

AEROBICS AS MEANS TOWARD IMPROVEMENT OF THE EFFICIENCY OF THE STUDENTS IN THE MEDICAL UNIVERSITY - PLOVDIV

(Professional paper)

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Abstract

The authors, working on the problem of the efficiency agrees, that its separating into physical and mental is conditional, since the activity of all organs and systems is based on the unity of the body's interior. It is proven that systematic physical exercises have positive impact on the mental functions, toward the mental and emotional stability. The deliberately usage of physical culture and sports means, increase to a large extend the stability of the mental efficiency towards the negative influences. In the past years aerobics is outlined as one of the most desirable sports by the students at the Medical university Plovdiv. Based on stated, an aerobics complex was created, that will satisfy the need for activity of the youth at student age, lower the stress level and help to the increase of their academic success and their forming as future physicians.

Keywords: *physical efficiency, mental efficiency, aerobics complex exercises, special physical preparedness, functional abilities, physical exercises, educational-training activities, musical accompaniment*

As one of the most important sides of personality, Vilenski et al., (Виленский et al.,) (2001) determines the emotional-volitional sphere, temperament and character, „that can be formed by training, exercises and education.“ Multiple researches on studying the parameters of thinking, memory, stability of attention and dynamics of the mental efficiency of persons, accustomed to exercises and ones that are not so, show that the parameters of the mental efficiency directly depend on the level of the general and special physical preparedness.

The term „efficiency“ carries information on the quantity of work, that a certain person may carry out for certain period of time and under particular requirements with respect to quality (Davidov & Peeva (Давидов & Пеева, 1995); Vilenski et al., (Виленский et al., 2001). Practically it is often spoken of muscle, nervous, emotional and visual efficiency, but as a rule such differentiation is incorrect, since the activity of all organs and systems is based on the unity of the body's internal environment. The physical strain of the individual organs and systems leads to temporary balance disturbance, but the recovery occurs rapidly to the expense of the general reserves and biological patterns of the internal environment.

The physical efficiency depends to the greatest extent on the structural and functional abilities of the joints as well as on the respiratory and cardiovascular system, endocrine glands, metabolic and excretory processes and other. The high physical efficiency is resulting not only on good genetic traits, but also on training of the

respective qualities (Попов (Попов), 1985). The efficiency may be assessed by determining the indicator PWC170 (Power Working Capacity = working capacity at pulse frequency 170 beats\ min. This indicator is measured in watts (W) and shows the work that a person may perform maintaining the heart frequency of 170beats\min (Бояджиев (Бояджиев, 2012).

The mental efficiency is determined by the quality of the main mental processes - perception, memory, thinking, attention and other, while the connection with the physical state is very strongly expressed (Vilenski et al., (Виленский et al.,), 2001), determines the mental labor as activity of the person to transform in his mind the basic models of reality through creation of new concepts, reasoning, conclusions and based on them – of hypotheses and theories. As result of the mental labor are scientific and spiritual values or solutions, which are used for satisfying public and personal needs.

It is proven, that some of the most important sides of personality – intellect, emotional-volitional sphere, temperament and character, may be regulated via training and exercises. The systematic physical exercises, including the educational – training activities have a positive impact on the mental functions, and since childhood form the mental and emotional stability towards performed strenuous activity. Multiple studies of indicators as the memory, stability of attention, dynamics of mental efficiency, performed to trained and untrained people show that the parameters of the mental efficiency depends directly on the level of general and special

physical preparedness. To a significant extent the stability of mental efficiency towards the impact of unfavorable factors is increased, if deliberately were used the means and methods of physical culture (Vilenski et al., (Виленский et al.), 2001).

The everyday life of students is filled with significant mental and emotional strain. The working posture, at which the muscles are keeping the body at a certain posture are strained for a long time, the often infringement of the regime of work and rest, the inadequate physical straining may be reason for a fatigue, that builds up and leads into exhaustion. The body is in a state of stress – one of the modern problems of humanity – which to a significant degree has a negative impact on some of its main functions and systems (Ivanova (Иванова), 2012; Karaslavova, Dyakova, Todorova, & Tufkova, 2009; Koleva (Колева), 2006).

It is determined that physical exercises and sport have a high impact on the mental efficiency of students – first year students, and to a lower degree – of students in their second and third year. The authors were looking for the reasons and concluded that the first year students get tired from the educational process much faster and also while adapting to the education processes at High schools. Therefore, for the first year students, the physical education and sport classes are one of the most important means for adapting to the conditions of life and education at the Higher school. The physical education and sport classes increase to a higher degree the mental efficiency in these faculties, in which the theoretic classes prevail and to a lower – in the majors in which the practical and theoretic classes are rotating (Vilenski et al., (Виленский et al.) 2001).

According to our researches as well as of other authors, aerobics is one of the sports, in which students are mostly interested in (Diakova, Peeva & Vojkova (Дякова, Пеева, & Божкова), 2007; Zlatareva & Vozhkovala (Златарова & Божкова), 2003; Ivanov (Иванов), 1995); Ivanov, 2003). For example, in the academic year 2009/2010 in the Medical university – Plovdiv, 139 students with were engaged with aerobics (of which 22 midwives, 32 pharmacists, 21 nurses, 46 physicians) which is 26,9% of all students engaged in sports. Additionally, 10 students (from I-st to VI-th year inclusive) have participated in the representative aerobics team of the university. The remaining students are distributed among the sports: basketball, volleyball, swimming, tennis, table tennis and soccer. In year 2011/2012 the student groups of mostly female students - 156 (30,53%) were engaged in aerobics while the reason for that may be sought in the popularity of this type of activity as well as in its minimal requirements with respect to the facilities .

In the student groups in basketball have participated 25 students (4,89%), swimming - 31 students (6,26%), in the tennis classes 86 students are trained (16,82%), in table tennis 99 students participated (19,37%) and in soccer - 96 students (18,78%).

Based on these facts and in compliance with the

modern requirements with respect to the sports training and in particular – aerobics, we created an aerobics complex, targeting improvement of the efficiency of the students during the semester as well as during the exam session. The complex offered (enclosure 1) contains three main parts – preparing, main and conclusive, each of them consisting of appropriate exercises, steps and combinations. The duration varies from 45 to 60 minutes depending on the level of preparedness of the participants, while this variation to the highest degree is expressed during the aerobic part of the training.

Preparatory part (Warm up) consists of general and a special part. In the general part an exercises for the large muscle groups and joints are included, and the special part prepares these muscles and muscle groups, which will mostly be strained in the main part. Included are exercises with uncomplicated coordination and low intensity (Low Impact) – main steps and their variations with different moves of the arms. At the end of the warm up static as well as dynamic stretching exercises are included. Some authors recommend in this part that the exercises should be dynamic toward maintaining the emotional level (Mineva & Tarnichkova (МИНЕВА & ТЪРНИЧКОВА, 2006). The exercises offered by us are presented by dynamic as well as static exercises. The recommended speed of the musical accompaniment here is 130-150 beats/minute.

The preparatory part of the lecture solves the following tasks :

- Gradual increase of the pulse rate
- Increase of body temperature
- Improving the blood flow towards the musculoskeletal system for the purpose of preparing for following straining
- Improving the joint mobility
- Increase of the emotional background and attention

The main part (Aerobics + Floor work) is presented by aerobic and strength training. The main part aims at:

- Gradual increase of the pulse rate to the level of the targeted area
- Increase of the functional abilities of the individual systems of the body
- Increasing the consumption of calories
- Firming and shaping of the major muscle groups and the problem areas in women – abdomen, thighs, buttocks .

The aerobic part (Aerobics) occupies central place in the aerobics training, its duration is minimum 20 minutes, and its purpose is developing and improving of the endurance and the coordination capabilities of the participants. Here, to the largest extent, via its typical movements the varieties of aerobics are expressed – classic, dance, step, tae-bo and many others. Depending on the level of preparedness of the participants and the type of aerobics, the musical bits may vary from 130 to 170 beats/minute. The aerobic part consists of introduction, actual and post-aerobic parts.

The purpose of the introductory aerobic complex is

to gradually increase the intensity and to coordinate the complexity, according to the physical and musculoskeletal abilities of the participants. The straining is gradually increased, the cardio-respiratory system is prepared for the actual aerobic series. Aerobic models and aerobic combinations with low intensity and various dance steps are included, which are performed without flying phase. It is recommended to include also the moves with the arms.

The actual aerobic complex is characterized by highest intensity, which leads to increase of the aerobic abilities of the organism and achievement of maximum oxygen consumption. Its duration is 10-15 minutes. The purpose is improvement of the cardiovascular and respiratory activity, increase of the functional abilities, as well as improvement of the general endurance and efficiency. The steps are highly dynamic, performed mainly with flying phase by which the training zone of the heart rate is reached as well.

In the **postaerobic complex** the intensity is gradually reduced which leads toward lowering of the pulse rate. The duration of this part is from 3 to 5 minutes.

The exercises of the **strength part** (Floor work) are performed mostly on the floor while their main goal is developing and maintaining of the strength of the major muscle groups of the back, abdomen, thighs and arms. The main starting positions are occipital lying, right and left lying, knee-elbow support, strips and other variations of theirs. Here is the place for use of additional equipment such as fit-ball balls, steps, dumbbells and levers with various weight, bands and many others.

In the **conclusive part** (Cool down) rehabilitation exercises are included – mainly respiratory and stretching exercises and also movements from the yoga system. During this part gradually, the metabolic processes and the pulse rate are slowed down to levels close to the starting ones. Here we recommend the stretching to be entirely in static regime (by holding at the point where the pain is tolerable) for the purpose of avoiding the, so called, stretch reflex.

Toward the following up of the participant's functional change of the pulse rate is used. The impact on the cardiovascular activity depends on the character of the straining, the number of classes weekly, the duration and intensity (High or Low impact) of the class. According to specialists in the field (Mineva, Tarnichkova) for determining the working puls (training zone) most appropriate is the modified formula of Karvonen:

- The individual maximum pulse rate (IMPR) – according to age – $220 - \text{age in years} - 220 - 20 = 200$ under the condition, that we adopt 20 years of age as average age of the participating students.

- The lower limit of the pulse rate – 60% of the individual zone of the maximum pulse rate – 60% of 200 = 120 beats/minutes.

- The upper limit of the pulse rate – 80% of the individual zone of the maximum pulse rate – 80% of 200 = 160 beats per minutes.

- Individual working zone of 20 year olds is

within 120-160 beats/minute.

The musical accompaniment (Enclosure 2) is of great significance for the aerobic classes. Besides creating the necessary mood, via the beats per minutes (Beats) the music to a large extent determines the straining – dependancy between the music bits and the pulse rate is established (Mineva & Tarnichkova (Минева & Търничкова), 2006). It is necessary the musical accompaniment to be coordinated with the abilities of the participants as well as with the style of the classes as well.

ENCLOSURE 1

Sample aerobic complex for beginners - classic aerobics

Preparatory part

Starting position (sp) – standing.

- 1–8 – squat and transfer of weight to the left and right, hands on hips.
- 1–8 – same movement of the legs with simultaneous bending of the arms in the elbow joints.
- 1–8 – step – touch, hands on hips.
- 1–80 – step – touch, arms are lifted upfront and lowered to starting position.
- 1–8 – combination of 2 and 4.
- = at 1.
- = at 1.
- = at 1.
- 1–8 – turning right and transfer of weight from left to right leg and back.
- 1–8 – springing in right lunge, arms are moved back and forth .
- 1–8 – bending and straitening of right knee and lifting of toes of left foot .
- 1–8 – holding in lunge, arms upfront.
- 1–8 – holding, arms on the bended leg.
- 1–8- bending and straitening of left ankle with lifting and lowering of foot
- 1–4 – holding with lifted toes (in counter-spitz)
- 1–8 – turning to the left and transfer of weight from left to right leg and back
- 1–8 – springing in left lunge, arms are moved back and forth
- 1–8 – bending and straitening of left knee and lifting of toes of right foot
- 1–8 – holding in lunge, arms upfront
- 1–8 – holding, arms on the bended leg
- 1–8 – bending and straitening of left ankle with lifting and lowering the foot
- 1–4 – holding with lifted toes (in counter-spitz).

Main part

Introduction to aerobic series

- 1–8 – step – touch, hands on hips.
- 1–8 – step touch, arms are bended simultaneously in the elbow joints up and down.
- 1–8 – step – touch, arms are bended asymmetrically in the elbow joints up and down.
- = at 3.
- 1–8 – march in place.
- 1–4 – march forward, 5–8 – march backwards.
- = at 6.
- = at 6.
- 1–4 – step – touch in place.
- 1–4 – march forward, 5–6 – step – touch in place.
- 1–4 – march backwards, 5–6 – step – touch in place.

- = at 10.
- = at 11.
- 1-4 – cross step to the right, 5-8 – cross step to the left, hands on hips
 - = at 14.
 - 1-4 – cross step to the right, lifting of arms forward and lowering down, 5-8 – cross step to the left, lifting of arms forwards and lowering down.
 - = at 16.
 - = at 16.
 - 1-4 – cross step to the right, hands on hips, 5-6 – step – touch, hands on hips
 - 1-4 – cross step to the left, hands on waist, 5-8 – step – touch, hands on hips
 - = 20.
 - = 20 with adding studied arm movements .
 - = 22.
 - = 22.

Actual aerobic series

- 1-8 – running in place, hands on hips.
- 1-8 – running in place, arms are straitened and bended in the elbow joints sideways.
 - 1-8 – running in place, arms are lifted up and lowered to starting positions.
 - 1-8 – running in place, the arms at 1 are lifted up, at 2 are bended in front of the chest, at 3 are straitened sideways, at 4 – starting position.
 - = at 4
 - = at 4 with movement forwards
 - = 6
 - 1-8 – jumps in place, hands on hips.
 - = 8, arms are bended in front of chest.
 - 1-4 = at 6, 5-8 = at 9.
 - 1-4 = at 6 running backwards, 5-8 = at 9.
 - = 10.
 - = 11.
 - = 10.
 - = 11.
 - 1-8 – skip.
 - Slowly performed: at 1 – jump to the right on right foot, at 2 – the left foot steps upfront, at 3 the right – to the right,
 - 4- starting position, 5-8 – jump to semi-squat, arms up.
 - = 15 to the left.
 - = 15.
 - = 16.
 - = 15, performed fast.
 - = 16, performed fast.
 - = 19.
 - = 16.
 - 1-8 = 10.
 - 1-4 = 15, 5-8 = 16.
 - Combination of all models studied, hands on hips
 - Combination of all studied models with learned movements of arms.

Post-aerobic series

- 1-8 – jumps in place.
- 1-8 – jumps to the left and right.
- 1-8 – step – touch.
- 1-8 – combination of 2 and 3
- = 4.
- 1-8 – unges to the left and right.

- 1-8 – luges backwards.
- 1-8 – combination of 6 and 7.
- 1-8 – lunges to the left and right without jump.
- 1-8 – lunges backwards without jump.
- 1-8 – combination between 9 and 10.
- 1-8 – springing in semi-quat

Strength part

Exercises for arms and shoulder girdle

Starting position– basic standing

- Lifting and lowering of arms forwards – 1-8.
 - Lifting and lowering of arms forwards with rotating lunges to the left and right – 1-8.
- starting position – standing with feet apart.
- Bending and straitening of arms in the elbow – 1-8.
 - Bending and straitening of arms in the elbow joints with squat– 1-8.
 - Lifting of arms sideways and lowering to starting position – 1-8.
 - Lifting of arms sideways and lowering to starting position with squat – 1-8.

Exercises for abdominal muscles

Starting position– occipital lying with open and bended legs

- Lifting of shoulders – 2x8.
 - Lifting and holding of shoulders – 1-8.
 - Springing – 1-8.
- Starting position – occipital lying with bended legs, one crossed over the other.
- Lifting of the opposite to the crossed leg shoulder – 1-8.
 - =1 with straitening of the leg simultaneously with the lifting of shoulder – 1-8.

Starting position – occipital lying, one leg bended, the other stretched forward.

1. Lifting simultaneously of the stretched leg and the shoulders– 1-8.

Starting position – bended occipital lying.

- Lifting of shoulders – 1-8.

Exercises for lower limbs hips and seat muscles

Starting position – sideways elbow – support lying, both legs stretched along the body.

- Lifting of upper leg up to 45°– 1-8.
- Holding of leg at 45°– 1-4.
- Springing – 1-4.
- = 2.
- = 3.

Starting position – sideways elbow-support lying, one leg stretched, the other bended in front of it.

- Lifting and lowering of the straight leg – 1-8.
- Springing with the straight leg – 1-8.

Starting position – knee-elbow support, one leg stretched backwards.

- Lifting and lowering of the stretched leg up to the horizontal – 1-8.
- Springing with the stretched leg – 1-8.
- Bending and straitening of the stretched leg – 1-8

Conclusive part

Starting position – lying

- Lifting of upper body – 1-8.
- Holding – 1-8.
- = 1.

- = 2.
- Starting position – sitting, one leg stretched forward, the other bended.
- Tilt forwards to the stretched leg, holding – 1– 8.
- Starting position – sitting, one leg stretched sideways, the other bended.
- Tilt sideways to the stretched leg, holding – 1– 8.
- Tilt forward, holding – 1– 8.
- Starting position – outspread seat.
- Tilt forward, holding – 1– 8.
- Starting position – sitting.
- Tilt forward, holding – 1– 8.
- Starting position – standing
- Exhalation , bending of legs – 1– 4.
- Standing up, inhalation – 5– 8.
- = 1
- = 2

ENCLOSURE 2

Music accompaniment

- 001 - Enrique Iglesias ft USHER – Dirty Dancing
- 002 - Beyonce – Run the World
- 003 – Lady Gaga – Edge of Glory
- 004 – LMFAO ft Lauren Bennet – Party Rock Athem
- 005 – Diddy, Dirty Monkey ft Skyler Grey – Coming
- 006 – Canto Pro Mar – DJ Meme pres. Brazilianism
- 007 – Loca People – Sak Noel
- 008 – Don.t stop the party – The Black Eyed Pease
- 009 – I.m into you – Djenifer Lopez
- 010 – Written in The Stars – Tinie Temp aft Eric Turner
- 011 – Can you Feel Me – ATFC
- 012 – Dazzle – ATFC
- 013 – 11o`clock – Green Lemon ft Magicafe

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