

## **ABSTRACT**

**Background:** In sports, various actions are taken to optimise results. Athletes focus on technical, motor, tactical, or psychological aspects. Artificial dehydration of the body is widely used in many sports, particularly in those where weight categories determine the opponents. Since artificial dehydration causes rapid weight loss before competitions, some sports federations limit its use by rules. Athletes turn to this method as they believe it will help them defeat their opponent, making artificial dehydration one of the most important issues in sports training. Given this, it is crucial to understand its effect on the psychophysiological functioning of athletes, which is the focus of my work on elite wrestlers. The dissertation is dedicated to studying changes in the psychophysiological state of elite wrestlers under conditions of artificial dehydration. It addresses the issue of artificial dehydration, considering the psychophysiological states of the athletes and their psychophysical characteristics.

**Objectives:** The purpose of this study is the scientific justification of changes in the psychophysiological state of elite wrestlers in conditions of artificial dehydration of the body.

**Materials and methods:** The research was based on a psychophysiological experiment in which two groups were formed: group I: 25 elite wrestlers (members of the national team in Greco-Roman wrestling), aged 20-34, who use artificial dehydration. Group II: 25 elite wrestlers (members of the national team in Greco-Roman wrestling), aged 20-34, who do not use artificial dehydration. The study was conducted during the pre-competition mesocycle in the competition period. The methods used to gather data were experimental and non-invasive. The data collected were processed using Microsoft Excel 2019 and the statistical analysis package Statistica 10 (StatSoft Inc.), as well as the RStudio software for R language, designed for statistical calculations and visualisation of their results. The following testing equipment was used: Omron BF511 body composition monitor; TANITA MC-780 P MA segmental body composition analyzer; Concept2 BikeErg cycle ergometer + modification for studying the 10

upper limb belt; Portable electrocardiograph with finger electrodes (held in hands): „Fazagraf“; „Multipsychometer-05“ computerised psychodiagnostic system. The „Multipsychometer-05“ system includes the following psychological and psychophysiological tools: test Color & Word (Stroop test), Lüscher colour test, Raven's Progressive Matrices test, test balance of nervous processes, test for determining the latent period of visual-motor reaction, test for determining nervous system endurance, WAM (well being, activity, mood) questionnaire.

**Results:** When assessing body composition, it was found that the indicators of high-level wrestlers varied, but most were within the normal range (according to Omron

Healthcare). A distinctive feature of the athletes was a high to very high percentage of skeletal muscle mass (ranging from 40.2-42.9% to 44.7-46,5%). The highest values were noted in national team leaders. The percentage of body fat in all athletes was close to low and normal levels (between 8-19.9%). Water content index was also studied, showing a total water percentage in the body. The normal values ranged from 50-65%. Analysing the relationship between morphofunctional state and physical fitness, all wrestlers showed a positive tendency to improve their physical fitness. According to the results of the functional brain asymmetry study, athletes were divided into two groups: those with left-hemispheric dominance and those with right-hemispheric dominance. Wrestlers with left-hemispheric dominance showed a slowdown in heart rate due to the activation of the parasympathetic system and reduced tension in the autonomic nervous system. In contrast, right-hemispheric dominant wrestlers exhibited a higher level of autonomic regulation tension due to the activation of central and sympathetic mechanisms. Heart rate variability analysis revealed differences between the groups. Wrestlers not using artificial dehydration had a higher heart rate regulation index compared to those who used it. As the tension in the autonomic regulation system increased, the sympathetic regulation fibres become more active in wrestlers who did not use artificial dehydration. The conclusions drawn from the study indicate that artificial dehydration, accompanying a wrestler's sports activity, 11

intensifies the influence of neurohumoral centres by activating parasympathetic autonomic regulation of heart rate. This suggests that rapid weight loss acts as an additional load on the autonomic nervous system, leading to protective inhibition (as per Pavlov), safeguarding the autonomic system from overload. At the same time, due to professional experience, compensatory mechanisms were activated to prevent the loss of cognitive resources. Analysis of psychophysiological indicators showed that elite wrestlers using artificial dehydration scored lower on the work capacity (mental state) and autonomy (mental state) scales in the Lüscher colour test and exhibited a less efficient mechanism of autonomic responses. They also had worse emotional states (below normal), indicating moderate nervous and mental stress. In contrast, the Raven test showed that the group using artificial dehydration scored higher, reflecting greater intelligence.

Conclusions: Based on the identified relationships between the psychophysiological state and resting metabolic rate in elite wrestlers during artificial dehydration (depending on the weight category), I present key criteria for current training monitoring. Resting metabolic rate generally increases with weight in wrestlers. When planning training for competitions and choosing weight loss methods, it is recommended to consider metabolism as a biomarker of elite wrestlers' functional state. The dissertation also proposes a new approach to improving the preparation of elite wrestlers who use

artificial dehydration. The interdisciplinarity of the work has simultaneously allowed the development of psychology as a scientific discipline.s

**Keywords:** artificial dehydration of the body, elite wrestlers, psychophysiological state, heart rate variability, bioelectrical impedance analysis, weight loss, Greco-Roman wrestling