



Methods of Physical Training for University Students

M. Mefodeva¹, R. Khairullin², O. Kalimullina³ and B. Fakhrutdinov⁴

¹Kazan Federal University, Kazan, Russia

Telephone: + 89178609095, E-mail: anjali@inbox.ru

²Kazan State Institute of Culture, Kazan, Russia

³Kazan State Institute of Culture, Kazan, Russia

⁴Kazan Federal University, Kazan, Russia

KEYWORDS Individually-Normative Method. Physical Exercise. Physical Fitness. Standard Reference Method. Typologically-Normative Method

ABSTRACT Physical exercises can have an extremely wide range of effects on the human body; therefore, some exercises have little impact on functioning of physiological systems and others increase their power repeatedly also. Physical training is one of the important factors in development of students. This study aims to examine that selection and application of physical exercises and physical training of students (n=80) should be carried out with regard to formation of necessary properties of the body on the basis of up-to-date information about patterns of physiological adaptations, which deeply and fully reveal the influence of various physical activities on success of adaptive reactions and effectiveness of professional activities. The results demonstrate high efficiency of the proposed methods of physical training, which can be used as a basis for physical training sessions.

INTRODUCTION

Physical education is one of the important factors resolving situations related to development of students, presented in educational standards as a humanitarian discipline of educational system of universities. It ensures harmonious development of students, their good health status, as well as achievement of a necessary level of general physical fitness, high performance, and functionality (Vilensky 1996; Lubysheva 2004; Warburton et al. 2006; Haskell et al. 2007; Gropper et al. 2012; Kuramshin 2010; Maselli et al. 2018).

Stress is a daily factor that is directly correlated with negative physiological and psychological effects including stroke, heart attacks and problem drinking. A stressor that is perceived by the body activates the hypothalamic-pituitary-adrenal (HPA) axis which causes the synthesis and release of the glucocorticoid hormone cortisol from the adrenal cortex. Studies have shown meditation or exercise programs help decrease stress and cortisol levels but this has not been tested in college-aged adults. In this study, undergraduate students were assigned to either meditation, exercise or control groups for four weeks to measure the effects of introducing either meditation or increased exercise on report-

ed stress and physiological response to stress in the form of salivary cortisol levels. Participants' stress was measured using the Revised Undergraduate Student Hassles Scale (RUSH-S) which measures a variety of stressors including academic, social, and personal hassles. Students completed the RUSH-S 3 times: at baseline and at 2 week intervals. Simultaneously, saliva samples were collected to analyze salivary cortisol levels using an enzyme-linked immunosorbent assay (ELISA). A one-way between subjects ANOVA was conducted to compare the effect of interventions on personal, academic and social stressors as measured by the RUSH-S. Both personal and social stressors were reduced for the meditation and exercise groups compared to the control group ($p=0.037$ and $p=0.052$, respectively). No significant reduction of academic stress was observed in either group compared to the control. Cortisol levels tended to correlate with RUSH-S results. This study suggests that interventions such as meditation or exercise may be beneficial to reducing stress in undergraduate populations (Clarke and Cohen 2019).

During their study at universities, students should accumulate the greatest potential for further increase in the welfare of modern Russian society and the state. As the vast long-

term experience and results of scientific research show, a certain part of students indicates insufficient level of physical fitness and physical development (Ilinich 2003; Feofilaktov 2005; Fagaras et al. 2015; Pengpid et al. 2015) which has led to a decrease in their health indicators as well as their educational and professional performance. In addition, it is proved that the existing system of physical education of university students does not yet provide a full solution to complex educational and recreational tasks (Ilinich 1990; Peshkova 2003; Biankina 2013; Deliens et al. 2015; British Active Students Survey 2018; Mesquita et al. 2018) which significantly increases the need to develop innovative methods of physical education, providing applied and recreational orientation and contributing to improvement of physical development and physical fitness involved. Therefore, special attention is paid to mandatory implementation of full individualization of the educational process based on individual characteristics of students, needs, and motives for systematic physical education.

The problem of overcoming low levels of physical fitness in students is extremely relevant, as quite a significant number of students in Russian universities have been affected similar diseases. Organizational and methodological aspects of physical education classes with this group of students are not properly worked out. There is also no clear system of ideas on construction of training processes, issues of availability of physical activity for the specified state of students are not justified, and rational planning options and parameters of training control are not established.

Objectives

It will be shown that selection and application of physical training of university students should be carried out with regard to formation of necessary properties of the body on the basis of information about patterns of physiological adaptations

METHODOLOGY

In the course of this study, the following research methods were used:

Analysis of Documentary Materials: Document analysis is a form of qualitative research in which documents are interpreted by the researcher to give voice and meaning around an assessment topic (Bowen 2009). Analyzing documents incorporates coding content into themes similar to how focus group or interview transcripts are analyzed (Bowen 2009). A rubric can also be used to grade or score document. There are three primary types of documents (O'Leary 2014):

- ♦ Public Records
- ♦ Personal Documents
- ♦ Physical Evidence

Pedagogical Observation: The observation method involves human or mechanical observation of what people do or what events take place during a buying or consumption situation. "Information is collected by observing process at work (Gile 1998).

Pedagogical Experiments: is a procedure carried out to support, refute, or validate a hypothesis. Experiments provide insight into cause-and-effect by demonstrating what outcome occurs when a particular factor is manipulated (Gile 1998).

Control tests of physical, timing, questioning in the form of interviews and questionnaires organizational, methodological and professional readiness as well as mathematical processing of experimental data.

Procedure

The study consisted of three stages:

1. Statement of the problem – that is, the nature and the mode of educational activity of students were studied which allowed for formulating objectives, tasks, and working hypotheses.
2. Review of the related literature – in order to investigate the state of physical training in higher education institutions and to ascertain pedagogical experiments. The physical state of students and the training effect of the discipline "Physical Education" were also examined.
3. Final stage – that is, the findings of the study were systematized and processed and then the theoretical conclusions were clarified.

RESULTS AND DISCUSSION

With the development and progress of quality education, the importance of physical education process is highlighted, after analyzing the data in physical quality and health from 2000 to 2017 which our (Kazan Federal University) sports department did among students, although the comprehensive physical quality of college students has raised, there still are many issues, especially, and positive change remains lagging. In some fields, their physical quality is worse than middle school students and that is really a cursing problem for the educators. The reason is that these students lack consciousness in physical exercise, their exercise frequency is also not very high. Basing on this, high school should train the habits in physical exercise of college students and build a more comprehensive intervention system.

While promote exercise consciousness, they could also make sure the efficiency of exercise and educational system, which will lead students to a better study habits and improve the comprehensive level (Wang 2018). Students with low physical fitness can focus their trainings on complex development and lagging muscle groups.

With respect to complex development, a standard reference method is used in which standards are obtained as a result of static processing of a large number of experimental data and used as model characteristics. Teachers should also do their best to help their students get good results (Zaytseva 1995). It should be noted that the given method can be applied regardless of levels of physical fitness.

The second method is conventionally called an individually-normative one. In this case, standards for performance of the corresponding motor tasks are developed for each student. The methodical approach consists of the following cases: in the process of testing, maximum capabilities of three main groups of muscles are determined: shoulder girdle and arms, pelvic girdle, legs, trunk muscles; by ranking, each student is determined by the individual structure of motor activity, that is, the students are evaluated with relatively better (and, accordingly, worse) developed muscles of the arms, legs, and torso. In particular, a characteristic feature of this method

is the focus of the impact on local lagging muscle groups (Mesquita et al. 2018).

The third method is a typologically-normative one, characterized by a targeted influence on physical quality, which is the most lagging one behind the average standard in this somatotypic group.

Stages of Program Implementation

The implementation of this program involves the following stages of experimental work (De-liens et al. 2015):

- Preparation of students to muscle loading with predominant focus of exercise on increasing aerobic capacity;
- Increased functionality of the body by adding to the volume of loads, which should positively affect physical performance of students and create a reserve background of adaptation to physical activity, closer in magnitude to the level of loads peculiar to students with a good level of physical fitness;
- Stabilization of the volume and increase in intensity of loads that can contribute to maintaining a good level of physical fitness.

Ascertaining Stage

It is known that level of physical fitness of a person depends on level of their physical development, functional state, degree of motivation for motor activity, and presence of sports experience. Therefore, it is of importance to analyze the above factors in students with different levels of physical fitness. To this end, an ascertaining experiment is conducted and the findings are presented in Table 1. In the real test of phys-

Table 1: Students' performance in physical education

Year	n	Mark							
		5		4		3		2	
		n	%	n	%	n	%	n	%
1 st	78	5	6.4	10	12.8	35	44.9	28	35.9
2 nd	142	9	6.3	16	11.2	64	44.8	53	37.7
3 rd	232	16	7.1	31	13.3	112	48.2	73	31.6

ical fitness, the percentage of unsatisfactory ratings is from 30 to 40 percent, so the relevance of the studied problem is obvious.

It should be emphasized that low levels of physical fitness can have very negative impacts on the human body as well as the quality of the formation of professional skills.

Formative Stage

At the formative stage, the experimental group is engaged in a specially developed experimental program whose main purpose is formation of physical qualities by means of physical training (Pengpid et al. 2015).

Program Content to Improve Physical Fitness of Students

Methods and means of physical training of students with a low level of physical fitness are used and these individuals are divided according to the general condition of the body into two groups: the first group – “main” – students with a moderately reduced level of physical fitness and functionality of the body; the second group – “weakened” – students with a reduced level of physical fitness and functionality of the body.

Training sessions are organized on the basis of the general condition of the students’ body, that is the number of sessions, duration, intensity of exercises, and “volume” which determine the total load are planned in terms of the functionality of the body and physical performance. Thus, it is necessary to be guided strictly by the principle of gradual increase of physical loadings.

Training sessions in the first week are held 2-3 times for 50 minutes, followed by up to 4 times. The main exercises included in the content of training sessions are: walking, running, floor exercises, sports and outdoor games, exercises with weights, as well as exercises on gymnastic equipment.

The structure and content of training sessions depend on the functional state of the students. In the initial period, training sessions are recommended in the following order: general developmental exercises in motion and on the spot for 10-15 minutes, strength exercises on the horizontal bar and the personal best (PB) for

5-7 minutes, running for 5 minutes, and volleyball game for 30-40 minutes. To adapt the body involved in physical exercises during the first three sessions, it is advisable to use a standard “for each group” physical activity.

Experimental Verification of Effectiveness of Proposed Training Program

To ensure the effectiveness of the developed program, the study is conducted on a total of 80 second- and third-year students (45 males and 35 females) in 2016-2018 academic years.

The results of the experiment show that the indicators of the physical condition of students of the control and experimental groups before the experiment do not differ. Both groups have a low level of physical fitness and functionality, but the developed program of physical training is used in the process of physical education of students of the experimental group. Students of the control group also continue their education according to the existing program.

The results of the study also indicate a change in quantitative and qualitative indicators between the experimental and control groups.

The results of the experiment also demonstrate that the students of the experimental group improve the level of physical fitness and functionality of the body. Data in Table 2 show that the students of the experimental group have a higher level of physical fitness than those in the control group in all the tests. The largest difference is also observed in the development of endurance, power, and speed-power qualities. This condition is mainly due to the content of sessions in the experimental group. The lack of a likely difference between the control and experimental groups in the development of speed is attributable to less time spent by the program on the development of this physical quality.

Thus, in the process of the experiment, there is an increase in physical qualities lagged behind in their development.

CONCLUSION

The results of the study reveal a change in quantitative and qualitative indicators between the experimental and control groups. The re-

Table 2: Physical fitness of students of control and experimental groups before and after experiment, $\bar{X} \pm m$

Index	Gender	Groups of students						Differ- ence
		Experimental		%	Control		%	
		before	after		before	after		
Running 3000 m	m	14.21±0.32	12.26±0.25	13.7	14.21±0.32	13.05±0.32	8.16	<0.01
Running 2000 m	f	11.52±0.49	11.08±0.37	3.8	11,52±0.49	11.48±0.49	0.3	<0.01
Running 100 m	m	14.48±0.06	14.01±0.04	3.2	14.48±0.06	14.32±0.06	0.6	<0.05
Pull-up on the crossbar	f	16.27±0.03	16.17±0.04	0.6	16.27±0.03	16.18±0.03	0.5	<0.05
Dip up	m	10.39±0.12	14.01±0.08	34.8	10.39±0.12	11.09±0.12	6.8	<0.01
Sit up	f	9.17±0.04	14.74±0.05	60.3	9.17±0.04	9.97±0.04	8.7	<0.01
Standing long jump	m	41.39±0.73	44.36±0.56	7.1	41.39±0.73	42.18±0.73	2.13	<0.01
	f	37.11±0.82	40.07±0.71	7.7	37.11±0.82	37.93±0.82	2.16	<0.01
Sit and reach	m	225.03±3.17	231.28±2.15	2.7	225.03±3.17	227.12±3.17	0.9	<0.05
	f	178.57±3.52	180.43±2.78	1.06	178.57±3.52	178.89±3.52	0.1	<0.05
	m	12.08±0.65	13.83±0.51	15	12.08±0.65	12.36±0.65	2.32	<0.05
	f	14.73±1.03	16.22±0.93	10.2	14.73±1.03	15.25±1.03	3.5	<0.05

spondents of the experimental group also show increased interest in physical education and sports. Results also suggest that the students of the experimental group mainly have a high, above-average, and average interest in physical education and sports. Thus, the results of the experiment confirm high efficiency of the proposed method of physical training, which can be used as a basis for introduction into practices of universities.

RECOMMENDATIONS

Future recommendations for research include investigating the most useful methods for disseminating them to real-world settings; incorporating more diverse population subgroups, including vulnerable and underrepresented subgroups; collecting cost data to inform cost-effectiveness comparisons; and testing strategies across different levels of impact to determine which combinations achieve the greatest effects on different modes of physical activity.

ACKNOWLEDGEMENT

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

REFERENCES

- Bowen GA 2009. Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2): 27-40.
- Biankina MY 2013. Psychophysiological particularities of personality in patients with epilepsy. *Bulletin of the RSMU*, 1(2): 216-220 (In Russian).
- British Active Students Survey 2017/2018. Report 2018. From <<https://www.surveymonkey.co.uk>> (Retrieved on May 2018).
- Clarke AM, Cohen BD 2019. Effect of exercise or meditation on reported stress and cortisol in an undergraduate population. *The FASEB Journal*, 33(1 supplement): 581-593.
- Deliens T, Deforche B, De Bourdeaudhuij I, Clarys P 2015. Determinants of physical activity and sedentary behaviour in university students: A qualitative study using focus group discussions. *BMC Public Health*, 15(1): 201.
- Fagaras SP, Radu LE, Vanvu G 2015. The level of physical activity of university students. *Procedia-Social and Behavioral Sciences*, 197: 1454-1457.
- Feofilaktov VV 2005. *Comparative Analysis of Innovative Technologies of Physical Training of Students of Humanitarian Universities on the Basis of Monitoring of Physical Development*. St Petersburg, Russia: Books- Ru Ltd. (In Russian).
- Gile D 1998. Observational studies and experimental studies in the investigation of conference interpreting. *International Journal of Translation Studies*, 10(1): 69-93.
- Gropper SS, Simmons KP, Connell LJ, Ulrich PV 2012. Changes in body weight, composition, and shape: a 4-year study of college students. *Appl Physiol Nutr Metab*, 37: 1118-1123.

- Haskell WL, Lee IM., Pate RR, Powell KE, Blair, SN, Franklin BA et al. 2007. Physical activity and public health. *Med Sci Sport Exerc*, 39: 1423–1434.
- Ilinich VI 1990. On some problematic issues of professional and applied physical training (issues of theory). *Theory and Practice of Physical Culture*, 3: 13–15.
- Ilinich VI 2000. *Physical Culture of the University Student*. Moscow, Russia: AST Publishing Group (In Russian).
- Kuramshin YF 2010. *Theory and Methods of Physical Education*. Moscow, Russia: Sovetsky Sport (In Russian).
- Lubysheva LI 2004. *Sociology of Physical Education and Sports*. St Petersburg, Russia: M Academy- Centro Sportivo (In Russian).
- Mesquita CAA, Turi-Lynch BC, Bergoc RD, Maia RL, Amaral SL, Monteiro HL 2018. Health-related physical fitness among undergraduate students in physical education. *Journal of Physical Education*, 29.
- Maselli M, Ward PB, Gobbi E, Carraro A 2018. Promoting physical activity among university students. A systematic review of controlled trials. *American Journal of Health Promotion*, 32(7): 1602–1612.
- O’Leary Z 2014. *The Essential Guide to Doing Your Research Project*. 2nd Edition. Thousand Oaks CA: SAGE Publications, Inc.
- Pengpid S, Peltzer K, Kassean HK, Tsala Tsala JP, Sy-chareun V, Müller-Riemenschneider F 2015. Physical inactivity and associated factors among university students in 23 low-middle- and high-income countries. *Int J Public Health*, 60: 539–549.
- Peshkova NV 2003. *Personality-Developing Approach in Physical Education of University Students*. Moscow/Russia: The Moscow Times (In Russian).
- Vilensky B 1996. Can analysis of word frequency distinguish between writings of different authors? *Physica A: Statistical Mechanics and its Applications*, 231(4): 705–711.
- Wang Y 2018. The Influence of Health Education on the Physical Exercise Behavior of College Students. In: *8th International Conference on Social Network, Communication and Education (SNCE 2018)*. Shenyang, China, 2–4 March, 2018.
- Warburton DE, Nicol CW, Bredin SS 2006. Health benefits of physical activity: The evidence. *Can Med Assoc J*, 174(6): 801–809.
- Zaytseva VV 1995. *Methodology of Individual Approach in Health Physical Training on the Basis of Modern Information Technologies*. Moscow, Russia: Meshcheryakov Publishing House.

Paper received for publication in October, 2019
Paper accepted for publication in December, 2019