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Optimization of movement activity and the mental state of students by dance aerobics

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Optymalizacja aktywności ruchowej i stanu psychofizycznego studentek za pomocą aerobiku tanecznego

Streszczenie

CEL: przetestowanie efektywności aerobiku tanecznego w celu optymalizacji aktywności ruchowej i stanu psychofizycznego studentek. METODY: medyczne i biologiczne: masa ciała (kg), BPM i BPD (mmHg), ChSS w stanie spoczynku i test Stange. Wszystkie dane uzyskane w badaniu zostały przetworzone zgodnie z procedurami opisowych i porównawczych metod statystycznych. Z obszaru statystyki opisowej zdefiniowano następujące parametry: reprezentatywne parametry centralne i dyspersyjne: średnia arytmetyczna -; odchylenie standardowe -; pomiar początkowy i końcowy. Przeprowadzono niesparowany test, zastosowany w statystyce porównawczej, w celu porównania średnich arytmetycznych dwóch niezależnych zestawów danych (grupy eksperymentalne i kontrolne). Analizę statystyczną przeprowadzono stosując oprogramowanie statystyczne SPSS. WYNIKI: Podczas nauki, a zwłaszcza podczas egzaminu, uczniowie doświadczają silnego

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stresu psycho-emocjonalnego, a stan fizyczny pogarsza się. Zastosowanie aerobiku tanecznego ma pozytywny wpływ na stan psychofizyczny studentek i optymalizację ich aktywności fizycznej. WNIOSKI: Analiza porównawcza danych potwierdziła skuteczność narzędzi do aerobiku tanecznego nie tylko przy braku negatywnych zmian podczas sesji egzaminacyjnej, ale także poprawie stanu psychofizycznego (stan zdrowia metodą WAM w KG – 3,8 punktu, EG1 – 4,3 punktu, EG2 – 4,5 punktu, EG3 – 4,8 punktu) i poziom zdrowia somatycznego uczniów (w KG $0,23 \pm 0,04$ punktu, EG1 $8,78 \pm 0,50$ punktów, EG2 $8,77 \pm 0,61$ punktu, EG3 $11,65 \pm 0,55$ punktów)

Słowa kluczowe: aktywność fizyczna, aerobik taneczny, studentki, stan psychofizyczny.

Abstract

PURPOSE: to test the effectiveness of dance aerobics to optimize the motor activity and the psychophysical state of female students. **METHODS:** medical and biological: body weight (kg), BPM and BPD(mmHg), ChSS in a state of rest and the Stange test. All the data obtained by the study were processed by the procedures of descriptive and comparative statistical methods. From the area of the descriptive statistics the following parameters were defined: representative central and dispersive parameters: arithmetic average –; standard deviation –; initial and final measuring. Unpaired test, applied in comparative statistics, was performed in order to compare the arithmetic means of two independent data sets (experimental and control groups). Statistical analysis was performed by applying SPSS statistical software. **RESULTS:** During the studying, and especially the examination time, students experience strong psycho-emotional stress and the physical state becomes worse. The use of dance aerobics has a positive influence on the psychophysical state of female students and the optimization of their physical activity. **CONCLUSIONS:** Comparative analysis of data confirmed the effectiveness of dance aerobics tools not only in the absence of negative changes during the examination session, but also improvement of the psychophysical state (state of health by the method of WAM in KG – 3,8 points, EG1 – 4,3 points, EG2 – 4,5 points, EG3 – 4.8 points) and the level of somatic health of students (in KG 0.23 ± 0.04 points, EG1 8.78 ± 0.50 points, EG2 8.77 ± 0.61 points, EG3 $11,65 \pm 0.55$ points)

Keywords: physical activity, dance aerobics, female students, psychophysical state.

Introduction

Nowadays, there is a negative dynamics of motor activity among the Ukrainian population. The lack of motor activity in modern society is considered one of the main problems of the nation [Pedišić, Jurakić, Rakovac, Hodak, & Dizdar [15]. The lack of motor activity leads to deterioration of the health state, increased risk of cardiovascular and other diseases, and decreased physical activity Dutchak [2]; Kohl, Murray [3].

Unfortunately, most students do not realize that physical education is a powerful factor in improving their health, the right way which can bring many useful things in one's life, and also fix disturbed functions caused by a sedentary lifestyle up Ksenofontova [4]; Sokolova [17].

One of the most popular and effective types of physical activity among female students is dance aerobics Oshanloo, Zafari, & Najjar [13], Gao, Lee, & Harrison [7]; Gao [8] dance aerobics attracts female students with its accessibility, variety

of directions, emotionality, you can choose physical activity depending on the and level of physical strength. The popularity of aerobics is attributed to the fact that this type of physical activity corresponds to the concepts of gender identity, is compatible with the concepts of femininity, the image of the female body and figure, and is due to the nature of the female body Mohd, Muhammad [11]; Martynova [10]; Pyatnitskaya [16].

Talking about the specifics of the educational process in a higher education institution and the interest of students in choosing a motor activity, we assume that dance aerobics classes will improve the psychophysical state of students and their quality of life.

Material and methods

The research was conducted on the basis of Pereiaslav-Khmelnytskyi State Pedagogical University named after Hryhorii Skovoroda. Students of the I–II courses, a total of 60 people, have taken part in the experiment of the Pedagogical Faculty. All students were divided into control (KG) and 3 experimental groups (EG1, EG2, EG3), each with 15 students.

All students agreed to participate in the experiment. The following research methods were used to solve the questions: analysis of scientific and methodological literature; questionnaire; pedagogical observation; pedagogical experiment; testing by WAM technique—well-being, activity, mood. Methods for determining the functional state of the cardiopulmonary system - heart rate and heart rate indexes (ChSS) in a state of rest and the Stange test and resting blood pressure-BPM and BPD (mmHg). The functional state of the respiratory system was determined by Shawn's breakdown and lung capacity (LU); estimation of the level of somatic health by the method of Apanasenko [1], including body mass index, vital index, strength index, Robinson's index, and determination of the recovery time of heart rate after 20 squats; methods of mathematical statistics.

Results

The development of experimental methodological approaches to the use of dance aerobics in the classroom for physical education of students is based on the following provisions.

The inclusion of dance aerobics in the process of physical education complies with the curriculum for higher educational institutions of Ukraine of III–IV accreditation levels and the “Regulations on the organization of physical education and mass sports in universities” and takes into account the interests and preferences of students.

The process of practical implementation of aerobics in the physical education program provides for the unity of educational, recreational and educational tasks and compliance with such general didactic principles as the principles of consciousness and activity, visibility, accessibility, individualization, systematic, gradual and consistent, the implementation of which contributes to the efficiency of the process physical education.

The number of training hours for dance aerobics was 64 hours. All training hours for dance aerobics were split up within 4 modules. The task of the first module (8 classes) was to improve the general physical shape of students and mastering the basic skills of aerobics, the second module (8 classes)—further general physical training of students, fixing the learned elements of aerobics and mastering new elements.

Within the third (8 classes) and fourth (8 classes) modules, in addition to solving the tasks of the first two modules, in order to ensure the strength orientation of the classes, the use of body bibs (weight 0.3 kg), dumbbells (1 kg) was assumed for the harmonious development of all muscles of the body and expanders.

In constructing each practical aerobic dance class, organizational and methodological requirements, traditional for this type of physical exercise, are applied. The classes consisted of the following structural parts: the preparatory part (warm-up and stretching) (7–10 minutes), the main part – exercises for improving the cardiovascular system (aerobic unit) (30–45 minutes) and the power unit (10–15 minutes), the final part, including exercises to restore and increase flexibility (2–5 minutes). To confirm the effectiveness of dance aerobics classes, a re-study of the physical and psychological state of the students of the control and experimental groups was conducted during the examination session. The results of the study of indicators of the physical condition of students during the examination period are shown in Table 1.

According to the the table, the physical condition of the students of the control group has changed significantly: heart rate from the rate of 82.5 bp/min has increased to 93.03 BPM; AT – from 120/70 to 130/90 mm Hg, the weight of the body decreased from 60 to 58 kg, the test score of Shtange has not changed significantly.

At the same time, in the experimental groups, the physical indicators practically changed, compared with those values that we recorded during the exam period, and some (the Stange test, heart rate) even improved. Moreover, the most pronounced positive changes were noted in the EG3 group. Dynamics of indicators of the psycho-emotional state of female students in the exam period after the experiment is shown in Table 2.

The analysis of the self-control diaries and the results of the research according to the WAM methodology show that the psychoemotional status of the female students in the control group during the examination period changed in a negative direction. Namely, majority of the students had worse sleep, appetite, and general well-being, decreased activity and mood.

In the experimental group of female students, the indicators of psycho-emotional state during the examination period did not change compared with those of the examperiod. At the same time, the psycho-emotional state of the students of the EG3 group was better compared to other experimental groups. A comparative analysis of the indicators of well-being, activity, and mood of female students of the studied groups in the exam period is shown in Figures 1–3.

According to the tables, it is clear that the use of dance aerobics had a positive effect on the psycho-emotional state of female students during the examination session, which proves the literature data on the effectiveness of physical activity in relieving emotional stress.

The results of the discovering of the level of somatic health after the experiment are shown in table 3. According to Table 3, the indicators of the somatic health of female students in the control group deteriorated when compared with the examperiod in almost all the components included in the rapid method of Apanasenko, 2010. Yes, they have deteriorated Robinson index (from below-average to low), life index and increased recovery time of the heart rate after exercise (from below-average to low). The general level of health of female students of the KG group during the examination period was low.

At the same time, the students of the experimental groups EG1 and EG2 did not experience a decrease in somatic health. The overall level of health in the EG1 and EG2 groups after the experiment was assessed as below average.

In the experimental group EG3, normalization of some components of somatic health was determined: vital index, Robinson index, recovery time after exercise. Indicators of mass-growth and power index did not change. The overall level of the somatic health of female students of the EG3 group after the experiment was average, that is, increased when compared to baseline data.

Discussion

Research has shown that the psycho-emotional state of the students of all the groups studied at the state of the experimental stage was satisfactory. The physical condition of the students during this period was generally within the normal range, with the exception of the registered functional stress in the work of the cardiovascular system. According to the express method of assessing the level of physical health by Apanasenko [1], it was found below the average level of health of female students of all the studied groups, which confirms data on the general trend of decline in the level of health of students in Ukraine. In the process of analyzing the results of the pedagogical experiment, the data (Pantelic, Milanovic, Sporis, & Stojanovic-Tosic [14], Okura, Nakata, Ohkawara, Numao, Katayama, Matsuo, & Tanaka [12]) on the positive effect of dance aerobics on the functional abilities of a person were confirmed; cardiovascular system (Mohd et

al. [11]); body's composition (Gasti & Hiremath [5], Marandi, Abadi, Esfarjani, Mojtahedi, & Ghasemi [9]); psycho-emotional condition (Hui, Chui, and Woo [6]).

Conclusions

The results of the questionnaire show that during the academic year, the psychophysical state of the students undergoes significant changes (in 70% of the respondents) and manifests itself in the form of psycho-emotional stress and deviations in the physical state of a different nature. The results of the study showed that the psycho-emotional state of the students was satisfactory (state of health by the WAM method in the KG – 4,8 points, EG1 – 4,5 points, EG2 – 4,6 points, EG3 – 4,4 points), physical condition is fine, with the exception of the registered functional tension in the cardiovascular system, the level of somatic health is lower than the average (in KG $6,48 \pm 0,73$ points, EG1 is $6,43 \pm 0,78$ points, EG2 $6,45 \pm 0,79$ points, EG3 $6,54 \pm 0,81$ points). Comparative analysis of data confirmed the effectiveness of dance aerobics tools not only in the absence of negative changes during the examination session, but also improvement of the psychophysical state (state of health by the WAM method in KG – 3,8 points, EG1 – 4,3 points, EG2 - 4,5 points, EG3 – 4.8 points) and the level of somatic health of students (in KG $0,23 \pm 0,04$ points, EG1 $8,78 \pm 0,50$ points, EG2 $8,77 \pm 0,61$ points, EG3 $11,65 \pm 0,55$ points).

Tables and figures

Table 1. Indicators of the physical condition of the campus of female students in the exam period

Group	$\bar{x} \pm m$	σ	v	t	p
Sample Stange, p					
KG	$38,25 \pm 2,19$	9,82	17,57	—	—
EG1	$45,25 \pm 2,40^*$	9,95	17,85	1,50	0,030
EG 2	$46,15 \pm 2,05^*$	9,30	16,48	1,68	0,020
EG 3	$52,50 \pm 2,51^{**}$	9,86	19,46	6,28	0,001
Body weight, kg					
KG	$58,42 \pm 1,90$	8,50	15,29	—	—
EG1	$60,15 \pm 1,88$	8,63	15,34	0,75	0,130
EG2	$63,47 \pm 1,92$	8,48	15,13	0,84	0,21
EG3	$63,05 \pm 2,01$	8,91	15,50	0,80	0,220

Table 1. Indicators of the physical condition of the campus... (cont.)

Group	$\bar{\chi} \pm m$	σ	ν	t	p
Blood pressure, mm Hg					
KG	130,90 ± 2,05	9,19	8,07	—	—
EG1	120,70 ± 1,55*	6,93	5,99	1,65	0,557
EG2	122,15 ± 2,00*	9,15	7,92	1,55	0,520
EG3	115,82 ± 1,95**	8,48	7,05	3,48	0,501
Blood pressure, mm Hg					
KG	80,05 ± 1,17	5,22	7,58	—	—
EG1	73,70 ± 1,18*	5,28	7,49	1,55	0,03
EG2	75,03 ± 1,15*	5,15	7,30	1,50	0,03
EG3	70,05 ± 1,20**	4,95	7,00	4,65	0,001
Heart rate at rest, BPM					
KG	93,03 ± 2,08	9,31	11,86	—	—
EG1	75,15 ± 2,00*	9,01	10,17	1,71	0,01
EG2	74,19 ± 1,95*	8,75	8,75	1,50	0,03
EG3	68,01 ± 1,80**	8,50	8,50	4,49	0,001

Note. Significance of Differences – * $p < 0,05$, ** - $p < 0,005$

Table 2. Indicators of psycho-emotional state of female students during the examination period

№	Indices	Kg	EG1	EG2	EG3
1.	Appetite (% of students)	Fine 30%	Fine 70%	Fine 95%	Fine 100%
2.	Sleep (% of students)	Fine 10%	Fine 65%	Fine 90%	Fine 100%
3.	General state (points)	Negative 3,8 6	Positive 4,3 6	Positive 4,5 6	Positive 4,8 6
4.	Activity (points)	Negative 3,9 6	Positive 4,3 6	Positive 4,5 6	Positive 4,9 6
5.	Mood (points)	Negative 3,6 6	Positive 5,0 6	Positive 5,5 6	Positive 5,8 6

Table 3. The level of somatic health of female students during the examination period ($\bar{\chi} \pm m$, n = 15, n1 = 15, n2 = 15, n3 = 15)

№	Indices	Groups			
		KG	EG1	EG2	EG3
1	Body weight (g/cm)	346,51±6,24	346,94±6,96	347,31±7,17	348,09±7,33
	Growth Points	0,76±0,41	0,78±0,5	0,77±0,49	0,77±0,49
2	Lung capacity (ml/kg)	47,15±2,05	54,15±1,95	54,85±2,01	56,95±2,13
	Body weight Points	2,21±0,39	4,22±0,41	4,23±0,41	4,22±0,41
3	BPM x AP. 100	116,05±3,15	91,28±3,23	90,28±3,10	78,89±3,30
	Points	0,29±0,12	2,74±0,36	2,63±0,35	3,63±0,35
4	Recovery time BPM after 20 squats for 30 s	3,30±0,13	2,29±0,10	2,50±0,11	1,42±0,11
	Points	0,92±0,31	1,22±0,37	1,21±0,34	3,22±0,33
5	Wrist dynamometry (%)	42,85±1,30	43,17±1,45	43,28±1,33	43,95±1,41
	Body weight Points	0,92±0,15	0,91±0,17	0,91±0,18	0,95±0,17
General health assessment (Score) Level		0,23±0,04 Low	8,78±0,50 Below the average	8,77±0,61 Below the average	11,65±0,55 Average

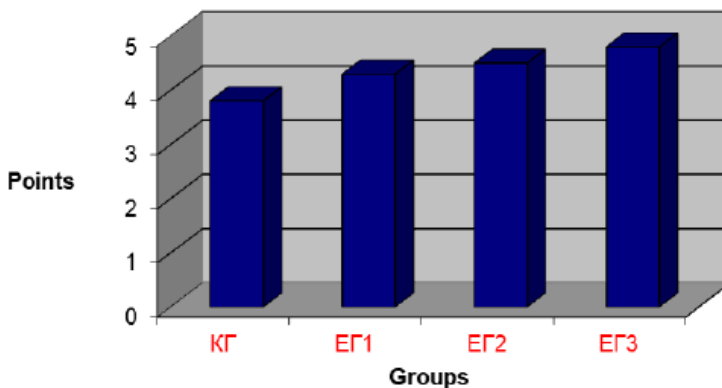


Figure 1. Comparative characteristics of indicators of the state of health of female students by the method of WAM during the examination period

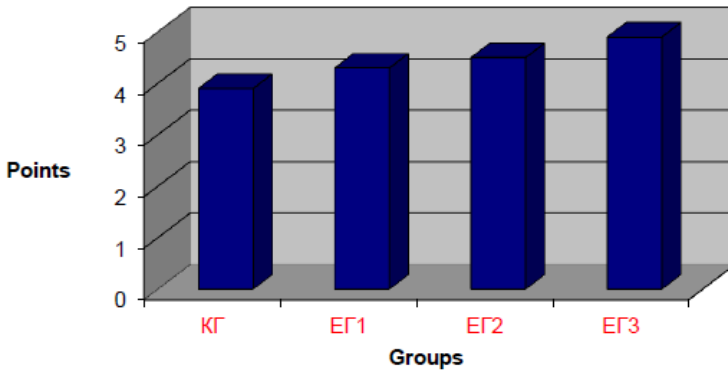


Figure 2. Comparative characteristics of indicators of the activity of female students by the method of WAM during the examination period

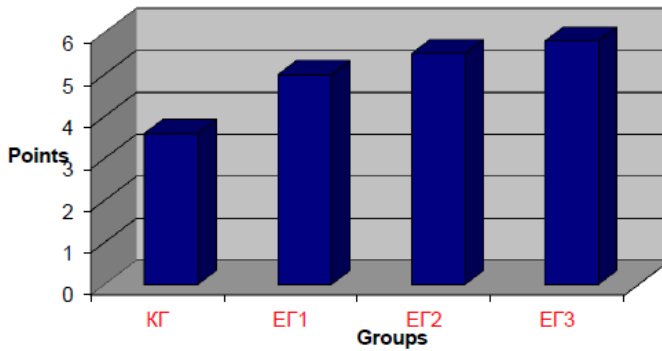


Figure 3. Comparative characteristics of indicators of the mood of students by the method of WAM during the examination period

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