quantity characteristics of dietary patterns are essential for support physical and mental activity. Assessment of questionnaire results indicated necessity to pay attention to dietary support of health status, physical working capacities by increasing individual authority role, improvement knowledge, giving information packet, organizing lectures and discussions during training process about dietary recommendations and solution of dietary problems in military environments. The study identified components for improving diet quality and deficits. Weight control procedure as well body composition maintenance is the first step is individual responsibility of respondents to control and follow dietary recommendation and 65.3% of respondents provided it. Supervision of dietary habits, water consumption, dietary patterns are essential for health capacity support done 73.6 % of respondents as indicated in questionnaire results. Control of physical fitness level and the sports tests results is the next step in following and support dietary recommendation. Sports tests shown that 72.2 % of respondents have excellent and results with distinction and correction of dietary habit with physical load indicated 66.7% of respondents. Long – term effect of dietary support of physical fitness level in addition to other components of training process is important and essential.

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