

## REVIEW ARTICLE

# THE IMPACT OF CATERING ON THE HEALTH AND LIFE SATISFACTION OF COALITION SOLDIERS DURING THEIR DEPLOYMENT ON A MILITARY OPERATION

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### Summary

The following thesis focuses on the issues regarding catering and food and its impact on health and life satisfaction of coalition soldiers during their deployment on a military operation in the Middle East area. Obviously, food is a part of our lifestyle and it is certainly an area affecting our life satisfaction, all the more affecting the life satisfaction of soldiers specifically in an armed conflict environment where they are exposed to higher stress conditions. Furthermore, life satisfaction is one of the variables influencing the work itself. And work influences our lifestyle and vice versa. It can be also said that life satisfaction influenced by the working environment also affects the health of soldiers. It turns out that work satisfaction has a very strong and lasting relationship with life satisfaction, as work is a central factor for most people, influencing their identity. Firstly, it was necessary to find out and describe information from the area of catering of troops in field conditions and fighting food rations which can be provided to deployed soldiers. The authors' fundamental research question is how the catering and food in the military operational environment affects the life satisfaction and health of deployed soldiers. To obtain the data, a standardized method, Life satisfaction questionnaire (authors: J. Fahrenberg, M. Myrtek, J. Schumacher and E. Brähler, 2001), was used. Food and catering play a very high role in our lifestyle, affects our health and furthermore, the quality of life in any situation. In life satisfaction, Danish soldiers have higher values, followed by American soldiers, and British men are the least satisfied during the foreign operation. The reasons for differences and their clarification corresponds with the last published "Happiness Index" which is investigated annually by the United Nations agency.

*Key words: Food and catering; Life Satisfaction; Health; Deployment; Military Operation*

### Introduction

Food and catering is a part of our life. Moreover, it is an area that affects our health. According to the one of the health definitions by Křivohlavý, health is defined as the overall (physical, psychological, social and spiritual) state of man that allows him to achieve optimal quality of life and is not an obstacle to similar efforts of other people (1). And we can say that eating, which is part of a personal lifestyle, is one of the important determinants of health and life satisfaction.

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Life satisfaction and health are largely related to the concept of health determinants and moreover also related to the area of well being. The designation of well-being can be also seen in the concept of understanding happiness as the relationship between the amount of positive and negative affects, or their ratio (2).

Among the direct determinants affecting health, we include the healthcare factor, its level, quality, accessibility, efficiency, health policy (affecting health from about 10-15%), genetic equipment of the individual, population (affecting health from about 15-20%), environmental factors affecting health from about 15-20%) and lifestyle (affecting health from about 50-60%). Here we point out the specific lifestyle and the catering of the soldiers which affect the health of soldiers.

### **Catering of troops in field conditions - hygienic-epidemiological supervision**

Most armies provide, through their medical support elements, within the activities of the troops, hygienic-epidemiological surveillance, both during peaceful life, for example during military exercises in training areas, as well as during deployment in foreign operations. One of the key areas of this activity is water distribution and troop catering. It is an activity that is essential to maintain units' combat capability and which largely affects operational deployment in the area. The principles of these supervisors are essentially the same for the home environment as for the foreign operation. However, they differ in certain nuances.

In the peaceful life of the troops, during their normal working duties in the home environment, all supervision and preventive measures are based on valid national legislation. Military catering is not different from those in the civilian sector and must meet the same hygiene standards. Concerning the deployment of troops during military exercises in the home training areas, before the exercise itself, the responsible authorities are surveying the area, focusing on possible sources of risk - sampling from used water resources, exploration of zoonotic areas, etc.

During the exercise itself, it is the commander's responsibility to maintain hygiene standards for his units, in accordance with applicable legislation, in collaboration with the unit's physician and other medical personnel. There is a check of the cooking areas, the hygienic regime of dispensing of food, the containers used for cooking and the dispensing of the food and the personnel working in this catering support. In preparation for the exercise, a binding regulation is issued that prohibits the use of unauthorized water and food resources in the exercise area (berries, mushrooms, etc.). It is also forbidden to hunt and consume wild animals in the deployment training area, as well as to touch found animal bodies that have come from unknown causes in this area. Everything is subject to strict records.

There are several factors that influence this hygienic-epidemiological surveillance within the framework of the foreign operation. It is necessary to take into account in which area the unit is deployed, what are the expected hygienic-epidemiological risks and climatic conditions, whether the unit is within the larger army unit, whether it is logistically independent, whether it has the means to monitor the hygienic-epidemiological situation abilities provide some other element, whether from coalition units or contracted civilian companies. However, the main fact remains that there is a constant need for this oversight (3).

Although the military is able to provide these services with its forces and resources, it is often the case that it is delivered through civil contracts. However, the military remains the last supervisory body responsible for the relevant conditions, based on national legislation in force - not according to the host state legislation. Thus, although catering, water management, housing and sanitation are often provided by a third party with its own control mechanisms, the armies carry out their own controls and preventive measures that function as quality control services and still provide units with a level of combat capability (4). It is this case that represents the realization of catering in the place of deployment, where this research was carried out.

In the area of units deployment water sources sampling is realized. As a rule, supplied bottled water from proven sources outside the base without the risk of contamination is used to prepare the diet. If this is not the case, standards for water treatment and use are set. Kitchen blocks are inspected with surface swabs, according to a valid time schedule. Inspection of disinfection plan of operations, hygiene of food dispensing and cleaning of dishes is carried out. A separate chapter is also the hygienic supervision of the staff, which is often not part of the deployed units.

Supervision of food preparation technology is also an integral part, as is the care of hand hygiene, both kitchen staff and boarders (5). They are all handled by SOPs (Standard Operating Procedures), which are binding. This issue is also summarized in the AMedP 4.5, AMedP 4.6, AMedP 4.7 and AMedP 8.5 alliance doctrines.

### **Combat food rations**

Daily rations have a rich history. Under various names, they were distributed in crisis situations for both the civilian population in the form of food rations, and for the army in varying amounts and quality. As an example we present fighting food rations from several selected countries. However, only USA combat food rations were distributed to coalition troops at the area of deployment, and only in the case of their work outside the base.

### **The Czech Republic**

Currently, the Army of the Czech Republic has 7 variations of meal allowances under the name Combat Rations (CR) labeled I - VII. In terms of content, these doses differ mainly in the main meal. Most items in the packages are mostly the same. Thus, seven forms are due to diversity in order to alternate between these doses and to be selectable. The nutritional value of the contained diet is governed by Regulation. 266/1999 Coll. (Decree of the Ministry of Defense on the method of providing free meals, equipment and transport requirements and providing accommodation for professional soldiers). One dose contains two main meals of 340g. This means that there are 14 kinds of main dishes.

As for the balance of nutritional and energy values of all packages, they are very similar. Their purpose is to feed the soldier and give him a balanced diet. The entire CR is placed in a cardboard box and then watertightly sealed in a plastic container. Weight of the full-day diet is about 1 500 g. One dose will give 3 420 kcal.

All CR foods can be consumed without heat, except for instant drinks, with some hot water. The main dishes are enclosed in aluminum bowls, which can also be newly heated with the enclosed chemical heater. Water is not included.

### **USA**

The content of one meal ready to eat (MRE) bag provides an average of 1 250 kcal (3 MREs are needed per 24 hours). This means that a soldier can receive up to 3 750 kcal per day. The weight of the MRE for 24 hours is approx. 1 500g (6).

### **France**

The French Army uses the RATION DE COMBAT INDIVIDUELLE RECHAUFFABLE (RCIR). The content provides an average of 3 200 kcal and the weight of the package is 1 500 g (7).

### **Germany**

In Germany fighting food rations are called "Einmannpackung" (EPA). The German army has two types of EPA. Types 1 to 8 have average nutritional value of one pack 3 600 kcal and the weight of the package is approximately 1 800 g. Types 9-12 have average nutritional value 3 800 kcal and the weight is 1.2 kg (8).

The amount of calories required per a man per day is always individual, but for that selected FIGHTING FOOD RATIONS, the minimum daily amount is set at 3 200 kcal.

### **Lifestyle and meals affect the health of soldiers**

Lifestyle and eating are among the main determinants of health and they affect the health of not only soldiers, but also play a major role in the current population and are related to the emergence of population diseases. Obesity is currently considered to be the most frequent metabolic disease worldwide, not only in developed but also

in developing countries. For example Dr. Fajfrova research described the development of health status of soldiers of the Armed Forces of the Czech Republic and emphasized the markers of noncommunicable diseases. Their study described anthropometric and biochemical parameters of a large group of Czech Army professional soldiers which were obtained over a period of 11 years. Results were striking. Especially because military professionals are a selected subpopulation represented partly by young, physically fit individuals without any serious health problems. Throughout the monitored period only one third of military professionals had a normal body weight. Furthermore, the number of individuals with BMI values in the overweight range increased during this period (9). This points to a deteriorating state of health and a bad lifestyle for a group like soldiers. Furthermore, it is confirmed that physical activity, together with a rational diet, is a basic measure in the prevention of cardiovascular, metabolic, oncological, but also musculoskeletal diseases. In the armies, there are many possibilities how to increase the effectiveness of physical training, modify the content of preventive rehabilitation or modify spa treatment procedures, which also modify the lifestyle of soldiers (10). Any physical activity carried out regularly and with a reasonable intensity has a positive impact on the human body. And we can say that the health benefits of physical activities are demonstrable in all age groups. Physical activity significantly increases energy expenditure. This helps maintain good physical condition, prevent cardiovascular disease and type 2 diabetes. Similarly, physical activity has a significant role in the prevention of oncological and other cardiometabolic diseases (11, 12, 13). The main health benefits of physical activities include, in addition to developing or maintaining cardiovascular fitness, increasing bone density and resistance, and increasing active muscle mass (13, 14). Furthermore, it has been demonstrated several times that regular exercise activity reduces blood pressure, total body weight, percentage of total body fat, or waist circumference. Equally important was the finding that regular exercise activity increases tissue sensitivity to insulin and HDL cholesterol (12, 14, 16). From a psychological point of view, it is proven that regular physical activity has a positive effect on the human psyche. It leads to leaching of endorphins and thus creates a favorable psychological effect in the sense of reducing anxiety and depressive states (17). Everything leads not only to better health but to a higher level of life satisfaction.

### **Meals influence the moral and life satisfaction of deployed soldiers**

During the research which was to map current life satisfaction and health factor for soldiers deployed in a foreign operation in the Middle East region we also focused on meals and catering. This is because we wanted to confirm the hypothesis that meals influence the moral and life satisfaction of deployed soldiers. Firstly, we identified the profile of the soldiers deployed in a foreign operation in terms of life satisfaction dimensions. We found out the comparison between soldiers from each participant country in terms of life satisfaction. And furthermore we identified the correlation between the amount of life satisfaction and the satisfaction with catering and food.

### **Method and data obtained**

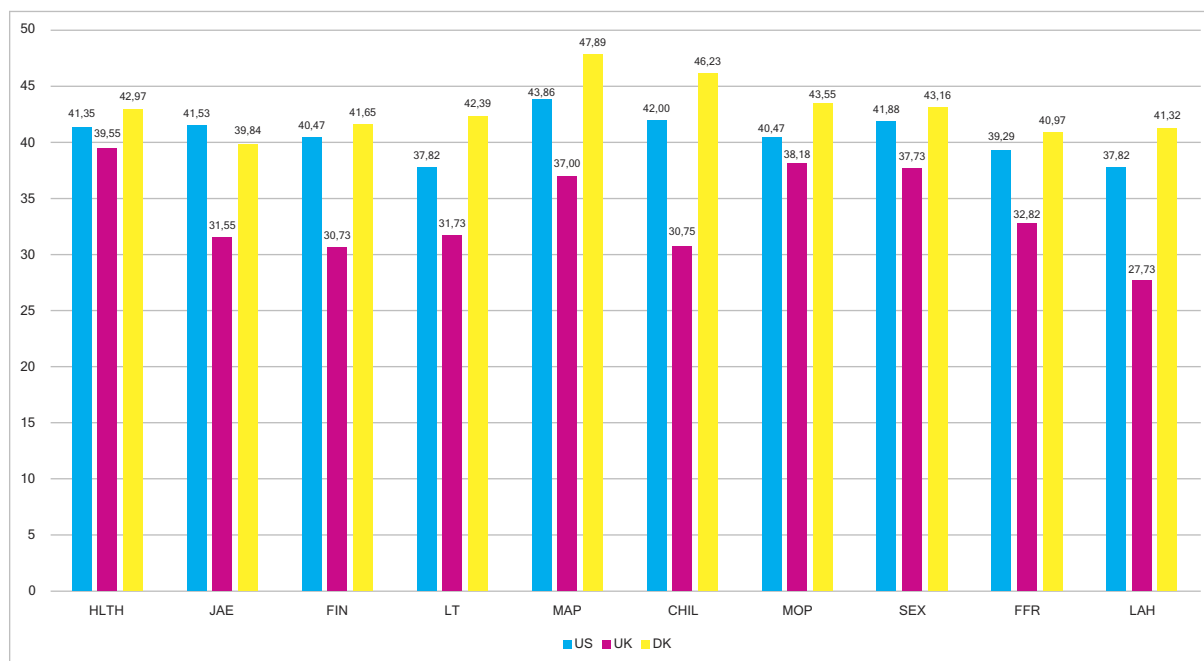
To obtain the data, a standardized method for life satisfaction was used: Life satisfaction questionnaire (authors: J. Fahrenberg, M. Myrtek, J. Schumacher and E. Brähler, 2001). Furthermore, a questionnaire for food satisfaction and socio-demographic data was used.

The Life satisfaction questionnaire is used for a relatively reliable capture of an individual picture of the overall life satisfaction of a person and differentiation of this satisfaction into ten areas that are focused on various components of life satisfaction. Each area contains 7 items to which the respondent answers within a seven-point scale. Overall life satisfaction is calculated based on the score obtained.

This questionnaire was established in Germany, where it was also standardized on a sample of 2870 persons (18). A Czech edition of this method is available in the Czech Republic (translated and edited by K. Rodná and T. Rodný published by Testcentr Prague). To carry out this research, the questionnaire was translated into English in cooperation with US Army psychologists. A total of 98 respondents participated in the research. This sample of participating members can be distinguished by sex - 80 men and 18 women. By Nationality 34 US (United States) soldiers, 33 UK (United Kingdom) soldiers and DK (Danish) 31 soldiers. Sampling was based on voluntary and anonymity and should be representative of each coalition state deployed.

### Comparison of the life satisfaction profiles between deployed nations

Comparison and differences of individual LSQ scales between deployed nations is shown in figure 1.



**Figure 1.** Comparison of the mean value of gross scores achieved for each area (HLTH - health, JAE - job and employment, FIN - finance, LT – leisure time, MAP - marriage and partnership, CHIL - relationship with children, MOP - my own person, SEX - sexuality, FFR - friends, family and relationships, LAH - living and housing) of the Life Satisfaction Questionnaire (LSQ) for deployed nations (US – United States, UK – United Kingdom, DK – Denmark).

For US soldiers, the average life expectancy was 279,12, for UK soldiers 238,46 and the DK soldiers 296. The most satisfied with the catering during the deployment were DK soldiers (7,6 points from 10) followed by US (6,3/10) and UK troops (5,7/10).

At the significance level  $P = 0,05$ , there was an established significance of the positive correlation between amount of life satisfaction and the satisfaction with the area of catering and food, where the correlation coefficient value is greater than or equal to 0,60.

Moreover at the significance level  $P = 0,05$ , there was an established significance of the positive correlation between the health dimension and the overall life satisfaction, where the correlation coefficient value is greater than or equal to 0,65.

### Conclusion

The research part of this work was mainly focused on finding out profiles of the research group in terms of life satisfaction. A standardized method for life satisfaction - Life satisfaction questionnaire was used to obtain and evaluate data. We also focused on finding more detailed and accurate information about possible relationships between overall life satisfaction and food/catering-related issues of soldiers operating in a foreign operation.

All goals were met. We identified the profile of the soldiers deployed in a foreign operation in terms of life satisfaction dimensions. The comparison between soldiers from each participant country in terms of life satisfaction was made. Furthermore, the correlation between the amount of life satisfaction and the satisfaction with food

and catering was identified and the hypothesis that there is a statistically significant correlation between overall life satisfaction and the health dimension was confirmed. We can say, that food and catering play a very high role in our lifestyle, affects our health and furthermore, the quality of life in any situation.

In life satisfaction, DK soldiers have higher values, followed by US soldiers, and UK men are the least satisfied during the foreign operation. The reasons for differences and their clarification corresponds with the last published "Happiness Index" which is investigated annually by the UN agency (19).

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### Conflict of interests

The authors declare that they have no conflicts of interest regarding the publication of this article.

### Adherence to Ethical Standards

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent was obtained from all individual participants involved in the study.

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