Bulletin of the *Transilvania* University of Braşov • Vol. 2 (51) - 2009
Series VIII: Art • Sport

THE IMPACT OF PHYSICAL ACTIVITY ON HEALTH – A CURRENT PROBLEM

S. CIOROIU[1] E. MOLDOVAN[2]

Abstract: *Through this work we try to draw an alarm signal, in our country, on a change in the individual life of today's society, with important repercussions on the health and quality of life. The lack of physical exercise is a major risk factor for many diseases, a fact that is shown by multiple WHO analyses, through the increase of morbidity and mortality due to these illnesses. We are trying to help by presenting the advantages of swimming, which can be a used as a solution, as many European countries believe.*

Key words: *physical activities, health, swimming.*

1. Introduction

The importance of physical exercise for a healthy life has been highly appreciated since ancient times. The following Indian quotation is very significant "Body activity that is designed to increase body power and strength is called physical exercise. It should be practiced regularly and in a correct manner. Physical fitness, body firmness, work capacity, physical resistance to weight lifting, eliminating physiological disorders and stimulating digestive functions can be effectively achieved through correctly done exercise. In contrast, enhanced effort leads to fatigue, exhaustion, or may give rise to other body weaknesses" [24].

Where health is seen not only as a state characterized by the absence of disease but as a positive concept, encompassing physical, social and emotional wellness, the importance of physical activity for health is already clearly established and quite well known [23].

An important, though unwelcome, feature of modern life is that physical activity has a low level. Due to the many technical means available in modern human life, opportunities which may require the body to perform physical exercise have been considerably reduced [17].

Current epidemiological studies have shown that sedentary living and the obesity associated with it are important factors contributing to the emergence of serious diseases with a significant impact on health and the quality of life, such as diabetes and atherosclerosis. Currently, the coexistence of these two diseases is a frequent cause of mortality and morbidity [24].

It is a truism today that physical inactivity, sedentariness, is a great danger for the individual. For example, WHO estimates that physical inactivity is annually responsible for 1.9 million premature deaths in the whole world, and

[1] Dept. of Theory and Individual Sports, *Transilvania* University of Braşov.
[2] Dept. of Theory and Collective Sports, *Transilvania* University of Braşov.

that 600 000 (something less than 1/3) of these occur in the European Region, in the 53 countries that belong to this region [7, p. 53-57].

Among the projects initiated by the European Union, some are mentioned in the following:

The European Network on Nutrition and Physical Activity - NPA is a network established by the European Commission in 2003, which included experts nominated by EU Member States and WHO [23]. The first meeting of its members took place on 30.06 - 01.07.2003, [20] and on 15 September 2003 was issued material on the NPA "mandate", which noted that "the network was initiated to provide a forum for discussion and exchange of views on the contribution of nutrition and physical activity to improve and maintain health" [22].

The role of NPA is to advise the European Commission on nutrition and physical activity problems, providing material for the annual work plans of the CAP FPH (2003 to 2008) (Community Action Program in the Field of Public Health) and will be maintained throughout the action of this program. At the first meeting of the NPA Network, representatives of several EU countries presented studies that focused on our country and were meant to bring about a positive and constructive attitude of those responsible [3].

The EU Platform for Action - Diet, Physical Activity and Health was launched on 15 March 2005 and is also an initiative that sought to accelerate and improve the effectiveness of CAP FPH actions (2003 to 2008).The launching initiative belongs to the European Commission, its purpose being "to provide a common forum for all stakeholders at European level interested in preventing and tackling obesity through diet and physical activity" [14]. The platform offers possibilities to:

- submit plans to improve nutrition and increase the number of those who do exercise;
- analyze the effectiveness of these plans and programs, to have a better record of examples of good practice [14].

2. Benefits of Exercise

– developing the heart muscle;
– improving blood circulation through blood vessels;
– normalizing the blood pressure - high pressure tends to decrease, while the lower one tends to increase;
– strengthening the bones in order to sustain body weight;
– improvement of the immune defense system by increasing the number of circulating red blood cells, lymphocytes and neutrophils; by stimulating the production of beta-endorphin at brain level the anti-tumoral activity of NK cells (natural killer) increases; one picogram (the billionth part of a gram) of beta-endorphin increases the activity of NK cells against tumors by 42%;
– lung development by stimulating deep breathing;
– reduction of negative emotional experience, improving the self-image by reducing anger and frustration;
– improved digestion and stimulated intestinal activities, reducing the production of gas and constipation;
– -developing muscle, bone and connective tissue;
– improving the beauty of the body;
– increasing the systolic flow;
– slowing down the aging process;
– ensuring a good quality sleep [8], [13-14], [16], [25].

The concern of authorities, and the various professional organizations' worries for tendencies manifested in health in general, and the various indicators of health in particular are based on a huge amount of information that results in significant figures.

Further studies and epidemiological data collected within them are those which draw attention to a continuing increase in the proportion of sedentariness, an alarming decrease in the percentage of those who manage to accumulate a sufficient amount (for the benefit of favorable effects) of motion, of physical activity, per week. Thus, statistics show that 17% of the world's adult population is totally inactive physically, and a rate of 41% of it are adults who do a slight form of activity - insufficient for them to benefit from its effects [7, p. 53-57]. Of the multitude of existing data and statistics about what happens to the European population and, especially, the population of children and young people, a study from England is mentioned, done in 1989 on over 10 000 children aged between 9 and 15 years: the average number of hours of exercise - regardless of sex - was 4.7 hours / week, also including physical activity at school. As always, boys, compared to girls, accumulated a greater number of hours of physical activity [13].

Design and implementation in schools of programs characterized by a genuine openness to educational content, promoting the practice of various systematic exercise would contribute to the success of the school and the family regarding a harmonious physical development of young people [9, p.42-43].

There are many types of exercise. The most beneficial to health are those from which the body benefits the most. The human body is endowed with 650 muscles, which give it the ability to move. If not used, these muscles begin to lose their shape and function and, if remaining inactive for a long time they can become useless [25].

Swimming is one of the special sports, since it doesn't show the typical restrictions of most sports. Swimming is addressed to all age categories, can be practiced regardless of physical condition does not require special equipment or "team-mates" and can also be practiced by pregnant women without any risk [19]. Some people can practice swimming alternating high intensity exercises with low intensity ones, while others can only see it as a means of relaxation [27].

Swimming has been known since prehistoric times, the earliest swimming records, according to Stone Age paintings, are about 7000 years old. Written references date back to 2000 BC. Some of the earliest references include the Gilgamesh, the Iliad, the Odyssey, the Bible, Beowulf and other epopees. In 1538, Nikolaus Wynmann, of German origin, wrote the first book on swimming, a dialogue on the art to swim (Der Schwimmer oder ein Zwiegespräch über die Schwimmkunst) [16].

In the next section of the work we present the strengths of this sport and why it should be practiced by many of us.

3. The Influence of Swimming on the Locomotory System

The greatest advantage of swimming is that muscles and joints work without having to bear any weight. Thus, over two thirds of the entire muscle mass grows without joints having to suffer. Ligaments

become stronger and develop their flexibility.

Swimming does not only ensure the maintenance of good condition but also a harmonious physical development, movements made in immersion processes detensioning all muscle groups, in particular the para-vertebral muscles.

An adequate combination of static exercises with dynamic ones determines a good blood circulation and a good maintenance of muscular structures, having positive effects on the body position.

By symmetrical movements, axial-symmetric in "back" and "crawl" and central-symmetrical in "butterfly" and "breaststroke", swimming ensures the adoption of proper positions and remedies any orthopedic deficiencies.

Adopting a horizontal position in water, the bone and joint system is freed of tension and has positive effects upon growth [2, p. 45-57].

American physiologists even determined an increase of the STH hormone which intensifies protein development and synthesis. In association with other pituitary hormones (ACTH and thyrotropin), thyroid and gonadal ones with an anabolic role, STH stimulates the growth process in height. [5, p.234-239].

Used for therapeutic purposes, swimming assures the healing of neuro-motor, bone and joint affections, and prevents affections such as spinal cord deviations, physical deficiencies or metabolic problems (obesity).

In the morpho-functional recovery program, swimming is the most common therapeutic factor, even used in hydrokinetotherapy (under-water movement therapy) [21].

4. The Influence of Swimming on the Cardio-Vascular System

The particularities of the effort made in swimming, the position of the body under water, water pressure on the thoracic box and low body weight are just some elements that enhance the functionality of vital importance for the organism: the cardio-vascular and the respiratory systems.

Related to the cardiac function, swimming practiced regularly leads to the development of the heart – hyperthrophia. In general, a sport that requires intense effort from the thorax (gymnastics, wrestling, weight lifting, boxing and swimming) favors the right half development of the heart; however, depending on the degree of adaptation of the heart muscle and on the specific effort, on the training methodology used [1, p. 227-228], the heart may be right, left or entirely hypertrophiated. Once having given up on competitive activities, regressive or nonregressive phenomena occur on a functional level for the right or the left heart, apparently depending on the specific type of effort [11, p. 98-102].

Swimming switches from the quantitative engagement of the heart, tachycardia, to a commitment to quality, bradycardia, with fewer heart revolutions per minute. Bradycardia training provides a biologically reduced consumption in resting. Therefore there is a controlling expansion of heart cavities. Heart muscle elasticity associates swimming with longevity. Swimming opposes cardio-vascular morbidity and risk factors of this system: excessive weight, hypertension, hypercholesterolemia, aterosclerosis, high neuro-psychological intensity.

In 1999, Italy, a complex of hypo-aerobic and hydro-aerobic exercises with moderate intensity were applied by a group of researchers to a sample of young women (aged 15-30) for one month, in daily 20 minute meetings. Devices such as the portable spirometer and the telemetric heart monitor were used, which highlighted adaptive changes and allowed data comparison. There were statistically significant differences only in the group that practiced in water. And Japanese researchers in comparative studies of various exercises carried out on land and in water, concluded that myocardial adaptations occur in particular due to water pressure on the thorax that intensely stimulates pressure receptors and intensifies venous circulation in particular by chest suction.

5. The Influence of Swimming on the Respiratory System

The use of oxygen, differences between arterial and venous blood or decreasing the effort of the contracting muscle are the functions that best benefit from swimming [6, p. 67-69].

There is an adaptation period of time when people begin to swim, when oxygen consumption is greater than its admission. In this period the body meets its energy requirements in particular by providing anaerobic energy processes, and increasing the capacity of absorbing and using oxygen is achieved through training as a result of increasing the vital capacity, the heart flow (volume range) and an optimal adaptation of the circulatory system.

Enhancing the use of oxygen, increasing the capacity of tolerance to oxygen deficit, improving irrigation blood, gradually develops the respiratory system. Therefore, when initiating swimming in sports particular attention should be given to respiration [12, p. 45-48].

A correct technique of aquatic respiration is used curatively for people with respiratory, heart or circulatory problems.

The rhythm of breathing, properly synchronized with the pace of implementation of various movements and beating water pressure, has a positive influence on such diseases.

Voluntary influence on respiratory phases is possible because breathing is a cortical function; voluntarily, it may be temporarily halted – apnea, can be accelerated (hyperventilation) or slowed down (hypopnea).

6. The Influence of Swimming on the Neuromuscular System

Swimming develops sensitivity to sensations as a signal function through the transformation of internal and external influences on the body. This sport develops psychomotric skills by the prioritary processing and integration of the spatial parameters of movement (direction, shape, amplitude), and then the temporal ones. Unlike other sports, except for gymnastics, swimming helps the mind form body schemes by developing impressions about the body [10, p. 64-67].

7. The Influence of Swimming on Metabolism

As for the sensory interference, continuous adaptation to water temperature and humid air from the pool improves thermal sensitivity. Water temperatures between 24-26 Celsius degrees represent strong stimuli that induce the constriction

of blood vessels. As a consequence, a greater quantity of heat is produced and circulation and energy metabolism are intensified.

8. The Influence of Swimming on the Nervous System

By perceiving a lower weight than in reality, the effects of aquatic exercises on relaxation or therapeutic practices go beyond the anatomic-functional scope, and swimming, in association with natural environmental factors, ensures the mental health of the individual, stabilizing the psycho-affective and the neuro-vegetative balances.

Swimming in the Netherlands is required. Children from ages 4 or 6 go swimming twice a week. Swimming diplomas are listed A, B and C. A and B diplomas are required. Those who want a C swimming diploma can do this optionally. To obtain such swimming diplomas a period of 2 years is needed [4]. Practice in Denmark is one hour of swimming per week in grades IV to VI [8].

9. Conclusions

Prevention of diseases has become a trend in today's medicine, and everybody in Romania tries to change things in this regard. Specialists in the field recognize, after decades of experience, that it is more useful to prevent a disease than to treat it, firstly in terms of life-quality and secondly from an economic point of view, since the costs are considerably reduced over time. Many illnesses can be avoided by lifestyle changes: physical activity, diet, tobacco, alcohol, etc.

In the present work we wanted to emphasize the impact of physical activity in society. I chose swimming because it is a complete sport, with very few side effects and more benefits and advantages than other sports. Our view is that Romania could follow the example of other countries regarding the introduction of swimming as a compulsory or optional subject in primary school.

The role of empowered people in this regard is essential, and the general interest should be maximal. Reducing the waiting time in front of medicine cabinets, reducing the number of patients, a decrease in the number of obese children, a decrease in the number of people with disabilities, are ethical problems that we all need to solve, whether we are teachers, doctors, kinetotherapists, sports instructors, nutritionists etc. Many of us are first of all parents and our children's future health is uncertain. Certainly, to a lesser or greater extent, we all have the means to do something, we just need to be aware of them and to start using them!

References

1. Cioroiu, S. *Efecte ale înotului de performanţă asupra organismului uman.* Teză de doctorat, Universitatea din Piteşti, 2007.
2. Dragnea, A. *Antrenamentul sportiv*. Bucureşti: Editura Didactică şi Pedagogică, 1996.
3. Dumitru, G. *Activitatea fizică - factor de promovare a sănătăţii în Europa(I),* 2006. Available at: http://www.medicinasportiva.ro/sport/articole/Activitatea%20fizica%20in%20Europa%20I.html
4. Gavrilă, A. *"Mami, e prea greu!"* 2008. Available at: http://www.adevarul.ro/articole/mami-e-prea-greu.html

5. Guyton, A.C. *Fiziologie*. Bucureşti: Editura Medicală Amalteea, 1999.
6. Jivan, I.; Cirla, L. *Natație – culegere de texte de specializare vol. I*. Bucureşti: Centrul de multiplicare A.N.E.F.S., 1992.
7. Martin, B.W.; Kahlmeier, S.; Racioppi, F. et al. Evidence-based physical activity – HEPA Europe, The European Network for the Promotion of Health-Enhancing Physical Activity. In: *J Public Health* 14, 2006.
8. Mita, B.; Miclescu, L. Dezvoltarea spiritului competiției sau dezvoltarea in spiritul competiției (eseu). In: *Stiinta Sportului*, nr.1, 2003. Available at: http://www.sportscience.ro/html/revist e_2003_37-7.html
9. Moldovan, E. *Activități de timp liber în natură şi în alte arii cognitiv-formative.* Braşov: Editura Universității *Transilvania* din Braşov, 2007.
10. Monciu, I. *Fiziologia Educației fizice şi sportului*. Bucureşti: Editura Didactică şi Pedagogică, 1997.
11. Mureşan, E. *Înot – Sinteză.* Bucureşti: Editura Fundației România de Mâine, 2000.
12. Todea, S. *Exercițiul fizic în educația fizică şi kinetoterapie*. Bucureşti: Editura Fundației România de Mâine, 2003.
13. *Benefits of Swimming - Health Benefits*. Available at: http://www.benefitsofswimming.com/
14. *Children, obesity and associated avoidable chronic diseases*. Available at: http://ec.europa.eu/health/ph_projects/ 2003/action3/action3_2003_04_en.htm
15. *Diet, Physical Activity and Health - EU Platform for Action*. Available at: http://scholar.google.ro/scholar?
16. Exercițiul fizic - moda sau necesitate?. In: *Perspective*, nr.5, 2005. Available at: http://www.perspectivechicago.com/article.php?id=64
17. *The Health Benefits From Swimming* . Available at: http://www.24hrfitness.co.uk/fitness/the-benefits-of-swimming.html
18. *Health Education Authority. Health update* 5. *Physical Activity*. London: 1995.
20. *History of swimming*. Available at: http://en.wikipedia.org/wiki/History_of_swimming
21. *International Physical Activity Questionnaire (IPAQ)* . Available at: http://www.ipaq.ki.se/ipaq.htm
22. *Inotul - calea spre sănătate*. Available at: http://www.medicas.ro/fitness-welness/inotul/
23. *Nutrition and Physical Activity (NPA) network first meeting. Luxembourg, 30 June – 1 July 2003*. Available at: http://ec.europa.eu/health/ph_determinans/life_style/nutrition/ev_20030630_en.htm
24. *Nutrition and Physical Activity (NPA) network. Mandate. Luxembourg 15 September 2003*. Available at: http://ec.europa.eu/health/ph_determinants/life_style/nutrition/documents/ev_20030630_rd02_en.pdf
25. *Nutrition and Physical Activity (NPA) Network members*. Available at: http://ec.europa.eu/health/ph_determinants/life_style/nutrition/documents/ev_20030630_rd01_en.pdf

26. *Rolul exerciţiilor fizice în menţinerea stării de sănătate*. Available at: http://www.armonianaturii.ro/Rolul-exercitiilor-fizice-in-mentinerea-starii-de-sanatate.html*articleID_420-articol
26. *Swimming*. Available at: http://www.uihealthcare.com/topics/exercisefitness/exer3116.html
27. *Swimming - health benefits*. Available at: http://www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Swimming?Open
28. *U.S. Department of Health and Human Services, Physical Activity and Health. A report of the Surgeon General*. Pittsburgh: National Center for Chronic Diseases Prevention and Health Promotion, 1996.