

## Original Article

### The implementation of basketball means in the recreational activities of student youth

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Published online: December 31, 2018

(Accepted for publication December 15, 2018)

DOI:10.7752/jpes.2018.04376

#### Abstract

The article presents the results of the implementation of basketball means into the recreational activities of students. The study involved 32 young men aged 17-21 years, all of them are students of Bila Tserkva National Agrarian University. In accordance with the tasks of the research work, we selected research organizing methods which are used in the practice of pedagogy, physiology and physical education of various groups of the population.

Analysis of the results obtained before and after the pedagogical experiment indicates a statistically significant difference ( $p<0.05$ ;  $p<0.01$ ) in most of the indicators studied. Under the influence of recreational activities by means of basketball, the young men aged 17-21 years improved their memory by 31.6 % ( $p<0.05$ ) and self-efficacy by 14.2 % ( $p<0.05$ ); their attention span increased by 39.1 % ( $p<0.05$ ). The index of the complicated Romberg test was improved significantly ( $p<0.05$ ), so the average result grew by 69.3 %.

The results obtained are recommended for implementation into the educational process of the Department of Health and Physical Recreation of the Bila Tserkva National Agrarian University, in particular for self-study of students in extracurricular time.

**Key words:** basketball means, student youth, recreational activities.

#### Introduction

Discussing the issue of the influence of various types of physical activity on the health of students, one should pay attention to the fact that traditional physical education classes satisfy only 25-30% of the total daily students' need for physical activity (Ivashchenko, 2017; Kashuba, 2017). The urgency of increasing the level of motor activity of students is confirmed with numerous studies (Blagii, 2015;). A promising step in solving this problem is the students' use of popular types of physical activity, as well as engaging them in extracurricular activities that can be conducted in various organizational forms and have certain advantages in stimulating students' activity in achieving a health-improving goal (Kozhokar, 2018; ). Numerous authors point out that it is very difficult to attract student youth to the purposeful motor activity, thanks to which it is formed an active healthy lifestyle, independence and proactivity in choosing the appropriate sports and forms of training. This requires considerable effort and the use of active propaganda to regular various sports activities (Platonov, 2004; Alpatsky, 2006; Bolotin, 2015; Galan, 2017; Bolotin, 2017; Melnyk, 2017; Pityn, 2017).

The most effective in this regard, in our opinion, are sports games, in particular, various types of basketball (classic basketball and streetball), which are becoming increasingly popular among students. The main advantages of the amateur basketball, as an effective means of health-improving and recreational activities, are as follows: the naturalness of the movements performed during the game (walking, running, jumping, throwing, passing and throwing the ball into the basket); its high emotionality, which is achieved through continuous changes in the playing environment and the competitive nature of the game; development of physical, mental and psycho-physiological qualities. In the process of fitness and health recreation basketball trainings, such physical qualities as speed, speed endurance and speed-strength endurance, agility, and coordination of movements successfully are developed (Poplavsky, 2004; Church, 2007; Hess, 2014; Iuliana, 2015; Bolotin, 2016; Kozina, 2017).

As a result of the analysis of the scientific literature in the field of research, it was found out that there was an insufficient number of publications devoted to the study of the psychological factors of recreational activity and attitudes toward physical recreation. As well as we established that there is the lack of study of the issue of the effectiveness of implementation of basketball means into the recreational activities of students, which determines the relevance of our research.

## Materials and Methods

The study was carried out on the basis of the Bila Tserkva National Agrarian University, the city of Bila Tserkva. The study involved 32 young men aged from 17 to 21 years, they all study at the Agro-Biotechnological and Biological-Technological Departments.

To solve the tasks set in our work, we used the following research methods: analysis of scientific and methodological literature, anthropometric methods, physiological methods, psychophysiological methods and pedagogical methods.

On the basis of generally accepted anthropometric research methods, we measured: body length (in centimetres); body weight (in kilograms), the girth dimensions of various body parts (in centimetres). The dynamometry of the right and left hand (in kilograms) was determined using a mechanical dynamometer. The functional state of the cardiovascular and respiratory systems was determined according to the indicators of systolic blood pressure (SBP, mmHg) and diastolic blood pressure (DBP, mmHg). The measurements were carried out using an Omron - M-1 mechanical tonometer (Japan) according to the Korotkov method. The heart rate was measured at rest ( $HR_{rest}$ , beats /min<sup>-1</sup>) by palpation. The vital capacity of the lungs (VC, l) was determined by spirometry using a portable dry spirometer. Two attempts were made with an interval of 15 seconds and the best result was recorded.

Pedagogical testing was carried out by determining the level of development of particular motor skills: strength, speed, flexibility, endurance, agility based on the results of various motor tests. To determine the speed abilities, it was used running 100 m race(s). To determine agility, it was used shuttle running race 4x9 m (s) and a standing long jump(cm) which was performed 2 times. The best result was taken into account. To assess strength endurance, the following exercises were performed: flexion and extension of arms in front lying support on the floor (times) and sit-up from the back-lying position, for 1 min (times). Flexibility was assessed using an exercise: bending forward from the sitting position, cm (cm). To assess the equilibrium, it was used the complicated Romberg test with eyes closed. During the assessment of the test, the attention was paid to the degree of posture stability and the duration of balance. Maintaining of a steady posture for more than 15 s without tremor is rated as normal; small tremor of the eyelids and fingers while holding the posture for more than 15 s is satisfactory; if the posture is held less than 15s - unsatisfactory.

## Results

As a result of the analysis of the scientific-methodical and special literature, it was found that the priority direction in the organization of extracurricular activities is the organization of training sessions at the choice of students. Among the various sports that arouse special interest of students, experts call sports games, athletic gymnastics, swimming, tourism, athletics. Taking into account the material and technical base of the Bila Tserkva National Agrarian University (BNAU), sports traditions and personal interests of students, we have developed a recreational program with basketball means, and implemented in the extracurricular time during the period since September 2017 till May 2018.

The goal of the program is to satisfy the need of students in organizing active recreation by means of basketball.

The main objectives of this program are: comprehensive physical development of an individual, health promotion and improvement of the psycho-physiological state of students in the process of studying; increasing the general and special physical fitness of students; achieving the level of technical and tactical preparedness in the performance of the game function.

The recreational program with basketball means is meant to be used for 9 months, with the 4-hour weekly load, the total – 136 hours. The program contains theoretical and practical sections. In the theoretical section, the rules and regulations of basketball and streetball and the basics of the technique of the game are provided, as well as the basic provisions on refereeing and recording score sheets of competitions.

In order to determine the impact of the recreational program on the indicators of the physical development of students, we carried out anthropometric measurements, body length (BL) and body mass (BW), body mass index (BMI) covering the dimensions of different parts of the body, dynamometry of the right and left hand.

All the studied indicators of physical development by the end of the pedagogical experiment did not have a statistically significant difference ( $p>0.05$ ), although there is a positive trend. The obtained average values of anthropometric indicators at the end of the pedagogical experiment were within the age norms (table 1).

Analysis of individual BMI indicators at the beginning of the pedagogical experiment found out a small number of the young men,  $n = 3$  (9.6 %) who had a body mass deficit and can be classified as “underweight”, and  $n = 2$  (6.2 %) who had a negligible overweight and can be classified as “overweight”, the rest of the young men corresponded to “normal range”. Repeated analysis of individual BMI indicators at the end of the pedagogical experiment revealed a significant improvement in the overweighed young men, and the individual results of young people with a body weight deficit remained almost unchanged.

There is a high variability of indicators of BW and BMI both at the beginning and at the end of the

pedagogical experiment, the variation coefficients are higher than 14.6 %, which indicates the heterogeneity of the sample

Table 1. Indicators of the physical development of the young men aged 17-21 before and after pedagogical experiment (n=32)

Indicators	Results before the pedagogical experiment (n=32)		Results after the pedagogical experiment (n=32)		p
	$\bar{x}$	S	$\bar{x}$	S	
Age, years	19.3	0.61	19.7	0.58	>0.05
BL, cm	179.6	4.12	180.5	4.01	>0.05
BW, kg	75.6	13.12	73.4	12.36	>0.05
BMI, kg/m <sup>2</sup>	23.9	4.61	22.7	3.47	>0.05
Chest girth, cm	92.4	3.11	93.3	4.02	>0.05
Shoulder girth, cm	28.5	2.21	29.8	2.33	>0.05
Waist girth, cm	75.7	3.16	76.1	3.28	>0.05
Pelvis girth, cm	92.1	2.01	92.4	2.18	>0.001
Thigh girth, cm	47.4	2.34	48.6	3.14	>0.01
Dynamometry right, kg	42.4	5.88	43.9	8.46	>0.05
Dynamometry left, kg	39.5	6.12	39.8	6.44	>0.01

High variability is observed also in the indicators of the right and left hand dynamometry, both at the beginning and at the end of the pedagogical experiment. This peculiarity can be explained by the fact that strength qualities are still being formed in the young men.

Basketball and streetball affect all body systems. During the game, the cardiovascular system, the breathing apparatus, the endocrine glands, the nervous system, etc., are actively working.

During the analysis of the results obtained before and after the pedagogical experiment, there was a statistically significant difference ( $p<0.05$ ;  $p<0.01$ ) in most indicators (table 2).

Table 2. Indicators of the functional state of the cardiovascular and respiratory system and psychophysical state of the young men aged 17-21 years before and after the pedagogical experiment (n = 32)

Indicators	Results before the pedagogical experiment (n=32)		Results after the pedagogical experiment (n=32)		p
	$\bar{x}$	S	$\bar{x}$	S	
VC, l	4.1	0.61	4.4	0.89	<0.05
HR <sub>rest</sub> , beats /min <sup>-1</sup>	81.6	5.11	77.4	5.34	<0.01
SBP, mmHg	119.4	6.71	117.5	8.64	>0.01
DBP, mmHg	77.3	3.81	78.1	6.15	>0.01
Ruffier index, nominal units	10.3	3.55	7.2	2.76	<0.05
Romberg test, second	7.5	3.56	12.7	3.54	<0.05
Short-term memory capacity, %	31.4	16.21	45.9	6.89	<0.05
Self-efficacy, points	26.5	9.11	30.9	3.18	<0.05
Attention span, points	4.2	2.67	6.9	1.08	<0.05
Number of mistakes	11.7	6.98	6.5	0.76	<0.01

The recreational program with basketball means had a positive effect on the VC index, which improved by 7.3 % ( $p<0.05$ ). The average heart rate at rest at the end of the pedagogical experiment improved by 5.1 % ( $p <0.01$ ). Almost no significant changes ( $p>0.01$ ) had indicators of systolic and diastolic blood pressure. Positive is the fact that the average results are within the age norm. In the analysis of individual indicators of systolic blood pressure, we identified the young men, n = 4 (12.5 %), in which this indicator is above 130 mmHg, which is the indicative sign the juvenile hypertension.

In the course of the study, we found that basketball means led to a significant improvement of 69.3 % of the average result of the Romberg sample ( $p<0.05$ ).

Analysis of the average result of the Ruffier index at the end of the pedagogical experiment indicates a significant improvement of 27.3 % ( $p<0.05$ ) and a transition from a satisfactory level of physical performance to an average level.

At the beginning of the pedagogical experiment, indicators characterizing cognitive functions had significant variability. Thus, the coefficients of variation ranged from 34.4 % to 63.6 %, which indicates the heterogeneity of the sample. Analysis of the average indicators of the cognitive functions of the young men at the end of the pedagogical experiment indicates significant positive changes. The amount of memory improved by 31.6 % ( $p < 0.05$ ), while efficiency increased by 14.2 % ( $p < 0.05$ ). The volume of attention improved by 39.1 % ( $p < 0.05$ ). The number of errors made decreased by 80.0 % ( $p < 0.01$ ). Such changes can be explained by the fact that game situations in basketball and streetball change very quickly. Continuous observation of players at the game helps to develop the ability to distribute and concentrate attention to orientation in space and time. Each player takes into account changes in situations during the game on their own, making appropriate decisions. It is very important for the development of such qualities as responsibility, independence.

To study the physical fitness of the young men, we used motor table 3.

Table 3. Indicators of physical fitness of the young men aged 17-21 years before and after the pedagogical experiment (n = 32)

Indicators	Results before the pedagogical experiment (n=32)		Results after the pedagogical experiment (n=32)		p
	$\bar{x}$	S	$\bar{x}$	S	
Running 100 m, sec	13.9	0.76	13.8	0.53	> 0.05
Shuttle running 4 × 9 m, sec	9.9	0.34	9.2	0.21	< 0.01
Flexion and extension of arms in front lying support, times	32.8	5.82	39.8	6.27	< 0.05
Bending forward from the sitting position, cm	2.8	4.22	5.3	4.18	> 0.01
Sit-up from the back-lying position, times /1 min	32.4	4.65	44.8	5.17	< 0.05
Standing long jump, cm	229.7	21.34	243.6	12.95	< 0.05

By the end of the pedagogical experiment, there was a significant improvement in particular motor qualities. A statistically significant difference ( $p < 0.01$ ) was observed in the performance of the shuttle running 4x9 m test, this indicator improved by 7.1 %. This motor quality characterizes agility and its improvement is natural, since the game of basketball or streetball is constantly changing the game environment, from attack to defence, which requires a quick motor reaction.

Positive dynamics is observed in the performance of the motor test in flexion and extension of arms in front lying support on the floor (times) ( $p < 0.05$ ), the average result improved by 21.3 %.

When performing the flexibility test at the end of the pedagogical experiment, there was a significant improvement of 89.3 %, but there is a high variability of this indicator. The coefficient of variation is 78.9 %, which indicates the heterogeneity of the sample.

When the test "Sit-up from the back-lying position in 1 minute" was repeated, the average result improved by 38.3 % ( $p < 0.05$ ), and the result in the standing long jump - by 6.1 % ( $p < 0.05$ ).

The results of the test in running 100 metres race did not undergo significant changes, this indicator improved only by 0.7 % ( $p > 0.05$ ). This feature may be due to the fact that speed qualities are more dependent on the genetic factor, and their development requires long-term targeted training.

## Discussion

Analysis of scientific and methodological literature and documentary materials indicates that today in Ukraine there is a marked decrease in the level of physical fitness and performance of students, deterioration of their physical and mental health, the functional state of the leading physiological systems, and the steady increase in the incidence (Zaitsev, 2009; Korolchuk, 2015).

The urgency of the problem is further enhanced by the fact that the negative trends of the decline of the main components of the physical condition of student youth also manifest themselves in the process of their study in a higher educational institution (Yarmak, 2017; Paliichuk, 2018). Numerous scientific studies state the insufficient effectiveness of the system of physical education of students and the content of their free time (Yarmak, 2018).

Numerous authors express the opinion that a rather promising direction in improving the physical condition and promotion of health, is implementation in the recreational activities of available and simple means, such as sports games (Kozina, 2008; Blagii, 2015; Bolotin, 2016).

Our research confirms data about the low level of involvement of students in motor activity (Nagovitsin 2011; Pangales, 2011); about the low organization of leisure of student youth (Galan, 2017).

It is important to note that the results of the pedagogical experiment fully confirm the results of studies

of numerous authors that point to a negative dynamic of indicators of physical fitness and performance of student youth (Blagii, 2015). Our research work supplemented the data (Zaschuk, 2010; Korolchuk, 2015) on the positive impact of basketball on the development of coordination qualities, agility, and psycho-physiological abilities of student youth.

### Conclusions

The effectiveness of the recreational program with basketball means was manifested in the positive dynamics of the studied parameters, a statistically significant difference ( $p<0.01$ ) in the heart rate at rest index and ( $p <0.05$ ) the Ruffier index, characterizing the response of the cardiovascular system to the dynamic load, was found. Significant improvement ( $p<0.05$ ) have VC and the complicated Romberg test. Studies have also shown that playing basketball had a positive effect on the cognitive functions of students.

**Conflicts of interest** – If the authors have any conflicts of interest to declare.

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