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Original Article

The effect of Ukrainian self-defense Spas on the fitness level of middle school students

VALERIA TYSHCHENKO[1], OLEXANDR PRYTULA[2], PAVEL PIPTYK[3], MARIA SINYUGINA[4], LIA GALCHENKO[5], OLENA BESSARABOVA[6], HANNA SYDORUK[7]
[1,2,3] Department of Theory and Methods of Physical Training and Sports, Zaporizhzhia National University, UKRAINE
[4,5,6] Department of Physical Training and Sports, Zaporizhzhia National University, UKRAINE
[7] Department of Tourism, Zaporizhzhia National University, UKRAINE

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Abstract:
The aim of the work. The purpose of this study was to identify the impact of Ukrainian self-defense Spas on ind o. icators of physical fitness. *Material and Methods*. Forty five middle school students aged 11 and 12 years of both genders volunteered to participate in the study. They were divided into two groups (control and experimental). The structure of the control group consisted of children who were engaged in the Physical Education classes for the general procedure. The composition of the experimental group was contained of children who were engaged in Ukrainian self-defense Spas. *Results*. As a result of the practices at school in Ukrainian self-defense Spas, there was a significant improvement in the experimental group based on several test results. It increased the level of speed, endurance, strength, flexibility, agility and speed-strength abilities. The final evaluation in the end of the academic year produced notable improvements in the group of middle school boys aged 11 and 12 years performing push-ups, sit ups and shuttle run. For girls in the same group, final values of indicators of physical fitness had statistically significant improvements as well in all tests except for the results of long jumps. In the control group, the outcomes proved minimal improvements in all indicators of physical fitness, in addition to the long jump, and core strength – in boys. In the results for girls, push-ups, standing long jump, and core strength were also negligible. *Conclusions*. The results of the study have confirmed Ukrainian Spas relevance in the direction of finding new ways to improve the physical fitness of middle school students aged 11 and 12 years as one of the most influential way to raise their level of physical activity. Additionally, it indicates the possibility of integrated comprehensive effects on the development process students using the Spas program and its effective means for integrated child development.
Key words: Ukrainian self-defense Spas, Physical Education, students, physical fitness

Introduction

Integration of national sports in many countries resulted in the world to the Olympic Movement. Back in 2004, UNESCO has signed the convention, where it was determined that the National Martial Art sport is the spiritual heritage of mankind. As a result, some countries have been trying to maintain their traditions and keep self-identity in the field of those national sports. Sports, in those countries, have been established, recognized and supported by the state and national sports communities. For example, in the United States, American football is considered as a national sport. In France – French boxing – savate, in Japan – sumo wrestling, in Thailand – Thai Boxing/Muay Thai, etc.

The selection criteria should be defined for the recognition of a national sport and the influence of national sports on the formation of self-identity. After all, the national sport contributes to the patriotic upbringing of the younger generation. That contains not only a set of physical activities and regulations, but also forms of cultural and Martial Arts traditions in the whole World.

The history of the Ukrainian National Physical Education and Culture has been studied by many scientists (Prystupa, 1995; Mandziak & Artemenko, 2010). At the present time, the research has shown that middle and high school students have been interested in Cossack traditions (Konoh & Prytula, 2010; Kaliandruk, 2016). One of the main Ukrainian national significances of Physical Education is national games. Honored Ukrainian teacher, Ushinsky (1983), offered the use of folk art to educate people because he believed that education should be inspiring. For instance, he considered moving the popular game as "window" through which someone can perform the show for adults and children, to promote the development of local talent, and to work in collaboration with other local theatre practitioners. After all, from generation to generation through folk art passed on moral and ethical standards of culture and norm behavior.

Corresponding author: VALERIA TYSHCHENKO, e-mail: valeritysh@gmail.com

History scientist of Ukrainian military and physical preparation, Timchak (1998), believes that the ancient Ukrainian military and physical preparation has been significantly enriched by the traditions of previous epochs. National and cultural identity is a key element to civil-patriotic education and the preservation of national traditions. Ukraine revives and actively develops various sports or skills in self-defense, which have become an important component of the formation and establishment of Physical Education and Sports at the present time.

One of the examples is a combat sport, Ukrainian self-defense Spas, which is intended to restore the system of patriotic education in Ukraine. Ukrainian Spas has national roots and was recognized as a national sport in 2017. Therefore, the main task of the Ukrainian national self-defense is the preparation of traditional Cossacks and highly qualified athletes who would represent the Ukrainian Sport Spas (Prytula, 2015).

Training practices for Ukrainian Spas have purely national traditions in self-defense as itself exercises necessarily accompanied by a historical story about the ability and achievements of the Ukrainian Cossacks. Spas is a full-contact combat sport that allows striking, kicking and grappling, both standing and on the ground, using techniques from other combat sports and martial arts. The combat sport also involves speed-strength, complex-coordination, flexibility and acyclic character. Due to the influence of the Orthodox religious, as well as the influence of the spiritual, moral and ethical principles of the glorious Zaporizhzhian Cossacks this kind of sports activity not connected with the inhuman manifestations.One of the important elements of the control process of Physical Education is the pedagogical control of the physical condition of middle school students, including monitoring indicators of health and physical fitness. The study of health condition in relation to Physical Education is very important at this time, and is one of the main directions out of the situation with the goal of preserving and strengthening it. In Physical Education, the final result depends strongly on the efficiency of the pedagogical control, provides feedback between teacher and pupils. Thus, the researchers assessed how morpho-functional indicators (Krucevich, 2003), indicators of physical health by the method Apanasenko (1992), as well as indicators of physical readiness of students for the Government tests and standard assessments of physical fitness for the Ukrainian population (Sergienko, 2010).

The influence of martial arts on state organism has repeatedly become the subject of research of both domestic and foreign scientists. For example to peculiarity of martial arts influence on the development of behavioural self-regulation of adolescents. It was necessary to determine the level of physical fitness in the learning process of students to establish the efficacy of practicing Spas.

Material and Methods

Participants

Forty five middle school students aged 11 and 12 years of both genders volunteered to participate in the test. Prior to the testing, the procedures were explained to the athletes, including the possible risks involved, and signed an informed consent form. The students were free from any injury or neuromuscular disorder. The research was approved by the Institutional Ethics Committee. The research was conducted in compliance with WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects, 2013 (WMA Declaration of Helsinki, 2016).

Study Design

Students were divided into 2 groups (control and experimental). The composition of the control group (CG) included 23 children (12 boys and 11 girls) who were involved in class for Physical Education using the general procedure. The composition of experimental groups (EG) included 22 children (12 boys and 10 girls) who were engaged in Ukrainian self-defense Spas. Probably pretest of middle school students aged 11 and 12 years before they begin to practice full-contact was conducted in September 2017, and the final was in May 2018. The students practice self-defense classes 4 times a week with a 2 hours duration.

Procedures

The level of physical fitness was defined in terms of activity and based on the basic physical qualities: strength, speed, agility, endurance and flexibility. Educational standards were used to assess the level of the development of these physical qualities. Thus, the development of power level was analyzed by tests: Push-ups (number of reps), Long Jump (cm), Sit Up (number of reps); level of the speed by tests: 60 Meter Sprint (s) and Jumping rope (number of times); agility – 4x9 m shuttle run (s); endurance – jumping from a squatted position (number of reps); flexibility – tilt the body forward from the initial seated position (Sit and Reach (cm)) and Shoulders rotation of the stick (cm).

Statistical analysis

In processing the experimental data, traditional methods of mathematical statistics, in particular, the method of averages, sampling method and time series have been used. As well as, calculated arithmetic mean, standard deviation, relative gains, reliability Student's t-criterion have been applied and Fisher's criterion (angular transformation (φ) Fischer).

Results

According to the probably pretest of the experimental group (EG) described the indicators of physical fitness, the participants haven't shown any significant differences from the control group (CG).

Considering the received indicators of strength development in middle school students aged 11 and 12 years of the control group, the study found that the boys had advantage and dominated in the performance over the girls (Table. 1). It should be noted that these differences are carrying a valid point in the tests, such as push-ups and the Standing long jump test ($p<0.05$) in girls ($p<0.05$) and the Standing long jump test ($p<0.05$) in boys. Other indicators differences were not significant ($p>0.05$). Comparing the level of indicators, in force development standards, revealed the levels of: push-ups – boys, the physical condition remained in a low level; girls – performed push-ups, from the middle to upper body – middle level; standing long jump among boys and girls registered higher results than previously; performing sit ups/curling the upper body all the way up towards the legs among boys were at the same low level as before.

The results of the agility level of the students based on the Shuttle Run test during our study (Table 1) found no significant differences in the boys (below average), and according to girls ($p>0.05$) with a general tendency to deterioration at the end of study (from below average to low). Analysis of the rate of level indicators throughout the study showed no significant difference in both gender groups on all parameters with the general tendency to deterioration of the results at the end of the study ($p<0.05$). If the boys' results were recorded as the average level, they remained low among the girls. The exceptions were the results of the jumping rope in the girls. The final data indicated the improvement. Considering results of the development level of both genders, the data revealed and was established the dominance of the boys over girls.

Table 1 Comparative characteristic of the values of physical fitness indicators for middle school students aged 11 and 12 years in the control group, $\overline{X} \pm m$

	Tests								
Stages of the study	Push-ups (number of reps)	Long Jump (cm)	Sit Up (number of reps)	4x9 m shuttle run (s)	60 Meter Sprint (s)	Jumping rope (number of times)	Jumping from a seated position (number of reps)	Sit and Reach (cm)	Shoulders rotation of the stick (cm)
Boys									
Start	10.8±1.66	1.62±0.02	16.85±1.22	12.4±0.46	10.95±0.43	34.85±1.81	22.85±2.47	5.57±0.57	51.14±1.16
End	11.8±1.64	1.76±0.05	18.14±1.58	12.8±0.34	11.05±0.49	34.14±1.68	22.63±2.13	7.65±0.57	52.71±1.2
t	0.43	2.60	0.65	0.70	0.15	0.29	0.07	2.58	0.94
p	>0.05	<0.05	>0.05	>0.05	>0.05	>0.05	>0.05	<0.05	>0.05
Girls									
Start	9.28±0.74	1.42±0.03	15.14±1.1	13.51±0.28	14.75±0.49	31.55±1.13	22.13±2.25	11.28±1.12	54.28±0.74
End	11.5±0.5	1.55±0.04	16.85±0.7	14.14±0.33	14.80±0.37	31.57±1.19	19.45±0.84	14.14±0.20	52.85±0.98
t	2.53	2.60	1.31	1.46	0.08	0.01	1.12	2.51	1.16
p	<0.05	<0.05	>0.05	>0.05	>0.05	>0.05	>0.05	<0.05	>0.05

In addition, the level of development of endurance performance was analyzed on the Squad Jumping Test among the students. In the course of our research, we identified the lack of significant differences, both in terms of boys and girls ($p<0.05$) with a general tendency to deterioration of the results at the end of the study. Considering the results of the endurance level of both genders, it was found that these children have been tested in December. The boys' performance have been dominating over girls, but these differences are not significant in nature ($p>0.05$). In terms of flexibility development level, the improvement of the results was found in the study. Thus, the Standing Forward Fond test differences showed valid results ($p<0.05$), but according to the Shoulder Flexibility Test the results were not significant ($p>0.05$), both in children and in girls.

The results of the comparison and the final evaluation of the indicators of physical fitness for 11 and 12 years old middle school students of experimental group during their practice Ukrainian full-contact Spas are presented in Table 2. However, it should be noted that positive changes took place as a result of all indicators of physical fitness among all students. The differences had legitimate character for all indicators except shoulder flexibility in the boys and the Standing Long Jump test in the girls. As a matter of fact, there have been not only quantitative, but also qualitative changes.

Table 2 Comparative characteristics of the values of physical fitness indicators for middle school students aged 11 and 12 years in the experimental group, $\overline{X} \pm m$

Stages of the study	Tests								
	Push-ups (number of reps)	Long Jump (cm)	Sit Up (number of reps)	4x9 m shuttle run (s)	60 Meter Sprint (s)	Jumping rope (number of times)	Jumping from a seated position (number of reps) times)	Sit and Reach (cm)	Shoulders rotation of the stick (cm)
Boys									
Start	10.2± 2.18	1.58± 0.05	16.26±2.18	12.8± 0.44	10.92±0.26	33.32±1.62	20.48±1.22	6.12± 1.36	51.32±1.28
End	21.3± 3.14	1.82± 0.02	30.18±2.42	11.2± 0.26	10.05±0.12	38.25±1.54	26.32±1.65	11.15±1.28	54.12±1.5
t	2.90	4.46	4.27	3.13	3.04	2.21	2.85	2.69	1.42
p	<0.01	<0.001	<0.001	<0.01	<0.01	<0.05	<0.01	<0.05	>0.05
Girls									
Start	9.42± 3.24	1.44± 0.15	15.08±2.4	13.22±0.76	14.26±0.52	30.25±2.28	21.48±2.14	11.16±1.18	53.14±1.46
End	18.12±2.28	1.62± 0.08	27.21±2.6	11.16±0.42	12.25±0.38	38.62±2.64	27.32±0.42	18.28±1.44	57.43±1.17
t	2.2	1.06	3.43	2.37	3.12	2.4	2.68	3.82	2.29
p	<0.05	>0.05	<0.01	<0.05	<0.01	<0.05	<0.05	<0.001	<0.05

Analysis of the final results of the indicators of physical fitness among 11 and 12 years old students, the participants revealed statistically significant differences in tests such as push-ups, sit ups, shuttle run 4x9 m, and Standing Forward Fond (Table 3). Indicators of physical fitness women studied groups were not statistically different among themselves according to the results of a single test – standing long jump.

Table 3 Comparative characteristics of the final values of physical fitness indicators for middle school students aged 11 and 12 years in study groups, $\overline{X} \pm m$

Study groups	Tests								
	Push-ups (number of reps)	Long Jump (cm)	Sit Up (number of reps)	4x9 m shuttle run (s)	60 Meter Sprint (s)	Jumping rope (number of times)	Jumping from a seated position (number of reps) times)	Sit and Reach (cm)	Shoulders rotation of the stick (cm)
Boys									
CG	11.8±1.64	1.76± 0.05	18.14±1.58	12.8± 0.34	11.05±0.49	34.14±1.68	22.63±2.13	7.65± 0.57	52.71±1.2
EG	21.3±3.14	1.82± 0.02	30.18±2.42	11.2± 0.26	10.05±0.12	38.25±1.54	26.32±1.65	11,15±1.28	54.12±1.5
t	2.68	1.11	4.17	3.74	1.98	180	1.37	2,5	0.73
p	<0.05	>0.05	<0.001	<0.01	>0.05	>0.05	>0.05	<0.05	>0.05
Girls									
CG	11.5±0.5	1.55± 0.04	16.85±0.7	14.14±0.33	14.80±0.37	31.57±1.19	19.45±0.84	14.14± 0.21	52.85±0.98
EG	18.1±2.28	1.62± 0.08	27.21±2.6	11.16±0.42	12.25±0.38	38.62±2.64	27.32±0.42	18.28±1.44	57.43±1.17
t	2.8	0.78	3.85	5.58	4.81	2.43	8.38	2.85	3.00
p	<0.01	>0.05	<0.001	<0.001	<0.001	<0.05	<0.001	<0.01	<0.01

Notes: EG – experimental group; CG – control group.

Analyzing the relative growth rates of both groups participants in the end of the school year, revealed the following (Table 4). The highest relative growth rates in the experimental group recorded in push-ups

(108.82%), and sit ups (85.61%) in boys, – push-ups (92.36%) and sit ups/curling the upper body all the way up towards the legs (80.44%) in girls. The highest relative growth rates among 11 and 12 years old middle school students CG was also recorded by some tests, but not as significantly as in terms of EG. It should be noted relative growth rates of boys in the CG performing the Standing Forward Fond test (37.34%) (Table 4). According to the relative increase in the performance of CG girls, the better performance was in the Standing Forward Fond test (25.35%) and push-ups (24.68%).

Table 4 Growth indicators of physical readiness for middle school students aged 11 and 12 years in study groups, %

Gender	Study groups	Tests								
		Push-ups (number of reps)	Long Jump (cm)	Sit Up (number of reps)	4x9 m shuttle run (s)	60 Meter Sprint (s)	Jumping rope (number of times)	Jumping from a seated position (number of reps)	Sit and Reach (cm)	Shoulders rotation of the stick (cm)
B	CG	9,26	8,64	7,66	3,23	0,91	-2,04	-0,96	37,34	3,07
	EG	108,82	15,19	85,61	-12,50	-7,97	14,80	28,52	82,19	5,46
G	CG	24,68	9,15	11,29	4,66	0,34	0,06	-12,11	25,35	-2,63
	EG	92,36	12,50	80,44	-15,58	-14,10	27,67	27,19	63,80	8,07

Notes: B – boys; G – girls; EG – experimental group; CG – control group.

Due to the necessity of qualitative evaluation of the use of national customs of Physical Education (Ukrainian self-defense Spas) at the school, and the purpose of the objective of our research, we have identified and assigned the children into four levels for derived indicators of physical fitness: sufficiently high, regular, medium and low (fig. 1, 2).

Evaluation of qualitative growth of the level of utilization Ukrainian self-defense Spas in the gym of school was carried out using Fisher's exact test (the angular transformation (φ) Fischer). The testing of significant criterion was obtained by determining the probability of the received value in the Student's t distribution.

Calculation of the angular transformation criterion (φ) Fischer showed that experimental groups for boys φ = 1,88 (getting the value is reliable to p≤0,05 level) and the control group boys φ = 1,11 (getting the value is valid at r≤0,1).

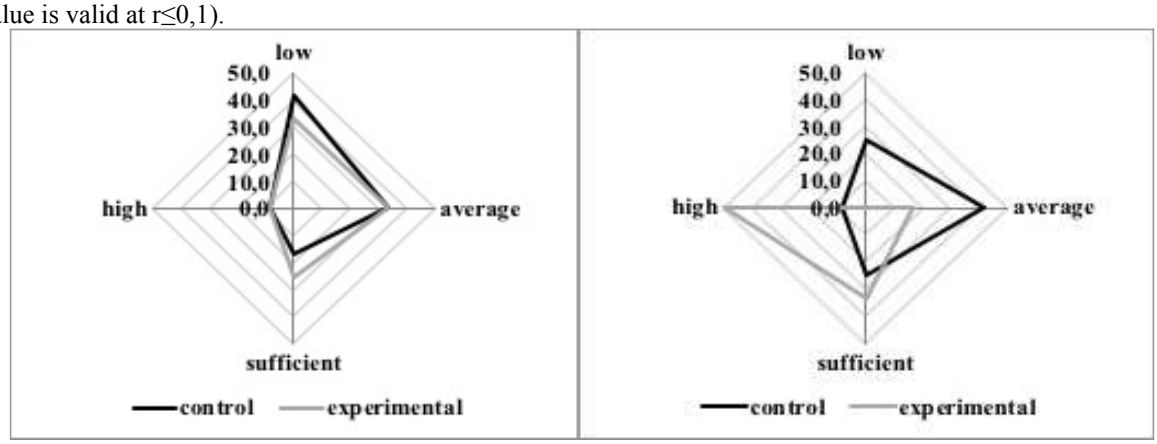

Fig. 1. Distribution of physical fitness levels in two groups of boys during the study

Calculation of the angular transformation Fischer's (φ) criterion showed that experimental groups for girls φ = 1.76 (getting the value is reliable to p≤0.05 level) and the control group girls φ = 0.3 (value obtaining a reliable level r≤0.5). Analysis of the results of statistical processing of the experimental data showed a high level of physical fitness using national customs of physical training (Ukrainian self-defense Spas) in school for children's experimental group (Ukrainian self-defense Spas) (fig. 1, 2).

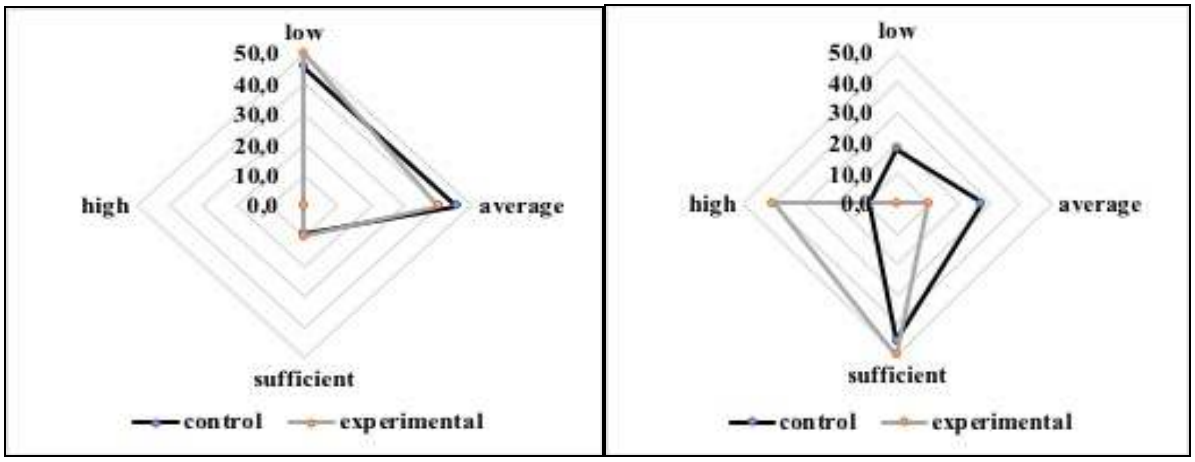

Fig. 2. Distribution of physical fitness levels in the two groups of girls throughout the study

Therefore, indicators of physical fitness in experimental and control groups for boys differed significantly. There was a close link between the implementation of Ukrainian self-defense Spas at school and the increasing level of physical fitness, the demonstrating effectiveness of the implementation of this type of Martial Arts sport in the educational process.

Discussion

The purpose of this study was to find the connection between the newer sport Ukrainian self-defense Spas, and its impact on physical fitness of 11 and 12 years old middle school students. The main contribution of the study was to use the exercises methods of the Ukrainian full-contact Sport for middle school participants. Obtained findings could help teachers and trainers to better understand the interaction between functional indicators and specific Spas elements performance, as well as assist them in understanding the results and make a correction in the process of preparation.

Analysis of the scientific and methodical literature reveals various other non-traditional to their specific sport exercises could be used for improving physical fitness of both students and professional athletes (Tishchenko, 2016; Valeria & Olexander, 2015). For example, in team sports, such as handball non-traditional physical activities could be playing rugby, swimming, gymnastic or practicing Ukrainian Spas (Kokareva et al., 2015). One of the priorities for training athletes, who specialize in Martial Arts, is to improve their speed and strength preparedness. To improve intramuscular coordination is useful to apply the exercises are similar to the main competitive exercise in judo, sambo or any other wrestling sports (Tron', Il'in 2013). In addition, the nature of changes in indicators of explosive strength has been studied in 14-17 years old male belt wrestlers. The methodology used specially-strengthening exercises with various free weights and each other's body weight to determine optimum value for the development of speed and power and also to improve specific training for offensive and defensive moves. The choice of weights corresponded with tasks for speed and strength trainings, the optimal correlation of physical loads and a sports practitioner's rest intervals (Arziutov et al., 2016).

In the research, Bakiyev and Kerimov (2012), the manual ergometry method has been successfully applied for the determination of the special physical performance, which most adequately reproduces the specifics types of wrestling as a combat sport. One of the first systematic works on the history of Physical Education in Ukraine was the book "Traditions of Ukrainian Physical Education" (Prystupa & Pilat, 1991). A few years later, was published their monograph and defended his doctoral dissertation (Prystupa, 1995; Prystupa, 1996). Interestingly enough, in terms of the development of ancient Ukrainian Martial Arts, there is a learning experience evaluating the functional fitness of middle school students involved in Ukrainian full contact Spas. To do the evaluation, a computer program "SHVSM" N. Malikov et al. (2003) was successfully used.

Moreover, functional preparedness of Ukrainian self-defense Spas participants were analyzed as well. Author Podnebesna (2009) recorded improvement in the level of physical fitness in 13 and 14 years old middle school students after they completed the author's teaching methods of full combat Spas. Of the 48 children in the experimental group, seventeen students have achieved a high level of physical fitness, whereas in the control group, no one does belong to that level.

Nevertheless, this is one of the first studies to explore and evaluate the importance of the Ukrainian self-defense Spas to improve physical fitness for middle school students.

Conclusion

In the control group, the increase was not significant for all indicators of physical fitness, except the long jump and flexibility – boys. The girls showed some progress in push-ups, the long jump and flexibility. However, as a result of Ukrainian self-defense Spas practices in middle school, there was a significant improvement in the test results for the experimental group. The level of speed, endurance, strength, flexibility, agility and speed-strength abilities was increased as well. Physical fitness has improved significantly in boys at

p<0.05 by tests: a jump rope and bend of the trunk; p<0.01 by tests: push-ups, shuttle run, running at 60 m, and squad jumping. The highest probability of differences in children of both groups at p<0.001 proved by tests: jump and squad jumping. The girls' performance increase was significant in all parameters tested, except for the long jump.

Further, the research development prospects require a solution to the problem of theoretical and methodological basis of pedagogy and psychology of Ukrainian self-defense Spas; better attention to the training of specialists in integrated occupations and Martial Arts sports, flexible updating the content of the higher sports education on the basis of continuity; marketing research requirements of the country qualified professionals of the National Martial Arts.

Conflicts of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

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