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Okhrimenko I. M.³, Rohovenko M. M.³**Level of stress and somatic health
in female law enforcement officers
during their training
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Охріменко І. М.³, Роговенко М. М.³**Рівень стресу та соматичного
здоров'я жінок-правоохоронців
під час підготовки до професійної
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Introduction

In Ukraine's current security and law enforcement environment, the National Police plays a significant role, responding to a wide range of offences, often under conditions of increased risk and stress [1–3]. In recent years, there has been a significant increase in the number of women in law enforcement agencies, consistent with the global trend toward gender equality and the integration of women into all areas of professional activities, including those traditionally considered “male”. The professional activities of female police officers encompass a range of operational and service tasks, such as apprehending offenders, participating in preventive measures, and ensuring public safety, which require high levels of stress resilience and psychological and physical fitness [4].

According to many scientists [5; 6], female law enforcement officers, including female cadets at educational institutions, are exposed daily to the adverse effects of a large number of professional stressors, most of which are permanent. According to experts [7; 8], stress in female law enforcement officers is a serious problem that leads to emotional burnout, poor health (cardiovascular disease, digestive issues, insomnia, etc.) and mental disorders (anxiety, anger, apathy, depression) caused by high load, traumatic experiences, gender stereotypes, and prolonged exposure to stress hormones (cortisol, adrenaline), which requires comprehensive support methods to prevent chronic diseases and maintain their health, working capacity, and professional longevity.

Scientists [9; 10] include the following among the main strategies for preventing and overcoming stress, as well as maintaining and restoring the mental and somatic health of female law enforcement officers: individual consultations with a psychologist, group training, development of self-help and emotion management skills; regular physical activity,

balanced nutrition, adherence to sleep and rest regimes; the formation of a sense of control, the development of stress resilience through training, the creation of a supportive environment; regular preventive examinations to identify and correct early signs of stress-related diseases.

Among the above-mentioned ways to overcome stress and improve the health of female law enforcement officers, the simplest, most accessible, and most effective are motor activity, exercise, and sports [11–13]. At the same time, the most common type of motor activity among female law enforcement officers, aimed at developing their physical qualities, strengthening their health, and reducing stress, is health-promoting fitness [14]. Health-promoting fitness is a set of exercises aimed at general body strengthening, stress prevention, rehabilitation, prevention of occupational diseases, improvement of general well-being, a proactive attitude, and mood [15–17]. It covers areas such as stretching, Pilates, aqua aerobics, functional training, and strength and cardio training, which help strengthen the muscle corset, improve joint mobility, and promote the restoration of women's physical and psycho-emotional state [18–20]. However, the use of health-promoting fitness training sessions for female cadets in higher educational institutions for professional activities, to prevent stress and strengthen somatic health, remains insufficiently studied, which informed the choice of research topic.

The aim of the research is to investigate the level of stress and somatic health among female cadets during health-promoting fitness training sessions as part of their academic training process.

Object, materials and research methods

Participants. The research, conducted in the 2022–2025 years, involved 149 female cadets from the National Academy of Internal Affairs (NAIA, Kyiv,

Ukraine) majoring in "Law" specialty. To achieve the research aim, we compared the level of stress and somatic health in female cadets aged 17–20 who participated in health-promoting fitness training sessions during their 1st and 2nd training years (Group No. 1, $n = 22$) with the indicators of female cadets who were engaged in other types of motor activity in the academy's sports clubs: martial arts (sambo, hand-to-hand combat; Group No. 2, $n = 17$), athletics (Group No. 3, $n = 12$), orienteering (Group No. 4, $n = 9$), kettlebell lifting (Group No. 5, $n = 11$), arm wrestling and powerlifting (Group No. 6, $n = 15$), table tennis (Group No. 7, $n = 13$), mini-football (futsal, Group No. 8, $n = 8$), volleyball (Group No. 9, $n = 10$), tug-of-war (Group No. 10, $n = 7$). In addition, we formed Group No. 11 ($n = 25$), which included female cadets who did not attend any sports clubs during their academic training; however, during sporting and mass-participation activities, they exercised according to the existing program under the guidance of a curator. Female cadets in groups 1–10 participated in NAIA sports clubs during their independent training hours (during sporting and mass-participation activities) under the guidance of coaches-instructors from the Department of Special Physical Training. The number of hours of motor activity per week was the same for female cadets across all groups: 4 hours of training sessions (2 sessions of 2 hours each) in physical training and 6 hours (3 sessions of 2 hours each) in sports clubs or other sporting and mass-participation activities. The differences that formed the basis of the comparative analysis between the groups' indicators were the content and focus of the motor activity training sessions. The criteria for inclusion of participants in the research were as follows: only female cadets could participate in the research; female cadets chose the type of motor activity at their own discretion in the first semester of their academic training; there were no health contraindications to participating in one kind of motor activity or another. The exclusion criteria were discontinuation of sports club membership due to health or other reasons, and the female cadets' own decision to withdraw from the research at any time. Female cadets in all groups were informed about the objectives of the research, after which they gave their written consent to participate in the research solely for scientific purposes.

The comparison of stress and health indicators among female cadets was conducted at the beginning of the 1st training year (initial stage of the research) and at the end of the 2nd training year at NAIA (final stage of the research). In addition, we examined the dynamics of these indicators within each group over the research period.

Research methods: analysis and generalization of literary sources, psychodiagnostic methods, biomedical methods, statistical analysis. Analysis and generalization of literary sources were used to conduct an analytical review of scientific sources on the outlined range of issues (30 sources from Scopus and Web of Science Core Collection were analyzed).

Psycho-diagnostic methods were used to assess the level of stress among female cadets during their academic training under modern conditions. For this purpose, we used the methodology of Yu. V. Shcherbatykh, which allows assessing the degree of manifestation of intellectual, behavioral, emotional, and physiological symptoms of stress in female cadets, as well as the overall level of stress [21]. The questionnaire form contained 4 sets of 12 symptoms each. Female cadets rated the presence of one of the intellectual and behavioral symptoms as 1 point; emotional symptoms as 1.5 points; and physiological symptoms as 2 points. The level of stress was assessed according to Table 1.

Table 1

**Table for assessing the level of stress
in female cadets according to the methodology
of Yu. V. Shcherbatykh, points**

Assessment in points	Stress level
0–5	Absent
6–2	Moderate
13–24	Pronounced
25–40	Strong
≥41	Excessive

Biomedical methods were used to study the somatic health of female cadets. For this purpose, the methodology of G. L. Apanasenko, which is based on anthropometric indicators and the state of the body's cardiovascular and respiratory systems [22], was used. This methodology is based on 5 indices: body mass index (BMI), vital index (VI), strength index (SI), and Robinson index (RI), heart rate recovery time index (HRRTI). The body mass index was calculated as body weight divided by height squared. The vital index was determined by the ratio of vital lung capacity to body weight. The ratio of the dynamometry of the stronger hand to body weight determined the strength index. The Robinson index was determined by the ratio of the product of the resting pulse and systolic blood pressure to 100. The heart rate recovery time index was calculated as the time required for the heart rate to return to baseline after 20 squats in 30 seconds. The level of somatic health of female cadets was determined by the sum of points for each of the five indicators in Table 2.

Data processing. Statistical analysis was applied to correctly process the data and identify the difference between the indicators under study. The significance of the difference in the results of the cadets was determined based on the Student's t-test. The significance for all statistical tests was set at $p \leq 0.05$. All statistical analyses were performed with the SPSS software, version 11.0.

Ethical approval. This research followed the regulations of the World Medical Association Declaration of Helsinki and ethical principles for medical research involving human subjects and was approved by the Academic Council of NAIA (Protocol No. 3 dated 19.09.2022). Informed consent was received from all female cadets who took part in this research.

Table 2

Table for assessing the level of somatic health in female cadets according to the methodology of G. L. Apanasenko, points

Indicators of somatic health	Level of physical health				
	Low	Below average	Average	Above average	High
BMI, kg/m ²	<16.9	17.0–18.6	18.7–23.8	23.9–26.0	>26.1
points	–2	–1	0	–1	–2
VI, ml/kg	<40	41–45	46–50	51–56	>56
points	–1	0	1	2	3
SI, %	<40	41–50	51–55	56–60	>61
points	–1	0	1	2	3
RI, c. u.	>111	95–110	85–94	70–84	<69
points	–2	–1	0	3	5
HRRTI, s	>180	120–180	90–120	60–90	<59
points	–2	1	3	5	7
Total points	3 and <	4–6	7–11	12–15	16–18

Research results

The results of the study of the level of stress in female cadets who engaged in various types of motor activity during their academic training under martial law are presented in Table 3. Assessment of stress levels in female cadets showed that at the beginning of the research, no significant differences were observed among the indicators across all groups ($p > 0.05$). The stress levels of female cadets in all groups were on the borderline between moderate and pronounced stress (± 12 points). During the research period, the stress level in all groups of female

cadets in groups 1–10 significantly ($p < 0.05$ – 0.001) decreased, which indicates the effectiveness of any type of motor activity for the prevention of stress in female cadets during their academic training under martial law. The most pronounced positive changes in stress levels were observed among female cadets who attended additional training sessions in health-promoting fitness, martial arts, orienteering, and sports games (table tennis, volleyball, football); the least pronounced changes were observed in athletics and strength sports clubs. In contrast, in Group No. 11, although the stress level decreased by 0.7 points, it did not change significantly ($p > 0.05$).

Table 3

Dynamics of the level of stress in female cadets ($n = 149$) who engaged in various types of motor activity during their academic training (Mean $\pm$ m), points

Study groups	Research stages		Δ	t/p
	Beginning	End		
Group No. 1 ($n = 22$)	11.6 $\pm$ 0.32	9.7 $\pm$ 0.29	1.9	p
Group No. 2 ($n = 17$)	10.9 $\pm$ 0.35	9.3 $\pm$ 0.31	1.6	3.42/<0.01
Group No. 3 ($n = 12$)	11.4 $\pm$ 0.41	10.2 $\pm$ 0.37	1.2	2.17/<0.05
Group No. 4 ($n = 9$)	12.0 $\pm$ 0.48	10.3 $\pm$ 0.41	1.7	2.69/<0.05
Group No. 5 ($n = 11$)	10.8 $\pm$ 0.39	9.7 $\pm$ 0.34	1.1	2.13/<0.05
Group No. 6 ($n = 15$)	11.7 $\pm$ 0.37	10.5 $\pm$ 0.32	1.2	2.45/<0.05
Group No. 7 ($n = 13$)	12.1 $\pm$ 0.44	10.2 $\pm$ 0.38	1.9	3.27/<0.01
Group No. 8 ($n = 8$)	11.8 $\pm$ 0.49	9.8 $\pm$ 0.39	2.0	3.19/<0.01
Group No. 9 ($n = 10$)	11.5 $\pm$ 0.51	9.4 $\pm$ 0.42	2.1	3.18/<0.01
Group No. 10 ($n = 7$)	11.2 $\pm$ 0.55	9.8 $\pm$ 0.44	1.4	2.01/<0.05
Group No. 11 ($n = 25$)	11.9 $\pm$ 0.28	11.2 $\pm$ 0.27	0.7	1.80/>0.05
$t/p1-p2$	1.48/>0.05	0.94/>0.05		
$t/p1-p3$	0.38/>0.05	1.06/>0.05		
$t/p1-p4$	0.69/>0.05	1.19/>0.05		
$t/p1-p5$	1.59/>0.05	0.01/>0.05		
$t/p1-p6$	0.20/>0.05	1.85/>0.05		
$t/p1-p7$	0.92/>0.05	1.05/>0.05		
$t/p1-p8$	0.34/>0.05	0.21/>0.05		
$t/p1-p9$	0.17/>0.05	0.59/>0.05		
$t/p1-p10$	0.63/>0.05	0.19/>0.05		
$t/p1-p11$	0.71/>0.05	3.79/<0.001		

Note: Mean – arithmetic mean; m – arithmetic mean error; n – number of female cadets; Δ – difference between the studied indicators; t/p – Student's t -test value/level of significance of differences between the indicators of female cadets in each group at the beginning and end of the research; $p1-p2, p1-p3, \dots$ – level of significance of differences between the indicators of female cadets who engaged in health-promoting fitness and other types of motor activity at the end of the research

Table 4

Characteristics of somatic health indicators in female cadets ($n = 149$) who engaged in various types of motor activity during their academic training (Mean $\pm m$)

Research stages	BMI, kg/m ²	SI, %	VI, ml/kg	RI, c. u.	HRRTI, s
Health-promoting fitness (Group No. 1, $n = 22$)					
Beginning	21.19 $\pm$ 0.26	44.21 $\pm$ 0.72	48.31 $\pm$ 0.76	85.14 $\pm$ 0.88	127.8 $\pm$ 2.58
End	19.87 $\pm$ 0.25	45.70 $\pm$ 0.68	51.85 $\pm$ 0.79	81.82 $\pm$ 0.86	117.2 $\pm$ 2.51
t/p	3.66/ <0.01	1.50/ >0.05	3.23/ <0.01	2.70/ <0.05	2.94/ <0.05
Martial arts (Group No. 2, $n = 17$)					
Beginning	21.44 $\pm$ 0.31	45.62 $\pm$ 0.81	48.05 $\pm$ 0.77	84.39 $\pm$ 0.93	126.3 $\pm$ 2.47
End	20.35 $\pm$ 0.29	48.16 $\pm$ 0.75	50.64 $\pm$ 0.82	81.40 $\pm$ 0.91	115.7 $\pm$ 2.41
t/p	2.57/ <0.05	2.30/ <0.05	2.30/ <0.05	2.30/ <0.05	3.07/ <0.01
Athletics (Group No. 3, $n = 12$)					
Beginning	20.53 $\pm$ 0.33	43.57 $\pm$ 0.86	47.97 $\pm$ 0.90	84.05 $\pm$ 1.05	124.9 $\pm$ 2.67
End	19.11 $\pm$ 0.30	44.84 $\pm$ 0.89	53.28 $\pm$ 0.94	80.27 $\pm$ 1.08	108.2 $\pm$ 2.68
t/p	3.18/ <0.01	1.03/ >0.05	4.08/ <0.001	2.51/ <0.05	4.41/ <0.001
Orienteering (Group No. 4, $n = 9$)					
Beginning	20.71 $\pm$ 0.39	44.03 $\pm$ 0.89	48.29 $\pm$ 0.85	85.07 $\pm$ 1.12	126.1 $\pm$ 2.86
End	20.08 $\pm$ 0.35	44.96 $\pm$ 0.92	53.05 $\pm$ 0.88	81.22 $\pm$ 1.08	112.5 $\pm$ 2.82
t/p	1.41/ >0.05	0.73/ >0.05	3.89/ <0.001	2.47/ <0.05	3.07/ <0.01
Kettlebell lifting (Group No. 5, $n = 11$)					
Beginning	21.61 $\pm$ 0.34	45.28 $\pm$ 0.79	48.18 $\pm$ 0.94	84.61 $\pm$ 1.10	126.4 $\pm$ 2.71
End	20.94 $\pm$ 0.33	49.11 $\pm$ 0.85	51.13 $\pm$ 0.96	81.96 $\pm$ 1.11	119.8 $\pm$ 2.69
t/p	1.50/ >0.05	3.30/ <0.01	2.20/ <0.05	1.70/ >0.05	1.75/ >0.05
Arm wrestling and powerlifting (Group No. 6, $n = 15$)					
Beginning	21.87 $\pm$ 0.31	45.49 $\pm$ 0.84	47.41 $\pm$ 0.74	85.53 $\pm$ 0.97	125.5 $\pm$ 2.55
End	21.82 $\pm$ 0.32	51.03 $\pm$ 0.81	48.24 $\pm$ 0.81	84.77 $\pm$ 1.04	120.1 $\pm$ 2.52
t/p	0.11/ >0.05	4.75/ <0.001	0.76/ >0.05	0.53/ >0.05	1.51/ >0.05
Table tennis (Group No. 7, $n = 13$)					
Beginning	20.68 $\pm$ 0.38	42.92 $\pm$ 0.69	47.85 $\pm$ 0.68	84.85 $\pm$ 0.92	125.7 $\pm$ 2.78
End	20.12 $\pm$ 0.36	43.15 $\pm$ 0.71	50.99 $\pm$ 0.75	82.17 $\pm$ 0.89	117.9 $\pm$ 2.74
t/p	1.07/ >0.05	0.23/ >0.05	3.10/ <0.01	2.09/ <0.05	2.01/ <0.05
Mini-football (Group No. 8, $n = 8$)					
Beginning	20.61 $\pm$ 0.46	43.16 $\pm$ 0.85	48.52 $\pm$ 0.97	85.20 $\pm$ 1.12	124.5 $\pm$ 2.94
End	19.89 $\pm$ 0.42	43.84 $\pm$ 0.84	52.73 $\pm$ 1.03	81.65 $\pm$ 1.07	110.1 $\pm$ 2.85
t/p	1.16/ >0.05	0.57/ >0.05	2.98/ <0.01	2.29/ <0.05	3.52/ <0.01
Volleyball (Group No. 9, $n = 10$)					
Beginning	20.75 $\pm$ 0.40	44.02 $\pm$ 0.79	47.61 $\pm$ 0.86	84.93 $\pm$ 1.05	126.0 $\pm$ 2.85
End	19.96 $\pm$ 0.38	45.69 $\pm$ 0.86	51.64 $\pm$ 0.88	81.71 $\pm$ 1.02	111.9 $\pm$ 2.81
t/p	1.16/ >0.05	1.43/ >0.05	3.28/ <0.01	2.20/ <0.05	2.02/ <0.05
Tug-of-war (Group No. 10, $n = 7$)					
Beginning	22.19 $\pm$ 0.48	45.66 $\pm$ 1.02	47.36 $\pm$ 0.95	86.01 $\pm$ 1.18	130.7 $\pm$ 3.07
End	22.21 $\pm$ 0.47	51.27 $\pm$ 0.97	48.32 $\pm$ 0.99	83.26 $\pm$ 1.15	122.9 $\pm$ 2.96
t/p	0.03/ >0.05	3.99/ <0.001	0.70/ >0.05	1.67/ >0.05	1.85/ >0.05
Sporting and mass-participation activities (Group No. 11, $n = 25$)					
Beginning	20.67 $\pm$ 0.23	43.49 $\pm$ 0.74	47.73 $\pm$ 0.59	85.86 $\pm$ 0.88	129.4 $\pm$ 2.46
End	21.85 $\pm$ 0.27	43.61 $\pm$ 0.76	48.54 $\pm$ 0.62	84.43 $\pm$ 0.85	124.1 $\pm$ 2.48
t/p	3.33/ <0.01	0.11/ >0.05	0.95/ >0.05	1.17/ >0.05	1.52/ >0.05
$t/p1-p2$	1.25/ >0.05	2.43/ <0.05	1.06/ >0.05	0.34/ >0.05	0.43/ >0.05
$t/p1-p3$	1.95/ >0.05	0.77/ >0.05	1.16/ >0.05	1.12/ >0.05	2.45/ <0.05
$t/p1-p4$	0.49/ >0.05	0.65/ >0.05	1.01/ >0.05	0.43/ >0.05	1.24/ >0.05
$t/p1-p5$	2.58/ <0.05	2.98/ <0.05	0.58/ >0.05	0.10/ >0.05	0.71/ >0.05
$t/p1-p6$	4.80/ <0.001	5.04/ <0.001	3.19/ <0.01	2.19/ <0.05	0.82/ >0.01
$t/p1-p7$	0.57/ >0.05	2.59/ <0.05	0.79/ >0.05	0.28/ >0.05	0.19/ >0.05
$t/p1-p8$	0.04/ >0.05	1.72/ >0.05	0.68/ >0.05	0.12/ >0.05	1.87/ >0.05
$t/p1-p9$	0.20/ >0.05	0.01/ >0.05	0.18/ >0.05	0.08/ >0.05	1.41/ >0.05
$t/p1-p10$	4.40/ <0.001	4.70/ <0.001	2.79/ <0.05	1.01/ >0.05	1.47/ >0.05
$t/p1-p11$	5.38/ <0.001	2.05/ <0.05	3.30/ <0.01	2.16/ <0.05	2.01/ <0.05

Note: Mean – arithmetic mean; m – arithmetic mean error; n – number of female cadets; Δ – difference between the studied indicators; t/p – Student's t-test value / level of significance of differences between the indicators of female cadets in each group at the beginning and end of the research; $p1-p2, p1-p3, \dots$ – level of significance of differences between the indicators of female cadets who engaged in health-promoting fitness and other types of motor activity at the end of the research

Moreover, the final value of stress level indicators in Group No. 11 is significantly ($p < 0.001$) worse than in groups 1–10, which allows us to conclude that additional training sessions, health-promoting fitness, and other types of motor activity have a more positive effect than the traditional program of sporting and mass-participation activities on reducing stress levels in female cadets. At the end of the research, the stress level in groups 1–11 was assessed as moderate.

The results of the research of the somatic health of female cadets are presented in Table 4. Analysis of the dynamics of the BMI in female cadets during the research period shows that in groups 1–10, where women consciously engaged in various types of motor activity in the academy's sports clubs, the BMI improved: in sports clubs of health-promoting fitness, martial arts, and athletics – significantly ($p < 0.05–0.001$), in the rest – insignificantly ($p > 0.05$). Unlike groups 1–10, in Group No. 11, the BMI indicators tended to worsen – the BMI significantly increased by 1.18 kg/m^2 ($p < 0.01$). Comparing the BMI of female cadets in Group No. 1 and other groups at the end of the research, we found that female cadets who practiced health-promoting fitness had a significantly ($p < 0.05–0.001$) better BMI than women who practiced kettlebell lifting, powerlifting, arm wrestling, tug-of-war, and, especially, female cadets who were involved in sporting and mass-participation activities; significantly the same ($p > 0.05$) as the groups that were involved in athletics, sports games, orienteering, and martial arts. The analysis shows that additional health-promoting fitness training sessions, as well as other types of motor activity, have a more positive effect on the body weight of female cadets and, accordingly, on their somatic health, compared with the traditional program.

Studying the dynamics of the SI in female cadets, we found that all groups showed a positive trend in indicators; however, the most significant ($p < 0.001$) changes occurred in female cadets who practiced martial arts and strength-based motor activities (kettlebell lifting, powerlifting, tug-of-war). At the end of the research, these groups showed the best SI indicators. The comparative analysis of the SI in female cadets who practiced health-promoting fitness with the representatives of other types of motor activity showed that in Group No. 1, the SI indicators are significantly better compared to Group No. 7 (table tennis, $p < 0.05$) and Group No. 11 (sporting and mass-participation activities, $p < 0.05$); significantly worse ($p < 0.05–0.001$) compared to groups 2, 5, 6, 10; and significantly the same ($p > 0.05$) as groups 3, 4, 8, 9.

The analysis of the VI in female cadets showed that respiratory system indicators improved across all groups during the research period. Still, the fewest changes were observed in Group No. 11, where female cadets did not attend any of the academy's sports clubs. In the vast majority of the groups studied, the VI indicators improved significantly ($p < 0.05–0.001$), except for the powerlifting, arm wrestling, and tug-of-war sports clubs, where the changes were insignificant ($p > 0.05$), and the group of female

cadets who trained using traditional methods during their sporting and mass-participation activities ($p > 0.05$). At the end of the research, the VI indicators of female cadets in Group No. 1 were significantly ($p < 0.05–0.01$) better than in groups Nos. 6, 10, 11, and significantly the same as in the rest of the groups ($p > 0.05$). This indicates that health-promoting fitness training sessions and most other forms of motor activity effectively strengthen the respiratory systems of female cadets.

The analysis of the RI showed that during the research period, the indicators of the cardiovascular system of female cadets improved in all groups. Still, insignificant changes were observed in groups 5, 6, 10, and 11 ($p > 0.05$), whereas in the remaining groups the changes were significantly positive ($p < 0.05$). Hence, both health-promoting fitness training sessions and most types of motor activity aimed at developing endurance have a positive effect on the cardiovascular system of female cadets during their academic training in martial law conditions. This will contribute to strengthening cadets' somatic health and disease prevention. At the end of the research, the RI indicators of female cadets who practiced health-promoting fitness were significantly ($p < 0.05$) higher than those of female cadets who practiced arm wrestling, powerlifting, and sports and mass-participation activities.

The study of the HR recovery index in female cadets after 20 squats within 30 seconds shows a pattern similar to the RI: a significant improvement in the index in most study groups, except for groups whose women were engaged in strength sports or traditional methods during their sporting and mass-participation activities. This allows us to emphasize once again the positive effects of both health-promoting fitness training sessions and other forms of motor activity on the functional capabilities of female cadets' central body systems.

The level of somatic health of female cadets in the studied groups at the end of the research is shown in Fig. 1. According to the methodology of G. L. Apanasenko, the best level of somatic health at the end of the research was found in female cadets who practiced athletics (8.68 points), orienteering (8.59 points), health-promoting fitness (8.31 points), mini-football (8.26 points), volleyball (8.19 points), martial arts (8.17 points), and table tennis (8.05 points). In these groups, as well as in the group where female cadets practiced kettlebell lifting (7.69 points), the level of somatic health is assessed as average. In the remaining groups, it is below average. The worst level of somatic health was found in Group No. 11, where female cadets were engaged in sporting and mass-participation activities (4.27 points); this value is significantly ($p < 0.05–0.001$) worse than in most of the groups studied.

The research shows that health-promoting fitness training sessions and other forms of motor activity positively affect the prevention of stress disorders and the strengthening of female cadets' somatic health during their academic training under martial law.

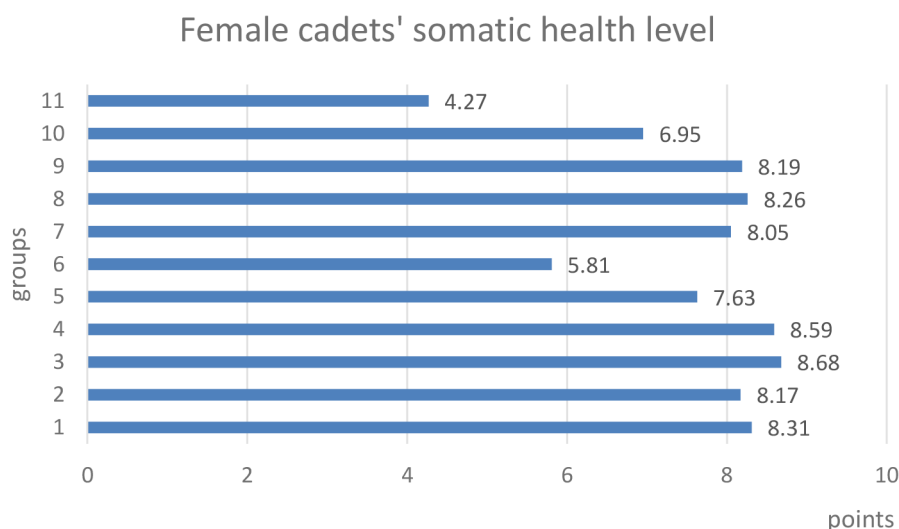


Fig. 1. Level of somatic health in female cadets who engaged in health-promoting fitness and other types of motor activity ($n = 149$, points):

1 – health-promoting fitness, 2 – martial arts, 3 – athletics, 4 – orienteering, 5 – kettlebell lifting, 6 – arm wrestling and powerlifting, 7 – table tennis, 8 – mini-football, 9 – volleyball, 10 – tug-of-war, 11 – sporting and mass-participation activities

Discussion of research results

The current reality shows that women serving in the police are becoming increasingly common in Ukraine. In recent years, there has been a steady increase in the number of women entering this profession, an essential step toward gender equality in law enforcement agencies [3; 4]. Currently, women are actively involved in all structural units of the National Police of Ukraine, including participation in crime scene investigations, the detention of offenders, and the protection of citizens' lives and health, as well as the safety of property of both individuals and legal entities. These duties require a high level of stress resilience, functional capabilities of the body's central systems, and physical fitness from women serving in the National Police.

As scientists point out [1; 2], police officers, regardless of gender, must possess not only the knowledge and skills necessary to perform their functional duties, but also the ability to make optimal decisions in extreme situations, communicate effectively with different groups of citizens, and stop illegal actions, including the use of physical force, special means, and firearms. Experts [5; 23] emphasize that female police officers must perform their professional duties no less effectively than their male colleagues, including apprehending offenders, freeing hostages, protecting against armed or unarmed attackers, and preventing attempts to seize weapons. This requires female police officers to possess a high level of physical fitness, including strength, speed, endurance, and coordination, which can be developed through training that accounts for their physiological and psychological characteristics. Motor activity is an effective means of promoting both physical and mental training for women in their professional activities and strengthening their health [3; 24–26].

Therefore, we conducted the research on the effectiveness of the most popular type of motor activity among female cadets – health-promoting fitness – compared with other types of motor activity with respect to stress and somatic health during their academic training under martial law. The results of the research revealed positive effects of both health-promoting fitness and other forms of motor activity on performance indicators of the respiratory, cardiovascular, and muscular systems in women, on body weight during training sessions, and on stress levels. As the data show, the most pronounced changes occurred among women who participated in health-promoting fitness, athletics, orienteering, martial arts, and sports competitions. At the same time, the traditional program of sporting and mass-participation activities for female cadets was found to be insufficiently effective – the worst results were recorded in Group No. 11 across all indicators studied. The research justifies and emphasizes the advisability of establishing sports clubs in higher educational institutions with specific learning environment, to facilitate the widespread introduction of additional motor activity training sessions of female cadets' choice, thereby improving the mental and physical health of future female law enforcement officers. After all, we have demonstrated the positive effects of health-promoting fitness and other forms of motor activity on the prevention of stress disorders and on the strengthening of female cadets' somatic health during their academic training under martial law. In general, our results extend and complement the conclusions of many scientists on the problem outlined [2; 3; 6; 8; 10; 16; 27–30].

Prospects for further research

It is planned to investigate the impact of modern fitness technologies training sessions on the morphological

and functional development of female cadets during their training for future law enforcement activities.

Conclusions

The levels of stress and somatic health among female cadets during health-promoting fitness training sessions in the course of their academic training under martial law were examined and compared with those during other types of motor activity. It was found that the stress levels in all groups of female cadets during the research period decreased significantly ($p < 0.05$ – 0.001), which indicates the effectiveness of any type of motor activity for the prevention of stress in female cadets during their academic training under martial law. The most pronounced positive changes in stress levels were observed among female cadets who attended additional training sessions in health-promoting fitness, martial arts, orienteering, and sports (e.g., table tennis, volleyball, football); the least pronounced changes were observed in athletics and strength sports clubs. At the same time, the stress level in the group where female cadets followed the traditional program is significantly ($p < 0.001$) worse than in other groups, which

allows us to conclude that additional training sessions in both health-promoting fitness and different types of motor activity have a positive effect on reducing stress levels in female cadets compared to the traditional program of sporting and mass-participation activities.

The comparative analysis of somatic health indicators shows that additional training sessions in health-promoting fitness and other forms of motor activity have a more positive effect on body mass index, strength index, vitality index, Robinson index, and heart rate recovery among female cadets, and, accordingly, on their somatic health status. A positive effect on indicators of the respiratory, cardiovascular, and muscular systems in women and a decrease in body weight during additional training sessions were observed. The most pronounced changes occurred among participants in health-promoting fitness, athletics, orienteering, martial arts, and sports games. This justifies the creation of sports clubs in higher educational institutions with specific learning environment, to provide female cadets with additional physical motor training sessions of their choice, thereby improving the mental and physical health of future female law enforcement officers and enhancing the effectiveness of their future law enforcement activities.

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The purpose of the work is to investigate the stress level and somatic health among female cadets during health-promoting fitness training sessions in the course of their academic training.

Materials and methods. The research, conducted in the 2022–2025 years, involved 149 female cadets from the National Academy of Internal Affairs (NAIA, Kyiv, Ukraine) majoring in «Law» specialty. To achieve the research aim, we compared the stress level and somatic health in female cadets aged 17–20 who, during their 1st and 2nd training years, participated in health-promoting fitness training sessions with those of female cadets who participated in other types of motor activity. Research methods: analysis and generalization of literary sources, psychodiagnostic methods, biomedical methods, statistical analysis. To study the stress levels of female cadets, we used the methodology developed by Yu. V. Shcherbatykh, which allows assessing the degree of intellectual, behavioral, emotional, and physiological symptoms of stress. To assess the somatic health of female cadets, the methodology of G. L. Apanasenko was employed, which is based on anthropometric indicators and the status of the cardiovascular and respiratory systems.

Results. The effectiveness of health-promoting fitness training sessions and other forms of motor activity in preventing stress and strengthening somatic health among female cadets during their academic training under martial law has been established. It has been shown that additional health-promoting fitness training sessions and other forms of motor activity have a more positive effect on stress levels, body mass index, strength index, vitality index, Robinson index, and heart rate recovery in female cadets, and, accordingly, on their somatic health, than traditional methods. During the additional training sessions, female cadets showed improvement in the performance of their respiratory, cardiovascular, and muscular systems, as well as a decrease in body weight. The most pronounced changes occurred among participants in health-promoting fitness, athletics, orienteering, martial arts, and sports competitions.

Conclusions. The results of the research justify the establishment of sports clubs within higher educational institutions to expand the provision of additional motor activity training sessions selected by female cadets, thereby improving both the mental and physical health indicators of future female law enforcement officers. Overall, this will ensure the effectiveness of their future law enforcement activities.

Key words: law enforcement officers, women, somatic health, stress, health-promoting fitness, professional activities.

Мета роботи – дослідити рівень стресу та соматичного здоров'я у курсантів-жінок під час занять оздоровчим фітнесом у процесі навчання.

Матеріали та методи. У дослідженні, яке проводилося у 2022–2025 навчальному році, взяли участь 149 курсантів-жінок Національної академії внутрішніх справ (Україна, м. Київ, НАВС), які навчалися за спеціальністю «Право». Для досягнення мети дослідження ми порівняли рівень стресу та соматичного здоров'я у курсантів-жінок віком 17–20 років, які впродовж навчання на I–II курсах займалися у секції з оздоровчого фітнесу (група № 1, $n = 22$), з показниками курсантів-жінок, які займалися іншими видами рухової активності у спортивних секціях академії: бойовими єдиноборствами (самбо, рукопашний бій; група № 2, $n = 17$), легкою атлетикою (група № 3, $n = 12$), спортивним орієнтуванням (група № 4, $n = 9$), гирьовим спортом (група № 5, $n = 11$), армреслінгом та пауерліфтингом (група № 6, $n = 15$), настільним тенісом (група № 7, $n = 13$), мініфутболом (футзалом, група № 8, $n = 8$), волейболом (група № 9, $n = 10$), перетягуванням канату (група № 10, $n = 7$). Окрім того, нами було сформовано групу № 11 ($n = 25$), до якої увійшли курсанти-жінки, які додатково під час навчання не відвідували жодну зі спор-

тивних секцій, а під час спортивно-масової роботи займалися за існуючою методикою під керівництвом начальника курсу. Курсанти-жінки груп №№ 1–10 займалися у спортивних секціях у години самостійної підготовки (під час спортивно-масової роботи) під керівництвом тренерів-викладачів кафедри спеціальної фізичної підготовки. Кількість годин на рухову активність у курсантів-жінок усіх груп на тиждень була однаковою: 4 год навчальних занять (2 заняття по 2 год) із фізичної підготовки та 6 год (3 заняття по 2 год) тренувальних занять у спортивних секціях або спортивно-масовою роботою. Відмінностями, які лягли в основу порівняльного аналізу між показниками груп, були зміст та спрямованість занять руховою активністю. Критеріями включення учасників дослідження визначено: учасниками дослідження могли стати лише курсанти жіночої статі; курсанти-жінки вибирали вид рухової активності за власним бажанням у першому семестрі навчання; відсутність протипоказань за станом здоров'я до занять тим або іншим видом рухової активності. Критеріями виключення були: припинення відвідування спортивних секцій за станом здоров'я або з інших причин; власне бажання курсантів-жінок вийти з дослідження у будь-який момент. Курсанти-жінки усіх груп були проінформовані про цілі дослідження, після чого вони надали письмову згоду на участь у дослідженні виключно в наукових інтересах. Порівняння показників стресу і здоров'я курсантів-жінок проводилося на початку I курсу (початковий етап дослідження) та наприкінці II курсу навчання (кінцевий етап дослідження). Окрім того, нами було досліджено динаміку вказаних показників у кожній групі за період дослідження. Методи дослідження: аналіз та узагальнення літературних джерел, психодіагностичні методи, біомедичні методи, статистичний аналіз. Психодіагностичні методи було застосовано для дослідження рівня стресу у курсантів жінок під час навчання у сучасних умовах. Для цього було використано методику Ю. В. Щербатих, яка дає змогу оцінити ступінь прояву інтелектуальних, поведінкових, емоційних та фізіологічних симптомів стресу у курсантів-жінок. Біомедичні методи було застосовано для дослідження соматичного здоров'я курсантів-жінок. Для цього ми використали методику Г. Л. Апанасенка, що базується на антропометричних показниках та стані серцево-судинної та дихальної систем організму.

Результати. Установлено ефективність занять оздоровчим фітнесом та іншими видами рухової активності для профілактики стресових явищ та зміцнення соматичного здоров'я у курсантів-жінок під час навчання в умовах воєнного стану. Доведено, що додаткові заняття оздоровчим фітнесом та іншими видами рухової активності більш позитивно порівняно з традиційною методикою впливають на рівень стресу, індекси маси тіла, силовий, життєвий, Робінсона, відновлення ЧСС курсантів-жінок та, відповідно, на стан їхнього соматичного здоров'я. У процесі додаткових занять відбулося покращання показників діяльності дихальної, серцево-судинної, м'язової систем організму у курсантів-жінок, зниження їхньої маси тіла. Найбільш виражені зміни відбулися у представниць оздоровчого фітнесу, легкої атлетики, орієнтування, єдиноборств та спортивних ігор.

Висновки. Результати дослідження зумовлюють доцільність створення спортивних секцій у закладах вищої освіти для більш широкого впровадження додаткових занять руховою активністю за власним вибором курсантів-жінок, що сприятиме покращанню показників як ментального, так і фізичного здоров'я майбутніх жінок-правоохоронців. У цілому це забезпечить ефективність їхньої майбутньої правоохоронної діяльності.

Ключові слова: правоохоронці, жінки, соматичне здоров'я, стрес, оздоровчий фітнес, професійна діяльність.

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