

THE INFLUENCE OF THE VARIOUS SPECIALIZED PHYSICAL EDUCATION TEACHING PROGRAMS ON STUDENTS' AEROBIC ENDURANCE

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Abstract: Aerobic endurance (AE) is considered as one of the physical abilities that determines success on job-related physical tests for police officers. Therefore, AE is one of the criteria in selection process, during the education and through working career. At the University of Criminal Investigation and Police Studies (UCIPS) the development of the level of AE takes place within the course of Specialized Physical Education (SPE). In the school year 2020/2021, due to the COVID-19 pandemic measures, SPE classes were organized in two models: regular (the first-year students) and online (the second, third- and fourth-year students). The aim of this study was to determine the influence of these different modules of SPE studying on AE of the UCIPS students. The sample of the respondents included 46 students of the first year (19 women and 27 men) and 45 students of the third year (21 women and 24 men). AE was estimated by using Cooper's running test at the start and at the end of the observed studying year. The difference between initial and final testing was defined by using a pair sample t-test. It was determined that AE increased by 5.5% ($t = -3.353$, $p = 0.004$) with women and for 4% ($t = -3.139$, $p = 0.004$) with men for the first-year students. In contrast, the third-year students had the reduction of AE by 3.6% ($t = 2.415$, $p = 0.025$) with women and by 6.2% ($t = 3.354$, $p = 0.003$) with men.

Keywords: physical abilities, aerobic endurance, police, students

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INTRODUCTION

The specific nature of police work entails resolving incidents such as arresting criminals, crowd control, separating individuals engaged in a physical altercation, as well as providing assistance after traffic accidents, or during natural disasters. In such cases, police officers are not only exposed to great physical exertion, but also to significant amounts of mental and physical stress. Therefore, a sufficient level of physical abilities is one of the key requirements for a successful resolution of critical incidents (Anderson & Plecas, 2000; Soroka & Sawicki, 2014; Marins et al., 2019). A high level of physical abilities, apart from enhancing work efficiency, is considered one of the crucial factors for the prevention of cardiovascular diseases and diabetes, as well as for decreasing injury risk (Ardern et al., 2003; Strauss et al., 2021). Due to the above-mentioned reasons, one of the parameters in the police selection system is physical ability assessment, whereas one of the key objectives of police education is to develop relevant physical abilities and skills required for successful performance in this section of police work (Dimitrijević et al., 2014; Lockie et al., 2021).

Aerobic endurance (AE) in police officers is identified as a significant physical ability related to the general health condition and possibly predicting performance in job-related fitness tests (Jamnik et al., 2010; Orr et al., 2018). At the University of Criminal Investigation and Police Studies in Serbia (UCIPS), within the scope of Specialized Physical Education (SPE), the Cooper 12-minute run test (RUN) is used in order to assess AE in the process of selection, as well as throughout the education (Janković & Dimitrijević, 2012). Incontrovertibly, not only is AE one of the determining factors for the success at the UCIPC entrance exam, but to a certain extent it can also affect studying efficiency from the aspect of time required in order to graduate (Koropanovski et al., 2020; Janković et al., 2021). Furthermore, a lower level of AE has been found in cadets who quit studies, possibly leading to the conclusion that physical ability could be a relatively precise indicator of successful performance throughout police education (Lockie et al., 2019).

One of SPE goals is to develop AE, while after the course, students are expected to fulfill certain predefined norms, conditioned by gender and the year of studies. This is achieved by means of educational training programs designed to enhance physical abilities of the selected candidates leading them to the appropriate professional level (Dopsaj et al., 2007; Janković & Dimitrijević, 2012). However, since the foundation of UCIPS, the SPE program has been modified several times, with the tendency of decreasing the number of classes. Similarly, the programs such as aerobic running training, swimming, skiing training, and practical field training have also undergone a decline. By comparing the impact of various programs, it has been found that this reduction of classes has negatively affected physical abilities, particularly AE (Dimitrijević et al., 2014). In addition, the SPE curriculum containing only the elements of martial arts in the forms of defensive tactics and the use of force is far from sufficient to improve AE in UCIPS students. However, by introducing two additional weekly aerobic training workouts in a semester (one within the curriculum, and the other where students train on their own following the instructions), it is possible to improve AE (Kukić et al., 2019). The results of the aforementioned study show the possibility for SPE professors to positively affect the betterment of their students' physical abilities, at least to a certain extent. This could be achieved not only through the training process itself, but also by improving students' theoretical knowledge, thus enabling them to conduct aerobic training independently.

Declaring COVID-19 a pandemic has led to numerous changes in many spheres of life, such as the social, economic, political, as well as technical-technological. One of the restrictive prevention measures pertained to shutting down educational institutions and included transitioning to network teaching. Distance learning has become an alternative to traditional one, with the majority of higher ed-



ucation institutions migrating to online teaching based on information communication technology (Batez, 2021; Kovačević et al., 2021). During the COVID-19 pandemic in the academic year 2020/21 at UCIPS, teaching was approached in two different manners. The first-year students were accommodated in a campus within UCIPC, following all prevention measures, and attended regular offline lessons. Conversely, sophomores and senior students attended online lessons at home. The aim was to determine the influence of different teaching models (traditional teaching versus the one based on information communication technology) on UCIPS students' AE.

METHODS

Participants

The sample of respondents consisted of 101 UCIPS students divided into two basic groups according to the teaching model. The first group comprised 46 first-year students (19 female students, whose average age was 19.7 ± 0.5 , BH 170.6 ± 5.8 cm, BM 63.5 ± 5.2 kg, BMI 21.9 ± 1.8 kg/m², and 27 male students, with an average age of 19.7 ± 0.5 , BH 181.3 ± 4.5 cm, BM 80.3 ± 9.1 kg, BMI 24.4 ± 2.1 kg/m²). The second group included 45 third-year students (21 females – average age: 21.6 ± 0.9 , BH: 170.3 ± 3.9 cm, BM: 63.8 ± 6.6 kg, BMI: 22.0 ± 2.2 kg/m², and 24 males – average age: 21.6 ± 1.0 , BH: 181.9 ± 6.6 cm, BM: 84.3 ± 7.9 kg, BMI: 25.4 ± 1.8 kg/m²).

Education teaching process

Due to the COVID-19 pandemic, studying unfolded in accordance with two separate models in the academic year 2020/21. The first-year students were accommodated in a dormitory within UCIPS and attended traditional lessons. SPE classes were held in the second semester, according to an accredited teaching curriculum, where students had three exercise classes and one lecture a week. Apart from SPE classes, the first-year students also had 60-minute swimming lessons once a week, as well as a daily 30-minute morning workout. What is more, in the second half of the spring semester, in April and May, physical abilities were assessed from the aspect of anaerobic and aerobic endurance with different load intensity. On the other hand, the third-year students attended online lessons exclusively, wherein they could obtain information regarding AE development programs, together with recommendations for training realization.

Aerobic Endurance Assessment Procedures

General aerobic endurance was estimated by means of the Cooper 12-minute run test (RUN), where students' objective was to cover as much distance as possible in 12 minutes. The assessment was conducted on a 230-meter circular running track marked after every five meters (Koropanovski et al., 2020). In order to determine the effect of SPE teaching process on AE, the respondents were tested twice, at the beginning (initial testing), and at the end of the particular year of studies (final testing).



Statistics

All data were analyzed by means of descriptive statistics in order to display basic parameters such as mean value, standard deviation, as well as minimum and maximum testing values. In the later analysis, the paired sample t-test was used to determine the difference between the initial and final measurements. Statistical significance was defined at the probability level of 95%, i.e. $p < 0.05$ (Hair et al., 1998). Statistical Package SPSS Statistics for Windows, Version 20.0 was used for statistical data processing.

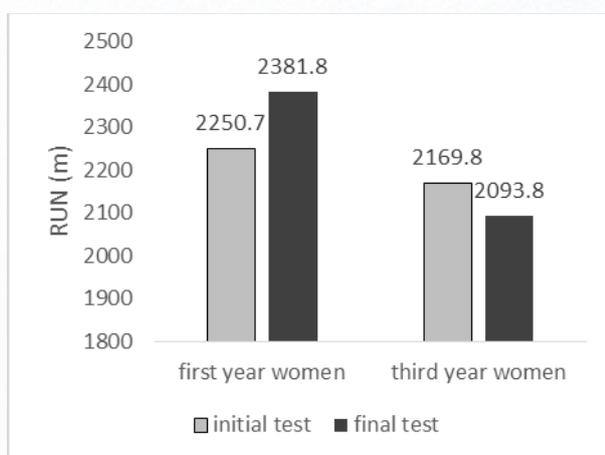
RESULTS

Table 1 - Basic descriptive parameters of the Cooper test results

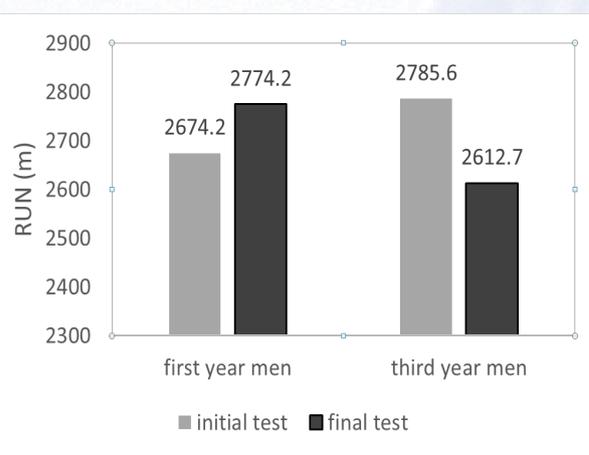
Females	Initial			Final		
	Mean \pm SD	Min.	Max.	Mean \pm SD	Min.	Max.
First year	2250.7 \pm 188.9	1930	2685	2381.8 \pm 131.3	2140	2575
Third year	2169.8 \pm 121.5	1840	2450	2093.8 \pm 171.2	1680	2350
Males	Initial			Final		
	Mean \pm SD	Min.	Max.	Mean \pm SD	Min.	Max.
First year	2674.2 \pm 230.7	2090	3200	2785.6 \pm 166.8	2370	3240
Third year	2774.2 \pm 113.4	2500	3080	2612.7 \pm 249.3	2070	3160

Table 2 - Paired sample t-test results

Variable	Absolute difference (m)	Relative difference (%)	t	P
First-year females	131.1	5.5	-3.353	0.004
First-year males	111.3	4	-3.139	0.004
Third-year females	75.9	3.6	2.415	0.025
Third-year males	161.4	6.2	3.354	0.003



Picture 1 - RUN results changes in female UCIPS students



Picture 2 - RUN results changes in male UCIPS students

CONCLUSIONS

Owing to the COVID-19 pandemic, the work of educational institutions had to be modified. At UCIPS, the first-year students attended traditional classes, whereas all higher-year students took on-line lessons. The goal of this paper was to determine the impact that these different teaching models would have on AE. The conclusion based on the study results is that a statistically significant decline of AE occurred in students of both genders after they attended online lessons. The factors leading to this result could be found in the lack of practical work with students, as well as in different social restrictions with a negative impact on students' otherwise active lifestyle. On the other hand, the students who attended traditional SPE lessons accompanied with additional physical activities, such as swimming, morning workout, as well as aerobic and anaerobic ability testing, managed to improve their AE, thus accomplishing one of the SPE objectives. The displayed results lead to a conclusion that in order to improve UCIPS students' physical abilities it is essential to organize a mixed teaching model which would not disregard health regulations, but would include both network teaching, and traditional exercise lessons as well. Thus, in direct contact with a professor, students would also have an opportunity to obtain sufficient theoretical knowledge enabling them to organize and conduct additional aerobic training independently. In the studies to come, it appears necessary to determine the impact of network teaching during the COVID-19 pandemic on other students' physical abilities, as well as on other factors that could be significant for the success in studying and the development of professional skills of the future Ministry of Internal Affairs employees.

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