

NATIONAL UNIVERSITY OF PUBLIC SERVICE

Doctoral School of Military Sciences

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**Examining the characteristics of sport motivation among armed
forces and law enforcement personnel**

author's description of a doctorate thesis (PhD)

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1. RESEARCH PROBLEM

Among the Hungarian population, few people make "sacrifices" for the sake of staying healthy and gaining health. For soldiers, being healthy is one of the pillars of their profession, as health is also a symbol of strength. In their case, they perceive their health problems as a 'weakness', so it can be assumed that they 'sacrifice' even less for health than the civilian population. This is manifested in a sedentary lifestyle, poor dietary habits, lack of early consultation of a doctor and failure to attend recommended screening tests.

As the age structure of the military has shifted towards older people (due to the abolition of early retirement and the steady rise in the retirement age), the number of people with health problems is increasing, with the result that fewer and fewer people are able to complete the annual physical fitness assessment to the required standard. This is a growing problem for the Hungarian Defence Forces (hereinafter: HDF), which needs to be addressed and prevention, alongside more rigorous fitness tests, could be the solution.

Compliance with the new requirements on physical fitness for *military service and* the annual physical fitness tests set out in Decree 10/2015 (30 July 2015) of the Ministry of Defence on "*Health, Psychological and Physical Fitness for Military Service and the Review Procedure*" (hereinafter: the Decree) is a problem for many soldiers. The HDF Body Composition Programme (hereinafter: HDF BCP), which was introduced as a new capability in 2015, can provide significant support for weight rehabilitation in many respects, but the background factors behind the high drop-out rate at the beginning of the programme need to be examined and the programme needs to be further developed and optimised in an appropriate manner. In the HDF BCP, no validated assessment tool is yet available that could reveal the sport motivation patterns of the participants. The EMI-2 sports motivation questionnaire was included at the time of its first launch, but it has so far only been used with a civilian population and its suitability for assessing the motivation of armed forces and law enforcement personnel to be physically active was questionable. In many cases, the motivational factors of meeting the requirements of the organisation as a workplace (e.g. passing the annual physical fitness assessment, NATO/mission) are in the foreground in the case of HDF military personnel, while the preservation of their own health and the pursuit of a healthy lifestyle with a preventive

approach is more neglected, which would be essential for maintaining long-term health and fitness for service.

In the case of a lifestyle change and in supporting it, it is essential to primarily map the individual motivational pattern, to monitor its changes, and to understand the underlying individual decision-making mechanisms, to guide them in a way that will make the person as successful as possible and thus enable the programme to work effectively. This is key to ensuring that the personnel of the HDF and the Hungarian armed forces and law enforcement agencies are healthy, physically and mentally fit, and fit for long-term deployment.

2. RESEARCH OBJECTIVES

In my scientific work, I have chosen an area that has not yet been discussed in sufficient depth among the personnel of the Hungarian armed forces and law enforcement agencies, and I believe that this is essential for organisations where physical fitness, stamina and health are required and indispensable. In the case of the HDF, it is essential that, despite the deteriorating physical and health conditions in society, there is a constant supply of suitably physically and mentally prepared, motivated personnel.

The aim of my research is to investigate the characteristics of sport motivation among the personnel of the armed forces and law enforcement agencies, especially the professional and contracted personnel of the HDF. Within the framework of the HDF BCP, which was introduced in 2015, I investigated the initial motivation of candidates in relation to their body composition indicators and their satisfaction with their health and fitness status. Furthermore, my objectives included a sociodemographic analysis of the association of sport motivation patterns with health status and health behaviour, and an estimation of the effectiveness of the programme in terms of changes in body composition indicators over the duration of the HDF BCP. I conducted a reliability study of the Exercise Motivation Inventory-2 (hereafter EMI-2) motivation questionnaire, which has been used so far only on a civilian sample, on a special sample and used a decision tree model to study which are the key motivational factors that can be used to predict the duration of participation in the programme already at the first visit.

My objectives are:

1. To investigate whether the motivational model fits the motivational factors validated for the civilian population and the personnel of the armed forces.
2. To investigate whether there is a difference in the motivational characteristics of HDF BCP participants to be physically active - due to being overweight or obese - compared to the control group.
3. To examine the extent to which the motivational factors "*Weight control*", "*Health*" and "*Disease avoidance*" differ between the HDF BCP participants and the control group.
4. Based on the EMI-2 motivation questionnaire, building a statistical predictive model to estimate the successful completion of HDF BCP.

3. RESEARCH HYPOTHESES

1. I would like to confirm that the EMI-2 sports motivation questionnaire, which has been used so far only on a civilian sample, fits the sample of law enforcement personnel, the pattern of its factors does not differ significantly.
2. I hypothesize that the motivational pattern for physical activity of HDF BCP participants is significantly different from the motivational pattern of the control group (non- HDF BCP participants).
3. I hypothesize that the motivational factors of the HDF BCP participants, "*Weight control*", "*Health*" and "*Disease avoidance*", as motivational factors, differ significantly from the control group's sport motivation pattern.
4. I hypothesize that using the EMI-2 questionnaire and the decision tree model, the sport motivation pattern can be used to predict with high confidence the duration of participation in HDF BCP.

4. RESEARCH METHODS

In the course of my research, I collected, analysed and evaluated data on professional and contracted personnel of the armed forces and law enforcement agencies (Hungarian Defence Forces, Police, National Tax and Customs Administration, Emergency Services, National Security Service, Prison Service), who were included in the National Defence Body Image Programme between 2016 and 2020.

In the statistical analysis, I included data from those who participated in at least the first appearance, so that their starting body composition was known, and who completed the EMI-2 sports motivation questionnaire section of the multi-part HDF BCP questionnaire.

The research consisted of two parts: a 7-part self-completion questionnaire and body composition measurements (height, weight, BMI, body fat percentage, skeletal muscle percentage, visceral fat value). The OMRON BF 511 measuring device was used to measure body composition.

In addition to sociodemographic data, the questionnaire included self-assessed health and fitness status, physical activity level, motivational background of the participants and the internationally accepted EMI-2 sports motivation questionnaire.

As for the control group, I completed the EMI-2 sports motivation questionnaire among the personnel who participated in the HDF Health Promotion Programs, this study was conducted in 8 HDF units. For statistical analyses, I used statistical tests (t-test, Wilcoxon test) correlation analysis, hierarchical clustering, decision tree model and neural networks in R environment with R studio program.

5. A CONCISE DESCRIPTION OF THE RESEARCH CARRIED OUT

In the first, introductory **chapter** of the thesis, I outline the problem of obesity as a public health problem and its impact among the personnel of armed forces and law enforcement organisations. I present the background to the introduction of the Defence Physical Fitness Programme, which was introduced in 2015 as a new capability for military defence.

In the **second chapter**, I review the basic concepts relevant to the interpretation of the research topic, based on national and international literature. I describe the changing concept of

health, health models and the relevance of the research topic for military science.

In the **third chapter**, I discuss the theoretical approach to the topic, based on the literature. I explain motivation, sport motivation, motivational theories and the trans- theoretical model of behaviour change (TTM) and its relevance to the process of lifestyle change.

In the **fourth chapter**, I describe the structure and process of the Army Body Composition Program (AR 600-9) used in the US Army, on the basis of which the HDF BCP was implemented in the domestic environment, in the HDF. I also situate the HDF BCP in the Hungarian Army's preventive activities, and describe the program's structure and practices.

In the **fifth chapter**, I present the studies carried out in the HDF BCP in the period 2015-2020 and the results and experiences of the programme so far. Since the introduction of the HDF BCP, I have also conducted 5 previous studies examining self-rated satisfaction with health and fitness status in relation to body composition indicators, and the motivational patterns of candidates by age group. I analysed participants' body composition changes during the HDF BCP and their distribution by TTM stages as a function of physical activity and nutrition.

Chapter six of this thesis presents the main findings of my research. The EMI-2 motivational questionnaire, the motivational patterns of HDF BCP participants in a control group comparison, the decision tree model and neural networks. Furthermore, the sample characterization, the statistical methods used and the EMI-2 sport motivation questionnaire used as a measurement tool in this research are presented.

In **chapter seven**, I present the results of the research. I will detail the analysis of the EMI-2 motivation questionnaire, precisely identifying the differences in the sport motivation questionnaire based on the responses of my own specific sample compared to the original grouping. I describe the correlations and differences obtained from comparing the motivational patterns of HDF BCP participants and the control group. I will present the results of estimator models (decision tree model, neural networks) that can be used to optimize the allocation of resources in HDF BCP and to extract hidden information about the study population that can be used to increase the probability that an individual will successfully complete the lifestyle program.

The thesis concludes with a summary of the scientific activities carried out, conclusions, a description of the 4 new scientific results and a presentation of the practical applications of the research results.

6. SUMMARISED CONCLUSIONS

From my previous studies, it was confirmed that the sample typically included cases where the subjects had an unrealistic view of their self-rated health, perceiving it as good despite their high BMI, body fat percentage and visceral fat levels. High obesity BMI value (obesity) is considered a disease (BNO code- E6690) and high visceral and subcutaneous body fat is also associated with significant health risks. Similar results were obtained when comparing their self-rated health status to their peers, but here we need to consider the fact that either it is unrealistic to compare them to peers with similar reference values, or as in the previous cases, their self-rated health status is unrealistic. These findings suggest that the individuals I have studied do not perceive their health status either realistically or as better than their peers, compared to objective measures, which indicates a cognitive dissonance. Overweight and obese people have a low disease awareness.

A more realistic assessment of satisfaction with self-assessed fitness status, and of fitness status relative to peers, may be provided by compulsory participation in the annual physical fitness assessment, given the specificity of the sample selected, and the assessment obtained there.

The results of the reliability test of the EMI-2 sports motivation questionnaire showed that the persons surveyed do not perceive any difference between the categories of maintaining *health* and *avoiding illness*, for them it means the same. I also found a difference between the original grouping of the factors of sport as *revitalisation* and sport as *enjoyment*, because the persons I interviewed did not distinguish between these factors either.

For the other groups, there were items that were separate, but the main motivating factors were well outlined in the responses of the people I interviewed. Thus, it can be said that the instrument has proved to be reliable (valid) for the sample of law enforcement personnel.

The HDF BCP is mainly for people with weight problems and unhealthy lifestyles, many of whom have already developed significant health deficits as a result of their excess weight. Based on the responses of the program participants and the control group to the motivational factors, I did not find significant differences in the average scores, but I did find differences in the motivational pattern.

Among HDF BCP participants, the *health and disease avoidance motivational* factors were ranked in the top two places, and the *strength and endurance* factor, ranked second for the control group, was ranked only fifth, suggesting that HDF BCP participants may require a different motivational structure and technique for maintaining physical activity motivation

compared to those with normal body composition.

Furthermore, I assumed that an estimation model could be developed that could predict with a high degree of certainty, based on the EMI-2 sports motivation questionnaire, the number of applicants who will participate in the programme for at least six months, from the first appearance in the HDF BCP. Based on my results, the decision tree model can predict with 84% accuracy, and neural networks with up to 100% accuracy, who will participate in the programme for at least six months. The model thus proved to be able to significantly increase the efficiency of both the participants in the programme and the HDF BCP, and to reduce dropout.

7. NEW SCIENTIFIC RESULTS

1. I analysed the changes in body composition indicators of the participants of the HDF BCP and examined their sport motivation patterns. From the results, I found that an important factor for a successful lifestyle change programme and its effectiveness is the maintenance of motivation throughout the programme and attendance at a minimum of 4 control examinations and 12 months of participation.
2. I have examined the willingness of armed forces and law enforcement personnel to engage in physical activity using the EMI-2 sports motivation questionnaire and I have demonstrated the applicability and usefulness of the questionnaire on the sample of armed forces and law enforcement personnel that I have examined, which may help to maintain motivation during a weight rehabilitation programme.
3. By comparing the sport motivation of a randomly selected non-representative sample (as a control group) of the Hungarian Defence Forces personnel and the motivational pattern of the physical activity of the participants of the HDF BCP, I have demonstrated that the sport motivation of a person participating in a lifestyle support programme (overweight, obese) and a person not participating in the programme (normal body condition) show a different pattern, therefore, adequate intervention options need to be applied based on the individual motivational pattern.

4. I applied an estimator model with 84% reliability among the participants of the HDF BCP, which can be used to predict the effectiveness of the HDF BCP and thus significantly increase its effectiveness, which helps to integrate it into the health culture of the Hungarian Defence Forces.

8. PRACTICAL USE OF RESEARCH RESULTS, RECOMMENDATIONS

I propose that in addition to the body composition indicators of the participants of the Hungarian Army's Physical Fitness Program, their sports motivation pattern should be examined and mapped in order to help the candidates to meet the criteria of a healthy lifestyle in accordance with the recommendations, for which I initiate the use of the motivational interviewing method at the first appearance in the HDF BCP, before the instrumental examinations.

To provide a more realistic assessment of the health status of the workforce, the measurement of physical fitness indicators should be included in the protocol of the annual mandatory occupational health examinations. In the context of programmes to optimise body composition indicators, it would be necessary, in my opinion, to introduce or continue compulsory physical education sessions in the formations, supplemented by specific physical therapy programmes for certain illnesses.

It is particularly appropriate to examine the motivational background of sporting habits in cases where the participants in the lifestyle change programme are members of the armed forces or law enforcement agencies, where the level of physical fitness is monitored annually by means of various fitness tests and may even lead to dismissal from further professional activity if the level of fitness is not satisfactory.

My findings should provide help to all professionals (physical education, physiotherapy, psychology, dietetics, health promotion, human development, nutrition) who are directly or indirectly involved in HDF BCP or other lifestyle change programmes that include physical activity and sporting behaviour change.

In order to increase the effectiveness of the work of the professionals involved in the HDF BCP, it is necessary to develop and raise awareness of the caloric intake habits necessary to maintain energy balance, taking into account the appropriate micro and macro nutrients, on the one hand, and an adequate response to the sport motivation pattern, on the other hand, in order

to achieve a sufficient level of physical activity on the delivery side, in order to address the physical fitness problems of the participants in the programme, which are due to an inappropriate lifestyle. For HDF BCP participants, the focus on the motivational factors of *Weight Control, Health and Disease Avoidance* should be the main motivational factors for their physical activity and a procedure should be developed to reinforce the other motivational factors in order to complete the programme as successfully as possible

My further results suggest that the effectiveness of HDF BCP and the success of each participant depends on attendance at the required follow-up visits and the reduction in body fat percentage at these visits. My studies show that those who participated in the program for 12 months were effective in changing their body composition. The primary goal is to maintain the motivation of HDF BCP participants until the end of the program (12 months). To do this, it is essential to identify the background factors that show individual differences in the participants, and thus to identify tailored intervention points.

The results of the decision mechanism analysis behind the sport motivation pattern of the individuals I studied - decision tree model, neural networks - not only allow to estimate the success of the individual participating in the programme, but also the effectiveness of the HDF BCP. Therefore, these studies will also become indispensable in the future, thus ensuring the dynamic "evolutionary" development of the HDF BCP. As long as these characteristics characterise the HDF BCP, as opposed to all static methods, it will be increasingly effective in the future.

THE AUTHOR'S LIST OF PUBLICATIONS ON THE SUBJECT

Book chapter/section

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PROFESSIONAL-SCIENTIFIC CURRICULUM VITAE

Zsófia Rázsó was born in 1988 in Szeged, in a military family. She graduated from the Radnóti Miklós Experimental High School in Szeged, and received her bachelor's degree in Physical Education at the Juhász Gyula Pedagogical Faculty of the University of Szeged (SZTE) in 2011.

He started his research and publication activities during his university years. In 2011, she was awarded a special prize in the Physical Education and Sports Science section at the National Student Conference on Physical Education and Sports Science (OTDK) with her scientific paper „*Rekreatív csoportos mozgásprogramra jelentkezők táplálkozási szokásainak jellemzője és összefüggése a pszichoszociális egészséggel*” [“*The characteristics of the nutritional habits of participants in a recreational group exercise programme and their relationship with psychosocial health*”], and in 2013 she was awarded 1st place at the OTDK with her paper “*A sportmotivációs struktúra és a szorongás jellegzetességei önkéntesek körében*” [“*The structure of sports motivation and the characteristics of anxiety among volunteers*”].

In 2009 she received a *City Scholarship* from the Municipality of Szeged, and in 2013 she was a *Scientific Scholar* in the framework of the TÁMOP programme "Ensuring excellent scientific talent" (TÁMOP-4.2.2/B-2012), and then she was a *recipient of the Eötvös Loránd Scholarship of the National Excellence Programme*. In the same year, she was awarded the *Good Student, Good Athlete Award* at her university.

She received her Bachelor's degree in Physical Education and Master's degree in Health Promotion (MA) from the University of Szeged in 2014.

In 2015, she started working at the Health Development Department of the Institute of Psychology and Health Behaviour of the Hungarian Defence Forces Health Centre as a civil servant, and after her initial military training as a non-commissioned officer. She is one of the professional developers of the Hungarian Defence Forces Body Composition Programme.

She started her doctoral studies as a HM scholarship holder at the Doctoral School of Military Science of the National University of Public Service in 2016. Her research interests include the characteristics of sport motivation.

She is a member of the Hungarian Society of Sports Science. She has an advanced level language certificate in English and a basic level language certificate in Italian.

The number of her scientific publications registered in the Hungarian Archives of Scientific Works: 33, of which 1 was published as an author of a book and 3 as a book excerpt. 1 publication in foreign languages is under publication.