

Original Article

Impact of specialized sports program for students with health issues

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Abstract:

The aim of this research is to perfect the school process in the Sports discipline through applying specialized program “Sports for Students with Health Issues” in the period of one academic year. Its impact was followed through the changes, incurring in the pulse rate after performing a kinesiotherapy complex. It was applied in the beginning and in the end (I and II testing) of the study being conducted and contains 32 exercises, distributed in three parts: Preparatory part with general exercises, Main part with combinations of exercises from various gymnastic disciplines, coordinated with the established main groups of diseases with students and Final part.

We examined the pulse rate as a reliable indicator for the level of motor suitability of a certain individual, as well as for the absence of training effect of the systematic activities with the program “Sports for Students with Health Issues”. The results of the set tasks indicate that 1) the kinesiotherapy complex is accurately dosage and conducted, which is indicative from the raising of the physiological curve; 2) it can be performed by all students, regardless of their disease and 3) it may be used for entry or exit testing. In conclusion, the training of students in the specialized program has positively affected them in the following directions:

- achieved are position functional changes in the activity of the cardiovascular system of students, expressed with pulse rate; - increased is the vitality which stimulates restorative processes, normalizes reactivity increases the organism’s stamina; - improves the circulation of separate organs and systems; - increases the physical capacity of organism as a whole; - regulates the emotional state: energizes, calms, relaxes and decrease stress.

Key Words: - pulse frequency, students, kinesiotherapy complex, higher school

Introduction

The data of the final researches of experts disclose certain tendency for increasing disease rate among students: problematic are respiratory, cardiovascular and digestive systems, metabolic processes reported are also some psychiatric disorders. As one of the main tools for fighting those diseases I. Ivanov states prophylaxis and improvement of social life conditions, labor, study and medical assurance. The author reaches to the conclusion that the systematic physical exercises, sports and tourism are among the main factors leading to high degree of non-specific adaptation of organism with most significant effect increasing its resistance to diseases, leading to improvement of life quality (Ivanov, 1994).

Many authors, examining the motor activity of students (Vilenskii, 2000; Dimitrov, 2007; Dykova, 2007, 2011; Ivanova, 2009; Iliev, 2001; Kalinina, 2007; Peeva & Dyakova, 2006; Semenov & Mironova, 2006) establish the lowest degree of motor activity and more strongly expressed tendency as its decrease for female students compared to male ones. Formed are also tendencies to groundless release from the physical education and sports classes at universities (Bozhkova, 2013, 2014; Dyakova, 2006; Ivanov, 2009).

I. Ivanov (1987) confirms the relation between the degree of motor activity of students and quality of overall education process. Students with higher motor activity not only have higher physical and mental working capacity but also significantly more rarely are absent due to diseases which inevitably reflects the positive level of utilization of the school material.

R. Tzarova (2013) and A. Tsarova-Vasileva (2013) examine the possibilities of the cardiovascular system for adaptation to physical exercises with the means of basketball, swimming and tourism with students. Various authors establish that in universities in the country enrolled are students having very low possibilities for adaptation of the cardiovascular system to physical exercising and very low functional condition състояние (R. Tzarova, 2013; A. Tsarova-Vasileva, 2013; Chacón-Araya & Moncada-Jiménez, 2013). The comparative analysis of results of athletes in various sports disciplines between those doing sports and those do not doing sports, give an opportunity to disclose specific peculiarities of developing the functional possibilities (Chatterjee et al., 2005; Milenović & Mutavdrić, 2007; Doncheva et al., 2009; Pavlov & Uzunova, 2010; Filipic et al., 2015). The stated facts motivated us to develop the program “Sports for Students with Health Issues” in order to cover all groups of students, including those with temporary or permanent diseases. Specialized program is coordinated with the individual diseases of students and adapted to the school process at Medical University -

Sofia in discipline Sports. It consists of two parts (for two semesters) with total hours of 60 academic hours.

Every semester contains 15 academic weeks, 2 academic hours per week with duration – 45 minutes (Bozhkova, 2014). We set a *goal of the research* to perfect the academic process in Sports discipline for students with health problems through applying specialized program. In order to follow its impact through changes which incur in the pulse rate, after the execution of the kinesiotherapy complex.

Material & methods

Participants

The study is held in the beginning (September) and the end (May) of the academic year 2013/14. Participants are 15 students from the Medical University - Sofia (12 girls and 3 boys), I and II course at the age from 18 to 25. All of them have established by a physician temporary or permanent health issues, of which bone-joinery - 7 students with lung diseases - 5 students with kidney problems - 2 with cardiovascular diseases - 1 student.

At detailed analysis made in the groups, we have found out that there is no reason to recommend to those students to avoid participation in trainings in physical education and sports, as the moderate motor activity for example is the best prophylaxis of bone-joinery problems. With the healthy individuals, it is enough to load efficiently the bone-muscle, as well as the cardio-vascular system for keeping the organism at good condition.

Study's aims:

1. Compiled to be appropriate Kinesiotherapy complex, according to established diseases to be performed by all students.
2. Registry of the pulse rate during execution of the Kinesiotherapy complex.
3. Compiled to be comparative analysis of the pulse rate chances at I and II testing for establishing the impact of the specialized program.

Procedures

The impact of the specialized program “Sports for Students with Health Issues” we followed through Kinesiotherapy complex through which we examined the dynamic of the pulse rate. It is applied in the end (I and II testing) of the study being conducted. The complex contains 32 exercises, distributed in three parts:

1. Preparatory part with general exercises and stretching – circles, curves, bends, lifting, releasing, strokes, swishes, springing, steps. It lasts $\frac{1}{4}$ of the total volume of the activity (10 min.), includes 8 exercises.
2. The main part is a combination of various gymnastics disciplines coordinated with the established main groups of diseases for students. It has duration of $\frac{2}{4}$ of the total volume of activity (25 min.), includes 17 exercises.
3. The conclusive part is $\frac{1}{4}$ of the total volume of activity (10 min.) and includes 7 exercises. It aims to rewind, normalize the pulse and support the recovery processes in the organism.

Applied is the pulsometry method MY-H016 4-Channel Holter ECG Monitor System price of ECG machine. The TLC series DCG systems is composed of the ECG recorders, a computer system, a laser printer and the software. The recorder adopts PCB and SMD technology, build in flash storage media that increases its memory capacity. The sampling rate of 200, 500, 1000 sampling sec has improved that quality of waveform. The software of the system is checked by AHA and MIT, which ensure its accuracy.

Automatically reported, registered, memorized and reproduced are values of pulse rate of students – at rest (in the beginning of performing the complex), after exercising (in peak – the second half of the main part) and after recovery (in the end of the complex).

Statistical analysis

Generalization of the studied characteristics was assessed by mean arithmetic value, standard deviation and error of mean arithmetic. Confidence of differences between mean values was stated by Student's t-criterion. Assessment of statistical hypothesizes based on 5% significance level. For statistical processing of data, we used licensed program Microsoft Excel (2010). Statistical analysis of the received results was conducted, considering recommendations on Microsoft Excel tables' usage for computer data analysis.

Results

During the motor activity exercises the following pulse rate is mandatory requirement. It is one of the most easily reported, objectified and providing information indicators for the capacity of the organism to the respective loading.

In Figure 1 presented is the dynamic of the pulse rate during I and II testing through kinesiotherapy complex. The study confirms that the kinesiotherapy complex observes strictly established structure of motor activity and slightly increases the pulse to individual work zone for every student.

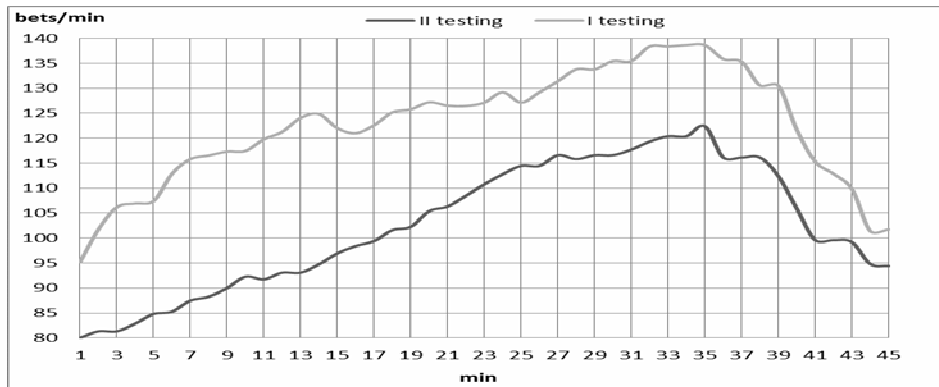


Figure 1. The dynamics of average values pulse frequency during I and II testing

On Table 1, data for comparative analysis between pulse rate at rest (beats/min), pulse rate after loading (beats/min), pulse rate after recovery (beats/min) during I and II testing through Kinesiotherapy complex are presented.

Table 1. Data for comparative analysis

№	TEST	I testing			II testing			Increase
		$\square\square_1$	S_1	V_1	$\square\square_2$	S_2	V_2	
1.	Pulse rate at rest (beats/min)	95,2	11,2	11,8	80,0	10,7	13,4	-15,2**
2.	Pulse rate after loading (beats/min)	138,7	17,6	12,7	122,4	19,9	16,3	-16,3**
3.	Pulse rate after recovery (beats/min)	101,7	12,1	11,9	94,4	15,6	16,6	-7,3*

Note: ** - $P_t \geq 95\%$; * - $P_t < 95\%$.

Discussion

The functional tests are a variety of physical ones but register various physiological parameters as pulse rate, lung ventilation, oxygen consumption, heartbeat and others. Main advantages of those tests are the possibilities for assessment not so much of the activity of the neuro-muscular system as much as the systems ensuring muscular activity (cardiovascular, respiratory, vestibular, etc.). Those tests allow obtaining information for functional condition of personality without reaching maximal loading. Experts are convinced that for preventing the incurrence of pathological conditions and forming chronic pathology with students with various degree of motor activity necessary is constant control of the organism's functional condition in the primary stage of functional changes (Шарова, Азыбозова & Белокрылов, 2013). The pulse rate is a reliable indicator for the degree of training of a certain individual as well as for the presence or lack of training effect, resulting of systematic activities.

The achieved results indicate that in the beginning of the activity (at rest) students have higher pulse rate than usual for this age upon both testing. The average values at I and II testing are respectively 95,2 bpm and 80 bpm. This average tachycardia may be explained with several side factors as for example stressful everyday life in the academic activity, transportation to the sports center, emotion of the upcoming sports activity and others. Noticeable is the fact that the dynamic of the primary pulse for the period of testing characterizes with material decrease of 15,2 bpm, supported with the necessary statistical truthfulness (table 1). Decrease of the pulse after exercising with 16,3 bpm (from 138,7 bpm to 122,4 bpm) suggest improvement of the activity of cardiovascular activity as result of program "Sports for Students with Health Issues" for the period of the study. The incurred positive change in the pulse rate is statistically significant. Present is economization of the work of cardiovascular system and existence of training effect (minimal pulse rate which gives training effect for 17-25 year-olds is 134 bpm). The pulse rate in the end of the complex (after recovery) is decreased to 94,4 bpm at II testing. The difference of 7,3 bpm is not supported with necessary statistical truthfulness (table 1) which speaks of impact of other factors upon recoverable abilities of the cardiovascular activity. The complex is accurately dosage, built and held because the increase of the physiological curve is gradual and has the following peculiarities: biggest increase of the pulse, i.e. the peak of the physiological curve is located in the second half of the main part (30-35 minute); highest peak of pulse does not exceed with more than 80 to 100% pulse frequency of the one measured at rest; in the end of the conclusive part the pulse comes back to the primary level and exceeds with about 10%.

Conclusions

The kinesiotherapy complex is accurately dosaged, built and held, as indicated form the increase of the physiological curve.

In conclusion, the training of students in the program "Sports for Students with Health Issues" has positively affected them in the following directions:

- achieved are position functional changes in the activity of the cardiovascular system of students, expressed with pulse rate;

- increased is the vitality which stimulates restorative processes, normalizes reactivity increases the organism's stamina;
- improves the circulation of separate organs and systems;
- increases the physical capacity of organism as a whole;
- regulates the emotional state: energizes, calms, relaxes and decrease stress.

Gratitude:

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References:

- Bozhkova, A. (2014). Sport programme for students with health issues. *Conference proceedings „Research in Physical Education, Sport and Health“*, Republic of Macedonia, pp. 149-152.
- Bozhkova, A., & Vasilev, K. (2014). Diagnostic analysis of health problems of students, released from the regular trainings on physical culture and sports. *Activities in Physical Education and Sport - International Journal of Scientific and Professional Issues in Physical Education and Sport*, 4(2), Skopje, Makedonia, pp. 168-171.
- Chacón-Araya, Y. & Moncada-Jiménez, J. (2013). The effect of different physical and sport activity courses on body image of Costa Rican students. *Journal of Physical Education and Sport*, 13(4), Art 78, pp. 498-503.
- Chatterjee, S., Chatterjee, P., & Bandyopadhyay, A. (2005). Validity of Queen's College step-test for estimation of maximum oxygen uptake in female students. *Indian J Med Res*, 121, pp. 32-35.
- Dimitrov, D. (2007). Study of the physical activity of students of the compulsory and optional forms of physical education and sport. *Sport & Science*, 3, pp. 207-212.
- Dontcheva, M., Zlatev, Z., & Kachev, O. (2009). Study the impact of cardio-complex on students from kalanethic groups Technical University – Varna. *Repertory 25 Faculty of Education of the University „St. St. Cyril and Methodius“*, Veliko Turnovo, pp. 538-541.
- Dyakova, D. (2007). Survey of attitudes of students to the risk factor smoking. *Repertory Personality, motivation, sports*, 12(3), pp. 30-35.
- Dyakova, G. (2011). Study of energy impact and activities with students. *Annual Technical University – Varna*, ISSN 1311-896H, pp. 118-122.
- Dyakova, G. (2006). Exemption of students from physical education classes - trends and forecasts. *Sport and Science*, 4, pp. 72-75.
- Filipicic, A., Zecic, M., Reid, M., Crespo, M., Panjan, A. & Nejc, S. (2015). Effect of physiotherapy and hippotherapy on kinematics of lower limbs during walking in patients with chronic low back pain: A pilot study. *Journal of Physical Education and Sport*, 15(4), Art 101, pp. 663-670.
- Ivanov, I. (2004). Optimization of physical education in higher education. Dissertation, NSA, Sofia.
- Ivanova, A. (2009). Influence of aerobics classes on some functional parameters. *Repertory, Personality, Motivation, Sports*, 14, pp. 262-264.
- Iliev, I. (2001). Study of the influence of physical activity in systematically dealing with bodybuilding students on their academic success. *Sport and Science*, special issue.
- Kalinin, I. F. (2007). Integrated approach to improving aerobics classes with students of higher educational institutions. *Thesis*, M.
- Milenović, P., & Mutavdrić, V. (2007). Differences in functional abilities between dancers and body builders. *Physical culture*, 35(2), pp. 217-220.
- Mineva, M., & Baycheva, L. (2005). Step aerobics. Theory and practice. „BOYKA“, ISBN 954-9689-31-X, Veliko Tarnovo.
- Pavlov, E., & Uzunova, G. (2010). A comparison of submaximal cycle ergometer and step-test for predicting VO_{2max} in soccer players. *Sport&Science*, extra issue, part II, Medical and biological aspect of sport, Publisher: BPS, pp. 36-39.
- Peeva, P., & Dyakova, G. (2006). Effect of the workout „Cardio kalanetics“ on some morpho-functional characteristics of students. *Repertory, Sport. Stress. Adaptation*, TIP TOP PRESS, ISBN: 978-954-723-006-4, pp. 614-617.
- Semenov, L. A., & Mironov, S. P. (2006). „Passport physical fitness of students“ as a means of feedback control prosesse physical education in high school. *TPFK*, 5, pp. 46-48.
- Sharov, L. V., Azybozova, T. F., & Belokrylov, N. M. (2013). Adaptive changes of the functional state of high school students in sports. *Theory and Practice of Physical Culture*, 10, pp. 25-28.
- Tsarova-Vasileva, A. (2013). Influence of activities with various sports on physical development and performance of students. *Dissertation*, Veliko Turnovo.
- Tzarova, R. (2013). Adaptation abilities of the cardiovascular system to physical loads by means of basketball, swimming and tourism within the conditions of the higher school. *Research in Kinesiology - International Journal of Kinesiology and other related sciences*, 41(2), Skopje, Makedonia, pp. 209-214.
- Vilenskii, M. Ya. (2000). Physical education for students. „Gardariki“ 2000, ISBN 5-8297-0010-7, pp. 448.