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METHODOLOGY OF PERFECTION OF HIGHER PEDAGOGICAL EDUCATIONAL ESTABLISHMENTS

GIRL STUDENTS’ RHYTHM

Kolumbet A.N., Dudorova L.Yu.

Kiev National University of Technology and Design

Abstract. Purpose: to study influence of methodic of rhythm perfection on girl students’ coordination abilities.

Material: in the research 264 girl students participated. We assessed individual and collective rhythm, internal and external motor rhythm; rhythm in exercises with musical accompaniment. Results: we have determined that creative motor tasks require variable conditions for their realization. We have proved demand in appropriate criteria for their assessment. It is noted that there is a demand in development of rhythm, considering its main kinds and manifestations, which are formed with some peculiarities. Individual rhythm is determined by activation of attention and its level. It is perfected more successfully rather with stimulated development than with natural.

It was found that with age the character of natural progressing of rhythm preserves. Conclusions: it is recommended to develop rhythm in compliance with its kinds and manifestations. Progressing and perfection of rhythm is a long lasted process and shall be realized during all period of girl students’ studying. Such approach forms girl students’ demand in finding of purposeful motor rhythm in all their new motor actions. It ensures optimality of their fulfillment.

Key words: physical education, coordination abilities, rhythm, girl students.

Introduction

Rhythm is the basis of live systems’ functioning. Self regulation of processes, adaptation to environmental changes; preservation of homeostasis are impossible without it, as well as synchronization of physiological processes under influence of physical loads. Motor actions also have certain rhythm: natural alteration of different efforts [2, 16, and 18].

When training physical exercises it is necessary to build theoretical model of rhythmic movements, which would be the content of them. Their visible simplicity, high orderliness in space and time can create an image of excess easiness and simplicity. Actually, for achievement of high results in moving much more time and efforts are spent. Free motor rhythms completely depend on human will and are the highest degree of motor acts’ organization.

One of important tasks of physical education is development of strive for beauty and perfectness; search of new ways of effectiveness increase. For this purpose, it is necessary to strive for variable content of trainings; cultivate girl students’ demand in everyday physical exercises; teach them to strive for purposeful motor actions and their variability [4, 24, 28, 30-34].

Significance of rhythm (as coordination ability) is determined by the fact that with its help optimal correlation of motor act’s different parts is achieved; its continuity and joining are ensured as well as rational distribution of efforts in space and time. This coordination quality requires more attention to its development and perfection.

The problems of coordination qualities’ development have always been paid great attention. Researches of a number of authors are devoted to perfection of coordination qualities in youth [7, 9, 14, 15, 18, 25, and 35]. Alongside with it, the authors did not manage to completely elucidate the problem of rhythm development in pedagogic HEEs’ girl students.

Hypothesis: we assumed that our research (in the process of long lasted experiment) of rhythm’s kinds will permit to mark out its main components, determine its assessment criteria. It will permit to offer renewed methodic of rhythm stimulated perfection in HEEs’ girl students.

The purpose of the research is analysis of influence of rhythm stimulated perfection methodic on pedagogic HEEs’ girl students’ coordination abilities.

Material and methods

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Participants: in the research 264 1st – 3rd year girl students (17-21 years’ age) of Chernigov national pedagogic university, named after T.G. Shevchenko and Kiev university, named after Boris Grinchenko, participated. All girl students belonged to main health group.

Procedure: the research was fulfilled during 2008-2010. Rhythm indicators were determined by every kind at the beginning, in the middle and at the end of academic year. We used five tests, offered by the authors earlier [13; 19].

Individual rhythm was assessed with test 1. When walking by lunges foot drops on the floor with certain accent from toe to full foot. The sound of foot’s contact with floor shall be equal by strength and uniform by duration. The assessment of motor rhythm was as follows: 5 points – leg drops on toe without sound and with accent – from toe on all foot, through equal periods of time. Amplitude of movements shall be equal, carriage – good, actions shall be free and expressive. 4 points: there is certain tension and stiffness, but movements are uniform and accented. 3 points – movements are accented with good amplitude with one or two disorders in steps’ uniformity.

Collective rhythm was assessed with the help of test 2. Girl student stood facing group of 3-5 persons, who fulfilled general exercises. Then, synchronously with other girl students she reproduced the same movements. We assessed degree of coincidence by direction, temp, amplitude, expressiveness. 5 points meant complete coincidence by all main parameters; actions are expressive and accurate; 4 points – actions coincide by direction, temp and amplitude, but are stiff and not expressive; 3 points – movements coincide in general by main parameters with two-three failures in temps and direction.

External rhythm of movements was assessed with the help of test 3. The tested copied the showed by teacher exercise: walking with forward rising of straight leg (up to horizontal level), moving hands aside (at shoulder level). It is necessary to keep the picture of movement, its form, amplitude, dynamic. We assessed the coincidence of the fulfilled exercise with the task. 5 points mean complete coincidence: leg is straight, risen up to horizontal level with stretched toe, arms are straight, moved accurately aside, making straight line, head is up, back is straightened; 4 points – leg is in horizontal position but toe is not sufficiently stretched; hands are moved exactly aside but head is a little dropped; 3 points mean leg positioned lower than horizontal position, hands are moved aside not accurately, movements are stiffed.

Internal rhythm was assessed with test 4. The tested girl students fulfilled the showed by teacher dance movement: forward waltz step with forward and aside hands’ moving, radiating gay and merry mood. We assessed coincidence of movement’s external form with radiated mood: 5 points – movements are correct by form and smooth, eyes follows hands’ movement, expression of face is happy; 4 points – movements are correct by form and character of fulfillment, smile is stiffed; 3 points – movements are correct by direction and amplitude, but there are no emotions.

Rhythm in exercises with musical accompaniment was assessed with test 5. Having listened to musical fragment, the tested girl students fulfilled exercise in compliance with its character. We assessed compliance of character of movement with content of musical fragment: 5 points meant complete coincidence of movements with character of musical accompaniment (march sounds – the tested fulfills drill step; waltz sounds - wide steps’ walking or lunges; polka sounds – jumps by both legs and etc.); 4 points – insignificant coincidence of movements with character of musical accompaniment; movements are chosen correctly but do not coincide sufficiently by amplitude and temp. 3 points were given for one or two incomplete coincidence with character of melody: jumps under march music; run under waltz melody.

Statistical analysis: for processing of the research’s results we used commonly accepted methods of mathematical statistic. For each of the tested indicators we calculated mean values and mean square deviation. Assessment of differences’ confidence was fulfilled by Student’s t-criterion at 1% and 5% significance levels. We calculated increment of the studied indicators. Increment temps was calculated by formula of S. Broudy:

\[ W = \frac{V_2 - V_1}{0.5 \times (V_2 + V_1)} \times 100\% \]

where: V1 and V2 – accordingly, initial and final results in control testing.
In fulfillment of complex pedagogic and biological examinations, in which girl students participated, we observed legislation of Ukraine about health protection, the Declaration of Helsinki 2000, Directive №86/609 of European community on participation of people in medical – biological researches.

**Results**

Methodic of stimulated rhythm’s development implied introduction of motor tasks in every training by all rhythm’s kinds: *activation of attention, training of motor memory, distribution and applying of efforts, orientation in space and time and ability to general actions*. Depending on type of training (its tasks, purpose), special exercises were given to girl students in warming up (main and finalizing) parts, in different sequence and scope. These exercises were of different complexity. For example light athletics training had subject: run in various directions and with different speed, throwing of small ball for distance. The task was to familiarize with peculiarities of runs with changing of direction and speed; to perfect technique of small ball throwing for distance from the spot. Warming up part included exercises for activation of attention as necessary condition of rhythm’s perfection: in walking first and third steps were to be marked with claps; after every third step – right hand rising with left on the waist; after five steps – turn by 360°; determination and memorizing of distance between steps in run and walking; memorizing of efforts in walking, calm run and with acceleration. Moving in column the tested shall fulfill general and warming up exercises synchronously with leading girl student.

In main part of training girl students were offered warming up and special exercises for main rhythm’s kinds development: in run by right side of the gym every fifth step was fulfilled with turn to the right and every tenth step – with turn to the left by 180°; in run by left side of gym left leg was put with accent. Steps should have been equal by amplitude with uniform speed; in diagonal running – double acceleration at the beginning (10-12 m) and in the middle of distance. The offered run tasks had clear rhythm and required certain fitness. That is why girl students were permitted to fulfill these exercises independently in free time.

For mastering of *throw rhythm* of small ball throwing for distance we used motor actions for activation of attention: visual inspection of place for ball throw, noting of some guide points; compare different by value efforts for preparatory movements (dropping of hand with ball, moving hand backward - upward) and main motor action (throw); concentration of attention on difference in applied efforts for fulfillment of main part of ball throw.

Development of *motor memory* was realized with the help of the following tasks: count and remember quantity of run steps in right and left sides of gym with accented putting of right and left legs. Determine the quantity of run steps in first and second accelerations in diagonal run and all additional steps before and after acceleration; remember the value of efforts in run with changing of direction and speed and in period of acceleration.

For training of *rhythm of applying and distribution of efforts* the following exercises were envisaged: run with turns to the right and to the left by 360°, run with back forward, prolongation of run step up to maximal amplitude, run with shortened steps and many other.

For perfection of small ball *throwing* girl students also fulfilled a number of movements: throw behind marked line from stance “on one knee”, from sitting position with straightened legs, with closed eyes, with quarter of strength, with half of strength and so on.

For better orientation in space girl students fulfill run by the right and left sides of gym within definite corridors (width 1-1.5 m), marked with chalk or paper strips. Having remembered the width of corridor and steps’ amplitude, they were to repeat the task without additional guide points. Having determined speed of 10 meters’ segment run by diagonal they were to keep it at longer (20 meters’) segment.

When throwing small bal for distance the girl students were offered: a) remember ball’s trajectory in the best attempt and repeat it several times; b) determine amplitude of additional and main movements, when throwing, compare throw distance with different arm’s amplitude and additional step forward; c) compare different feelings, when throwing ball in gym and outdoors.

Training and perfection of *collective rhythm* (ability to collective actions) was realized in the process of sports game at the end of main part of training. Besides, girl students mastered Greek folk dance “Sirtaki” with accented rhythmic movements, which are fulfilled first slowly and then - with gradual acceleration. For better feeling of mutual actions girl students positioned their hands on shoulders of each other. In finalizing part of training there were exercises for attention, fixing of motor memory and other: a) walking with accented foot putting
on toe ("acute" step), with arms’ movement (rising on tip toes – hands up, when dropping on full feet – hands down), hands behind head with keeping straight carriage; b) walk, rolling from heel to toes with accent on vertical position in upper point (position - on toes), arms aside with palms upward and other.

By the end of first year training for rhythm’s development and perfection some results became obvious (see table 1). Girl students became able to fulfill exercises with higher amplitude, correctly find required accents. Culture of movements improved. Materials of the research point at demand in development of rhythm, considering its main kinds and manifestations, which are formed with some peculiarities. For example, individual rhythm was determined by degree of attention’s development and activation. It is perfected more successfully in stimulated development than in natural.

Analysis of rhythm increment by level of motor memory permitted to find that with age the character of rhythm’s natural development is preserved. Indicators are gradually improved. In stimulated formation of this rhythm’s kind it was registered that experimental trainings favorably influenced on increment temps. Girl students reproduce by form a lot of motor actions with rather high accuracy. In their age, for mastering of motor action’s character application of visible patterns is quite sufficient. Systemic fulfillment of different game exercises by girl students with their gradual complication facilitates development of motor memory.

Some peculiarities of rhythm increment were observed when fulfilling collective actions (collective rhythm). This kind of rhythm is connected with some specific requirements. They include ability to distribute very accurately muscular efforts, orienting on movements of team members. The pre-set amplitude requires accuracy of exercise’s fulfillment by space characteristics. Targeted perfection facilitated better increment of indicators; the offered motor tasks did not require significant strength. With game or competition methods they facilitated more successful transformation of motor actions’ individual rhythm into collective.

Analysis of data on formation of rhythm in exercises with musical accompaniment showed that natural increment of indicators has tendency to improvement with age. Application of stimulated development methodic for this rhythm kind showed the highest increment temps of experimental girl students’ indicators.

**Table 1. Increment of indicators (%) of different kinds of rhythm**

<table>
<thead>
<tr>
<th>№</th>
<th>Tests</th>
<th>Period of research</th>
<th>Control group</th>
<th>Experimental group</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>M</td>
<td>±m</td>
<td>M</td>
</tr>
<tr>
<td>1</td>
<td>Individual rhythm</td>
<td>1st year</td>
<td>2.28</td>
<td>0.18</td>
<td>8.14</td>
</tr>
<tr>
<td>2</td>
<td>Collective rhythm</td>
<td>2nd year</td>
<td>4.62</td>
<td>0.20</td>
<td>10.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd year</td>
<td>3.78</td>
<td>0.30</td>
<td>11.53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1st year</td>
<td>2.60</td>
<td>0.15</td>
<td>9.17</td>
</tr>
<tr>
<td>3</td>
<td>Internal and external rhythm of movements</td>
<td>2nd year</td>
<td>3.05</td>
<td>0.15</td>
<td>8.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd year</td>
<td>3.31</td>
<td>0.26</td>
<td>10.56</td>
</tr>
<tr>
<td>4</td>
<td>Rhythm in exercises with musical accompaniment</td>
<td>2nd year</td>
<td>4.00</td>
<td>0.31</td>
<td>4.78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd year</td>
<td>3.74</td>
<td>0.28</td>
<td>5.15</td>
</tr>
<tr>
<td>5</td>
<td>Rhythm in exercises with musical accompaniment</td>
<td>1st year</td>
<td>2.63</td>
<td>0.09</td>
<td>4.57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2nd year</td>
<td>4.12</td>
<td>0.18</td>
<td>5.77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd year</td>
<td>3.99</td>
<td>0.29</td>
<td>4.27</td>
</tr>
</tbody>
</table>
Discussion

Man is able to control free motor act, in the base of which there is definite rhythm. In this case we speak about higher level of muscular functioning’s organization. In the process of active muscular functioning motor rhythm is generated by motor system itself. With impulses’ entering nervous system their transformation occurs. As a result new algorithms of motor actions appear. Main elements of muscular functioning (neuron connections of central nervous system, nervous-muscular apparatus) switch in organized movement of all motor system with definite clear rhythm [1, 10, and 21].

Functional system ensures reverse afferentation – connection from working organ to regulating nervous centers [11, 20, and 24]. Receptor signal circulates by closed ring from muscular, ligament and tactile receptors in the form of neuron impulses. Simultaneously it fulfills a role of timer and program, determining rhythm.

Information about space-time and space-power characteristics of motor action is conditioned by appearing of certain rhythm. The emerged impulses transform in mechanical movement. Depending on external conditions (age of a trainee, physical fitness, character of motor task and etc.) there happens constant modification of motor program. As a result rational motor team, amplitude, distribution of efforts and optimal rhythm take place [2, 17].

Rhythm conditions required correlation of motor act’s separate phases, continuity of muscular functioning during pre-set time, coincidence and amplitude of movements. Physical exercise has certain speed (temp) and regulated distribution of efforts (dynamic). The temp and dynamic of motor act are closely interconnected and influence on each other. It is not possible to voluntarily change temp of run or distribution of efforts. The higher is temp of run for long jump the more efforts are required for their rational distribution in order to create optimal conditions for fulfillment of main motor act [3, 19, 28]. With too high temp of run fulfillment of preparatory actions for push off becomes more difficult. That is why at the last step and the step before last speed is reduced. It permits to more completely realize motor potential. Temp, dynamic and harmony are the main components of rhythm.

Temp is speed of fulfillment of motor act’s separate elements. Physiological functions to large extent are determined by speed. The higher it is the stronger muscular load’s influence on organism. With insufficient speed training influence is absent as well as positive effects [2, 4, 18].

Dynamic (distribution of efforts in fulfillment of physical exercises) is one more component of rhythm. Motor act consists of several components, which require different muscular efforts. For example, long jump from the sport with push by two legs and arms’ waving includes the following preparatory actions: squatting, moving arms backward, re-distribution of muscular-skeletal apparatus’s links; then – push forward by two legs with quick arms’ waving (main phase is accompanied by maximal muscular efforts), landing and keeping body balance (final phase, in which efforts sharply reduce).

If temp of movements coincides with dynamic of muscular efforts’ distribution, then change of many nervous centers and inter-centers relations’ functional state take place; conditional reflex activity improves, coincidence of motor and vegetative functions’ activity increases. As a result harmony of movements is achieved [1, 9, 14, 15].

Harmony is manifested as more perfect control over body with fulfillment of physical exercises. With coincidence of temp and dynamic less time and efforts are required for motor act with higher movements’ amplitude. In this connection in practicing of physical exercises it is necessary to work out individual rhythm. Feeling of lightness of movements, “muscular joy”, satisfaction of trainings are important signs of individual rhythm’s formation. Without it, it is impossible to cultivate demand in motor functioning, strive for achievement its optimal scope, ensuring required level of health.

The character of rhythm depends on specificity of motor actions. Physical exercises are fulfilled individually and collectively. In cyclic and non cyclic exercises rhythm is different. Rhythm is greatly influenced by musical accompaniment. We can mark out the following main kinds of rhythm, characteristic for motor functioning: individual rhythm; collective rhythm, external rhythm; internal rhythm; rhythm in cyclic physical exercises; rhythm in non cyclic physical exercises and rhythm in exercises with musical accompaniment [6, 15, 16, 22].

Different kinds and manifestations of rhythm determine content of methodic of definite motor functioning training. For mastering new physical exercise it is necessary to determine its rhythm; to find principle moment of
efforts’ application (to make program of actions) [2, 5, 8, 12, 23]. With it, rhythm’s manifestation depends on a number of factors and is assessed with the help of special criteria [7, 19, 20, 27].

It would not be correct to speak about development and perfection of rhythm in general. It is known that at one or several trainings it is possible to form one or another kind of motor coordination, depending on tasks of training.

**Conclusions**

1. Rhythm is a kind of coordination qualities, which has its own kinds and manifestations. With it, its perfection implies usage of various exercises.
2. Creative motor tasks imply different conditions for their realization. For their assessment appropriate criteria are required.
3. Rhythm training shall be in compliance with its kinds and manifestation. It requires appropriate approach to content of the methodic and its perfection.
4. Targeted development of rhythm, considering its kinds and manifestations results in improvement of its indicators with different temps of increment. It positively reflects on girls’ physical fitness.
5. Development and perfection of rhythm is of long term character and shall be realized during all period of girls’ studying at HEE. Such approach forms girls’ demand in finding of purposeful motor rhythm in all new motor actions that ensures optimality of their fulfillment.

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**Conflict of interests**

The authors declare that there is no conflict of interests.

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INFLUENCE OF STUDY IN HEE ON UBIQUITY AND STRENGTH OF STUDENTS’ COMPUTER GAMBLING
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Abstract. **Purpose:** to clear up effectiveness of learning-education process for counteraction of students’ harmful passion to computer games’ ubiquity. **Material:** 1st – 3rd year students (main health group) were the objects of the research. In total they were 952 boys and 523 girls. In 1st year students’ academic groups testing was carried out at the beginning of academic year (October); in academic groups of 1st-3rd year students the testing was at the end of academic year (May). **Results:** it was found that among 1st year boy students ubiquity of computer gaming as well as time losses, connected with it are higher than among girl students. Educational process is not sufficiently effective in struggle against computer gaming. For girls, this passion is not dangerous in general. In the course of study at HEE, the strength of this passion reduces independent on sex. **Conclusions:** for increase of educational process’s effectiveness and improvement of students’ life quality it is necessary to consider personal features of boy students as well as to organize health related measures with the help of health related physical culture means. **Key words:** students, learning-educational, harmful habits, computer games, physical culture, healthy life style.

Introduction
Entering the world educational space requires development of new educational standards, implying formation of communicative, personality, regulative and cognitive universal learning actions with active implementation of informational communicative educational technologies in educational process. It was found that at present in pedagogic psychology there is no sufficiently clear idea about computer games’ influence on man and what individual-typological features of gamer are connected with his (her) computer activity and choice of game genre. As a result there are no programs of psychological maintenance of students, involved in computer games [5, 7, and 19].

In modern HEEs system of electronic resources exists and is developing. Students use it for fulfillment of additional tasks on curriculum subjects. But the same system provokes students for long term sitting at computer. Working with computer students spend much more time than it is required for fulfillment of their curriculum tasks. As per some opinions influence of electronic recourses on internet addiction and computer gambling can be minimal; modern students just are inclined to spend their time in the Net [3]. Special sector of study of man and informational technologies’ interaction is connected with researches of computer addiction, which is interpreted as pathological passion to work or computer games.

Alongside with it information and computerized character of modern society is becoming still more global. As per the data of project “Internet in Russia/Russia in Internet” of fund “Public opinion”, by quantity of users Russia is ahead of Australia, Spain, Italy, France, Great Britain and Brazil, taking the third place in the world. In period from 2002 to 2009 the quantity of Internet users in Russia had increased from 8% (8.7 million) to 36% (42 million of people), and level of daily audience – from 2.1 million to 23.9 million of people. Thus, every third resident of Russia is an Internet user and every seventh attends Internet every day. Alongside with it the quantity of scientific researches, devoted to this addiction constantly growth. The content of these researches is presented from the point of different psychological directions and schools [20].

As on to day, our own researches [13, 14, 27, 32] about influence of study at HEE on students’ computer addiction’s ubiquity and strength showed that computer gambling has certain threats for students; distracts them from preparation to curriculum classes. Entertainment sites and computer games require a lot of time for passing
all game stages. All these can result in weakening of educational level; in loss of concentration on important life values. To large extent computer is used by students as mean of entertainment and relaxation with the help of computer games. Students already can not give up computer games before preparation to curriculum classes with the help of Internet. It facilitates increase of ubiquity and strength of students’ computer gambling. After long, involving and taking nearly all physical forces computer game, students have no forces and time for studying with the help of electronic resources. In some games students make experiments and develop their fantasy in computer game. It helps them in preparation for creative work in future professional functioning. But in most cases, all time is spent for computer games, giving no use for study and work.

Orzack M.H. outlined the following psychological symptoms of internet addiction and computer gambling: good self-feeling and euphoria with sitting at PC; absence of wish to stop; increase of time, spent at computer, no attention to family and friends; feeling of emptiness, irritability, appearing during any activity, not connected with computer; problems in study [31]. One of main symptoms of already formed internet addiction is complete absorption with Internet. As a result – demand in being in Net as much time as possible [24].

Studying in HEE with usage of electronic resources in reasonable frames can be considered to be normal usage of Internet. From the point of view of Davis R.A., sound Internet users have clear aim and spend reasonable and limited time for its achievement. They do not endure psychological or cognitive discomfort [26]. For them, Internet is only useful tool.

As a result of long term being in Internet, game activity is widely considered to be an important moment of young person’s development.

Teperik R.F. and Zhukova M.A. note that disorders in communication with Internet addiction are manifested as deviations in emotional component, reduction of ability to feel partner’s emotional state and to understand non verbal communication’s aspects [22].

Modern education is not possible without the newest multi-media and interactive computer programs, without electronic storage media. Internet contains both cognitive and entertaining resources. In this connection, to day scientists speak about internet addiction and computer gambling among students [1, 2, 3, and 9].

It should be also noted that with years students’ interest to on-line games disappears and priorities change: school children are more involved in on-line games (15%), than students (5%). Electronic resources render minimal influence on appearing of internet addiction among students. It is connected with the fact that studying at HEE implies concentration of attention on required subjects and mastering of information.

Technical progress results in appearing of students’ habits, which are dangerous for human physical and mental health and quickly progress in addictions. There appear habits, which are the so-called “technical drugs”. They lead person to virtual reality from reality actual.

Many people spend most of their lives in front of screens of different electronic devises (TV set, PC, notebook and etc.). Long term watching of TV programs (news, shows, serials and so on), passion to computer entertaining technologies worsen eyesight, lead to physical inactivity, reduce workability, memory and attention; worsen person’s emotional balance. In the worst case it results in computer or TV addiction. For example, comparatively not long age term “internet mania” appeared. It means internet addiction [13, 14].

For young people, who have not sufficient will power for resistance to addiction, monitor habits are especially dangerous. Study at modern HEEs to large extent is based on usage of computer informational technologies. Student is forced to use computer technologies to have progress in studying. Many students have no idea about safety measures, permitting to save health with it. If student spent his leisure time for “rest” with monitor, he can loose his health and progress in study, as well as success in future professional activity [13, 14].

In this connection study of computer harmful habits’ ubiquity and creation of necessary educational technologies are an important task. Such technologies shall exclude appearing and expansion of harmful habits among students and their progressing in addictions.

Implementation of informational-computer technologies in HEE shall solve a number of tasks: optimization of educational process, increase of learning independence, preparation of comprehensively developed graduates. However, in practice, society faces with actual problem: with every day the quantity of people with computer addiction is increasing. For students, computer shall be a necessary electronic device for successful
studying but it is still a mean of communication and leisure. In this connection, students in their researches [3] and scientists speak about internet addiction problem [11, 14, and 18].

“Internet-addiction” is rather a wide term, which means a great number of problems of behavior and control over passions. One of such passions is on-line internet gambling. Conception “computer addiction” also includes computer gambling («Doom», «Quake», «Unreal» and other, strategies of «Star Craft» type, quests [24].

In Russia the problem of internet addiction has been studied only recent decade. For example, Babaeva Iu.D., and Vojskunskij A.E. [2, 10] worked out their criteria of such addiction. Mendelevich V.D. [18] outlined the types of internet addicted personalities. However, psychological characteristics of internet addicted students and the most effective directions to internet addiction’s prophylaxis have been studied insufficiently [8]. More over, there are quite a few researches on internet addiction’s prophylaxis among students by means of physical culture and sports [13, 14].

By results of questioning, realized by fund “Public opinion”, prevailing group of internet users in Russia are young people of age from 18 to 24 years old, representing students. This group makes 48% from total number of internet users. Young generation takes internet as main mean of education and personal communication [20].

For long time Russia was out of the mentioned problem. But suddenly opened internet opportunities involved significant part of youth. Increase of Internet users’ quantity of students’ age, absence of complex measures of psychological prophylaxis resulted in growth of internet dependence and mass computer gambling [8].

Wide ubiquity of internet addiction in modern society proves demand in detection of addicted persons, in studying of their personalities’ psychological characteristics and in working out effective prophylaxis measures as additional health related physical culture [15, 16, 18, 25] and sports [4, 6, 17, 30] trainings.

In foreign countries the problem of internet addiction has been studied for more than 20 years. The quantity of scientific researches, devoted to this problem, constantly increases. They describe the problem from the point of different psychological approaches and schools. American psychologist Iang K.S. [24] noted main pre conditions; a stage of this addiction’s progressing; he also offered diagnostic criteria of such addiction. He worked out three-level mode, explaining passion to internet using [24, 28]. Orzack M.H. [31] marked out physical and psychological symptoms, characteristic for internet addiction. Grifiggs M. [29] regarded possibility of internet addiction’s formation on the base of other additions. Davis R.A. [26] offered cognitive-behavioral model of pathological Internet usage [8].

In Russia the problem of internet addiction has been studied only recent decade. Babaeva Iu.D. and Vojskunskij A.E. [2, 10] worked out their criteria of such addiction. Mendelevich V.D. [18] outlined the types of internet addicted personalities. However, psychological characteristics of internet addicted students and the most effective directions to internet addiction’s prophylaxis have been studied insufficiently.

It should be noted that owing to a number of reasons students are the main internet users. Just in this group of population the risk of internet addiction is the highest. Constant demand in information, high cognitive motivation, high social activity and deficit of time form from students the main group of internet users.

In the course of our research we found certain main contradictions between significant prevalence (48%) of students-internet users (from 18 to 24 years’ age) and absence of researches on detection of internet addicted or computer games’ persons among them. Besides there is non coincidence between increasing of internet addicted users of students’ age and absence of prophylaxis measures by means of physical culture and sports.

Passion to computer games is often regarded by students as threat for development of personality. When students become actual gamers they move aside from understanding of demand to spend time for studying or sports. Gamers often take the role of game character and it often can have negative results. It is often connected with their identification of themselves with negative game heroes. For computer games’ addicted persons it is of special interest to involve in virtual life. With it, computer addiction appears, accompanied by insomnia and irritability.

*The purpose of the research:* to clear up effectiveness of HEE educational process in struggle with computer gaming and to substantiate appropriate tasks for departments and faculties of physical education.
The task of the research is to analyze changes in ubiquity and strength of students’ passion to computer games in process of their study at HEE as well as to work out practical recommendations for prophylaxis of such habits with the help of physical culture and sports practicing.

Material and methods
Participants: 1st-3rd year students from Krasnoyarsk were the object of our researches. All they studied “Physical culture” discipline for main health group. In total 952 boys and 523 girls of 1st-3rd year participated in the research.

Organization of the research: In the research we used questioning. The questioning was carried out among 1st year students at the beginning of academic year and among 1st-3rd year students – at the end of academic year. The students were offered to point quantity of hours, spent during one day on computer games and to assess the strength of this habit before entering HEE and in the period of questioning by 10-points scale.

The used by us method of questioning was a subjective one and could not give objective data on the studied problem. Its results depend on many factors: how student can feel duration of time; how strong their motives for actions are; how strong their habits are. Not all of students have sufficiently developed self-consciousness. Besides, not all students have sufficient motivation for giving diligent answers. In our research we rejected the questionnaires, in which we found obvious contradictions in answers to different questions. Besides, we did not consider assessments, in which only 2-3 points were used for estimation of different habits’ strength. It illustrated that student did not want to think about objective assessment. May be because of bad knowledge of him. Thus, the data, received by us can be related only to the most advanced students, who have high feeling of responsibility and developed self-consciousness. It is rather probable that students, who have the strongest computer games’ addiction, did not participate in the questioning. The questioning gives rather objective data on dynamic of strength of habit to computer games and permits to make well grounded conclusions about effectiveness of HEE educational process in struggle with this bad habit. Besides, just the students with high feeling of responsibility and self-consciousness will successfully graduate from HEE and become highly qualified specialists in different branches. That is why it is important to study dynamic of changes in personality exactly of these students.

Statistical analysis: statistical processing of questioning results included the following: 1) calculation of percentage of addicted students; 2) calculation of percentage of students with dangerously strong habit (7–10 points) and weak habit (1 – 3 points, i.e. not dangerous for transformation in addiction); 5) calculation of percentage of with weakened or increased habit as well as students, who gave up the habit or gave way to this habit during studying; 6) assessment of confidence by Student’s t-criterion (with level of significance not less than 0.05). The received data were processed with the help of statistical functions of Microsoft Excel.

Results of the research
Main results of students’ questioning are given in tables 1–3. The questioning showed that boy students spend on computer games much more time than girl students (see table 1). Among boys ubiquity of this habit is higher than among girls (see tables 1, 2). At the end of academic year ubiquity of computer games habit is noticeably lower than at the beginning among boys. However, at the 2nd year of studying it grows to initial level. At the end of 1st – 3rd year 20 – 25% of boys spend on this habit more than two hours a day. It is dangerous for their physical and mental health.

HEE educational process is not sufficiently effective in struggle with computer games habit among 2nd – 3rd year students as well as in reduction of addiction danger among 1st and 2nd year students.

Table 1. Distribution of students by time losses (hour/day), connected with computer games

<table>
<thead>
<tr>
<th>Year, sex</th>
<th>N*</th>
<th>Mean Hour/day</th>
<th>No, %</th>
<th>&lt; 1,%</th>
<th>1–2,%</th>
<th>2–4,%</th>
<th>&gt; 4,%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male, beginning</td>
<td>217</td>
<td>1.8 ± 0.1</td>
<td>20</td>
<td>24</td>
<td>23</td>
<td>23</td>
<td>11</td>
</tr>
<tr>
<td>Female, beginning</td>
<td>185</td>
<td>0.5 ± 0.1</td>
<td>69</td>
<td>16</td>
<td>8</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>1m*</td>
<td>465</td>
<td>1.3 ± 0.1</td>
<td>30</td>
<td>30</td>
<td>22</td>
<td>10</td>
<td>9</td>
</tr>
</tbody>
</table>
Table 2. Ubiquity of students’ computer games habits and their strength

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Male, beginning</th>
<th>Female, beginning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total, %</td>
<td>80</td>
<td>31</td>
</tr>
<tr>
<td>7 – 10 points, %</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>1-3 points, %</td>
<td>45</td>
<td>64</td>
</tr>
<tr>
<td>N1*</td>
<td>174</td>
<td>58</td>
</tr>
</tbody>
</table>

Notes: N1 – volume of samples of students, who have computer games habits.

Among girl students ubiquity of this habit is much higher than at the beginning of studying. Next years it does not change. If at the beginning of studying at HEE every third girl played computer games then, at the end of academic year it was every second. However, most of girls spend less than one hour a day for computer games at the end of academic year. It means that for girls this habit is not dangerous. It is proved by the fact that 25% of girls assess the strength of this habit as 7-10 points at the end of academic year (see table 2). It can be regarded as addiction. But most of girls regard their habit as weak (1-3 points by 10 points’ scale, see table 2).

Table 3. Dynamic of students’ computer games’ strength in HEE (volumes of samples N1, see table 2)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>1m</th>
<th>2m</th>
<th>3m</th>
<th>1f</th>
<th>2f</th>
<th>3f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase of habit’s strength, 0–10 points</td>
<td>-1.4 ± 0.2</td>
<td>-1.7 ± 0.3</td>
<td>-1.9 ± 0.3</td>
<td>-1.4 ± 0.4</td>
<td>-1.6 ± 0.5</td>
<td>-1.7 ± 0.3</td>
</tr>
<tr>
<td>Habit’s weakening, %</td>
<td>52</td>
<td>55</td>
<td>63</td>
<td>56</td>
<td>65</td>
<td>69</td>
</tr>
<tr>
<td>Habits’ increase, %</td>
<td>12</td>
<td>7</td>
<td>10</td>
<td>17</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Gave up the habit, %</td>
<td>16</td>
<td>11</td>
<td>21</td>
<td>29</td>
<td>32</td>
<td>53</td>
</tr>
<tr>
<td>Gave way to habit, %</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

During studying at HEE the strength of habit reduces in all students, independent on sex: in 3rd year boys – to larger extent than in 1st year boys, with significant difference. Percentages of such students increase with increase of studying period in HEE (Students of both sexes) for 3rd year students they are higher than for 1st year students). Among 3rd year girl students more than half gave up computer games habit. Their share is much higher than among 1st and 3rd year girl students.

Discussion

Analysis of the research’s results and special literature showed the presence of tendency, connected with students’ involuntary involvement in internet addiction and computer gambling. It is resulted from certain influence of peculiarities of modern educational system, using electronic recourses. It proved our assumptions about the presence of such problem.

On the base of our research’s results we worked out practical prophylaxis recommendations for teachers, aimed to students’ distraction from such habits with the help of more useful practices of physical culture and sports. Such trainings are recommended to be realized in the following directions:
1. Everyday analysis of approaches to prophylaxis of addicted behavior, connected with computer gambling. It serves as psychological prophylaxis of further expansion of this harmful habit. As a result student will be more informed about the following: mechanisms of computer gambling’s influence on personality, mechanisms of the habits’ progressing, methods of personal self-assessment, after effects of long term playing computer games.

2. Work out principles of correct behavior, connected with computer usage in academic classes, and recommend them.

3. Facilitate development of individual system of resistance to negative after-effects, connected with students’ passion to computer games.

4. Form motivation for healthy life style.

5. Facilitated familiarization with alternative, more useful students’ activity.

6. Realize measures for prophylaxis of students’ internet addiction and computer gambling as well as to help them in their social-moral recovery. It is necessary to create conditions for formation of demand in healthy life style and practicing of physical culture and sports in this group of students.

7. Teach students to understand and realize what happens with man under progressing of computer gambling.

8. Organize support of students, who are games addicted. Provide required assistance in overcoming of depression and anxiety.

9. Social adaptation of students to resistance to negative influence of computer addiction and form vitally important skills of taking decisions on healthy life style’s practicing.

10. Ensure positive emotional background at curriculum classes on physical culture and on trainings in sports circles and competitions.

In our substantiation of practical recommendations we based on the received by us results of our own researches [13, 14, 27, and 31]. Besides, we based on assumption that computer addiction can appear as a result of long term playing computer games and certain personal conditions: for example, when relation to own game level is connected with personal life status as well as with possibility to pass all game levels through certain kind of meditation.

Penetration in virtual world does not permit to return to reading books. Computer civilization with helmet, glasses, key board and joystick involves minds of youth. In virtual world of two or multi side communication young people create their own virtual world independently. Team game is a mean of a kind of life, a mean to pass away from uncontrolled reality. In their virtual reality every young person is sure that he is a winner. It is exactly the danger of computer addiction.

Formation of computer addiction is influenced by psycho-emotional factors. Virtual world is inevitable and it is a reality. Students shall be trained to adapt to such reality. New opportunities of education are inevitably connected with computer usage, as well as electronic recourses and internet. Fatigue after curriculum classes is compensated by the so-called “virtual pillow”, which can help to avoid difficulties of studying, work and life in general. Just in computer games student’s personality reaches unprecedented heights in own self assessment of own potentials. Sometimes it is strengthened by material stimuli as money prize for victory in computer game. It can result in the highest degree of computer game addiction.

The task of modern HEE teacher is not to admit mass escape to virtual world of computer games, when practicing curriculum classes with internet usage. Mass escape to multi media world has not been possible yet. However it is important not to reduce total computerization of HEE education to absurdity. It is necessary to use computers reasonably, without progressing of bad habits, internet addiction; computer gambling and audio-visual addiction.

In opinion of Sokhan’ L.V. “human way of life is a system of stable, typical for the given social demographic group means, forms and kinds of life activity”. It is a peculiar picture of how young people live in conditions of their social historic being. As per prognosis of a number of scientists, the quantity of students, related to special health group can reach 50% from total quantity. Unfortunately this trend will preserve in the nearest 10–15 years. In this case total losses of work power will be more than 10 million people in 2006–2015 (in average 1
At stage of students’ period healthy life style is the most important social factor, enduring all levels of modern society. It influences on main spheres of society’s life [21].

HEE physical culture departments shall implement new forms of computer addiction’s prophylaxis. Physical culture instructors shall have new attitude to creation of motivations and conditions for healthy life style. If youth will be instilled with sports practicing, all acute problems (drugs addiction, alcoholism, internet addiction, computer gambling) will also be solved. The main components shall be motor functioning, rational eating, giving up harmful habits, general hygiene, hardening, giving up long term working with computer.

Students’ satisfaction with health state is much higher, when practicing sports actively. It also strengthens resistance to harmful computer habits. We can state that in respect to students’ and youth’s health there still exist deficit of information about harmful habits (including computer addiction). It is connected with deficit of medical statistic of their indicators. Such situation is conditioned by the fact that student’s way of life is pre determined by its contradictory position in society.

In teacher’s reasonable professional functioning it is necessary to keep balance in usage of time for fulfillment of electronic tasks. It is important not to give students any chance to distract for entertaining sites or games. It is very important to use achievements in computer sphere without any harm for health and psyche; to distract from harmful computer habits by means of physical culture. Our own researches [12, 13, and 14] were devoted to recreation and preservation of youth’s health on the base of physical exercises and healthy life style. As prophylaxis of computer addiction it is very important to use sports practicing. It is proved by many other researches [4, 6, 14, and 16].

From general postulates of morality, peculiar virtual ethic principles in computer world outcome. During curriculum classes with electronic recourses teachers can orient students for certain ethic values and develop their correct understanding of good and evil.

Social virtual world influences on virtual values, formed in students. In computer games propaganda of healthy life style can be built in as well as importance of sports practicing. It is necessary to find such games, which would lead students to sports circles and real sports practicing. Young man shall be facilitated to transform from strong and successful in virtual world into physically strong person in real world. Thus, computer games will render positive social effect: motivate youth for active life style. Computer games shall facilitate increase of students’ motor functioning, no matter how paradoxically it is. Our morality has not been yet adapted to virtual world.

In our opinion the following key moment is of extreme importance: modern HEE education shall use computers and interest to computer games in positive sense [11, 23]. Besides, it shall direct the wish to long term work with computer in required by society direction.

Thus, the content of health related physical education can imply a number of knowledge and skills, which shall be mastered by students with prevailing orientation on health related, generally developing and sport-recreational tasks; on independent overcoming of computer addiction. The priority attention shall be paid to formation of physical, psychic and social-moral health; to personality-oriented approach in system of individual choice of physical culture activity’s means for overcoming of computer addiction. It is very important to use physical culture instructors so that to use knowledge and physical culture means for students with different degree of computer addiction.

Conclusions
1. In order to increase HEE educational process’s effectiveness in health improvement of students’ way of life it is necessary to detect and consider personal features of boy students. These features are risk factors of computer addiction.
2. The work of physical culture and sports faculties results in some reduction of computer addiction probability in students.
3. Physical culture and sports faculties and departments shall take additional measures on students’ health improvement for reduction of computer addiction’s ubiquity. Organized and independent physical culture trainings can facilitate it.
4. For HEE teaches it is necessary to do all the best for change of students’ attitude to own health and way of life. Besides, it is necessary to instill students with positive attitude to reading, art and sports. It permits to eradicate harmful habits, including computer addiction.

5. Teachers shall organize curriculum classes with electronic recourses so that not to provoke progressing of students’ computer addiction.

Conflict of interests
The author declares that there is no conflict of interests.

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The electronic version of this article is the complete one and can be found online at: http://www.sportpedu.org.ua/html/archive-e.html

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INTINTEGRATIVE ASSESSMENT OF KICK BOXERS’ BRAIN BLOOD CIRCULATION AND BIO-ELECTRICAL ACTIVITY IN CONDITIONS OF CORRECTION TECHNOLOGIES’ APPLICATION

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2Lesgaft National State University of Physical Education, Sport and Health, St.-Petersburg, Russia
3Kazimierz Wielki University in Bydgoszcz, Poland.

Abstract. Purpose: to scientifically substantiate the role of para-vertebral impacts on blood circulation and bio-electrical activity of kick boxers’ cortex. Material: in the research participated kick boxers (main group, n=62) and university students (control group, n=25) of 18-23 years’ age. Assessment of para-vertebral impacts with device “Armos” and classic massage was fulfilled with the help of the following methodic: trans-cranial dopplerography of head main arteries and cortex EEG of the tested. Results: it was found that with the help of para-vertebral impacts by device “Armos” linear velocity of cerebral blood flow reduces to normal limits and in- and inter-hemispheres’ interaction strength increases. Conclusions: para-vertebral impacts by device “Armos” activate integrative processes and inter-hemispheres’ interactions of different cortex areas of kick boxers. It can witness about better formation of functional systems, ensuring sports efficiency.

Key words: kickboxing, device “Armos”, cerebral dopplerography, electroencephalography, linear velocity of blood flow, coherence.

Introduction

Kickboxing is characterized by high physical, psycho-physiological and emotional tension, in connection with kick/punch impacts; by rather high temp of duels and actions of high static-kinetic level. That is why, in our work modern approaches to training technologies is presented. In basic period technology includes training of local-regional muscular endurance, accurate actions and formation of resistance to hypoxia. It requires assessment of blood flow borders (cerebral inclusive and bio-electrical activity of brain). It is connected with the fact that kick-boxers’ sports functioning often is accompanied by brain micro-traumas and disorders in sportsmen’s body segments. Kick-boxers endure muscular-fascial imbalance and disorder of static-kinetic stability. Comparative analysis of correction technologies’ influence showed high effectiveness of some of them in influence on cerebral blood circulation and brain’s bio-electrical activity. We showed some priorities of the applied technologies, comparing our data with control data received in fitness technologies’ practicing. We also found specific mechanisms of functional changes, characteristic for this kind of sports.

Kickboxing requires from sportsman comprehensive fitness and adaptive ability to fulfill intensive motor actions in short periods of time. In connection with the above said, kick-boxers can endure muscular-fascial imbalance, resulting in fatigue and risk of traumas [8, 16, and 20]. It should be also noted that kick/punch impacts in head area can cause micro-traumas [17, 18, 19, and 25] and other deeper disorders of organs [21, 23, and 24]. Application of brain bio-electric activity and dopplerography methodic in trainings permits to open sports potentials of the tested [6, 10].

In materials of sports physiology and kinesiology there is quite a number of works on rehabilitation of sportsmen with nervous-muscular disorders [2, 3, and 9]. In these works weak links are revealed and technologies of manual-muscular testing, functional eating are offered; creation of artificial training-correction medium system, reflex moving to sports influences are described [1] (including overloads and disorders of adaptation).

The researches of N.A. Volynkina [4] showed that compensated compression of peripheral tissue was a factor, reducing sportsmen’s adaptation reserve. Correction influences permit to increase the reserves, spent on adaptation-compensatory processes in conditions of average degree traumas. O.G. Sukhorukova [12] offered technique of dura mater restoration during 2-5 minutes, in conditions of competitions. In works of Shitikov T.A. [15] potentials of manual therapy and applied kinesiology in correction of athletes with post traumatic vascular
disorders are shown. Such correction causes reduction of increased excitability of brain’s segmental structures, which ensure tonic reactions of cranial and cervical muscles, normalization of muscle tonus under metabolic-trophic disorders. These integrative processes facilitate strengthening of connections between neuron chains and mobilization of organism’s reserves for sports efficiency. Klimesch W. [22] found that organism’s integrative functioning is based on cortical/sub-cortical connections and mobilization of neuron circuits with frequency of external rhythm. It happens against the background of increase of nervous organization’s plasticity, which regulates processes in conditions of unexpected factors.

**Hypothesis:** It is assumed that the conducted rehabilitation measures permitted for complex scientific group and coach to timely eliminate appearing dysfunctions and, at the same time, use organism’s reserves for increasing of its functioning. Sportsmen’s relaxation increase resistance of brain structures to synchronization and activation at inter-neuron level. Integrative processes and inter-hemisphere interactions of different areas of kick-boxers’ brains are activated. It can witness about better formation of functional systems, ensuring sports efficiency.

**The purpose of the research** is to scientifically substantiate the role of manual-correction influence with devise “Armos” and classis massage impacts on blood flow and bio-electrical activity of kick boxers’ cortex and comparison of these data with the data of fitness practices.

**Material and methods**

**Participants:** in the research participated kick-boxers from first spots grade to masters of sports (main group, n=62) and students of ФГБОУ ВПО “South-Ural State university”. The students practiced fitness technologies 2 times a week (control group, n=25). All participants were of 18-23 years’ age. Kick-boxers were the main group (2nd group, n=62), which was divide into two sub-groups: 3rd (n=40) and 4th (n=22).

**Procedure (organization of the research):** By standard methodic all tested kick-boxers and control group students (n=87) twice (before and after corrections) endured two diagnostic procedures. The first was supersonic trans-cranial dopplerography («Digi-lite» of «Rimed» Co, Israel) for study of blood flow in frontal, middle, vertebral (4th segment) brain arteries of both hemispheres; main (basilar) artery (MA), basal vein of Rosenthal. Then we registered electroencephalogram (EEG) from symmetric outlets of occipital (O1, O2), parietal (P3, P4), central (C3, C4), forehead (Fp1, Fp2, F3, F4, F7, F8), temple (T3, T4, T5, T6) with separate ear indifferent electrodes. In the range from 1 to 35 Hz we calculated spectrums of coherence with resolution by frequency of 0.2 Hz for segments 2 from monopole EEG. Average coherence level is calculated automatically for all EEG frequency band in the whole and for separate physiological rhythms. On the base of mean coherence level we assessed coherence spectrums. Besides, we studied statistical linear connections of electric processes of two brain areas. They were assessed by value of connection by every separate frequency of oscillations independent on their amplitude [5].

After preliminary testing by two above mentioned methodic, 2nd main group of kick-boxers was divided into two sub-groups. With device “Armos” we conducted 10 days’ course of influencing on para-vertebral areas in sub-group 3 (n=40) and 10 days’ course of classis massage (back and neck) in sub-group 4 (n=22).

Device “Armos” is a rigid structure with special protrusions. Lying on back, sportsman puts this device turn-by-turn under cervical, thoracic and lumbar spines. After dozed pressing by weight of own body on the mentioned backbone segments unloading is achieved. It reduces possible pain and increases backbone mobility. This method is based on deep penetration of “Armos” device protrusions in muscular fascial tissues of backbone system. It stretches shortened muscles and opens bootastic joints that restore their mobility [14]. Technology and methodic of apparatus-manual correction “Armos” implied stimulation of nervous-muscular and fascial segments of backbone, ensuring keeping of dynamic postures, support and defense of organism from shocks. Fascias have cell memory and form myo-fascial chains. Fascias ensure regulation of neighboring muscles and other organs’ tonus. In case of patho-bio-mechanical dysfunctions there happens disordering of impulses’ passing from muscles to organs, ensuring static-kinetic balance. EEG and brain blood stream registration permits to find left- or right hemisphere motor- cerebellum thalamo basilar conductivity for diagnosis of main and compensatory sides of affection.

**Statistical analysis:** statistical processing of the research material was fulfilled with the help of programs Statistica 10.0, SPSS 17 on the basis of key methods. Confidence of differences between groups was determined with Mann-Whitney test.
Results of the research

Results of testing of kick-boxers’ and control group blood flow are given in table 1. Comparison of kick-boxers’ and control group indicators before and after correction influences with apparatus-manual method showed confident differences by all spectrum of brain arteries (p ≤ 0.05-0.01). Exclusion was left front brain artery, right brain artery and main artery. It can be assumed that higher diameter of left carotid and left backbone arteries (as well as asymmetry of kick-boxers’ dynamic positions in duel) results just in such re-distribution of blood stream. In most of arteries, under impact of apparatus-manual complex “Armos” excess of brain blood flow substantially decreased. Vein blood flow in basal vein of Rosenthal was studied with method of trans-cranial dopplerography. Parameter of blood flow systolic velocity (LVBF – linear velocity of blood flow with norm of not more than 19 cm/sec) and indicator of artery-vein balance (correlation of final diastolic velocity in carotid artery with maximal systolic velocity in internal jugular vein) are the main indicators of brain vein blood circulation. In control group these indicators were in reference limits.

Table 1. Characteristics of brain blood flow in the tested groups before and after corrections

<table>
<thead>
<tr>
<th>Parameters of cerebral blood stream</th>
<th>1st control group (n=25)</th>
<th>2nd group before correction (n=62)</th>
<th>3rd subgroup after “Armos” (n=40)</th>
<th>IV subgroup after massage (n=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear velocity of blood flow in middle brain artery (cm/sec.)</td>
<td>right</td>
<td>93.9±18.8</td>
<td>136.3±18.1*</td>
<td>95.48±16.11**</td>
</tr>
<tr>
<td></td>
<td>left</td>
<td>96.3±19.7</td>
<td>124.85±18.9*</td>
<td>95.5±16.0**</td>
</tr>
<tr>
<td>Resistivity index in middle brain artery</td>
<td>right</td>
<td>0.56±0.07</td>
<td>0.64±0.04*</td>
<td>0.55±0.05**</td>
</tr>
<tr>
<td></td>
<td>left</td>
<td>0.55±0.21</td>
<td>0.73±0.17*</td>
<td>0.54±0.02**</td>
</tr>
<tr>
<td>Linear velocity of blood flow in frontal brain artery (cm/sec.)</td>
<td>right</td>
<td>77.1±13.20</td>
<td>87.15±15.82*</td>
<td>87.03±11.94**</td>
</tr>
<tr>
<td></td>
<td>left</td>
<td>77.3±18.1</td>
<td>83.76±17.31*</td>
<td>81.88±13.28**</td>
</tr>
<tr>
<td>Resistivity index in frontal brain artery</td>
<td>right</td>
<td>0.58±0.03</td>
<td>0.69±0.05*</td>
<td>0.55±0.07**</td>
</tr>
<tr>
<td></td>
<td>left</td>
<td>0.54±0.05</td>
<td>0.66±0.11*</td>
<td>0.55±0.34**</td>
</tr>
<tr>
<td>Linear velocity of blood flow in back brain artery (cm/sec.)</td>
<td>right</td>
<td>54.7±17.1</td>
<td>78.95±13.2*</td>
<td>54.39±8.11**</td>
</tr>
<tr>
<td></td>
<td>left</td>
<td>56.9±16.3</td>
<td>64.34±10.25*</td>
<td>58.01±9.35**</td>
</tr>
<tr>
<td>Resistivity index in back brain artery</td>
<td>right</td>
<td>0.56±0.19</td>
<td>0.75±0.25*</td>
<td>0.54±0.12**</td>
</tr>
<tr>
<td></td>
<td>left</td>
<td>0.56±0.08</td>
<td>0.75±0.09*</td>
<td>0.53±0.07**</td>
</tr>
<tr>
<td>Linear velocity of blood flow in 4th segment of backbone artery (cm/sec.)</td>
<td>right</td>
<td>57.2±8.1</td>
<td>31.97±12.45*</td>
<td>58.10±7.11**</td>
</tr>
<tr>
<td></td>
<td>left</td>
<td>56.1±4.1</td>
<td>37.22±13.17*</td>
<td>56.95±7.89**</td>
</tr>
<tr>
<td></td>
<td>right</td>
<td>0.53±0.06</td>
<td>0.60±0.06</td>
<td>0.52±0.04</td>
</tr>
</tbody>
</table>
PHYSICAL EDUCATION OF STUDENTS

Parameters of cerebral blood stream

<table>
<thead>
<tr>
<th></th>
<th>1st control group (n=25)</th>
<th>2nd group before correction (n=62)</th>
<th>13th subgroup after “Armos” (n=40)</th>
<th>IV subgroup after massage (n=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistivity index in 4th segment of backbone artery</td>
<td>left</td>
<td>0.54±0.05</td>
<td>0.66±0.07*</td>
<td>0.51±7.21**</td>
</tr>
<tr>
<td>Linear velocity of blood flow in main brain artery (cm/sec.)</td>
<td>59.1±12.3</td>
<td>74.43±14.14</td>
<td>67.55±13.78</td>
<td>72.09±13.33</td>
</tr>
<tr>
<td>Resistivity index in main brain artery</td>
<td>0.51±0.05</td>
<td>0.64±0.07*</td>
<td>0.54±0.05**</td>
<td>0.60±0.25</td>
</tr>
<tr>
<td>Inter-hemisphere asymmetry by middle brain artery, (%)</td>
<td>4.2±1.5</td>
<td>10.99±11.2*</td>
<td>0.98±1.5**</td>
<td>8.03±11.87</td>
</tr>
<tr>
<td>Inter-hemisphere asymmetry by frontal brain artery, (%)</td>
<td>2.5±1.5</td>
<td>4.6±0.7*</td>
<td>0.8±0.05**</td>
<td>6.99±13.83</td>
</tr>
<tr>
<td>Parameters of cerebral blood flow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-hemisphere asymmetry by back brain artery (%)</td>
<td>3.9±2.8</td>
<td>16.9±16.1*</td>
<td>4.9±2.9**</td>
<td>16.05±19.02</td>
</tr>
<tr>
<td>Inter-hemisphere asymmetry by backbone arteries, (%)</td>
<td>1.3±12.0</td>
<td>13.5±8.9*</td>
<td>4.8±2.8**</td>
<td>12.15±11.10</td>
</tr>
</tbody>
</table>

Notes: * - confident differences between indicators of 1st and 2nd groups (p < 0.05); ** - confident differences between indicators of 2nd group and 3rd subgroup (p < 0.05); *** - confident differences between indicators of 2nd group and 4th subgroup (p < 0.05).

In group of kick boxers indicator of artery-vein balance before correction was less than 1 and velocity of blood stream in basal vein of Rosenthal was by 43% higher than normal. In the whole it worsened blood circulation because of complicated vein outflow of dystonic character. After fulfilled corrections in subgroups 3 and 4 we registered physiological orientation of both parameters – statistically significant in “Armos” group. In conditions of ischemic progressing of brain substance it is important to realize self-regulation of brain circulation. We found parameters of blood circulation regulation reserves (anatomic, myogenic and metabolic) when making compressing test, tests with breathing pauses and hyper-ventilation with calculation of cerebral vascular reactivity index. The results of these tests are presented in table 2.

With computer electroencephalograph “Neuron-Spectr – 4” (“Neuro-Soft”, Russia) we registered EEG from symmetric occipital (O1, O2), parietal (P3, P4), central (C3, C4), forehead (Fp1, Fp2, F3, F4, F7, F8), temple (T3, T4, T5, T6) outlets with separated ear indifferent electrodes. In frequency band from 1 to 35 Hz we calculated coherence spectrums with resolution by frequency 0.2 Hz for segments 2 of monopole EEG. On the base of mean coherence level (calculated automatically for all frequency band of EEG in the whole and for separate physiological rhythms) we assessed coherence spectrums. Besides, we studied statistical linear connections of electric processes of both brain areas. They were assessed by value of connection by every separate frequency of oscillation, independent on their amplitude.

Table 2. Characteristic of vein outflow in tested contingent before and after corrections, (M±m)
Table 3.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>1st group (n=25)</th>
<th>2nd group before correction (n=62)</th>
<th>3rd subgroup “Armos” (n=40)</th>
<th>4th subgroup massage (n=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear velocity of blood flow in basal vein of Rosenthal (cm/sec.)</td>
<td>19.00±3.15</td>
<td>27.22±4.92*</td>
<td>18.89±4.15**</td>
<td>22.78±5.75</td>
</tr>
<tr>
<td>Artery-vein balance</td>
<td>1.00±0.65</td>
<td>0.78±0.45*</td>
<td>0.97±0.15*</td>
<td>0.83±0.37</td>
</tr>
<tr>
<td>Circle of Willis (% of separation)</td>
<td>55.35</td>
<td>35.15</td>
<td>39.58</td>
<td>34.76</td>
</tr>
<tr>
<td>Auto-regulatory response (myogenic reserve), %</td>
<td>75.18±2.46</td>
<td>66.39±16.35*</td>
<td>83.68±10.45**</td>
<td>72.69±17.54***</td>
</tr>
<tr>
<td>Metabolic reserve (index of cerebral vascular reactivity), %</td>
<td>52.41±2.95</td>
<td>29.66±12.98*</td>
<td>59.89±18.01</td>
<td>41.15±21.22</td>
</tr>
</tbody>
</table>

Notes: * - confident differences between indicators of 1st and 2nd groups (p < 0.05); ** - confident differences between indicators of 2nd group and 3rd subgroup (p < 0.05); *** - confident differences between indicators of 2nd group and 4th subgroup (p < 0.05).

In table 3 we present in-hemisphere coherences of different cortex areas of three groups’ kick boxers. We found high coherence in frontal lobe, significant coherence in other areas, in left- right side correlations in conditions of apparatus-manual influence “Armos”. According to the found coherences kick boxers have rather good functions of prediction, formation of movement’s idea, pre-motor programming of movement and its realization. A little less coherence was noticed when influencing on analyzers’ systems as well as with visual perception of movements, in which frontal brain artery (FBA), middle brain artery (MBA) and back brain artery (BBA) are engaged. Concerning regulation of movements, in the order of significance frontal lobe, central, parietal and occipital areas are engaged.

Table 3. Indicators of in-hemisphere coherences of alpha rhythm in tested groups

<table>
<thead>
<tr>
<th>Cortex zones</th>
<th>Background electroencephalogram</th>
<th>Electroencephalogram with hyper-ventilation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>II, n=62</td>
<td>III, n=40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fp1-Fp2</td>
<td>0.62±0.004</td>
<td>0.66±0.005</td>
</tr>
<tr>
<td>F3-F4</td>
<td>0.65±0.003</td>
<td>0.69±0.006</td>
</tr>
<tr>
<td>C3-C4</td>
<td>0.63±0.003</td>
<td>0.70±0.005</td>
</tr>
<tr>
<td>P3-P4</td>
<td>0.60±0.004</td>
<td>0.67±0.006</td>
</tr>
<tr>
<td>O1-O2</td>
<td>0.53±0.005</td>
<td>0.61±0.007</td>
</tr>
<tr>
<td>F7-F8</td>
<td>0.44±0.004</td>
<td>0.52±0.007</td>
</tr>
<tr>
<td>T3-T4</td>
<td>0.40±0.005</td>
<td>0.46±0.007</td>
</tr>
<tr>
<td>T5-T6</td>
<td>0.35±0.005</td>
<td>0.39±0.007</td>
</tr>
</tbody>
</table>

Notes: Fp1-Fp2 – pole of frontal lobe; F3-F4 – frontal lobe (pre-motor cortex); C3-C4 – central area (motor cortex); P3-P4 – parietal area; O1-O2 – occipital area; F7-F8 – back forehead area (additional motor area); T3-T4 – front temporal area; T5-T6 – back temporal area; * – confidence of differences p≤0.05.

In 3rd subgroup of kick boxers we registered confident distinction of in-hemisphere coherence from group 2 by central, back forehead, parietal-occipital and temple areas of analyzers’ fields. We also found prevailing (by 8-15%) development of 3rd subgroup sportsmen’s two motor regulation components: involuntary, caused by sensor stimuli and arbitrary, caused by internal motive.

By alpha frequencies range of kick boxers we studied compatibility degree in short and longs pairs of in-hemisphere coherences (see table 4)
Table 4. Indicators of in-hemispheres’ coherences of alpha rhythm in tested groups

<table>
<thead>
<tr>
<th>Cortex zones</th>
<th>Background EEG</th>
<th>EEG with hyper-ventilation (HV)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>II, n=62</td>
<td>III, n=40</td>
</tr>
<tr>
<td>Fp1F3</td>
<td>0.74±0.004</td>
<td>0.75±0.005</td>
</tr>
<tr>
<td>F3C3</td>
<td>0.71±0.004*</td>
<td>0.76±0.005</td>
</tr>
<tr>
<td>C3P3</td>
<td>0.67±0.005*</td>
<td>0.73±0.005</td>
</tr>
<tr>
<td>P3O1</td>
<td>0.65±0.004</td>
<td>0.67±0.006</td>
</tr>
<tr>
<td>Fp2F4</td>
<td>0.73±0.004*</td>
<td>0.81±0.006</td>
</tr>
<tr>
<td>F4C4</td>
<td>0.72±0.005</td>
<td>0.72±0.006</td>
</tr>
<tr>
<td>C4P4</td>
<td>0.65±0.005</td>
<td>0.66±0.007</td>
</tr>
<tr>
<td>P4O2</td>
<td>0.76±0.005</td>
<td>0.72±0.007</td>
</tr>
<tr>
<td>F7T3</td>
<td>0.72±0.005</td>
<td>0.75±0.006</td>
</tr>
<tr>
<td>T3T5</td>
<td>0.60±0.005</td>
<td>0.64±0.006</td>
</tr>
<tr>
<td>F8T4</td>
<td>0.71±0.005</td>
<td>0.73±0.007</td>
</tr>
<tr>
<td>T4T6</td>
<td>0.57±0.005</td>
<td>0.61±0.006</td>
</tr>
</tbody>
</table>

Notes: * – confident differences form indicator of control group, ** – in groups of sportmen, p<0.05. Fp3 – pre-frontal cortex of frontal lobe from the left; F3C3 – pre-motor cortex of frontal lobe from the left; C3P3 – motor cortex of frontal lobe from the left; P3O1 – parietal-occipital area from the left; Fp2F4 – pre-frontal cortex of frontal lobe from the right; F4C4 – pre-motor cortex of frontal lobe from the right; C4P4 – motor cortex of frontal lobe from the right; P4O2 – parietal-occipital area from the right; F7T3 – forehead-temple area from the left; T3T5 – temple area from the left; F8T4 – forehead-temple area from the right; T4T6 – temple area from the right.

Discussion

In the course of writing the article there appeared some discussible moments. In opinion of M.V. Koroliova [7], increased brain blood circulation is an adequate functional reaction to muscular impacts. They require increased oxygen supply to motor cortex neurons. However, in opinion of Shevtsov A.V. [14] increased brain blood circulation shall be regarded as a state of system’s tension, which can result in pre-morbid status and even in pathology of brain blood vessels. It should be added that excessive blood flow trail in rest state requires additional energy supply. Probably, myocardium shall work more intensively. Results of our mutual researches permitted to specify mechanisms of the processes, which take place and take neutral position in this duel of opinions. Actually, Koroliova M.V. is right, thinking that the found in our researches (see table 1) increased blood flow in kick boxers can be regarded as a symptom of working hyperemia. It witnesses about increasing of functional demand of motor neurons depending on the following: the higher neurons’ demand in oxygen and glucose are the higher is blood flow. But Shvetsov A.V. is also right to some extent because owing to continuous increase of competition and training functioning’s tension in muscular-skeletal apparatus of practically healthy sportsmen different physiological-bio-mechanical disorders are diagnosed. It can become a factor, provoking a number of borderline states of different organs and systems, for example myo-fascial pain syndrome with “trigger” zones, initiating pain, local muscular hyper-tonuses and etc. [11, 26, and 27]. Technique of many kick attacks, especially in kickboxing disciplines “low-kick” and “K1”, results in twisting of backbone, when attacking legs, because of torso inertia, one-side overload and over tension of muscular skeletal apparatus. It causes tissues’ lesion [6]. In parallel with it trophic dysfunctions of metabolic, autogenic and vascular-vegetative character appear. It results in imbalance of central, periphery and cerebral blood circulation [13]. There appears a question if increase of cerebral haemo-dynamic parameters occurs only as a result of increase of motor neurons’ functional demands. The answer was received after rick boxers’ recreational correction with device “Armos”. Such correction influence on reflex areas in muscular-ligament apparatus of disordered segments, recovers static dynamic disorders of backbone and blocked joints’ functions. These manipulations permit to eliminate blockages in joints and muscles with normalization of cerebral blood circulation and improvement of vein outflow. Our experiment showed confident reduction of brain blood circulation velocity parameters. Though, we observed increase of control data. It witnessed in favor of Koroliova’s M.V. opinion about working hyperemia in perfusion-metabolic coupling. To
the above said it should be added that we had not found referent borders of cerebral blood flow in different areas of localization velocity parameters. Now information material is accumulated, which will permit to analyze differentially localization of linear blood flow velocities. It is the task of next researches.

**Conclusions**

1. Analysis of indicators of kick boxers’ brain cortex bio-electrical activity, fulfilled with technology “Armos”, permitted to determine brain resistance to stress impacts and better stability of functional state, comparing with group of kick boxers, who endured classic massage and control group.

2. In hyper-ventilation test we registered increase of inter-hemisphere interaction strength in pre-frontal cortex in group 3. We found confident distinctions from control group in increase of in-hemisphere coherence in forehead pre-frontal cortex from the right by 12% in group 3 and decrease by 15% in right parietal-occipital region in groups 3 and 4.

3. Application of device-manual procedure “Armos” reduced brain blood flow and increased reserves of 3rd group kick boxers’ functional system (decrease in right and left middle brain arteries, in right and left back brain arteries, p≤0.001). Besides, we found increase of blood flow linear velocity (earlier reduced) up to referent borders in right and left backbone arteries (p≤0.001).

4. We also observed inter-hemisphere asymmetry in middle, front and back brain arteries, in right and left middle back brain arteries; in right and left backbone arteries and main basilar artery.

**Conflict of interests**

The authors declare that there is no conflict of interests.

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FACTORY ANALYSIS OF MASS MEDIA INFLUENCE ON ACADEMIC SPORTS DEVELOPMENT

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Abstract. Purpose: Main objective of this research was factorial analysis of mass media influence on academic sports development. Material: Methodology of the research was descriptive- correlation. Population of the research was composed of all referees, coaches and athletes participating in students' sports Olympiad of Iran Payam e Noor Universities in year 2014. Statistical sample of research was chosen randomly and consisted of 176 persons. Data gathering tool was a researcher made questionnaire; its superficial and content validity was approved by academic professors and media experts; also the stability of research tool was reported to be at an acceptable level. SPSS 23 software was used to analyze research data and also AMOS 24 software was used to analyze structure validity. Results: Findings showed there is a significant difference between current situation and desirable situation in all research dimensions. Also, factorial analysis of all research variables showed improvement of coaches' technical performance (0.86), improvement of referees' technical performance (0.85), and promotion of academic sport managers' awareness (0.83) respectively are mostly influenced by mass media. Conclusion: It should be kept in mind that academic sports development is one of the factors of the entire country sports development. Hence, it is crucial to attend to different dimensions of student sport's aspects such as human, financial, planning and etc., especially in championship area to be able to further macro objectives of country's sports development. Considering current conditions, mass media should have a new perspective on academic sports in order to be able to attend to their responsibilities to further the excellence of country's sports.

Key words: Mass Media, Sports Development, Academic Sport, Women's Sport.

Introduction

Sports development requires attention to several dimensions at macro, middle, and micro levels. One of the most important components of sports is academic sport which is, based on evidence, highly influential on students' mental and physical health [12] and its main objective is to create the required context and appropriate opportunities for the pervasive stratum of college students, in order to attain healthy competitive and entertaining environment [5]. Physical activity and participation at university's sport programs can have a significant share in promotion of academic community's social, mental and physical health [8]. One of the main factors in cultural development is mass media [1, 6]. The most essential objective of mass media in support of each country's national agenda could be sports development, which itself has several dimensions and axes [13].

Traditionally researchers have divided mass media into published and electronic. Published media includes newspapers and journals while electronic media includes radio, television, cinema, and internet (as modern media) [3, 10 and 11], all of which render direct influence on values and norms of the society since span of their activities includes a great number of the population of society [2]. Due to this reason, in most countries different media have established especial channels for sports [1].

Based on the discussion above, one of the important and influential factors in academic sports development is mass media. It is evident that effort to increase presentation of sport matches and programs as well as news coverage of women's sport in different sub-parts such as academic sport will be highly influential on more enhancement of participation and quality of performance of athletes, coaches and referees and will also result into development of other components of women's sport in the country. In this research, influence of television, radio, and press on academic sport development has been analyzed.

Analysis shows the existing distance between current situation in mass media and favorable situation of cultural development has a significant difference and this weakness is also observed in sports domain [1]. In their research Emami and Mallaei (2013) [4] have also reported that share of women's sport in TV news coverage was very minimal. Mahdavian Mashhadi (2008) [7] claimed mass media to play significant role in activating public, educative, championship, and technical sports especially in respect to women's sport. Ghasemi et al. (2008) described media role, particularly of the entire country TV, as important in development of championship sport and explained the importance of paying attention to all sport components in television. Academic sport has always
been studied and analyzed from different aspects; but in Iran it still has not reached the necessary dynamics as a study domain. On the other hand, importance and necessity of attention to influential factors on academic sport development and lack of professional studies in this area make the significance of this research more obvious. As a result, in this research, to analyze the influence of television, radio, and press (as mass media) on academic sport development, athlete students participating in Iran's sports Olympiad of Payam e Noor Universities' students has been approached.

**Purpose**

The purpose of this research was factorial analysis of mass media influence on academic sports development.

**Material and methods**

**Participants:** population of the research consisted of all participating referees, coaches, and athletes in Iran sports Olympiad of Payam e Noor Universities, 2014. Statistical sample of research consisted of 176 persons who were selected randomly.

**Research Design:** methodology of this research is descriptive - correlation. To gather research data a researcher made questionnaire was utilized. In order to determine superficial and content validity of research tool, the questionnaire was approved by academic professors and media experts. Questionnaire's stability was reported to be α=0.91.

**Statistical Analysis:** to analyze research data, descriptive statistics (frequency, frequency percentage) and inferential statistics (Kolmogrov-Smirnov test and Wilcoxon) using SPSS 23 software were performed; also to analyze structure validity and to present measurement models of research variables AMOS 24 software was used.

**Results of the research**

Demographic findings of the participating athletes are summarized in table 1.

**Table 1. Description of Personal Characteristics of Respondents**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Variable</th>
<th>Percentage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Spent Watching Sport Programs on TV (Hour)</td>
<td>32.8</td>
<td>57</td>
<td>Age (Year)</td>
<td>18-21</td>
<td>57</td>
</tr>
<tr>
<td>Less than 1</td>
<td>78.7</td>
<td>137</td>
<td>22-26</td>
<td>48.9</td>
<td>85</td>
</tr>
<tr>
<td>1-2</td>
<td>16.7</td>
<td>29</td>
<td>27-31</td>
<td>13.2</td>
<td>23</td>
</tr>
<tr>
<td>3-4</td>
<td>2.9</td>
<td>5</td>
<td>Physical Education Other than Physical Education</td>
<td>5.2</td>
<td>9</td>
</tr>
<tr>
<td>More than 4</td>
<td>1.7</td>
<td>3</td>
<td>Associate Degree</td>
<td>32-36</td>
<td></td>
</tr>
<tr>
<td>Less than 1</td>
<td>69.4</td>
<td>120</td>
<td>Bachelor</td>
<td>47.4</td>
<td>83</td>
</tr>
<tr>
<td>1-2</td>
<td>20.2</td>
<td>35</td>
<td>Master and Higher</td>
<td>6.3</td>
<td>11</td>
</tr>
<tr>
<td>3-4</td>
<td>5.2</td>
<td>9</td>
<td>Educational Attainment</td>
<td>85.1</td>
<td>148</td>
</tr>
<tr>
<td>More than 4</td>
<td>5.2</td>
<td>9</td>
<td>Sport Background (Year)</td>
<td>8.6</td>
<td>15</td>
</tr>
<tr>
<td>Less than 1</td>
<td>36.6</td>
<td>63</td>
<td>1-6</td>
<td>27.5</td>
<td>46</td>
</tr>
<tr>
<td>1-2</td>
<td>41.4</td>
<td>72</td>
<td></td>
<td>46.7</td>
<td>78</td>
</tr>
<tr>
<td>3-4</td>
<td>14.4</td>
<td>25</td>
<td>7-12</td>
<td>22.2</td>
<td>37</td>
</tr>
<tr>
<td>More than 4</td>
<td>8.6</td>
<td>15</td>
<td>13-18</td>
<td>3.6</td>
<td>6</td>
</tr>
</tbody>
</table>

Using Kolmogrov-Smirnov test, hypotheses of abnormal distribution of data was disapproved; hence to compare current situation and desirable role of mass media in academic sport development Wilcoxon test was used (Table 2).
Table 2. Comparison of Current Situation and Desirable Role of Mass Media in Female Academic Sports Development

<table>
<thead>
<tr>
<th>Variable</th>
<th>Significance Level</th>
<th>Z Statistics</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Result</td>
<td>0.001*</td>
<td>-9.151</td>
<td>Promotion of Public Awareness of Academic Sport</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.201</td>
<td>Athletes' Performance Improvement</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.538</td>
<td>Identification of Sports Talents</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.128</td>
<td>Improvement of Coaches' Technical Performance</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.516</td>
<td>Improvement of Referees' Technical Performance</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.732</td>
<td>Promotion of Academic Sports Managers' Awareness</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.110</td>
<td>Determining Academic Sports Strategies</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-10.088</td>
<td>Fair Allotment of Academic Sport Facilities</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.527</td>
<td>Increased Research on Academic Sport</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.836</td>
<td>Increasing Allocated Budget for Academic Sport</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.452</td>
<td>Increasing Sponsors and Public Investment</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.804</td>
<td>News Coverage of Academic Sport</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.826</td>
<td>Increased Employment and Entrepreneurship at Students' Olympiads</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.951</td>
<td>Increased Audiences for Academic Sports</td>
</tr>
<tr>
<td>Existence Difference</td>
<td>0.001*</td>
<td>-9.431</td>
<td>Familiarity with Academic Sport Champions</td>
</tr>
</tbody>
</table>

*p<0.05

Table 3 demonstrates the factor analysis of role of television, radio, and press, separately, on sports development.

Table 3. Factor Analysis of Role of Television, Radio, and Press on Academic Sport Development

<table>
<thead>
<tr>
<th>Standard Regression Weight of TV Influence on Research Items</th>
<th>Standard Regression Weight of Radio Influence on Research Items</th>
<th>Standard Regression Weight of Press Influence on Research Items</th>
<th>Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion of Public Awareness of Academic Sport</td>
<td>.677</td>
<td>.644</td>
<td>0.001*</td>
</tr>
<tr>
<td>Athletes' Performance Improvement</td>
<td>.715</td>
<td>.748</td>
<td>0.001</td>
</tr>
<tr>
<td>Identification of Sport Talents</td>
<td>.667</td>
<td>.672</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

*.*p<0.001
From Table 3, it is evident that factors of promotion of academic sports managers' awareness, improvement of coaches' technical performance, and improvement of referees' technical performance respectively take the highest influence from television, radio, and press.

**Table 4.** Fit Indices of Measurement Model for Level of Influence of Mass Media on Academic Sport Development

<table>
<thead>
<tr>
<th>RMSEA</th>
<th>CFI</th>
<th>IFI</th>
<th>NFI</th>
<th>AGFI</th>
<th>GFI</th>
<th>CMIN/DF</th>
<th>Fit Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.055</td>
<td>0.97</td>
<td>0.97</td>
<td>0.92</td>
<td>0.88</td>
<td>0.92</td>
<td>1.537</td>
<td>Factor Analysis of TV’s Role</td>
</tr>
<tr>
<td>0.059</td>
<td>0.96</td>
<td>0.96</td>
<td>0.91</td>
<td>0.86</td>
<td>0.91</td>
<td>1.604</td>
<td>Factor Analysis of Radio’s Role</td>
</tr>
<tr>
<td>0.064</td>
<td>0.95</td>
<td>0.95</td>
<td>0.90</td>
<td>0.85</td>
<td>0.90</td>
<td>1.713</td>
<td>Factor Analysis of Press’s Role</td>
</tr>
</tbody>
</table>
Based on measurement model for level of influence of mass media on Iran's female academic sport development (figure 1), improvement of coaches' technical performance (0.86), improvement of referees' technical performance (0.85), and promotion of academic sport managers' awareness (0.83) respectively are the mostly influenced variables by mass media.

Discussion
Results of the research clarified that there is a significant difference between current situation and desirable situation of influence of media under investigation in all research variables. In other words, mass media does not perform appropriately on their designated roles. Hence, media is expected to enhance their effort to achieve their prophecy regarding academic sport development. Rahimi Ajdadi (1996) [9] had indicated television, radio, and press have had a crucial and significant role in progression and development of women's sport in society and had been able to expand people's beliefs to criticize as well as make progress in the society. It is worth mentioning despite conduction of several studies over different periods of time on influences of mass media on different sport areas, yet there are still deficiencies in achieving the relevant objectives in case of media most especially in terms of women's sport. This represents a gap between mass media performance in broadcast of women's sport and results of the conducted researches.

Results of factorial analysis of this research showed that television renders respectively the most influence on promotion of academic sport managers' awareness (0.85), improvement of coaches' technical performance (0.80), and fair allotment of academic sport facilities (0.78). Based on results of research, it seems those engaged in different TV channels should pay much more attention to their performance in terms of sports; since television is amongst the most influential media on development of different sport areas which is, based on the related factor analysis, influential on development of dimensions of academic sport.

Results of factor analysis on radio demonstrated that this media is respectively influential on improvement of coaches' technical performance (0.81), fair allotment of academic sports facilities (0.79), and determining academic sports strategies (0.78). In other part, factor analysis of extensible variables that are influenced by press
respectively include improvement of referees' technical performance (0.74), increasing academic sport managers' awareness (0.72), and improvement of athletes' performance.

Finally, overall factorial analysis of mass media influence on academic sport development showed improvement of coaches' technical performance (0.86), improvement of referees' technical performance (0.85), and increasing academic sport managers' awareness (0.83) are respectively the most influenced variables by mass media. Based on research findings, technical performance in women's sport events and matches is one of the most essential factors that is influenced by mass media. In other words, presentations and media reports of women's events will play significant role in increasing coaches, referees, and athletes' performance quality. This might be due to lack of visibility of valuable efforts of women in sports. Therefore, based on research results and respondents' comments, audio and visual broadcast and presentation of women's sports on mass media is motivational sign to increase women's performance quality to even higher levels in sports fields. Motivation to being seen, encouraged, cheered, and supported by audiences both in sport arena and media is amongst important reasons to enhance women's performance quality in sports. Therefore, mass media such as television, radio, and press have a crucial and effective role to make this happen. Also, based on final measurement model of this research, media has a high influence on increasing academic sports managers' awareness especially in terms of women's sports. Since mass media especially television, due to extensive audience coverage, are important and effective tools to increase awareness and to direct beliefs and cultures, all over the world a great amount of attention is paid to them by audiences. Considering the research results, mass media due to this serious role, shall exert effort to transfer information and awareness such as sending messages and criticisms of those involved in sports as well as people of society to concerned managers and others in charge as much as possible. As it has been argued, one of the indirect communication channels of athletes or non-athlete people in society with concerned high officials is through influential media such as television and radio.

Other results of the final factor analysis of research demonstrated that determining academic sport strategies, increased academic sport research, identification of sport talents, promotion of public awareness about academic sport, fair allotment of academic sport facilities, increased budget allocation to academic sport, increased sponsors and public investment, increased employment and entrepreneurship in students' Olympiads, and increased audiences for students' sports are also variables highly influenced by mass media in Iran.

**Conclusions**

It is evident that information dissemination role of media could be utilized as a tool for increase of public awareness level in respect to academic sport as well as to attract college students toward sports. Media, by taking advantage of advertising, information dissemination and education about sport and its advantages, can cause more active participation of female college students in different fields of public sports as well as championships in universities. At the same time, if women's sport is broadcasted by media, it probably would increase investment and financial supports both from public and private sectors in terms of women's sport; since, one of main objectives of financial supporters is to be introduced to public and attract even more consumers. This would be possible in shadow of media's higher supports from women's sport. Another dimension of academic sport development by mass media is increased employment and entrepreneurship; this means support and introduction of entrepreneurs and others engaged in the field by mass media would perform as a motivational force for others to be creative and innovative at students' sport events and Olympiads.

**Conflict of interests**

The author declares that there is no conflict of interests.

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SPORT AND MENTAL HEALTH LEVEL AMONG UNIVERSITY STUDENTS

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Abstract. Purpose: study of mental health level of university student, athletes and non-athletes. Material: The tested group consisted of 160 male and female undergraduates from Ouargla University, Algeria; 80 students-athletes from Institute of Physical Education and Sports and 80 students-non-athletes from Department of Psychology, English and Mathematics. In the study we used health mental scale, adapted by Diab (2006) to Arab version scale, formed from five dimensions (Competence and self-confidence, Capacity for social interaction, Emotional maturity, Freedom from neurotic symptoms, self rating and aspects of natural deficiencies). Results: the findings indicated that university students have high level of mental health. And the mean of the responses of students-athletes group by mental health scale reached (M = 32.40), with standard deviation (STD = 5.83), while the mean of the responses of students-non athletes group by mental health scale has reached (M = 27.47), with standard deviation (STD = 7.88). T-value, required to know significance of differences between means of students-athletes and students-non athletes has reached (T=4.51), (DF=185, p <0.01). So there are significant statistical differences between student athletes and non-athletes in their responses by mental health scale in favor of the student athletes. Conclusion: sports are beneficial in respect to mental health among university students and emphasizing the importance of the mental health of university students through its integration in the various recreational and competitive activities. Future qualitative research, covering multi-variables’ tests on mental health and others psychological characteristics could be performed in sports area.

Key words: mental health, sports, university students.

Introduction

Although it has been known for some time that physical exercises are good for physical health, it is within the past decade, that it has become commonplace to read in magazines and health newsletters that exercises can also be valuable in promoting sound psychological health. This optimistic appraisal has attracted a great deal of attention among public. However, for the most part, scientific community has been much more cautious in offering such unsubstantiated endorsement. Until recent time, assessment of the research literature on psychological outcomes associated with exercise, such as reduced anxiety and depression, current state have been equivocal. (Landers & Arent, 2001)

Ninety-five percents of college counseling center directors said that the number of students with significant psychological problems is of growing concern in their centers or campus, according to the latest Association for University and College Counseling Center Directors survey of counseling center directors. Seventy percents of directors believe that the number of students with severe psychological problems in their campuses has increased in the past year (Directors report that 21 % of counseling center students had severe mental health problems, while another 40 % had mild mental health problems). (AUCCCD, 2013)

People have regular tendency to do so, because it gives them an enormous sense of well-being. They feel more energetic throughout the day, sleep better at night, have sharper memory, and feel more relaxed and positive about themselves and their lives. And it’s also powerful medicine for many common mental health challenges. Most previous researches do conclude that sports, physical activity and exercises do have beneficial effects on general mental health. Within higher education environment, it is surprising that little research has explored the potential benefits of sports in a cohort of individuals who are at risk of mental health problems, i.e., university students. Of the few studies that have been conducted, Van Raalte et al. (2015) referred that viewing the www.SupportForSport.org site resulted in enhanced mental health referral knowledge and efficacy relative to a control group. Results suggest that tailored on-line programming can affect outcomes for student-athletes across geographic region and resource availability levels. Tyson et al. (2010) conducted a study on physical activity and mental health in student population. Results indicated that significant differences were observed between the low, medium and high exercise groups on the mental health scales, indicating better mental health for those, who engaged in more intensive exercises’ practicing. Whilst Ahmadi et al. (2002) reported that engaging in body building and swimming reduced scores on the beck Depression Inventory in female students, other searcher Toskovic (2001) found that students engaging in dynamic Taekwondo also reported lower levels of depression than in control group.
The purpose of study
Taking into account the evidence to suggest that sports are beneficial for mental health, and that university students are at elevated risk of such problems, the following study sought to investigate the impact of sports on mental health level among university students.

For the purpose of this study, the research study questions were as follows:
SQ1. What’s the level of health mental among university students?
SQ2. Are there significant differences in the level of mental health between student athletes and non-athletes?

The Hypotheses
HY1. There is high level of mental health among university students.
HY2. There are significant differences in the level of mental health between student athletes and non-athletes.

Material and methods
Participants
The sample of study consisted of 160 male and female undergraduates students from Ouargla University Algeria; 80 students’ athletes from Institute of Physical Education and Sports and 80 students’ non-athletes from Department of Psychology, English and Mathematics (figure.1). Participants were selected randomly.

<table>
<thead>
<tr>
<th>Institute (department)</th>
<th>Student athletes</th>
<th>Student non-athletes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Institute of physical educational</td>
<td>Psychology</td>
</tr>
<tr>
<td>The first</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>The second</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>The third</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>

Figure.1. Distribution the members of sample

Tool
In this study, Scale of Mental Health was used to collect data. adapted by Diab (2006) to Arab version, scale formed from five dimensions (Competence and self-confidence, Capacity for social interaction, Emotional maturity, Freedom from neurotic symptoms, self-rating and aspects of natural deficiencies).

To ensure the psychometric properties of the scale, it has been applied on 30 students; as the value of validity scale (T= 7.91) level of significance (0.01). The reliability was done, the value of Cronbach's alpha coefficient equal to (0.67) and the value of Spearman-Brown coefficient equal to (0.87).

Data analysis
Data analysis was carried out with the help of statistical packet for social sciences (SPSS) 20.00 software program. The results were presented as descriptive statistics. Regarding the correct tool, there is in front of each item estimate balance consists of one degree, where the "no" give (0) and "Yes" to give (1).

Results
In this section, the findings obtained from the data analysis related Sports and mental health level among university students are given in detail. Findings concerning the level of mental health among university students are shown in table 1.

<table>
<thead>
<tr>
<th>Level of mental health</th>
<th>Repetition</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High level</td>
<td>136</td>
<td>85%</td>
</tr>
<tr>
<td>Low level</td>
<td>24</td>
<td>15%</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>100%</td>
</tr>
</tbody>
</table>

In table 1, the number of students with high mental health has reached (s= 136), percentage (85%). While the number of students with low mental health has reached (s=24), percentage (15%). Thus, we can conclude that the level of mental health among students is high.

In table 2, mean values of students-athletes group’s responses by mental health scale has reached (M = 32.40), with standard deviation (STD =5.83), while the mean values of students-non athletes group’s responses by mental health scale has reached (M=27.47), with standard deviation (STD=7.88). T-value (to know significance
of differences between means of group student athletes and group students’ athletes) has reached (T=4.51), (DF=185, p <0.01). So, there are significant statistical differences between students-athletes and non-athletes in their responses by mental health scale in favor of students-athletes.

Table 2. Significance of differences in the mental health level of the tested sample

<table>
<thead>
<tr>
<th>Sample</th>
<th>N</th>
<th>M</th>
<th>Std</th>
<th>T Calculated</th>
<th>DF</th>
<th>Sing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student-athletes</td>
<td>80</td>
<td>32.40</td>
<td>5.83</td>
<td>4.51</td>
<td>158</td>
<td>yes</td>
</tr>
<tr>
<td>Student–non athletes</td>
<td>80</td>
<td>27.47</td>
<td>7.88</td>
<td></td>
<td></td>
<td>0.01</td>
</tr>
</tbody>
</table>

**Discussion**

The study, which was carried out in order to determine the level of mental health among students, revealed some important information, findings, and results. As results of this study, it was concluded that the students in university had high level of mental health.

This study differs from most previous studies, except the work of Samin (2012), who showed that there was high personal compatibility among university students. This difference exists due to nature of the mentioned studies’ goals as well as different characteristics of the samples in their sex, age, and cultural/social background. Based on the above, and the result of our findings of the first hypothesis, it is clear that there are factors helping students, such as social conditions, stable economic and situations, making them to feel self-importance as well as enabling them to cope with the psychological effects of life difficulties that might pass out during the study. These factors contribute to the sharp rise in the degree of psychological and social compatibility, and represent a kind of moral support, stimulating students' abilities to cope with various difficulties. Ganellen et al. (1984) referred that these factors mitigate the impact pressure on the individual, and strengthen psychological sources, and increase individual's sense of value and importance.

Based on results we concluded that there were significant differences between students-athletes and students-non athletes in level of mental health. Perhaps sports activities affect the various aspects of personality and growth, and also develop some life needs of students, thus influencing their behavior and personality. For example, opportunity for social interaction (Crone et al.2005), psycho-social, such as positive emotional experiences (Carless and Douglass, 2004; Carless & Sparkes, 2008; Crone, 2007), sense of achievement (Fogarty and Happell,2005) and improvements in general mental wellbeing (Laforge et al., 2002), are positively influenced on by sport activity as well as moderate depression (Craft, 2005; Craft & Perna, 2004) and anxiety (Biddle & Mutrie, 2001). Sports activity promotes self-confidence Larry (1983) referred that physical exercises let college men to be more satisfied, more outgoing, sociable and confident.

**Conclusion**

Finally, there is high level of mental health among university students in University Ouargla, and there are significant differences between students-athletes and students-non athletes. Thus, sports have potential to be of benefit for mental health of university students and emphasize importance of the mental health of university students through its integration in the various recreational and competitive activities.

Future qualitative research, covering multi-variables’ tests on mental health and others psychological characteristics could be performed in sports area.

**References**


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The electronic version of this article is the complete one and can be found online at: http://www.sportpedu.org.ua/html/archive-e.html

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PERSONALITY ORIENTED SYSTEM OF STRENGTHENING OF STUDENTS’ PHYSICAL, PSYCHIC AND SOCIAL-MORAL HEALTH

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Abstract. **Purpose:** to work out content of individualized trainings, permitting to correct deviations in different aspects of physical, psychic and social-moral health of higher educational establishments’ students. **Material:** in experiment 105 boy students of 20-24 years’ age participated. All students gave conscious consent to participate in experiment. The trainings were practiced 4 times a week, 45 minutes each. **Results:** it is interesting that change of different personality’s features is rather long process, which in some aspects resist to changes. We showed approaches to training vitally important skills and abilities, required for adaptation to modern social cultural medium; to the simplest techniques of organization of independent health related physical culture trainings; to means of health strengthening, formation of knowledge on health related physical culture. We developed personality-oriented system of formation of psychic and social-moral health. **Conclusions:** the worked out approach permits to achieve real positive psychic and socially important qualities of student’s personality during one academic year. **Key words:** health, physical culture, physical training, psycho-regulation, breathing gymnastic.

Introduction
Recent years there have been observed worsening of higher educational students’ physical, psychic and social-moral health [3, 17]. The found deviations in health are the results of many reasons: reduction of motor functioning against the background of increased academic loads; reduction of every day motor activity; violation of healthy life style rules [25]. Study of higher school students’ psycho-physical indicators [16] showed that in most cases there is found weak condition of motor qualities with unsatisfactory state of different psychic indicators [14]. To avoid this situation it is necessary to implement different forms of health related physical culture, special, correcting and rehabilitating activity in system of higher educational establishment students’ physical education. However, in this respect, pedagogues of higher educational establishments face great difficulties [6] because of absence of developed and scientifically grounded program of such trainings.

At present time problems of physical education of higher educational establishments’ students are still more acute [37]. As it was found in [8], traditional system of physical education does not realize the tasks of health formation of educational establishments’ students to the fullest extent. In such situation it is necessary to develop pedagogic technology [15] oriented on training of psycho-physical, social-moral health and important for learning students’ qualities [5].

Formation of students’ psycho-physical health can be realized in different directions. In opinion of V.V. Ismiyanov [13] such approach implies qualitative changes of students’ physical fitness (improvement of motor qualities: general endurance, speed endurance, strength, flexibility, quickness), psycho-emotional state (personality’s qualities, communicability, will power, feelings and emotions). It results in significant improvement of social status and life-building in system of higher education and further professional functioning of students. In such cases it is very important to determine students’ ability to self-cognition of own psycho-physical and motor potentials [4]. Not less important is express-assessment of students’ physical health level [27], substantiation of the used tests [28, 32].

The state of students’ social-moral health is determined by several factors. A.A. Opletin and V.D. Panachev [21] found that students’ will efforts facilitate stability of personality, psychic and physical health and increase of life tonus as well as workability and optimism. In process of pedagogic auto-training practicing at physical culture lessons psychological settings for formation of self development competence that facilitates formation of student’s professional orientation. In the process of future functioning psychological settings are fixed and transform in social. In other works [19] it is shown that in the structure of students’ temper low level of demand in mastering of objective world and strives for mental and physical labor prevails. With it is noted that there are good indicators of social activity and communicability.

Training of students’ significant for studying qualities requires appropriate content of their psychological and psycho-physical fitness. The offered by V.V. Pichurin [24] content of students’ such training is effective in respect to reduction of individual anxiety. The author points that application in physical culture lessons significant for boys kinds of sports – weight lifting and power lifting and for girls – aerobics and sakhadja yoga statistically significantly influenced
on reduction of individual anxiety. For achievement of the set aims Yu.A. Osipov et al. [22] recommend using technologies of formation of social physical culture—sports medium, rating system of assessment of students’ sports achievements; individualized and specialized programs of students’ physical education.

In other works demand in the following is noted: rising of psychological comfort in students’ groups in conditions of increase of their physical activity [38]; application of social constructive educational model for students’ training [30]; demand in consideration of social demographic factors’ influence on formation of students’ healthy life style [33]; determination of health levels and physical condition, physical workability and physical fitness; students’ psychic state [1, 26, 31]; constant monitoring of students’ health condition [29, 32, 40]; appropriate substantiation of tests’ usage [34].

In our previous researches we determined that content of additional (health related) physical culture training envisages prevailing orientation on health improving, general developing and sport-recreational tasks. With it, first attention is paid to formation of physical, psychic and social-moral health [15]. In such cases it is necessary to use adequate forms of control over students’ health [32] with their appropriate substantiation [35]. Besides, it is necessary to consider the presence of possible deviations in students’ health [36, 39]. Earlier we found that in training of future pedagogues it is important or realize salute-genetic approach [12]. This approach is based on anthroposophically oriented methodological principles and facilitates healthy, holistic development of students. With such approach main directions of students’ training (academic learning, training by life experience, internal spiritual development) are oriented on activation of human internal intentions; awakening of students’ will to study during all life; stimulation of independent work on own perfection in professional and personal spheres.

Testing of students elucidate a little individual peculiarities of such category. Such important aspects as physical, psychic and social-moral health of students are still out of scientists’ interests. The absence of such data seriously hinders formation of students’ comprehensive personalities and their social adaptation in modern society.

In connection with the above said it seems to be important to seek innovative approaches to new methodic and technologies’ working out in the process of students’ education and teaching. The purpose of such search is physical rehabilitation and pedagogic correction of students’ health by means of health related physical culture and elements of sports activity [5].

**Hypothesis:** personality-oriented system of students’ health formation shall consider their individual features. Such approach will permit to solve the following tasks:
- teaching to vitally important skills, required for adaptation in modern social-cultural medium;
- training the simplest techniques of organization of independent health related physical culture training;
- teaching to methods of health strengthening; formation of knowledge in health related physical culture.

**The purpose of the research:** is to work out personality oriented system of formation of students’ physical, psychic and social-moral health.

**The tasks of the research:**
1. To work out complexes of physical exercises for correction of deviation in physical, psychic and social health of students.
2. To assess effectiveness of complexes of physical exercises for correction of deviation in physical, psychic and social health of students.

**Material and methods**

**Participants:** in experiment 105 boy students of 20—24 years’ age participated. All students gave conscious consent to participate in experiment. The trainings were practiced 4 times a week, 45 minutes each.

**Procedure:**

Pedagogic experiment was conducted during one academic year on the base of pedagogic faculties of higher educational establishments. Experiment involved pedagogues, medical workers, specialists in physical education.

At each training, one from four training complexes was worked at:
1. Block “Attention”, block “Gymnastic for eyesight” and block “Breathing gymnastic”.
2. Block “Carriage” and block “Prophylaxis of flat-footedness”.
3. Block “General physical training”.
4. Block “Prophylaxis of cold” and block “Psycho-regulation”.

Testing was fulfilled twice a week: at the beginning and at the end of pedagogic experiment.

Organization of health related exercises’ training considered three main principles:
- Principle of consequent teaching from simple to complex;
- Principle of movement’s temp and duration correspondence to targets and tasks of training process safety;
- Principle of safety of educational process.

**Assessment of physical-metrical indicators:** we studied right hand strength, kg; left hand strength, kg; vital capacity of lungs, l; body length (cm) and mass (kg); heart beat rate in rest (b.p.m.); chest circumference (cm) [18].

**Assessment of significant for studying indicators:** it was fulfilled by pedagogues by five points’ scale. They assessed formation of interest to studying, mental workability, aggressiveness, emotional stability, degree of attention concentration, assiduity [10].
Assessment of formation of interest to physical culture and sports practicing: was fulfilled by students, who estimated each motive: health strengthening, communication, strive to be courage and resolute, preparation for future activity; self satisfaction with activity, self assertion and self realization by five points’ scale [7]:

1. I practice physical culture for health strengthening.
2. I practice physical culture to communicate more with my fellow students.
3. Physical culture permits for me to manifest courage and resolution.
4. I practice physical culture to prepare for professional functioning.
5. I practice physical culture, because I like sports trainings.
6. I practice physical culture and sports to defeat my fellow students.

After it we calculated mean value of accounted points.

Assessment of formation of socially significant qualities [20]: in questionnaire students assessed statements about their qualities by five points’ scale. In total 24 statements were used in questionnaire.

1. Respect most of people and my classmates;
2. I develop ability to see difficulties of other people and actively help them;
3. I am ready to sacrifice my interests in favor of collective;
4. I help my peers, not waiting for praise or award;
5. I want that my labor would be useful for people;
6. I have careful attitude to man made things;
7. I always strive to do my best in any work;
8. I strive to cope with all difficulties in work by myself;
9. I often invent my own approach to business, own means of achievement of the set target;
10. I like to offer and realize new deeds;
11. I am a purposeful person;
12. I am able to work in full strength for long time;
13. I am ashamed if I lazy to help my parents or friend;
14. Discontent with myself helps me to fight with my drawbacks;
15. I am responsible in respect to class interests, mutual success;
16. I feel sympathy toward peers, who are not able to do something;
17. I fulfill any unpleasant work, if it is useful for people;
18. I have careful attitude to animals, vegetation, nature;
19. I am scrupulous and diligent in any business;
20. I like independent, difficult work;
21. I like to do any work interesting and useful for myself and other people;
22. I like to master new activities, new knowledge and new skills;
23. I used to outline the main in any business without distracting to less important tasks;
24. I am able to control my temper and be tolerant in conflicts with people.

After calculation of collected by every student points we determined average level of social qualities’ formation: activity, moral position (questions 1, 2, 13, 14), collectivism (questions 3, 4, 15, 16), civic consciousness – strive to be useful for people (questions 5, 6, 17, 18), diligence (questions 7, 8, 19, 20), creative activity (questions 9, 10, 21, 22) and will quality (questions 11, 12, 23, 24).

Assessment of motor qualities’ formation: assessment of main motor qualities (strength, quickness, dexterity, flexibility, speed-power indicators, general endurance) we used tests for the following:

1) Quickness of movements – 30 meters’ run from high start;
2) Dexterity – “shuttle run” 3x10 m;
3) Speed-power indicators – long jump from he spot;
4) Strength – chin ups;
5) Flexibility – forward bending from sitting position;
6) General (aerobic) endurance – run during 6 minutes.

Assessment of healthy life style indicators: components of healthy life style (in percents) were assessed with questioning method. Students informed about usage of the following components: morning exercises; independent practicing of physical exercises in any form; attendance of sport circle; hardening; normal night sleep. Every answer was assessed by five points’ scale. The sum of collected points was calculated by eight test questions. Then mean value calculated.

Content of trainings: was oriented on strengthening of health different aspects [9].

Complex I

1. Block “Attention” (25 minutes):
Walking on narrow support: gymnastic balance beam, gymnastic bench; walking by marks – with back forward, side forward.

Exercises for coordination and balance: juggling by big (volleyball) and small (tennis) balls (2-3 balls); moving on inclined, limited support with and without an object on head.
Exercise on gymnastic balance beam: walking with different amplitude of movements, with acceleration; walking with legs‘ waving and turns on toes; stance on toes; forward jump by pushing with two feet; balancing on one foot; squat with hands on floor; jumps down.

Multiple passes of basketball ball in pairs – up to 3-5 minutes.

Catching of volleyball (tennis) ball: from floor, rolling ball (standing on the spot and in motion), flying high, making step.

Throw of basketball ball in basket by two hands from below.

Throw of small balls to target from the spot and in motion.

2. Block “Gymnastic for eyesight” (10 minutes)

The exercises are fulfilled in convenient sitting position with head resting on chair’s back and maximally relaxed muscles.

“Eyeball movements to the right and to the left” – shall be fulfilled without excessive tension, as slow as possible.

“Eyeball movements upwards and downwards” – shall be fulfilled with maximal amplitude with head upright.

Repeat 4-6 times to each side. Close eyes and relax muscles for 30-40 seconds.

“Fixing of eyes on tip of nose” – shall be fulfilled with maximally relaxed muscles and calm, even breathing, during 10-20 seconds. After exercise, close eyes and relax body muscles for 30-40 seconds. If student feel fatigue, rest time can be prolonged.

“Eyes rotation” – rotate eyes by circumference: first clockwise, then – counterclockwise. Make 3 rotations to each side. Rotations shall be smooth, without jerks. Head shall be unnovable. Relax muscles for 30-40 seconds.

“Blinking”: quickly press and part eyelids (blink) during 15-20 seconds. After it, close eyes and relax muscles for 30-40 seconds. This exercise is useful after durable reading; in breaks between exercises for eyesight.


Lungs’ ventilation: deeply inhale and exhale as quickly as possible. Make 5-7 cycles. After exercise, relax muscles in lying position with closed eyes.

Cleaning breathing: take main stance and deeply inhale through nose, make 2-3 seconds’ pause. Exhale by “portions” (3-4 portions in one cycle).

Expansion of chest: in main stance stretch arms forward. Fulfill deep inhales/exhales: during inhale move arms backward aside; at exhale – return arms in forward position. Repeat 10-12 times. This exercise expands chest that is very important for good breathing. Children with narrow chest have weak breathing muscles. This exercise helps to form elementary skills of rational breathing movements.

Complex 2
Block “Carriage” (35 minutes)


Bow posture: lie on abdomen, feet together. Bend legs and seize ankles. Arms shall be stretched. Try7 keep legs and feet together. Slowly raise shins. Backbend so that only abdomen is in contact with floor. Look upward. Keep the posture for 10 sec. and slowly take initial position. Relax all body. The posture is useful for all body, especially for backbone and abdomen; it perfectly eliminates defects of carriage.

Stand on one foot: - initial position – stand on one foot with left ankle on the base of right thigh. Or you can place left sole on inner surface of right thigh. Keep palms together in front of chest. Keep balance. Slowly raise palms above head, keep them together. Part hands aside like tree branches. Arms shall be stretched. Slowly come out of posture and repeat it on other foot. This exercise forms correct carriage, develops arms, girdle and back muscles; improves balance.

Posture of armchair: stand upright with feet parted by approximately 40 cm. Stretch arms forward, hands are relaxed, hanging down. Bend legs in knees and squat a little. Imagine that you are sitting in invisible armchair. Keep posture as long as possible. Upper part of legs will be tensed. It is an excellent exercise for legs and back’s muscles, as well as for handsome carriage.

Swallow posture: bend forward from main stance. Raise right leg parallel to floor, stretching arms forward. Arms, torso and right leg make straight line. Keep posture for 20-30 seconds and take initial position. Repeat exercise with rising left leg. This exercise trains back muscles as well as muscles of thigh back side and girdle.

Forward bent in sitting position: lie on back, keep feet together. Slowly take sitting position, bend forward as low as possible. Seize ankles. Drop head and relax. Keep posture about 20 seconds. Come out of posture: first sit upright and then, lie on back. Place arms along torso with palms upward. Feet are a little apart.

Cobra posture: lie on abdomen, keep legs together. Place palms on floor at shoulder level. Slowly raise and bend as much as possible head and chest; keep abdomen in contact with floor. Look upwards. Keep posture about 20 sec. Breath normally. Then low slowly first chest and then head. This exercise strengthens back muscles and eliminates shifts in backbone.

Triangle: from main stance part feet wider than shoulders by jump. Raise arms aside at shoulder level with palms downwards. Turn right and left feet to the right – left leg is stretched. Bend torso to the right and touch right ankle with right palm (possible to place right palm on the floor). Stretch left arm upwards. Keep posture for 30-40 seconds. Breathing
shall be even and deep. Take initial position and fulfill the exercise to other side. This exercise increase hip joints and backbone’s mobility; expands chest.

*Forward lunge with arms upwards:* From main stance raise arms upwards – palms together. Make deep forward lunge with right leg; raise head and look at palms. Angle in right knee shall be 90°, left leg is stretched. Keep posture for 20-30 seconds. Breathing is free. This exercise increase tonus and strengthen muscles of back, legs and shoulders.

**Block “Prophylaxis of flat-footedness” (10 minutes)**

Initial position (i.p.) is sitting on gymnastic bench. Seize basketball ball with feet and throw it (12-15 times).

i.p. is sitting on gymnastic bench; rolling of small ball by foot (50-60 sec. by each foot).

i.p. is sitting on gymnastic bench; bending and unbending of feet quickly (20-30 sec.).

i.p. is sitting, resting on floor by hands; rolling of ball by inner feet arches.

i.p. is standing on knees with hands on waist. Sit on heels 10-12 times.

i.p. is standing by gymnastic wall. Walk on the spot highly raising thigh and bending foot in sole.

i.p. is standing with hands on waist. Walk on the spot keeping contact of toes with floor (up to 60 sec.).

i.p. is sitting position with hands on floor. Actively bend and unbend feet (by 18-20 times).

Jumps on the spot with little moving forward on tip-toes (up to 1 minute).

Balancing on filled ball – up to 1 minute.

**Complex 3**

**Block “General physical training” (45 minutes)**

At first stages of training the quantity of exercises can be reduced; the, with improvement of physical fitness it can be increased.

Run and jumps on the spot; with moving with additional weight (in different directions and with different amplitude, from different initial positions).

Running on arms, move forward.

Carrying of moderate loads on back with maximal speed.

Outdoor games of power orientation (for example improvised basketball with filled ball).

Chin ups on gymnastic bar.

Squatting with different temp and different initial positions; on one or two feet.

Jumps in depth by method of “strike training”.

Long and high jumps from the spot and from run.

Jumps in half squat position in different directions (face, back, right or left side forward).

High jumps with catching hanged objects.

Jumps on one or two feet, moving forward by circle, by “snake”, on the spot with turn.

Skipping (or with shortened skipping rope) on the spot and in movement.

Pressing ups in lying position.

Bending of stretched legs in hanging on arms position.

Torso bending in position lying on back, on abdomen.

Jumping down from pedestal of 40-60 cm height.

Exercises on gymnastic bar.

Walking in deep squat.

Shuttle run (5 x 6) with touching floor with hand.

Climbing rope by 2-3 meters’ height.

**Complex 4**

**Block “Prophylaxis of cold” (5 minutes)**

Exercises for neck consist of three movements:

1. In standing position relax neck and sharply turn head ftp the right and to the left. Repeat 5-25 times;
2. In standing position drop head sharply forward and backward for 5-25 times;
3. In standing position bend head to the right and to the left (5 times). Breathe normally. When bending try to keep shoulders unmovable. After some time you will be able to put ear on shoulder.

This exercise strengthens neck muscles; relaxes in case of tonsillitis, pharyngitis, makes voice louder, eliminates speech defects.

Hatha Yoga exercises (25 minutes):

*Triangle:* from main stance part feet wider than shoulders by jump. Raise arms aside at shoulder level with palms downwards. Turn right and left feet to the right – left leg is stretched. Bend torso to the right and touch right ankle with right palm (possible to place right palm on the floor). Stretch left arm upwards. Keep posture for 30-40 seconds. Breathing shall be even and deep. Take initial position and fulfill the exercise to other side. This exercise increase hip joints and backbone’s mobility; expands chest.

*Forward bent from lying position:* lie on back, keep feet together. Slowly take sitting position, bend forward as low as possible. Seize ankles. Drop head and relax. Keep posture about 20 seconds. Come out of posture: first sit upright
and then, lie on back. Place arms along torso with palms upward. Feet are a little apart. This posture is favorable for back part of legs and abdomen muscles. 

*Forward bent from standing position*: take main stance. Close palms behind back. Raise palms upward up to upper back at blades’ level. Put feet wider than shoulders. Bend torso forward to right knee. Keep this posture for 20-30 seconds with normal breathing. Turn to initial stance, removing palms from behind the back. If it is difficult to close hands behind back, it is possible to seize wrist and then continue other movements. This exercise strengthens back and legs’ muscles, increase mobility in girdle.

*Birch (stand on shoulders)*: lie on back, arms are along torso with palms down. Raise both straightened in knees legs, until they will be behind head. Bend arms in elbows and place palms on back. The, slowly raise legs, feet towards ceiling. Legs and torso shall make straight line and chin – pressed to chest. Keep this position 15-30 sec. without over tension. Then slowly low legs and place arms on floor, palms down. This exercise is favorable for central nervous system, blood vessels; increases resistance to cold.

*Block “psycho-regulation” (15 minutes)*

*Relaxation lying posture*: lie on back with feet at about 40 cm width. Head touches floor, palms – upward and arms are at little distance from torso. Close eyes and relax. Breathe rhythmically. Then breathing will become light and slow. Concentrate on deep and light exhales. Keep this position 3-5 minutes.

*Stand on shoulders (birch)*: Birch (stand on shoulders): lie on back, arms are along torso with palms down. Raise both straightened in knees legs, until they will be behind head. Bend arms in elbows and place palms on back. The, slowly raise legs, feet towards ceiling. Legs and torso shall make straight line and chin – pressed to chest. Keep this position 15-30 sec. without over tension. Then slowly low legs and place arms on floor, palms down. This exercise is favorable for central nervous system, blood vessels; increases resistance to cold.

*Stand on one leg*: stand upright with feet parted by approximately 40 cm. Stretch arms forward, hands are relaxed, hanging down. Bend legs in knees and squat a little. Imagine that you are sitting in invisible armchair. Keep posture as long as possible. Upper part of legs will be tensed. It is an excellent exercise for legs and back’s muscles, as well as for handsome carriage and self-confidence.

*Lying rest posture*: lie on back with feet at about 40 cm width. Head touches floor, palms – upward and arms are at little distance from torso. Close eyes and relax. Breathe rhythmically. Then breathing will become light and slow. Concentrate on deep and light exhales. Keep this position 3-5 minutes.

*Statistical analysis*: we used commonly known methods of transformation of questioning empiric data [23]. With the help of logical procedures we revealed correlations of the studied variables and determined mean statistic indicators of boys and girls’ physical fitness at the beginning and at the end of academic year. Confidence of differences was determined by Student’s t-criterion and significance level (p).

**Results**

**Substantiation of physical education system’s effectiveness**

**Assessment of students’ motor fitness**

For assessment of effectiveness of the worked out education system’ content we fulfilled estimation of main motor qualities. In table 1 we present mean statistic data of students’ physical fitness at the beginning and at the end of pedagogic experiment. Data analysis showed that most of the studied indicators witness about increase of results, comparing with initial data (р <0.05). Exclusions were results of 30 meters’ run, in which no confident differences were found.

Table 1. Indicators of students’ motor fitness at the beginning and at the end of pedagogic experiment (M+m)

| Indicators | Testing | | | | |
|------------|---------|---------|---------|---------|
|            | Initial| Final   | Differences | Confidence of differences |
| 30 meters’ run, sec. | 7.2 ± 0.14 | 7.0 ± 0.15 | 0.2 | 0.97 | > 0.05 |
| Shuttle run 3 x 10 m, sec. | 10.65 ± 0.14 | 10.2 ± 0.16 | 0.45 | 2.12 | < 0.05 |
| Long jump, cm | 130.6 ± 1.95 | 137.2 ± 2.39 | 6.4 | 2.07 | < 0.05 |
| Chin ups, q-ty of times | 10.7 ± 0.27 | 12.1 ± 0.62 | 1.4 | 2.07 | < 0.05 |
| Bending, cm | 8.9 ± 0.62 | 11 ± 0.8 | 2.1 | 2.07 | < 0.05 |
| Run during 6 minutes | 1203.2 ± 81.4 | 1474.4 ± 89.6 | 271.2 | 2.24 | < 0.05 |

**Assessment of students’ physical metric indicators**

In table 2 we give mean statistical data of students’ physical metric indicators at the beginning and at the end of pedagogic experiment. At the end of pedagogic experiment in the studied indicators we registered statistically confident (p<0.05) improvements, comparing with initial data. Exclusions were results of body length and mass, in which no differences were found.
Table 2. Indicators of students’ physical metric parameters at the beginning and at the end of pedagogic experiment (M±m)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Testing</th>
<th>Differences</th>
<th>Confidence of differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial</td>
<td>Final</td>
<td>t</td>
</tr>
<tr>
<td>Body length, cm</td>
<td>159.0 ± 1.23</td>
<td>160.5 ± 0.8</td>
<td>1.02</td>
</tr>
<tr>
<td>Body mass, cm</td>
<td>57.0 ± 0.89</td>
<td>56.9 ± 0.89</td>
<td>0.08</td>
</tr>
<tr>
<td>Chest circumference, cm</td>
<td>100.8 ± 1.12</td>
<td>104.1 ± 0.97</td>
<td>2.23</td>
</tr>
<tr>
<td>Vital capacity of lungs, l</td>
<td>3300 ± 31.67</td>
<td>3398 ± 28.45</td>
<td>2.18</td>
</tr>
<tr>
<td>Right hand dynamometry, kg</td>
<td>47.9 ± 0.79</td>
<td>49.9 ± 0.53</td>
<td>2.1</td>
</tr>
<tr>
<td>Left hand dynamometry, kg</td>
<td>47.0 ± 0.79</td>
<td>49.1 ± 0.53</td>
<td>2.21</td>
</tr>
</tbody>
</table>

Table 3. Indicators of students’ interest to physical culture practicing and formation of healthy life style skills (points) (M±m)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Testing</th>
<th>Differences</th>
<th>Confidence of differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial</td>
<td>Final</td>
<td>t</td>
</tr>
<tr>
<td>Interest to physical culture</td>
<td>4.01 ± 0.1</td>
<td>4.41 ± 0.1</td>
<td>2.83</td>
</tr>
<tr>
<td>practicing, points</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formation of healthy life</td>
<td>8.4 ± 0.6</td>
<td>20.9 ± 2.8</td>
<td>4.37</td>
</tr>
<tr>
<td>style skills, conv. un.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After pedagogic experiment we found confident (p<0.01) increase of students’ interest to physical culture practicing.

Assessment of healthy life style skills’ formation resulted in the following: total data showed statistically confident increase (p<0.001) of healthy life style skills’ formation (see table 3).

Assessment of significant for studying indicators

These indicators were combined as far as we found no statistically confident differences between them (see table 4).

Table 4. Indicators of students’ pedagogic characteristics (M±m)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Testing</th>
<th>Differences</th>
<th>Confidence of differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial</td>
<td>Final</td>
<td>t</td>
</tr>
<tr>
<td>Interest to studying</td>
<td>2.14 ± 0.1</td>
<td>2.47 ± 0.1</td>
<td>2.33</td>
</tr>
<tr>
<td>Mental workability</td>
<td>2.25 ± 0.1</td>
<td>2.56 ± 0.1</td>
<td>2.19</td>
</tr>
<tr>
<td>Aggressiveness</td>
<td>2.28 ± 0.1</td>
<td>2.15 ± 0.1</td>
<td>0.92</td>
</tr>
<tr>
<td>Emotional stability</td>
<td>2.97 ± 0.1</td>
<td>3.26 ± 0.1</td>
<td>2.05</td>
</tr>
<tr>
<td>Concentration of attention</td>
<td>2.76 ± 0.1</td>
<td>3.06 ± 0.1</td>
<td>2.12</td>
</tr>
<tr>
<td>Diligence</td>
<td>2.81 ± 0.1</td>
<td>3.11 ± 0.1</td>
<td>2.12</td>
</tr>
</tbody>
</table>

After pedagogic experiment we found that practically all studied indicators were on higher, statistically confident (p<0.05) formation level. Exclusion was indicator of aggressiveness, in which differences between groups were not confident.

Assessment of socially significant qualities

Socially significant indicators of different age groups were combined as far as there were found no statistically confident differences between them (see table 5).

Table 5. Socially significant qualities of students (M±m)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Testing</th>
<th>Differences</th>
<th>Confidence of differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial</td>
<td>Final</td>
<td>t</td>
</tr>
<tr>
<td>Activity of moral position</td>
<td>3.04 ± 0.1</td>
<td>3.36 ± 0.1</td>
<td>2.26</td>
</tr>
<tr>
<td>Collectivism</td>
<td>3.16 ± 0.1</td>
<td>3.47 ± 0.1</td>
<td>2.19</td>
</tr>
<tr>
<td>Civic consciousness</td>
<td>3.24 ± 0.1</td>
<td>2.51 ± 0.1</td>
<td>1.91</td>
</tr>
<tr>
<td>Diligence</td>
<td>3.30 ± 0.1</td>
<td>3.61 ± 0.1</td>
<td>2.19</td>
</tr>
<tr>
<td>Creative activity</td>
<td>3.42 ± 0.1</td>
<td>3.74 ± 0.1</td>
<td>2.26</td>
</tr>
<tr>
<td>Will quality</td>
<td>3.38 ± 0.1</td>
<td>3.69 ± 0.1</td>
<td>2.19</td>
</tr>
</tbody>
</table>

At the end of pedagogic experiment most of socially significant qualities (with the exclusion of civic consciousness quality, in which no differences were found) were statistically confident (p<0.05) were formed better.
Discussion

Results of our researches supplement the data of other authors about demand in formation of students’ healthy life style [13] and their self cognition of their psycho-physical and motor potentials [4]. It should be noted that results of many researches [1, 19] to larger extent are oriented on socialization of students with health problems in conditions of educational medium. Our previous works [15, 27] also point that it is possible to apply the worked out approaches to students of this category.

Significance of students’ psycho-physical-indicators of health can be one of the most important components in formation of their behavior style in social medium of universities. In this aspect our results are in good agreement with opinion of Gherissi A. Et al. [30] about specificities of realization of national holistic strategy of social constructivist model of students’ education. Our previous researches point at worsening of higher educational students’ physical, psychic and social moral health [2]. Results of our present research continue solution of this problem. Mc Sharry P. and Timmins F. [38] note significance of behavioral model, which permits for students to master stress control skills. It is especially important for first year students for their successful adaptation to educational medium. Results of our research point that it is possible to strengthen physical, psychic and social-moral health through creation of individualized behavior system.

Analysis of the received results permitted to determine that students indicators before and after pedagogic experiment differ statistically confidently. Effectiveness of the worked out system is proved by the following: confident differences of physical fitness before and after pedagogic experiment, statistically confident advantage by most of physical metric indicators, confident increase of interest to physical culture practicing and formation of healthy life style skills.

It is interesting that change of different personality’s features is rather long process, which in some aspects resist to changes. We found statistically confident changes in such parameters as socially significant qualities of person, indicators of pedagogic characteristics. It points at rather adequate and effective means and methods, used in our research. Such approach permits to achieve real positive changes of psychic and social-significant qualities of higher educational establishments’ students within one academic year.

Conclusions

Thus, content of additional (health related) physical culture training implies list of knowledge, skills and abilities. Prevailing orientation of such training shall be directed on solution of health related, general developing and recreational tasks. With it, attention of first priority shall be paid to formation of physical, psychic and social-moral health. Application of non traditional health related means, like Hatha Yoga, in physical education system will also be effective. Very important is ability to consciously form healthy life style skills. It permits to strength and deepen professional fitness at the account of activation of creative abilities, releasing of additional time due to rhythmic organization and structuralizing of educational process.

Results of the conducted researches supplement theory and methodic of students’ physical education with new ideas about upgrading of educational process. The basis of such process is implementation of personality oriented system of students’ physical, psychic and social-moral health strengthening.

References


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The electronic version of this article is the complete one and can be found online at: http://www.sportpedu.org.ua/html/archive-e.html

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OVERWEIGHT AND OBESITY RISK ASSESSMENT – TWO METHODS, DIFFERENT RESULTS
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Physical Education and Sport Department, Bucharest Economic Studies University

Abstract. **Purpose**: the purpose of this study was to verify if there is any significant difference between body fat assessment by calculating body mass index and by using bioelectrical impedance analysis. **Materials**: subsequently we determined the ratio between body fat and muscular mass percentage in a sample of 156 university girl students. **Results**: BMI and muscle mass percentage seem to have similar variance and trends, while body fat exceeded in numbers and percents the highest levels of BMI. While by calculating BMI the found number of overweight and obese subjects was 23 from the total of 156, (14 %); by measuring body fat percentage that number increased to 67 (43%) of girl students in the sample. The t test showed significant difference between BMI values and the body fat percentage for the study sample: t (155) = 2.37, p<0.01. **Conclusions**: this study supports the idea that BMI results may be insufficient for correct assessment of overweight and obesity risk. Body composition adds useful information about health and fitness. A few concluding recommendations, regarding beneficial effects of exercise, have been made aiming to provide students of all body parameters with meaningful, relevant and positive physical education and health knowledge.

Key words: Body composition, girl students, body fat, fitness, health.

Introduction
A report of Organization for Economic Cooperation and Development (OECD) entitled ‘Health at a Glance: Europe 2012’ says that more than half (52%) of the total adult population across the European Union are now overweight or obese [22]. Explanation implies balance between sedentary behavior and physical activity and the changes in people’s nutrition habits after the half of the 20th century. In this postindustrial society, technology development replaced human work force with machines reducing gradually people’s physical labor. Nurturing habits and customs did change, and they were influenced in many different ways by urbanization, technology progress and globalization. This three factors have often resulted in diets, in which an important percentage of energy intake comes from industrial processed food, associated with an increased consumption of sugar, fats, and salt [14].

Poor eating is leading to a range of physical health problems and some psychological after effects as well. Overweight problems of children and young people are associated with asthma, type 2 diabetes, depression, being bullied, learning difficulties, low self confidence and social reluctance; the greater body mass index is, the greater are risks to health and precarious quality of life.

In spite of wide interest to body weight assessment and physical appearance, most individuals are not aware of how much fat they deposit in their bodies. The most used equation for approximate the body fat is body mass index (BMI). A report by World Health Organization (1995) warned that row BMI data might create confusion between masculinity and overweight. De Lorenzo et al. (2001) suggested that BMI reliability for measuring body fat is questionable, and recommended direct measurement of body fat for an accurate diagnosis of overweight and obesity.

The purpose of this study is to verify if there is any significant difference between body fat estimation by calculating body mass index and by using bioelectrical impedance analysis. Subsequently we studied the ratio between body fat and muscular mass percentage in a sample of young Romanian women.

Material and methods
The objective issues of weight management tackled in this paper are weight, body mass index and body composition. The study sample consisted of 156 girl students, between 19 and 24 years’ age, randomly selected from those who attended weekly physical education sessions. For objective data collection we used anthropometrical measurements – height and weight – which enable us to calculate Body Mass Index (BMI) and body composition.

BMI is a measure of body fat based on height and weight; its normal range is usually considered as 18.5 to 24.99 kg/cm²; with it, values 25 are considered as overweight and over 30 – as obese. Body composition was assessed with a bioelectrical impedance analysis technology. It showed data about body fat and muscle mass percentage.

Body fat (BF) percentage, referred to as relative body fat, was obtained by dividing fat mass by total body weight. Average BF percentage was 15 for men and 23 for women. Obesity, which may be defined as an excessive
amount of total body fat for a given body weight, was identified as excessive body fat 25% for men and 32% for women. Wilmore, Buskirk, DiGirolamo & Lohman (1986) indicated some referential values for body fat assessing:

<table>
<thead>
<tr>
<th>Essential fat</th>
<th>&lt;8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal fat</td>
<td>15%</td>
</tr>
<tr>
<td>Most athletes</td>
<td>12–22%</td>
</tr>
<tr>
<td>Optimal health</td>
<td>18–30%</td>
</tr>
<tr>
<td>Optimal fitness</td>
<td>16–25%</td>
</tr>
<tr>
<td>Overweight &amp; Obesity</td>
<td>&gt;30%</td>
</tr>
</tbody>
</table>

Adapting the standards to our sample characteristics we compared body fat percentage data in our study with the Standards of Fatness for Women in Percent Body Fat [10]. It considered the average as 23% and also a normal interval between 9 and 22% (below average) and between 24 and 31.9% (above average). Body fat values below 8% represent a risk of diseases and disorders associated with wrong eating and above 31% are a marker of diseases associated with obesity.

Beside descriptive statistic analysis, the paired-samples “t” test was calculated for comparison between data sets.

Results

Average weight of adult person is 62 kg according to a league table of the world's 'fattest' nations from London School of Hygiene & Tropical Medicine [18]. In this table Romania has a middle range: 95 from 177 countries with an average weight of 66.4 kg. Girl students in our sample had average weight of 58 kg, with 1.65 m average height, resulting in average BMI value of 21.2 kg/m^2, corresponding to a slender feminine silhouette.

In the next table we present descriptive statistic data for three studied variable:

<table>
<thead>
<tr>
<th>Table 1. Descriptive statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Mode</td>
</tr>
<tr>
<td>SD</td>
</tr>
<tr>
<td>Sample variance</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Count</td>
</tr>
</tbody>
</table>

Taking into account BMI values and its corresponding classification we obtain the following results:

<table>
<thead>
<tr>
<th>Table 2. BMI results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight &gt;18.5 kg/m^2</td>
</tr>
<tr>
<td>units</td>
</tr>
<tr>
<td>%</td>
</tr>
</tbody>
</table>

According to BMI values almost 62 % of the subjects are in the normal weight group, 14 % are overweight and obese and the rest 23.6 % are underweight.

Body fat percentage measurement showed different results:

<table>
<thead>
<tr>
<th>Table 3. Body fat results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal fat &gt;15 %</td>
</tr>
<tr>
<td>units</td>
</tr>
<tr>
<td>%</td>
</tr>
</tbody>
</table>
From this point of view the number of subjects presenting an important percentage of body fat surpasses by far optimistic result of BMI calculated previously.

**Table 4. Muscular mass results**

<table>
<thead>
<tr>
<th></th>
<th>&lt; 35%</th>
<th>34.9 – 30%</th>
<th>25 – 29.9%</th>
<th>&lt; 25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>units</td>
<td>8</td>
<td>41</td>
<td>95</td>
<td>12</td>
</tr>
<tr>
<td>%</td>
<td>5%</td>
<td>26.4%</td>
<td>61%</td>
<td>7.7%</td>
</tr>
</tbody>
</table>

The muscular mass percentage mean value in our sample was 29%, i.e. higher than the reference mean value of 23%. We consider it normal, given the homogenous sample of very young women and being known that lean body mass is decreasing with age.

**Discussion**

The ratio body fat percentage of muscle/mass, measured in the research sample, revealed that in 81 of subjects muscle mass percentage is bigger than body fat percentage; in 2 cases those two variables were equal and in 73 subjects body fat percentage was higher than muscle mass. Fat tissue contains no water and has bigger volume comparative with muscle tissue, which has higher density. The higher is the percentage of body fat, the higher the overall body volume is. Body fat percentage also directly correlates with increased health risk, especially in respect to metabolic and cardiovascular diseases [3, 5, 16].

As the figure above shows, there is significant difference between the variance of three variables presented in this research: BMI and muscle mass percentage seem to have similar variance and trends, while body fat exceed in numbers and percents the levels of BMI of the obese.

Calculating BMI, the determined number of overweight and obese subjects was 23 from the total of 156, (14%), while by measuring body fat percentage that number increased three times (43%) of girls students in our sample. In other words 20% of girl students were in normal weight group, because of high body fat percentage, could be considered actually overweight. “T” test showed significant difference between BMI values and body fat percentage in the studied sample: t (155) = 2.37, p<0.01. While BMI may give an individual a general idea of increased risk of obesity-related health problems, it fails to distinguish the composition of that weight [8].

In most countries the rise in obesity has affected all population groups, regardless gender, age, race; income or education level. Evidences from a number of countries, including Austria, England, France, Italy and Spain, indicate that obesity tends to be more common among individuals in disadvantaged socio-economic groups, being particularly strong among women [15]. There is also a relationship between the number of years, spent in full-time education and obesity, with the most educated individuals displaying lower rates; with it the gradient of obesity is stronger in women than in men [21]. “Educational achievements correlate with higher earnings through access to
better job opportunities and social networks, which in the long term are expected to translate into higher health expenditures and thus better health” [7].

Physical activity has an indubitable beneficial effect on some aspects of quality of life. In the past years of 21-st century mounting research has shown how lifestyle changes, including exercise, stress management, and diet can prevent almost ninety percent of chronic illnesses in our society [4].

Regarding the effect of exercise, localized in a specific body part Anikieiev (2015), analyzing a number of studies, concluded that contribution of fat oxidation to muscles functioning energy supply is extremely little [2]. Actually only main metabolism can be supplied by fat oxidation [17] and consecutively the skin fold thickness will not decrease in that specific spot because the surrounding muscles work out. Fat loss comes down not due to targeted exercises, but owing to the basic principle of how many calories you expend versus how many you take in [12]. Combining cardiovascular exercise with weight training and correct eating seems to be right approach to more fat than weight loss [19].

Conclusion

BMI results may be insufficient for a correct estimation of overweight and obesity risk. The body composition adds useful information about health and fitness status.

Physical education and sport instructors should have supporting and encouraging attitude and motivate students for physical effort. Satisfaction, gained from exercising, can eventually become a motivation in itself, especially when the effort has positive effects on enhancing perceptions of health and overall well-being.

A few concluding recommendations can lead to an enhancement of vigor and health for students of all ages and body parameters:

− To encourage young people to set realistic and feasible goals and motivate them to keep weight under control by combining eating and physical activities;
− To establish a good relationship between effort and recovery and, at the same time, to make clear that individuals are responsible for their own success or failure;
− Exercise enjoyment is positively associated with motivation for physical effort. Physical education instructors can enhance enjoyment by creating good working climate, by adding variety to workouts, and by ensuring that the fitness programs are physically challenging and meet the subject’s preferences and personal goals;
− To provide all young people, of allbody parameters, with meaningful, relevant and positive physical education and health knowledge and eventually to deliver healthy, valuable graduates for society.

Integrating physical and health education in preventative strategies would have better effect in reducing overweight and obesity among university students and co-morbidities associated with these later, during life [14].

Conflict of interests

The author has no conflict of interests to declare.

References


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THE RELATIONSHIP BETWEEN BIORHYTHM (PHYSICAL CYCLE) AND SPORTS PERFORMANCE IN WOMEN'S BASKETBALL

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Abstract. Purpose: Despite many researches that have been done in the field of biorhythm and due to lack of single view among scholars, as well as importance of forecasting of athletes’ performance to improve their results, the purpose of this study is to determine relationship between biorhythm (physical cycle) and sports performance of Iranian Super League women basketball players. Material: This is a descriptive-correlational study. Statistical population was women basketball players in 1394-95 women's Super League and the statistical sample included all of the players of the teams, qualified as semi-finalists (44 players). The tool, used in this research, was athletes’ performance questionnaire (Charbonneau, 2001) containing five questions by a Likert scale from 1 (poor) to 5 (excellent) points. Biorhythm software and descriptive tests and also inferential statistical test including Chi-Square, independent T-test and one way ANOVA at significance level of (α≤0.05) in SPSS software were used for analyzing the collected data. Results: results showed that there was no significant relationship between physical energy and performance of athletes (p = 0.85). Also the results of one way ANOVA test showed that there was no significant difference between performance of athletes at three levels (positive, negative and critical) and physical cycle (p = 0.96). The value of Chi-Square was equal to 2.63 that showed there was no significant relationship between different levels of physical cycle and the results (win or lose) of match (p = 0.026). Conclusion: The results of this study revealed that physical performance did not depend on 23-day cycle, stated in the Biorhythm theory, and there was no evidence proving existence of these cycles. It can be concluded that there is no justifying reason to use the Biorhythm software in hard exercises.

Keywords: biorhythm, performance, sports, physical cycle, women’s sport.

Introduction

Biorhythm is one of the newest topics in the area of mind ergonomics identification, which can be very effective in reducing work related accidents and any mistakes without apparent reasons through identifying intellectual, physical and emotional aspects of a person [4, 7]. Today, there is too much emphasis on attending different aspects of human resources, both physical and non-physical in order to maximize individual and organizational productivity and the prerequisite for this is identifying human resources accurately in terms of physical and intellectual ergonomics. One of the most essential elements in this kind of identification is using biorhythm, which represents their intellectual, physical and emotional characteristics in different days of their lives [10, 9].

The changes in stamina and ability to carry out everyday activities, such as exercising and participating in a party, feeling healthy or sick, dealing with problems and even intellectual order or critical moments of life that an individual experiencing his/her worst or best conditions in terms of energy are categorized in three alternating cycles, namely physical, emotional and intellectual, which altogether form the individuals’ biorhythm [13]. Awareness about the situation of physical, emotional and intellectual energy can help increase individual’s productivity. For example, when the physical energy is in its peak, it is the best time for doing heavy works, sports, surgical practices and making vital decisions. In the course of positive thinking and perception, one must act more carefully and avoid risky activities, because there is a high possibility of error and making mistakes in this period [21].

The word “Biorhythm” has been derived from the Greek words “bios”, meaning life, and “rhythmus”, meaning regular and thoughtful move. From the perspective of Biorhythm theory, humans are being influenced by physical, emotional and intellectual cycles from the day they are born and continuing until death [19, 6]. These cycles include 23-day physical cycle, 28-day emotional cycle and 33-day cognitive cycle, each of which has the following features [11, 5]:

a. A high-level or positive phase;
b. A low-level or negative phase;
c. A critical day.

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As it is seen in figure 1, the top part of the curve shows the positive phase. A positive phase includes those days when the body releases its energy and is likely to be at its peak. The lower part of the curve shows the negative phase in which the body returns the released energy in the positive phase and is likely to have a below normal performance. The number of days in this phase is equal to the number of days in positive phase. The body tends to instability on critical days. The critical point is an almost neutral point belonging to one of the positive or negative cycles or it does not belong to any of them at all [11].

It seems that half of the time period of each cycle is positive and the other half is negative. In other words, in each first 11.5 days, physical activity is associated with mobility, energy, high physical strength, accurate and effective work together with endurance and stability. Weakness, fatigue, lack of stored energy and lack of ability are observed in the next 11.5 days. Optimism, willingness to work and live and active participation in works are observed in the first 14 days of emotional cycle. The second 14 days are associated with bad temper, irritability, impatience and moroseness. Similarly, for intellectual cycle, after the first 16.5 days, intelligence, understanding, high analytical spirit and creativity will be replaced by second 16.5 days and its features such as forgetfulness, laziness of thought and difficulty in focusing and decision making [8, 12].

Physical cycle
Phyllis believed that physical cycles originate from muscle tissues. This cycle refers to the masculinity of people and affects their physical conditions. It is believed that there is a concurrence between adrenal gland and physical cycle in the body. This cycle continues for 23 days and associates with strength, mobility, determination, endurance and innovation. When the physical cycle is above the baseline (2nd to 11th day), the physical condition of a person is charged and will be discharged gradually. In such a situation, the person is able to do better in physical works and feels stronger and more enthusiastic than before. There is a low probability of the person becoming ill and he/she can also endure and handle more pressure. Some doctors believe that between the second and ninth days, when the patient's physical cycle is well placed in positive area, is the best time to do surgery. On the other hand, when the physical cycle is placed below the baseline (13th to 23rd day), the released energy will be charged gradually. In such situations, the person simply gets tired and is susceptible to cold and other diseases [2, 3, 15 & 13].

Emotional cycle
This cycle dominates in nervous system. It is more related to femininity of a person and affects a person's feelings. In fact, all women feel the existence of this cycle in their bodies. This is a 28-day cycle which controls sensitivity, emotional issues, temperament, moods, nervous system and creativity. As long as this cycle remains above the baseline (2nd to 4th days), individual’s creativity, emotions, love and spirit of cooperation is in a good condition and he/she is more optimistic and happier than before. On the contrary, people feel bored, grumpy and depressed when this cycle is placed below the baseline (the 16th to 28th days). Also people become more cantankerous and irritable than before in such situations [1, 4].

Perceptual or Intellectual cycle
This cycle continues for 33 days and affects individual’s learning ability, analytical thinking, reasoning, judgment and decision-making. When this cycle is placed above the baseline (2nd to 16th days) people are able to think more intelligently, solve the problems more effectively, perform more successfully in the exams and make decisions more accurately. This is an appropriate time for creative thinking and producing novel ideas. But when the cycle is placed below the baseline (18th to 33rd days), individual’s thinking capacity is reduced. They show a poor judgment and memory performance falls off. They may find it hard to focus or may take wrong decisions. This period may be a good time to review previous known ideas (Moemeni Piri et al, 2012). Biological foundation of some of body cycles is completely recognized. The most well-known cycle is the menstrual cycle of women.
which follows a certain time rhythm and regularly repeats every 28-35 days. The researchers believe that even the most complex human functions such as intelligence, emotions and physical skills follow such cycles that start from the birth and are repeated regularly throughout the life [9].

Rabiei and Khatami No (2011) showed a significant relationship between biorhythm and job satisfaction. Also Hosseini and Mahdi Zadeh (2009) indicated in their study that there is a significant relationship between biorhythm and academic performance.

A handful of studies have been done about Biorhythm theory in sports some of which confirmed the theory while some showed inconsistency in their results. In a research conducted by Faria and Elliott (1980), the maximum consumed oxygen of VO2max by female gymnasts in the critical days of physical biorhythm cycle was tested and the result showed that physical biorhythm cycle does not have a significant effect on aerobic capacity of athletes. Maura (2009) in study examined the relationship between the biorhythm cycles and sports performance of 61 students from four teams in three phases in football final matches and the results showed a significant relationship between performance and biorhythm cycles.

Shaebani Bahar et al. (2013) examined the relationship between competition results and physical, intellectual and emotional cycles in a student’s Olympiad. They concluded that there is a significant relationship between physical, intellectual and emotional cycles with the competition results. Moldovan et al. (2011) studied the performance of gymnasts and biorhythm and the results showed that gymnasts had a better performance in positive phase. Souatra and Wiyor (2002) in a 15-month study showed that people’s critical days of biorhythm has been the primary cause of work-related accidents. Taylor's research (2004) on employees of the UK electricity company revealed that there is a significant relationship between biorhythm and reduction of work-related accidents and that there is a significant relationship between more accurate decisions of senior managers and their good and bad days. Willey & Farnkoni (2003) mentioned lack of attention to biorhythm of people, especially its emotional aspect, as the primary cause of reduction in efficiency or employees’ quality of work in administrative jobs.

In fact, the purpose of studying biorhythm cycles or identifying and calculating people’s rhythmic cycles is to determine the impact of these rhythms on individual’s conditions, calculate the optimal and critical days, perform activities optimally, predict weakness and strength times and not to perform some activities in the critical days (Dehghan, 2008). Researchers believe that knowing about the athletes’ positive and negative phase or critical days of physical cycle by the coach or other people, who are in contact with them, can increase productivity, prevent sports injuries, improve performance and other factors influencing physical performance of athletes (Zareian et al., 2014). However, there are very limited and conflicting results about the application of Biorhythm theory in sports. Some supporters of Biorhythm theory refer to the relationship between success of athletes and the days when their biorhythm is in a positive condition and others believe that there is no relationship between biorhythm and athletes’ success. Lack of research in this field either overseas or local has induced researchers to try to answer the following questions: Is there any relationship between the performance of athletes and their biorhythm?

Hypothesis: This study tries to evaluate the relationship between physical dimension of biorhythm and performance of the players at the professional level in the women's tournament so that we could approve or reject this influence and provide valuable information for the coaches about the players’ condition at the day of the match or even weeks of training. This can greatly contribute to success of the players.

Purpose: Despite many researches that have been done in the field of biorhythm and due to the lack of a single view among scholars, as well as the importance of forecasting the performance of athletes to improve their performance, the purpose of this study is to determine the relationship between biorhythm and sports performance in Iranian Super League women's basketball players.

Material and methods
Participants: The statistical population was women's basketball players in 1394-95 women's Super League and the statistical sample included all of the players of the teams qualified as semi-finalists (44 players).

Procedure: This study is an applied research and is a descriptive correlational study in terms of nature. The tournament was held in the form of home and international matches. The tool, used in this research, was athletes' performance questionnaire (Charbonneau, 2001) containing five questions on a Likert scale of 1 (poor) to 5 (excellent) points. This questionnaire was delivered to the coaches after each match so that they could evaluate the players’ performance with answering its questions based on the day of the match, comparing to previous matches and other days and their knowledge and expectations of the players. The results of the competition were recorded in which code 1 denoted a win and code 2 denoted a loss.

Biorhythm software and a form to collect information were used in order to determine the athletes' biorhythm. Data on age and date of birth of the athletes were collected through a demographic information form. Athletes who were in their menstrual cycle, as well as those who were injured or psychologically damaged by
being faced with some bad news before the match were excluded for integration purpose. The Farsi version of Biorhythm software was employed to draw athletes’ biorhythm. The software drew players’ biorhythm by entering their date of birth. [21].

After revealing the athletes’ biorhythm through Biorhythm software, all of their cycles were examined. Based on the physical cycle of biorhythm in each course of collecting questionnaire’s data, three different phases were distinguished:
1. Cycle is located above the zero line (positive phase).
2. Cycle is located below the zero line (negative phase).
3. Cycle is located in the zero and critical range (48-hour).

Statistical analysis: Inferential statistics such as Pearson correlation coefficient, independent two-sample T-test, Chi-Square test, one-way analysis of Variance (ANOVA) and Tukey post hoc test were used to investigate the hypotheses. It should be noted that all statistical analyses were performed by using SPSS software at the significance level of (P ≥ 0.05).

Results of the researches

The results given in table 1 show that there is a positive relationship between physical energy and athletes’ performance, but this relationship is not significant (r= 0.02, p= 0.851).

Table 1. Relationship between biorhythm (physical cycle) and sport performance

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Pearson Correlation Coefficient</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship between biorhythm (physical cycle) and sport performance</td>
<td>88</td>
<td>0.02</td>
<td>0.851</td>
</tr>
</tbody>
</table>

The results of table 2 show that there is no significant difference between the energy average in two groups of win and loss (p= 0.851).

Table 2. Independent T results of mean physical energy with match results

<table>
<thead>
<tr>
<th>cycle</th>
<th>Groups</th>
<th>N</th>
<th>Mean±SD</th>
<th>df</th>
<th>t</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>Winner</td>
<td>47</td>
<td>51.83±26.38</td>
<td>86</td>
<td>0.188</td>
<td>0.851</td>
</tr>
<tr>
<td></td>
<td>Loser</td>
<td>41</td>
<td>52.95±29.48</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of table 3 show that there is no significant differences between athletes’ performance in three levels (positive, negative and critical) of physical cycle (p= 0.96).

Table 3. One-way ANOVA results of Athletes’ performance with different levels physical cycle

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Group</td>
<td>64.8</td>
<td>2</td>
<td>32.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Group</td>
<td>59900</td>
<td>75</td>
<td>798.68</td>
<td>0.041</td>
<td>0.96</td>
</tr>
<tr>
<td>Total</td>
<td>59964</td>
<td>77</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the results of table 4, the value of Chi-Square is 2.63 showing a significant relationship between different levels of physical cycle and match results (win or loss) (p= 0.26).

Table 4. Relationship between match results with different levels physical cycle

<table>
<thead>
<tr>
<th>Physical cycle</th>
<th>match results</th>
<th>winner</th>
<th>loser</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td></td>
<td>17</td>
<td>24</td>
<td>41</td>
</tr>
</tbody>
</table>
Discussion

According to the Biorhythm theory, people face internal changes at different times, which may be the cause of different behaviors and performances at different times. Biorhythm can determine good and bad of people’s performance in different days. In fact, according to biorhythm in critical days, people inherently tend to be inaccurate and if they do some risky works at this period, this inaccuracy may cause them some problems. Interpretation of different conditions of biorhythm physical cycle in different situations can be a great help to justify and evaluate physical conditions and performance of athletes. Also according to biorhythm, knowing the physical condition of athletes can help to plan for getting the best results (Shaebani Bahar, 2013). This is the question that needs to be answered here: is there any relationship between biorhythm and performance of athletes?

The results of this study showed that there is no significant relationship between physical energy and performance of athletes. This means that increasing the level of physical energy has no effect on increasing or decreasing the performance of athletes on the day of the match. This is consistent with findings of Reilly et al. (1983) about the impact of the biorhythm on the performance of professional women athletes, and with findings of Wolcott et al. (1977) about professional hammer throw. Also this is consistent with the findings of Connor & Molly (1991), and Ezanlou et al. (2007) who investigated the biorhythm experimentally and concluded that biorhythm cycle has no effect on people’s performance. Perhaps one of the reasons of these consistencies is the professional level of the studied tournament. However, the results were inconsistent with the findings of the Biorhythm theory by Willis (1972), Wallerstein and Roberts (1973), Wilhelm Felix (1928) and Alfred Teleshter (1920) which all believed that the performance is improved when the biorhythm cycle is located at the top of the baseline. Also this is inconsistent with the findings of Shaebani Bahar et al. (2013). However, these studies evaluated the performance of novice athletes in training and student matches and perhaps the differences in the level of competition and maintaining physical and intellectual fitness of athletes in professional events are the cause of these different results. We can also mention the difference in performance in practices and matches as a reason in this regard. Because an athlete can control many factors in a practice, but the performance in a match will be very different from practice and its conditions. However, we cannot certainly acknowledge the inefficiency of this software, because it has increased the performance on positive days of physical cycle in some cases, such as factories, staff and students. This increase was proved to be significant based on the findings of Rabiei & KhatamiNo (2011) and Hosseini & Eshraghi (2010). Also based on the findings of Vazifeedoust et al. (2013), the biorhythm has an impact on the quality of managers’ decision-making. Perhaps this software works fine when it comes to the people who do not need permanent intellectual, emotional and physical fitness.

The results of the study did not show any significant difference between the performance of athletes at three levels of physical cycle (positive, negative and critical) (p= 0.96). These results are consistent with findings of Jenkins et al. (2011), Lester (1990), Piliandis et al. (1993), Quigley (1982), Faria and Elliott (1980), and are inconsistent with the findings of Moemeni (2012), Rabtea and KhatamiNo (2011), Hosseini and Mehdi Zadeh (2009), Singh and Sharma (2011), Parikh et al. (2010), Maura (2009) and Taylor (2004). So, it can be concluded that awareness of positive, negative and critical situations of physical cycle is not effective in achieving desirable results for athletes’ performance. Therefore, it is not possible to predict the athletes’ best time to do the match when their physical cycle is in positive condition. In fact, there are many factors affecting the quality of performance in a match, such as physical condition, having no injuries, good condition of training before the match and getting enough rest and sleep before the match.

With regard to relationship between match results (win or loss) and different conditions of physical cycle, the findings showed that positive and negative conditions of athletes have no effect on their wins or losses. This is inconsistent with the findings of Moldovan (2011) which showed that the performance of athletes is higher in positive conditions of biorhythm cycle. This is also inconsistent with the findings of Ehsani and Parsa (2010), who revealed a decrease in employees’ performance on critical days and an increase on positive days, and findings of Taylor (2004) on the reduction of work-related accidents in the positive phase of the cycle. It can be concluded that the conditions and situations that happen in a match such as key players being sent off, biased referee judgments, unfavorable conditions of safety and security and even bad weather conditions all may affect a team’s

<table>
<thead>
<tr>
<th></th>
<th>percent</th>
<th>41.5</th>
<th>54.5</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Negative</strong></td>
<td>Frequency</td>
<td>13</td>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td><strong>positive</strong></td>
<td>Frequency</td>
<td>48.1</td>
<td>51.9</td>
<td>100</td>
</tr>
<tr>
<td><strong>critical</strong></td>
<td>Frequency</td>
<td>7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>percent</td>
<td>70</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td><strong>Chi-squared test</strong></td>
<td>x²=2.63</td>
<td>df =2</td>
<td>p-value =0.268</td>
<td></td>
</tr>
</tbody>
</table>
winning and losing. Therefore, the positive condition of the team is not a reasonable predictor for its winning chance.

With regard to receiving many stimuli by the athletes during the matches and the ability and experience of professional athletes in competition with controlling intellectual and emotional conditions as well as maintaining physical fitness at desirable level for major events, it can be concluded that using biorhythm in sports and for athletes in a major event could be effective in increasing athlete’s motivation provided that it is in a positive phase. It should also be noted that the coach should not use this software fraudulently for increasing motivation of the athletes. Otherwise, for professional athletes who need to keep their physical conditions and energy at the best level during matches, the negative phase of this theory could implicate some undesirable intellectual effects during the competitions. However, the coaches can use biorhythm in practices for increasing athletes’ performance, motivation and self-confidence at the best condition of physical cycle, but this software does not cause any increase or decrease in performance for match conditions. Of course, more researches need to be done in this area.

**Conclusions**

So any long-term planning to use biorhythm as a basis for competition and training is a bit unwise. Although knowing intellectual features and physical conditions of the athletes could help coaches to select players for important matches, but this software is hardly helpful for the coaches in this case. It should be noted that professionalism requires athletes to maintain their intellectual, emotional and physical fitness to compete in the best conditions. This could be one of the most important factors indicating why Biorhythm theory does not apply to professional athletes.

**Conflict of interests**

The authors declare that there is no conflict of interests.

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