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COMPLEX DEVELOPMENT OF SCHOOLGIRLS PHYSICAL QUALITIES IN THE FRAMEWORK OF VOLLEYBALL CLASSES

***Iasîbaș Pavel*[1]**
[1] *"A.S. Pushkin" Gymnasium, Cimislia, Republic of Moldova*

Abstract. *It was conducted a research aimed at studying the effectiveness of volleyball classes for the integrated development of the physical qualities schoolgirls, 7th grade pupils. At the beginning of the study, we recorded the low performance of the participants in the experiment within the educational content of the discipline "Physical Education" in assessing the overall physical training. In order to increase the efficiency of the process of formation of psychophysical qualities and the level of technical training on the subject of "Volleyball", we have developed and implemented a program, which provides curricular and extracurricular system of classes. Regular volleyball classes, in addition to physical education lessons, throughout the school year can have a beneficial effect on the level of physical and technical training of schoolgirls. Statistical data show a reliable complex development of all physical qualities: speed, agility, strength, endurance, flexibility, speed-strength and technical indicators.*

Keywords: *physical education, volleyball, program, sports activities, schoolgirls, physical and technical training.*

Introduction. School physical education plays a crucial role in the development of the personality of pupils. Due to the impact of physical exercises on the systems and functions of the child's body, their regular use can significantly increase the indicators of physical qualities, improve the processes of growth and development. Harmoniously schoolchildren, get sick less often, have high academic performance. However, due to many factors, including socio-economic crises at the condition level, cultural transformations at the level of human society as a whole, including the extinction of the gaming subculture of childhood, the disappearance of the courtyard children's community, a radical change in the leisure of the younger generation when moving from a joint independent organized outdoor games in order to spend a significant amount of time using gadgets, there is a systemic deterioration in health indicators and the level of physical training of schoolchildren, a decrease in the percentage of those who succeed in the discipline "physical education". There is a need to find affordable and relevant forms of physical exercise based on effective means [3].

Among the pupils from the gymnasium cycle, especially in girls, the game "volleyball" is especially popular. Unlike other team sports, there is no direct contact between opponents in volleyball. The special aesthetics and gracefulness of the movements of the players, combined with the power elements of technical and tactical techniques, the high emotionality of the game - all this attracts schoolgirls for volleyball game [2,4]. It is in the power of a physical education teacher to transform the high motivation of pupils into high sports results, improve health and physical training. The most convenient format for practicing sports games within the school has been and

remains sports classes. A sufficient amount of study time for mastering the technique and tactics of the game, expanded opportunities for an individual approach to pupils, competitive activities make the volleyball classes effective for improving performance in physical education [5,6]. It is of interest to compare performance indicators in the main exercises-tests for physical training between schoolgirls from gymnasium cycle, who additionally go in for volleyball classes and girls who go in for physical culture only during school lessons, provided that physical education programs in both groups are consistent.

The purpose of the study – to establish the degree of effectiveness of classes in volleyball for the development of physical qualities in adolescent girls.

The objectives of the study included the following steps: testing the level of physical training before the start of classes, testing at the end of the academic year the comparative characteristics of the results obtained.

Methodology and organization of the study.

According to the experimental program (in volleyball classes), 16 girls (7th grade pupils) were engaged. The control group consisted of 15 girls (7th grade schoolgirls, who do not attend volleyball classes and go in for physical culture according to the general educational program). The age of schoolgirls - 13 years ± 0.5 years. All participants in the experiment were enrolled in the main health group, pupils and their parents (legal representatives) were acquainted with the purpose and conditions of the study, and gave their personal consent to participate.

The study monitored changes in the indicators of motor abilities of female gymnasium pupils in the following exercise tests: standing long jump, standing high jump, shuttle run 4x9 m, jumping rope (1 min.), run 30 m., lifting the torso in the supine position (30 sec.), bending the arms while lying on the bench (30 cm.), throwing a medicine ball (1 kg.), leaning forward (sitting), cooper test (6 min.).

To evaluate the results obtained, the Student's criterion (t) was used, calculated by the formula:

$$t=\frac{\overline{X}_1-\overline{X}_2}{\sqrt{m_1^2+m_2^2}}$$

The study was carried out at the Gymnasium. ”A.S. Pushkin”, Cimislia (Moldova) in the 2016-2017 academic year. Duration of the experiment - 9 months.

Research results and their analysis. Before the start of the classes, the participants of the experiment demonstrated similar results in terms of the values in assessing the level of physical training. Speed-strength indicators in jumps, coordination abilities (jumping rope), results in tests in order to determine strength abilities and flexibility on average, corresponded to a satisfactory level of physical training in both groups. A little higher results were shown in the shuttle run. In the long run, the lowest results were noted (Table 1).

The fact of the rapid physical development of girls at this age cannot be ruled out. In adolescent girls, against the background of puberty, an active growth of the body in length is observed, which, undoubtedly, can have a significant impact on the final results in tests. Under these conditions, it is inappropriate to carry out measurements in dependent groups of subjects. Comparison of independent groups makes it possible to evaluate the results of the training process most objectively.

The training process in the volleyball classes began at the end of September and lasted until the end of May. Classes were held in the afternoon twice a week. The duration of the lessons is 90 minutes. Total 68 training sessions in the academic year (Table 2).

Table 1. Indicators of the level of physical qualities development in schoolgirls before the start of the experiment

Indicators	Experimental group (n=16)			Control group (n=15)			t	p
	$\overline{X}$	δ	m	$\overline{X}$	δ	m		
Standing long jump (cm)	159	7,6	1,3	156	11,58	2,99	0,8	>0,05
Standing high jump (cm)	38,8	4,35	1,08	39,9	3,37	0,87	0,7	>0,05
Shuttle run 4x9 m (sec)	10,4	0,43	0,1	10,58	0,33	0,08	1,2	>0,05
Jump rope for 1' (number of times)	84	6,68	1,67	83,2	7,66	1,97	0,3	>0,05
Run 30 m (sec)	5,65	0,24	0,06	5,54	0,29	0,07	1,2	>0,05
Raising the torso in the supine position (number of times)	21,43	2,25	0,56	21,3	1,3	0,33	0,2	>0,05
Bending the arms in emphasis lying on the bench (number of times)	9,8	3,67	0,9	9,4	2,38	0,6	0,4	>0,05
Medicine ball throw (m)	311	11,7	2,94	313	13,7	3,54	0,4	>0,05
Running 6 minutes (m)	771	52,3	13,1	774	74,9	19,35	0,1	>0,05
Sitting forward bent (cm)	11,56	1,8	0,4	11,6	2,35	0,6	0,2	>0,05

* Differences are significant at t = 2,05 (0,05), 2,76 (0,01); (df=29).

Table 2. Schedule of training sessions and competitions for the 2016-17 academic year

Month	Monday 15.30-17.00	Thursday 15.30-17.00	Total hours	Competitions
September		29	2	
October	3, 10, 17, 24, 31	6, 13, 20, 27	18	
November	7, 14, 21, 28	3, 10, 17, 24	16	Lyceum championship
December	5, 12, 19, 26	1, 8, 15, 22, 29	18	
January	5,16, 23, 30	12, 19, 26	14	
February	6, 13, 20, 27	2, 9, 16, 23	16	
March	6, 13, 20, 27	2, 9, 16, 23, 30	18	Town championship
April	3, 10, 17, 24	6, 13, 20, 27	16	
May	1, 8, 15, 22, 29	4, 11, 18, 25	18	

The educational and thematic plan was presented by lectures, practical and methodical classes. Most of the study time was devoted to practical exercises. At these training sessions, they mastered the technique of moving (6 hours), receiving and passing the ball (20 hours), serving and receiving a serve (20 hours), attacking blow (16 hours), attack

tactics (8 hours), defense tactics (8 hours), psychological training (6 hours), general physical training (20 hours), integrated training (20 hours), control (4 hours).

Testing the level of physical training at the end of the academic year showed significant positive changes in most of the observed indicators. The most significant increase was recorded in bench push-ups (t=4.5), Cooper's Test (t=4.1), jumping rope (t=3.8), forward bend (t=3.5), lifting the body in supine position (t=3.1). There were also significant changes in the 30 m run (t=2.6), standing long jump (t=2.5), 4x9 m, shuttle run (t=2.4), standing high jump (t =2.1).

It is necessary to note some physiological features of girls of this age. Adolescence is characterized by puberty of the body, hormonal changes and heterochrony in the manifestation of motor abilities. Despite the fact that the development of strength and endurance in girls in adolescence presents certain difficulties, high motivation, diversity and complex nature of the means used can be very effective if the classes are systematic followed (Table 3).

Table 3. Indicators of the level of physical qualities development in schoolgirls after the completion of the experiment

Indicators	Experimental group (n=16)			Control group (n=15)			t	p
	$\overline{X}$	δ	m	$\overline{X}$	δ	m		
Standing long jump (cm)	165	8,33	2,08	156	11,44	2,95	2,5	<0,05
Standing high jump (cm)	41,6	3,86	0,9	38,9	3,2	0,83	2,1	<0,05
Shuttle run 4x9 m (sec)	10,23	0,36	0,09	10,53	0,28	0,07	2,4	<0,05
Jump rope for 1' (number of times)	94,4	7,2	1,8	85,2	6,27	1,62	3,8	<0,01
Run 30 m (sec)	5,22	0,27	0,06	5,48	0,29	0,07	2,6	<0,05
Raising the torso in the supine position (number of times)	23,8	2,4	0,6	21,5	1,55	0,4	3,1	<0,01
Bending the arms in emphasis lying on the bench (number of times)	13,75	3,33	0,83	9	2,42	0,63	4,5	<0,01
Medicine ball throw (m)	320,9	15,8	3,95	319	14,8	3,8	0,4	>0,05
Running 6 minutes (m)	858	53,8	13,45	774,6	60,1	15,5	4,1	<0,01
Sitting forward bent (cm)	14,75	1,84	0,46	1,9	2,66	0,68	3,5	<0,01

* Differences are significant at t = 2,05 (0,05), 2,76 (0,01); (df=29).

Strength is a fundamental quality, on the manifestation of which other motor abilities largely depends. At the same time, for girls, the age from 12 to 17 years-old is the most critical period in terms of the possibility of developing strength, including dynamic strength endurance [1]. Nevertheless, largely due to the systematic nature of the exercises and an integrated approach to the development of physical qualities in the game method, positive dynamics can be traced in all exercise-tests, which require a manifestation of strength. The only exception was the test for throwing a stuffed ball at a distance.

Speed-strength indicators have the least potential for directed development. In addition, by the age of 15, the natural increase in speed-strength qualities is completed, which is also demonstrated by the results in the control group of subjects (a slight improvement in the

results of most schoolgirls, and in some cases in standing high jump - a decrease in performance). At the same time, in volleyball classes, traditionally, much attention is paid to the implementation of various jumping exercises, which undoubtedly has a beneficial effect on the speed-strength indicators of those involved.

The age of 13 years-old, one way or another, regardless of the pace of physical development of children, is a favorable period for the development of both the frequency of movements and the speed of a single movement. The speed of movements, with insufficient attention to its development (especially the lack of playing practice), tends to regress at a rapid pace [10]. In the 30 m run in the experimental group, high results were recorded compared to the beginning of the study. The systematic use of outdoor games in combination with a sensitive period for the development of speed had a positive effect on the manifestation of the speed of movements.

At the age of 12-14 years-old, it is most favorable for the development of flexibility, however, starting from the age of 14-15 years-old, mobility in the joints can decrease at a rather high rate in the absence of attention to this quality [7]. Girls practicing according to the experimental method showed good results in forward bending, which indicates the right choice of exercises for those involved.

The best effect in the development of dexterity can be achieved throughout the entire school age if outdoor games are systematically applied. Another condition is their diversity [8]. Significant changes in jumping rope and shuttle running indicate the fact that in the experimental group the girls were engaged in the most favorable conditions for the development of movements coordination.

Improvement in endurance performance is a problem in adolescence, and in most schoolchildren it tends to decrease, which was demonstrated by participants in both groups at the beginning of the experiment. Nevertheless, regular classes, optimal physical activity, performance of tasks against the background of fatigue contributed to the increase of endurance, which is undoubtedly a positive result.

Conclusions.

1. Assessment of the physical training level in the studied group of adolescent girls allows us to speak about the insufficient level of development of all physical qualities. Despite the period of puberty and active growth of the body in length, there is a lag in tests for the speed of movements and their speed-strength indicators, strength, agility, endurance and flexibility. In the absence of additional activities in the sports classes, there is a tendency to lag behind the standard in the level of physical training.

2. Regular volleyball classes at school during the school year (68 lessons of 90 minutes with a regularity of 2 times a week) can have a significant impact on the level of development of the physical qualities of 13-year-old girls. The speed-strength indicators of movements, speed, agility, strength, flexibility and endurance can significantly improve according to the results of standard exercise tests.

3. The results of the study indicate the need to increase the study time allotted for physical exercises with middle school girls, popularize sports activity, in particular volleyball, involve gymnasium girls to sports mass work in order to improve health indicators and increase the percentage of pupils who succeed in the discipline "physical education".

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