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PHYSICAL EXERCISE AS COMPLEX BIOPSYCHOSOCIAL STRAIN

OLIVIA PAULA BRUJA[1], IULIANA BOROŞ-BALINT[2], SIMONA TACHE[3], MIRELA MANEA[1]

ABSTRACT. The theme of this article convers the benefits of exercise for society. Physical exercise is complex psychophysiological strain on the body, which determines adaptive changes in the functional neuromuscular, cardiovascular, respiratory, endocrine systems, as well as in metabolism, immunity and mental functions. Roles of physical exercise are sanogenetic, anti-aging, diagnostic, and therapeutic. Implications of physical exercise are psychological, social, economic-financial, legal, political and educational. Physical activity through exercise, physical education and sport has an antistress effect and represents a sanogenetic therapeutic strategy in preventive medicine and public health.

Keywords: physical exercise, health, stress.

REZUMAT. ***Efortul fizic ca solicitare complexă biopsihosocială.*** Tema acestui articol se referă la beneficiile efortului fizic pentru societate. Efortul fizic este o solicitare psihofiziologică complexă a organismului, care determină modificări adaptative ale sistemelor funcţionale: neuromuscular, cardiovascular, respirator, endocrin, ale metabolismului, imunităţii şi ale funcţiilor psihice. Efortul fizic are rol sanogenetic, antiîmbătrânire, diagnostic şi terapeutic. Implicaţiile efortului fizic sunt psihologice, sociale, economico-financiare, juridice, politice şi educative. Activitatea fizică prin mişcare, educaţie fizică şi sport constituie pilonul sanogenetic antistres şi reprezintă o strategie terapeutică sanogenetică în medicina preventivă şi sănătatea publică.

Cuvinte cheie: efort fizic, sănătate, stres.

General considerations

Physical exercise is complex psychophysiological strain on the body, which determines adaptive changes in the functional neuromuscular, cardiovascular, respiratory, endocrine systems, as well as in metabolism, immunity and mental functions (Derevenco 1992, Foss and Keteyian 1998, Tache and Staicu 2010; Staicu and Tache 2011).

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Roles of physical exercise

a. The sanogenetic role

Exercise is life itself. Physical exercise contributes to the improvement of the major functions of the body:

- in non-athletes, for maintaining the physical health of the body through adaptive cardiorespiratory, immunological and metabolic changes, with the reduction of the risk of diabetes, hypertension, colon cancer; the maintenance of the health of muscles, bones and joints; weight control and prevention of obesity; prevention of sedentary behavior; reduction of stress; reduction of the risk of premature and cardiac disease death (Tache and Staicu 2010; Staicu and Tache 2011).

Studies on physical exercise and its sanogenetic effect in non-athletes have been carried out, for anaerobic exercise (workout on the weight lifting machine) or aerobic exercise (running on the track or on the treadmill; walking at a brisk pace; training on the cycle ergometer; jogging; stair climbing on a machine or on an actual flight of stairs; swimming).

The recommended type of exercise should be moderate in intensity and duration, and constant.

- in athletes, for obtaining physical fitness, with a high sanogenetic degree, a high psychophysiological capacity, a balanced behavior, in order to obtain high performance sports results through scientific training (Drăgan 2002).

b. The anti-aging prolongevity and active longevity role

Physical activity decreases after 30-45 years of age, particularly in women, but the moderate practice of physical exercise is recommended for the increase of survival (Foss and Keteyian 1998, van den Heuvelvi 2006).

c. The diagnostic role

The physical exercise tests performed by non-athletes and athletes allow to assess physical fitness and adaptation limits based on: the determination of exercise capacity – depending on intensity, duration, mechanical efficiency and the balance or imbalance between the requirements and consumption of O_2, the energy source; neuromuscular, respiratory, cardiovascular, endocrine metabolic adaptation to exercise; fatigue and overtraining (Derevenco 1992, Foss and Keteyian 1998).

d. The therapeutic role

The beneficial effects of moderate exercise on immunity have been evidenced: in young subjects compared to eldery subjects; in HIV infected patients; in patients with certain types of cancer; in chronic fatigue syndrome; in space flight (Tache and Boboş 2011).

Physical exercise has beneficial effects of normalizing glycemia in type 2 diabetic patients; beneficial effects of stimulating antioxidant mechanisms in case of moderate intensity and duration exercise; it plays a role in functional recovery after sports traumas and other injuries; in locomotor disorders (kinesitherapy); the treatment of mental diseases, neuroses (depression, schizophrenia, anxiety), diabetes, coagulation and fibrinolysis disorders, dyslipidemia, cardiovascular diseases (coronary disease, hypertension) (Sbenghe 1999).

e. Economic benefits

Physical exercise contributes to the reduction of drug therapy costs, through the promotion and implementation of physical activity (Gettman 1996).

Implications of physical exercise

Through its economic, financial, legal, political, cultural, physical and mental health consequences, sport is a major biopsychosocial phenomenon (Thomas 2002; Grosu 2008).

a. Psychological implications

Physical exercise has favorable effects on mental health through: development of self-confidence, independence; stimulation of courage, perseverance, overcoming of failures; wish for self-improvement; wish to control the aesthetic shape of the body; wish to acquire biomotor skills; wish for recreation in the natural environment; aspiration towards a sports hero model (Thomas 2002; Murphy et al. 2006).

b. Social implications

The benefits for physical health indirectly contribute to social well-being. The implications are as follows: micro- and macrosocial integration; acquisition of civilization values; development of mass sport; social mobility; the wish for social affirmation through sport (Murphy et al. 2006).

c. Economic-financial implications

Professional sport economically and financially contributes to: the development of sport equipment industry; development of sport technology; development of mass-media; reduction of expensive medical treatments; circulation, accumulation and handling of amounts of money (Gettman 1996).

Although certain sports are expensive (skiing, tennis), some physical activities (running, jogging, fitness) are not costly and are beneficial for health (Grosu 2008).

d. Legal implications

Professional sport requires in the case of competitions the respect of national and international regulations.

e. Political implications can manifest in international sports competitions.

f. Educational implications have a role in the formation of personality, cognitive behavior and function, starting with the primary and secondary selection of children and juniors for sport (Drăgan 2002).

Physical exercise and stress

Physical exercise can be considered complex stress: neuromuscular, systemic cardiorespiratory, endocrine metabolic, biochemical – oxidative stress, psychoemotional, which is influenced by environmental conditions (temperature, pressure, radiation, humidity, polluting agents), which in turn have a stressing effect.

Stages of stress

Stress includes four interconnecting stages: the physical or psychological strain of the environment; the favorable or unfavorable individual perception of the strain; the response to stress, which can be favorable (eustress) or unfavorable (distress); the behavioral consequences (Weinberger and Gould 2003).

Limiting factors of physical exercise

Physical activity, exercise triggers protective mechanisms against stress, favorable mechanisms for the maintenance of mental fitness and mechanisms dependent on physical fitness.

The limiting factors of physical exercise include: automation; professional problems; lack of time; marriage, children; change of domicile; loss of the team or the partner; accidents; age; health state; financial state; health risk factors: smoking, alcohol consumption, drug use, irrational nutrition; pollution (Resch 2010).

Eustress has favorable effects on the body, determining adaptive changes in the cardiovascular, respiratory, endocrine, muscular, nervous systems.

Eustress designates the level of moderate, optimal psychoneuroendocrine stimulation, which maintains the physical and mental balance and tone of a person, the health state, and induces a positive adaptation to the environment. Eustress, stimulating or tonifying stress is indispensable for life and for the maintenance of mental and physical functions, necessary for human activity. It increases the resistance of the body to strain (Derevenco ș.c. 1992).

Eustress is defined as a desirable phenomenon, as positive stress, with beneficial, energizing effects on the body, vitalizing, favorable for age (Tache 2006) (Table 1).

Distress

Distress is stress that exceeds a critical intensity, whose values vary largely from one individual to another. It is caused by intense and prolonged negative overloads, overstrains that exceed personal physiological and psychological resources, which results in decreased performance, dissatisfaction, psychosomatic and physical disorders (Derevenco et al. 1992). It may be equivalent to strain.

Distress is defined as an undesirable phenomenon, as negative, destructive stress, harmful for life, or an acute and/or chronic aggression that disturbs the command, regulation and defense systems of the body: the psychic, nervous, endocrine and immune systems (Riga and Riga 2008) (Table 1).

A particular form of distress is posttraumatic stress disorder syndrome, caused by exceptional collective or individual psychotraumatizing events: participation in conflicts, catastrophes, natural disasters, detention in camps, nuclear accidents, rape, sexual abuse experienced in childhood. The syndrome manifests by hyperemotivity, reliving of the psychic trauma, sleep disorders, somatic disorders, and requires adequate psychological/psychiatric treatment.

Tabel 1. Characteristics of eustress and distress
(adapted from Derevenco et al. 1992, Hayward 1999, Tache 2006, Riga et al. 2008, Tache and Staicu 2010, Boroș-Balint 2012, Jurcău et al. 2012, Tache and Ciocoi-Pop 2013)

Characteristics	Eustress	Distress
Quality of response to stress	- favorable, beneficial, pleasant effects - mild or moderate stress	- unfavorable, harmful, destructive effects - intense or prolonged stress
Influence on psychophysiological homeostasis	- pro-homeostatic effects - maintenance of psychophysiological tone	- anti-homeostatic effects - disturbance of psychophysiological tone
Causes	- critical life events, with a positive effect - moderate, short duration stressing agents (eustressors)	- critical life events, with a negative effect - intense, long duration stressing agents (distressors)
Physiological mechanisms - the sympatho-adrenal system	- the alarm stage according to the general adaptation syndrome (Selye) - intense activation, with increased catecholamine secretion - moderate activation of CRF, ACTH, cortisol secretion	- the exhaustion stage according to the general adaptation syndrome (Selye) - deactivation, with increased adrenaline secretion - predominance with highly increased cortisol secretion

Characteristics	Eustress	Distress
- the hypothalamic-pituitary-adreno-cortical axis - other mechanisms	- moderate increase of endorphin, serotonin, dopamine secretion - humoral immune (IgA, interferon) and cell immune (NK cells) activation - activation of some brain areas	- decrease or suppression of humoral and cell immunity - dysfunction of some brain areas
Biochemical mechanisms - redox homeostasis	- activation of antioxidant defense	- activation of oxi-nitrosative stress
Psychosocial characteristics - mental tone (cognitive, affective, volitional) - anxiety - emotivity - manifestation - reactions - social support - requirements/ possibilities - performance	- increase - absent - positive emotions, euthymia - active and positive adaptation - self-control - present - balance - increase	- disturbance - present - apathy - passive and maladaptation - loss of control - poor/absent - imbalance - decrease
Correlations with the health state	- sanogenetic effect	- increase of vulnerability to disease - pathogenetic effect – diseases (e.g.: arterial hypertension, myocardial infarction, decreased resistance to infections, cancer)
Treatment	-	- psychotherapy - medication - behavioral therapies
Influence on athletes - physical performance - physical training - fatigue	- increase - favored - physiological	- decrease - overtraining - pathological

Conclusions

Physical activity through exercise, physical education and sport has an antistress effect and represents a sanogenetic therapeutic strategy in preventive medicine and public health (Riga et al. 2013).

REFERENCES

Boroș-Balint I. (2012). *Stresul psihofiziologic și capacitatea de efort fizic*. Ed. Risoprint, Cluj-Napoca, 34-36, 32.

Derevenco P, Anghel I, Băban A (1992). *Stresul în sănătate și boală*. Ed. Dacia Cluj-Napoca, 17-42.

Drăgan I (sub red) (2002). *Medicina sportivă*. Ed. Medicală, Bucureşti, 427-433.

Foss MI, Keteyian SJ (1998). *Fox's Physiological Basis for Exercise in Sport*. Sixth ed. McGraw-Hill.

Gettman LR (1996). *Economic benefits of physical activity*. Physical Act Fitness Res. Digest; 2:1-6.

Grosu EF (2008). *Conceptele fundamentale ale ştiinţei sportului*. Colecţia „Ştiinţa sportului" Cluj-Napoca, Ed. GMI.

Hayward S (1999). *Biopsihologie*. Ed. Tehnică, Bucureşti, 165-189.

Jurcău RN, Jurcău IM, Niculescu RM, Jurcău E, Jurcău N (2012). *Psihologie pedagogică*. UTPRESS, 256-276.

Murphy P, Sheard K, Waddington I (2006). *Figurational Sociology and its Application to Sport*. In Jay Coakley & Eric Dunning (eds.). Handbook of Sports Studies. London: Sage Publications, 92-105.

Resch M (2010). *The physiological factors affecting athletic performance*. Orv. Hetil, 151(20):815-821.

Riga D, Riga S, Motoc D (2013). *Pilonul sanogenetic anti-stres: mişcarea, educaţia fizică şi sportul*. Palestrica Mileniului III, vol. rezumate, 14, 1, 46-47.

Riga S, Riga D (2008). *Stresologie, adaptologie şi sănătate mintală*. Cartea Universitară Bucureşti, Cap.3, 116-126, Cap.4, 121-126.

Sbenghe T (1999). *Bazele teoretice şi practice ale kinetoterapiei*. Ed. Medicală, Bucureşti, 7-17.

Staicu ML, Tache S (2011). *Adaptarea organismului la efort fizic*. Volumul 2. Ed. Risoprint, Cluj-Napoca.

Tache S, Ciocoi-Pop DR (2013). *Paradoxul oxigenului în condiţii de efort fizic*. Palestrica Mileniului III, vol. rezumate, 14, 1, 47-48.

Tache S, Boboș C (2011). *Reactivitatea imunitară și efortul fizic*. Palestrica Mileniului III, 12, 3:254-258.

Tache S, Staicu ML (2010). *Adaptarea organismului la efort fizic*. Volumul 1. Ed. Risoprint, Cluj-Napoca.

Tache S (2006). *Oxidanții și antioxidanții*; În Mureșan A, Tache S, Orăsan R (sub red.) Stresul oxidativ în procese fiziologice și patologice, Ed. Tedesco, Cluj-Napoca, 1-27.

Thomas R (2002). *Sociologie du sport*. Paris, Presses Universitaires de France, 79-80.

van den Heuvelvi (2006). *All-in One*. Viaţa Medicală, 36, 8.

Weinberger RS & Gould D (2003). *Foundations of Sport & Exercise Psychology*. Third Ed., US Human Kinetics 82.

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SPORT AND ITS IMPLICATIONS FOR THE QUALITY OF LIFE OF ELDERLY PERSONS

GHEORGHE SABĂU[1], MARIA MACRA-OŞORHEAN[2]

ABSTRACT. It is known nowadays that sport maintains and improves (physical and mental) health and prolongs life expectancy, a fact mentioned by both those who practice sport in its various forms, and by specialists in physiology, medicine, sociology or sports psychology. *Objectives.* The objective of the present study is to raise awareness of the fact that our life style (including physical activities and recreation through sport) has a major impact - if not an overwhelming one – on our health and on the prolongation of life expectancy. *Methods.* Studies have been carried out on a representative sample of retirees from Transylvania, which have attempted to highlight how the subjects relate to the period of retirement and the marginal place that sports occupy as a way of spending free time in the universe of the preferences of the retirees that have been interviewed. *Results.* The relationship between the overall quality of life of the people and the ways of spending their free time (even by practicing physical exercises and maintenance sports), respectively the practice of performance sports, is obvious: the high percentage of people who practice sport among the total population is itself an indicator of a developed society. *Conclusions.* The elderly in the Transylvanian urban area appreciate their subjective wellbeing as positive and mention as their main needs: maintaining their mental activity, their utility as persons and their relationships.

Keywords: quality of life, sport, leisure activities, pensioners.

REZUMAT. ***Sportul şi implicaţiile sale asupra calităţii vieţii la persoanelor în vârstă.*** Este un lucru cunoscut în zilele noastre faptul că sportul întreţine şi îmbunătăţeşte sănătatea (fizică şi mentală) şi prelungeşte speranţa de viaţă, fapt menţionat atât de cei care practică sportul în diversele lui forme, cât şi de specialiştii în fiziologie, medicină, sociologie sau psihologie sportivă. *Obiective.* Obiectivul lucrării este de conştientizare a faptului că stilul de viaţă (având şi componenta activităţilor fizice şi de recreere prin sport) are un impact major – dacă nu covârşitor – asupra sănătăţii şi prelungirii speranţei de viaţă. *Metode.* Studiile au fost realizate pe un eşantion reprezentativ de pensionari din Transilvania, care au încercat să evidenţieze modul în care subiecţii se raportează la etapa pensionării, precum şi locul marginal

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pe care îl ocupă sportul ca modalitate de petrecere a timpului liber în universul preferinţelor pensionarilor intervievaţi. *Rezultate.* Relaţia dintre calitatea vieţii de ansamblu a oamenilor şi modalităţile de petrecere a timpului liber (şi prin practicarea exerciţiilor fizice şi sporturilor de întreţinere), respectiv a practica sportul de performanţă, este evidentă: procentele ridicate ale practicanţilor de sport din rândul populaţiei totale este în sine un indicator al unei societăţi dezvoltate. *Concluzii.* Persoanele vârstnice din mediul urban transilvănean îşi evaluează în mod pozitiv starea de bine subiectivă, iar principalele nevoi sunt: păstrarea activităţii mintale, utilitatea lui ca persoană şi păstrarea relaţiilor.

Cuvinte cheie: calitatea vieţii, sportul, activităţi de loisir, pensionari.

Introduction

In contemporary social life, both ordinary people and political and cultural personalities acknowledge sport as a phenomenon with special functions in the development of the individual, especially through its major social implications. Starting from the famous works of J. Dumazedier (1950, 1962), some sociologists point out that the "physical" function of sport, that is, its benefits for the health of the body, leads to an indirect function, namely that of social well-being.

Quality of life is an evaluative concept, being the result of relating the living conditions and activities that make up human life to human needs, values and aspirations. As C. Zamfir indicates (1993), quality of life, "refers both to the overall assessment of life (how good, satisfying life is for various individuals, social groups, organizations), and to the evaluation of different conditions and spheres of life" (p. 79). The following components of the quality of life are considered:

- the quality of the environment
- the human quality of worklife
- the quality of interpersonal relations
- the quality of family life.

Objectives

The awareness that lifestyle (including the component of physical and recreational activities through sport) has a major, if not overwhelming, impact on health and the extension of life expectancy is one of the factors leading to this situation in advanced countries. But things are different in poorer states. Thus, entertainment (that is, sports and hobbies) may not occupy an essential place in the scale of values of these individuals, as it overlaps in their life choices with concerns related to their family, community, profession, etc.

Subjects and methods

This is a recent study (2011) conducted on a representative sample of retirees from Transylvania, with the aim of highlighting how the subjects relate to the retirement stage in their life. Other aspects covered in the survey are ways of relational communication, leisure time activities by pensioners and their views about retirement. The research tool was a questionnaire based on multiple-choice questions.

In what follows, we present some of the findings of our research as they provide a relevant picture regarding the lifestyle and perceived quality of life of the elderly, and the marginal place that sports occupy as a way of spending free time in the universe of the pensioners interviewed.

Results

The main reasons for the elderly people interviewed to stay indoors are shopping (28%), commissions / official problems (22%) and visiting relatives or friends (18%) (Figure 1). Although, overall, being active is considered by the subjects a strategy with the greatest benefits for the elderly, according to their answers ("opportunity to rest after I've worked all my life" and "the loss of all roles accomplished during the active period"), most of them (65.5%) fall under the explanations of the *disengagement theory*, while the "activity" category includes only 24% of the respondents (by their choosing the answer "possibility to practise leisure activities more intensely than during employment") (Figure 2).

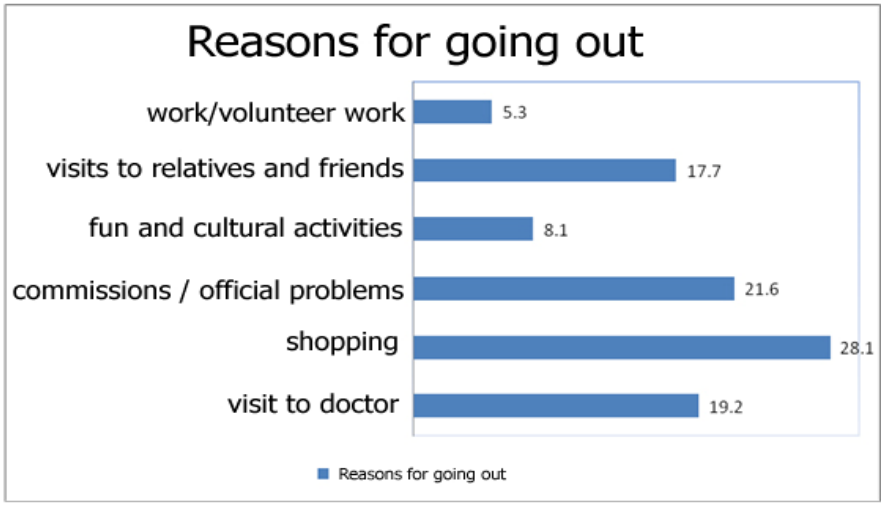

Figure 1. Reasons for older people to go out

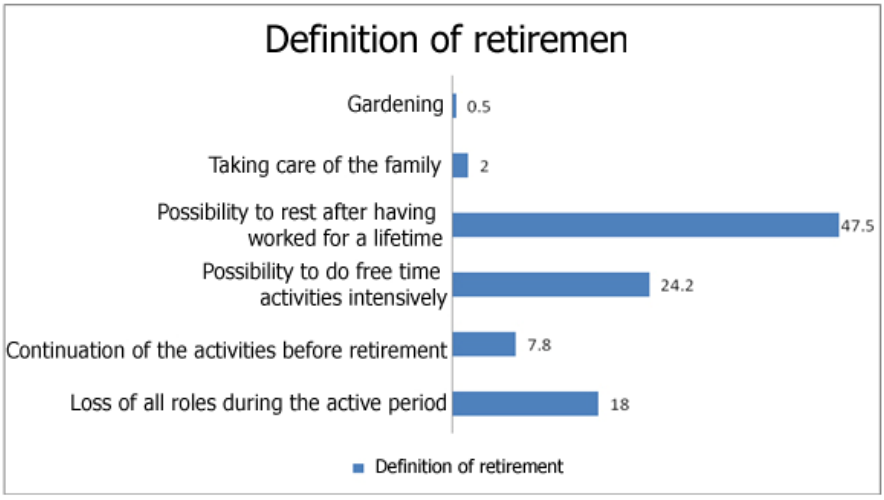

Figure 2. Definition of retirement

Almost two thirds of the respondents (59%) believe that, after daily activities, they have a lot of free time, being busy with activities in or outside the home. Watching TV (31.5%) is the preferred activity in the free time spent at home by the Transilvanian elderly. By watching TV the elderly satisfy their communication and information needs, which they cannot satisfy in their social environment that is limited to their children and, in some happy cases, to relatives or acquaintances (Figure 3).

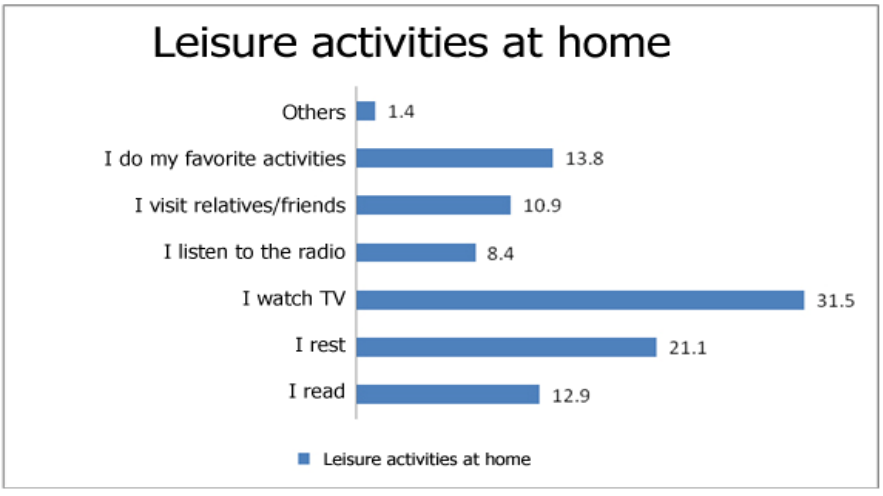

Figure 3. Leisure activities of the elderly at home

The leisure activities outside home preferred by the respondents are: meeting with relatives / friends (30%), walks in the park (26%) and going to church (24.5% - 79% of respondents are Orthodox) (Figure 4).

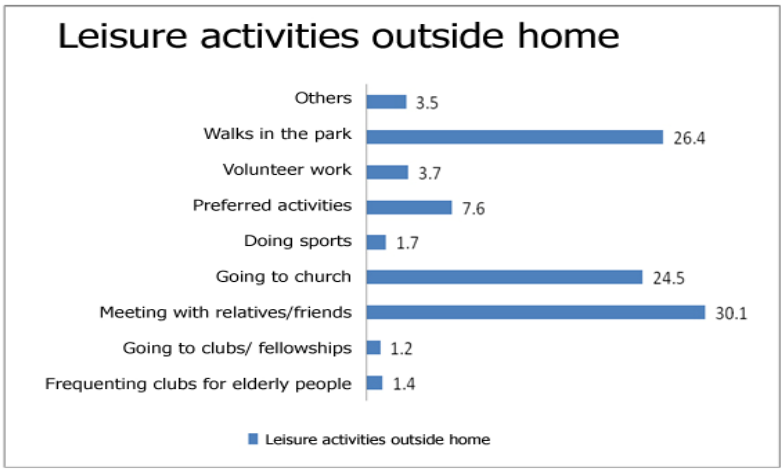

Figure 4. Leisure activities of the elderly outside home

The main needs of the elderly, as shown in the analysis of their responses to the questionnaire are as follows: maintaining mental activity (27%), being useful as persons (21%) and maintaining relationships (21%), while expressive needs with a postmodern potential (to carry out interesting activities, to acquire new knowledge, to have friends / engage in group activities) occur in significantly lower percentages (Figure 5).

Figure 5. Needs and desires of retirees

The most demanded activities are those that help them to maintain their health, the respondents selecting this item in proportion of 34% (Figure 6).

Figure 6. Training activities/fun required by the elderly

The human relationships of the elderly people investigated are lower in intensity after retirement than before retirement, except close family relations (I-IV degree relatives), where the frequency of meetings is higher - 3.69 (on a scale of 1 to 5, where 1 is much lower and 5 much higher). Relations with neighbors are also maintained at the same level as before retirement (Figure 7).

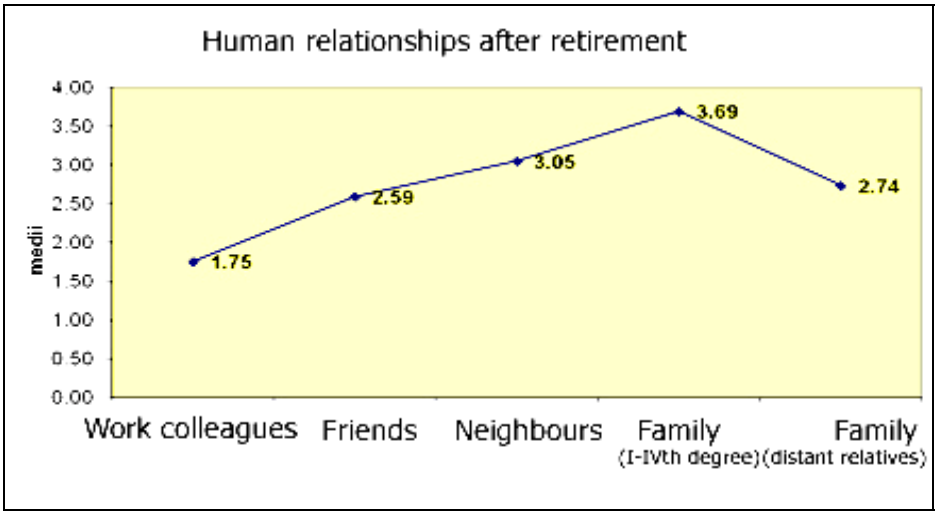

Figure 7. Human relationships after retirement

Most elderly persons (73%) in our sample have grandchildren, that is, they are grandparents, but their answers surprise because they include themselves in the category defined by the literature (Chelin and Furstenberg, 1992 cited in Quadango, 1999) as *distant grandparents*: 42% of them see their grandchildren so rarely that their relationship is just ritualistic and symbolic. Other 28% reveal that they are companionship *grandparents* (they have educational activities and spend free time with their grandchildren), while 27.5% declare that they are *involved grandparents* (they live with their grandchildren and are in constant contact with them).

Conclusions

The main conclusions drawn from the analysis of our research findings are:

- Transylvanian urban elderly people evaluate their subjective wellbeing as positive;
- The higher the income, the greater the degree of satisfaction of current existence needs;
- The higher the level of education of elderly people, the greater their interest in current events;
- Most of the elderly surveyed belong to the disengagement theory;
- Women have a higher frequency of meetings with neighbors and close family (first - forth degree relatives), as compared to men, who have a higher frequency of meetings only with close family;
- The main roles of elderly persons in the family regard household administration and support of various kinds, while the roles they can have in society are of affective and educational counselling;
- More than half of our respondents belong to the category of involved grandparents and companionship grandparents;
- Watching TV is the favourite leisure activity at home, while the most frequent leisure activities outside the home are meeting with relatives / friends, walks in the park and church attendance;
- The main needs of elderly people are to maintain their mental activity, to be useful to the others and to maintain their relationships;
- The activities that a pensioner can do for their community are: taking care of the green areas, administration, counselling / consultation, various repairs, volunteering, etc.
- Most elderly persons do not frequent the clubs / day centers created for them.

REFERENCES

Dunlap, R., Jones, R.E. (2002). „Environmental concern: Conceptual and measurement issues". În R. Dunlap şi W. Michelson (eds.). *Handbook of environmental sociology*. Westport, CT: Greenwood Press

Fontaine, R. (2008). *Psihologia îmbătrânirii*. Iaşi: Ed. Polirom

Hărăguș, (2008). „Distribuţia sarcinilor domestice în cuplurile din România". În P. Iluţ (coord.) *Dimensiuni ale familiei actuale din România*. Cluj-Napoca: Presa Universitară Clujeană: 221-244

Hosu. I. (coord.). (2002). *Youth issues and challenges in South-Eastern Europe*. Cluj-Napoca: Civitas Foundation for Civil Society

Humă, C., Chiriac, D. (2003). „Aspecte globale ale ecologizării urbane". În *Calitatea vieţii*, 1

Inglehart, R, Klingemann, H. (2000). „Genes, culture and happiness". În E. Diener şi E. Suh (eds.). *Subjective well-being across cultures*. Cambridge: MIT Press

Lucuț, G., Rădulescu, S.M. (2000). *Calitatea vieţii şi indicatorii sociali. Teorie – metodă – cercetare*. Bucureşti: Luminalex

McGranahan, D., Scott, W., Richard, C. (1990). „Qualitative indicators of development". *Discussion Paper*, 16, United Nations Research Institute for Social Development

Pop, C.E. (2009). „Ingredientele unei vieţi bune". Calitatea vieţii, XIX, nr. 3-4: 225-245

Quadagno, J. (1999). *Aging and the life course*. US: McGraw-Hill Comp.

Sabau, G. (2010). *Efectele practicarii miscarii fizice organizate asupra calitatii vietii* Teza de doctorat. Facultatea de Sociologie si Asistenţă Socială UBB Cluj-Napoca

Sandu, D. (1999). *Spaţiul social al tranziţiei*. Iaşi: Ed. Polirom

Wimbush, E. (1994). „A moderate approach to promoting physical activity: the evidence and implications". *Health Education Journal*, 53: 322-336

Zamfir, C. (1976). „Indicatori sociali ‚de stare' şi indicatori sociali ‚de satisfacţie' ". În *Viitorul social*, nr. 3

STUDIA UBB EDUCATIO ARTIS GYMN., LVIII, 3, 2013, pp. 21 - 24
(RECOMMENDED CITATION)

OPTIMIZATION OF ANNUAL PLANNING METHOD BY MEANS OF STRUCTURED SPORTS TRAINING OF REPUBLICAN JUNIORS IN FOOTBALL

FERENC FIKKER[1], ANDRAS ALMOS[1]

ABSTRACT. We think that the first step which must be taken by all those who have as their objective the training and instruction of juniors in football is activity rigorous planning. The activity of the football coach is coordinated through an annual, weekly training plan and lesson outline. Planning must be based on the elements and principles of sports training. Making an accurate and correct plan for annual training is essential from the point of view of structured sports training. The more accurate and simple the plan, the greater the chances of excluding errors from the planning process. Using this method of work we obtain a precise structured training and also a continuous controlled development which will help to achieve our goals.

Keywords: annual planning, structured sports training, graphical model

REZUMAT. ***Optimizarea metodei de planificare prin instruire sportivă structurată având ca obiectiv dezvoltarea continuă a juniorilor republicani în fotbal.*** Considerăm că primul pas care trebuie făcut de către toţi cei care au ca obiectiv instruirea şi pregătirea juniorilor în fotbal este planificarea riguroasă a activităţii. Activitatea antrenorului de fotbal este coordonată prin intermediul planului de pregătire anual, săptămânal şi al conspectului de lecţie. Planificarea trebuie să aibă la bază elementele şi principiile antrenamentului sportiv. Conceperea unui plan de pregătire anual precis şi corect este esenţial din punct de vedere al instruirii sportive structurate. Cu cât planul este mai exact şi mai simplu, cu atât sunt mai mari şansele de a exclude erorile din procesul de planificare. Folosind această metodă de lucru obţinem o instruire structurată precisă şi totodată o dezvoltare continuă controlată, ceea ce ne va ajuta la îndeplinirea obiectivelor.

Cuvinte-cheie: planificare anuală, instruire sportivă structurată, model grafic

Introduction

Practice has shown that a coach cannot manage a high performance training process from memory or with no planning at all. The activity of a football coach is coordinated through annual, weekly training plan, and lesson

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outline. The annual planning model is very easy to conceive, it provides a clear picture of the entire period concerned while the design of the weekly and daily plans will be more accessible.

Current level reflected in the special literature

Macrocycle shall mean large training cycles. In football this extended period refers to a competitive year, which spans two calendar years: from September to December – the tour, from March to June – the return. Training cycles repeat on quantitative and qualitative stages, both in terms of basic structure and effort dynamics. The cyclic repetition of the basic structure is based on the concentric nature of resuming the same aspects from one year to another, but to higher qualitative and quantitative levels. That is why they are also called periodic cycles.

They are made up of several mezocycles which favours the return of the following macrocycles on higher quantitative and qualitative stages during a long process. Planning structure also depends on the correlation between the volume, intensity and complexity of effort, on the succession of different training links (classes, stages, parties and periods).

Planning must be designed as a structure from operational positions involving organizational measures, resources and forms of assessment, at lesson or lesson system standards. It is considered that hour, day, week, month, year can be taken as structural reference points. In brief, macrocycles are relatively large time sequences where high performance capability must be continuously raised to an ever higher level.

Issues approached

This structure is conditioned on several factors, among which we should first mention interdependence between content items and their order. We would like to mention here general physical training, specific physical training, technical training, tactical training, effort -rest interrelationship. Table 1 shows the annual planning for the period of the championship tour. As far as calendar point of view is concerned, planning structure is clear - there are present the months of training with the number of days pertaining to these months while the structure of the school year in progress is also considered. Training activity corresponding to each month is segmented according to the weekly structure. Each column in the row corresponding to weeks comprises the training days numbered sequentially (July 13th -19th is the first week of training, from Monday to Sunday). This type of segmentation makes easier coach's planning work: by following the columns, he can easily conceive a weekly training plan and then, daily activity. Moreover, this graphical model allows the centralization of various stages (represented as coloured columns in the left table and having the quantity correspondent within the table) and he can

also follow their quantitative materialization (e.g. "3 tra." – three trainings / week) or calendar planning of the stage ("preparatory games - 2" indicates planning a training game on August 2, "Holliday - 7-9" means the period of holiday from August 7 to 9) during each week.

To illustrate how to "decipher" a column, we chose week July 27 to August 2, including: centralized training between August 27 to 28 (3 trainings), a day off on August 29th (end of centralized training), 3 trainings from July 30 to August 1 and a training game on August 2nd.

Table 1. Annual planning model - championship tour

months 2009	july 31 d.					august 31d.					september 30 d.					october 31 d.				november 30 d.						december 31d		
weeks	1-5	6-12	13-19	20-26	27-2	3-9	10-16	17-23	24-30	31-6	7-13	14-20	21-27	28-4	5-11	12-18	19-25	26-1	2-8	9-15	16-22	23-29	30-6	7-13	14-20	21-27
Training period			11tra.	2 tra.	3 tra.	3 tra.	9 tra.	9 tra.	9 tra.	9 tra.	7 tra.	7 tra.	7 tra.	7 tra.	5 tra.	7 tra.	7 tra.	7 tra.	7 tra.	7 tra.	6 tra.	7tra	5tra			
Centralized training				21 10 tra	28 3 tra.																					
Friendly games					2	6	16	23	30	6																
Championship games											13	20	27	4	8 11	18	25	1	8	15		24	3			
Transition period																								7 6tra.	18 5tra	
Holiday					29	7-9										13-15					16			1 3	19	
Control/Measurement exams			14																					8		

Table 2, designed for the return period of the championship follows the same structure. The only difference is the column that appears at the end of the table, representing the sum of events corresponding to each stage (for instance, 236 trainings, 15 games, 36 days of holiday).

Table 2. Annual planning model - Return championship

months 2010	january 31 d					february 28 d.				march 31 d.				april 30 d.					may 31 d.					june 30 d.					total
weeks	28-3	4-10	11-17	18-24	25-31	1-7	8-14	15-21	22-28	1-7	8-14	15-21	22-28	29-4	5-11	12-18	19-25	26-2	3-9	10-16	17-23	24-30	31-6	7-13	14-20	21-27	46
Training period		6tra	6tra	6tra	4tra		4tra	5tra	7tra	7tra	7tra	7tra	5tra	4tra	4tra	5tra	6tra	6tra	6tra	5tra							236
Centralized training					29 5tra.	6 11tra																					29
Friendly games							14	17 21	28		14																15
Championship games										6		21	25 28	1	8 11	15 18	21	2		12 16							26
Transition period																					17 6tra	6tra	6tra	10 4tra			33
Holiday	3	10	17	24		7	9							3	5				3		23	30	6	11			36
Control/Measurement exams			13																			24					4

Conclusions

Planning the annual activity of a junior team is an important step in the approach we consider necessary for making coaching activity more professional. Conceiving annual training schedule in this schematic form can be seen as an effort. Advantages are, however, significant and justify the approach. One of the main benefits of this model is the potential of this model to bring together all parts of the activity carried out during a competition year in a synthetic form. Synthesis entails the possibility of rational and wise planning of effort as the visual element involved in this method facilitates the elimination of hazards represented by overburdening the team by a disproportionate effort or by undertraining the juniors. One considerable advantage to mention in the end is the flexible nature of this model, which is suitable for changes even in the course of training. By means of this working method, we get a precise structured training and also a controlled continuous development which will help achieve the targeted objectives.

REFERENCES

Antohi, L., Antohi, N. (1998). *Fotbalul modern de la antrenament la joc*, Iaşi: Publishing House Fundaţiei Chemarea

Apolzan, D. (1996). *Fotbal 2010,* Bucureşti: Publishing House F.R.F.

Bacconi, A., Mazzali, S. (1999). *La preparazione fisica del calciatore*, Koala Libri, Reggio Emilia

Bârsan, M. (1980). *Fotbal. Tactica jocului. Metodica jocului scoală,* Bucureşti: IEFS

Ciolca, S.M. (2006). *Fotbal-Curs de aprofundare. Pregatire antrenori*, Bucureşti: Publishing House Fundatiei Romania de Mâine

Cojocaru, V. (2000). *Strategia pregatirii juniorilor pentru fotbalul de inalta performantă*, Bucureşti: Ed. Axis Mundi

Douge, B., Hastie, P. (1994). *Eficacitatea coach-ului. în: Antrenoriat si competitie*, Bucureşti: C.C.P.S.

Dragnea A., Teodorescu-Mate, Silvia (2002). *Teoria sportului,* Editura FEST, Bucureşti

Giacomini, M. (2009). *Ghid tehnic pentru scolile de fotbal,* editia a III-a, traducere FRF

Martens, R. (1987). *Coaches guide to sport psyhology,* London: Human Kinetics Publisher,

Rădulescu, M., Cojocaru, V. (coord.) (2003). *Ghidul antrenorului de fotbal – copii şi juniori,* Bucureşti: Publishing House Axis Mundi

Popovici C. (2005). *Fotbal Copii şi juniori*, Cluj-Napoca: Editura Napoca Star

Roman, Gh., Batali, F.C. (2007). *Antrenamentul sportiv. Teorie şi metodică,* Cluj-Napoca: Publishing House Napoca Star

Teodorescu, S. (2007). *Periodizarea si planificarea în sportul de performantă,* Bucureşti: Publishing House Morosan

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SEVENTH GRADE PUPILS' MOTIVATION TO PARTICIPATE IN THE TOURISM EDUCATION MODULE

DIMITRINKA GEORGIEVA TSONKOVA[1]

ABSTRACT. The scientific paper analyses the results from a survey performed with seventh grade pupils. The leading motives for participation in the Tourism education module are specified. The activities which are most interesting to the pupils while studying tourism are pointed out.

Key words: tourism, module education, motivation

Introduction

Multiple and varying personality and psychological factors condition the various types of human activities in their complexity, and define how active the person will be in the activity by attributing particular meaning to it. The question is very acute, during the school age period, what makes young people get involved in one or another type of activity, and what is at the basis of their behavior. In reality all pupils are motivated, but the question is: Motivated to do what? The answer to this question is especially important for the correct management of the educational process. This is why it is necessary to study the learners' motivation in character and degree and in different types of activities including physical education and sport, because it determines the learners' activity or passivity (Geron, E., Y. Mutafova, 2004; Mutafova, Y., I. Ilieva, S. Boneva, 2002) This issue never loses its importance, since many of its aspects remain insufficiently clarified and analyzed. Based on this, we have addressed our attention to the particular topic, with a focus on the education in the tourism module, which in recent years is one of the preferred modules in the third and additional class in physical education and sport, regulated by the respective documents of the Ministry of Education, Youth and Science (*Law on the education degree, education minimum and curriculum*, 2002; *Instructions and work documentation for the third and additional class in physical education and sport*, 2004).

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The purpose of the academic research is to study the motivation of seventh grade pupils for participation in the Tourism education module, as part of the studies and education process in physical education and sport, while the results obtained are to contribute to its improvement and to the increase of the pupils' interest in it.

Methods of research organization

34 seventh grade pupils from *Ivan Momchilov* Secondary School in the town of Elena and 38 from *Hristo Botev* Secondary School in the town of Gabrovo are surveyed in the school year 2010-2011. The data is processed statistically with SPSS 12.

Presentation

Module education is a contemporary technology which has found a wide application in our country in recent years, in the different educational degrees. It consists in that the studies contents are structured in relatively independent and logically completed organizational and methodical blocks, called modules. It addresses the development of the learners' personality as a whole through *improvement of the intellect and the motor capacities, increase of the positive motivation for active school work, building and improving of skills for independent work and self-control* (Nedkova, A., 2010)

The education in the Tourism module, as part of the studies and education process in physical education and sport, complies with the legislative norms by taking into consideration *the pupils' interests*, *the schools' traditions, the geographical characteristics of the region, the degree of preparedness and qualification of the teachers to conduct various types of touristic activities.* Different forms are being practiced, as most popular is the pedestrian tourism in the form of hiking tours in plain and mountainous terrains and in different climatic conditions. The study contents are divided thematically and include various activities, most of which have an integrative character. The pupils receive knowledge and acquire practical skills to overcome natural obstacles, to orientate with the help of tourist marking, to put up tents and give first aid in case of an incident. Parallel to the education in tourism, sufficient attention is paid to the necessity of a healthy life style of the pupils. They get acquainted with the principles of rational nutrition, work and recreation, and improvement of the functional capacities of the organism. In respect to educational work, the teacher focuses on building of teamwork skills, overcoming of complex situations, and formation of a system of values in conformity with the generally accepted norms of behavior. The experience so far shows, that the Tourism module is accessible to the pupils, and their active and successful participation in it presupposes above all a sufficient degree of motivation (Tsonkova, D., 2007).

The results from the survey disclose the attitude of the pupils and the factors which determine their activity or passivity in the touristic activities.

The answers to the first question: **„Would you participate in the Tourism module if it were not obligatory?"** point to the reasons for the pupils' participation in module Tourism (Fig. 1). Most of the pupils - 70,5% consider that the obligatory character of the education is insignificant for their participation in the different touristic activities, but 26,5% would not participate. There are some students without a definite opinion on the question (6,94%).

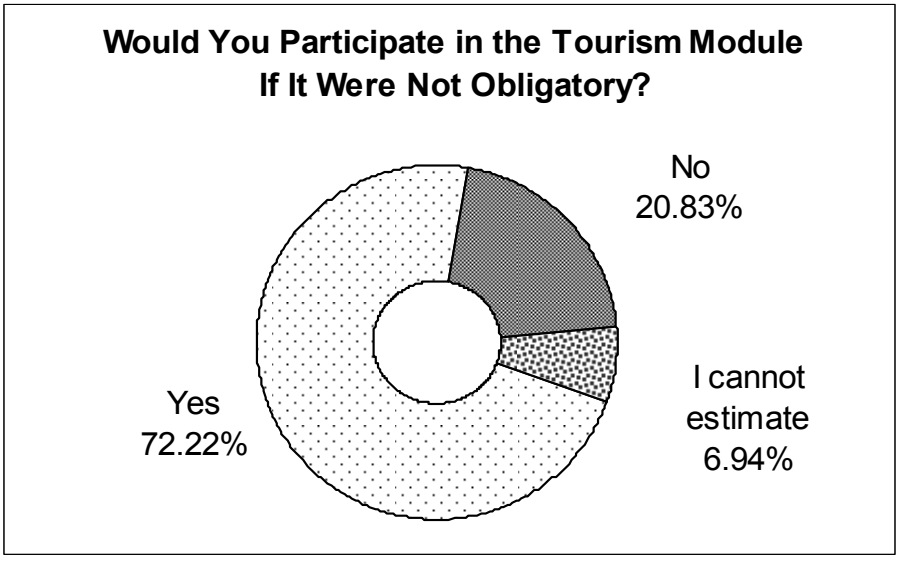

Fig. 1.

It is clear that the majority of the seventh grade pupils are willing to participate, as a result of their interest in the activities which take place in this education module. We consider that this interest is not incidental, having in mind that the surveyed pupils come from towns in proximity to the mountain (Elena and Gabrovo) and this has an effect through created traditions, thinking, attitudes etc. of the people in these regions.

We looked for the particular motives for participation in the Tourism education module with the question **„Why do you participate in the Tourism education module**?", to which the surveyed could give maximum 3 answers. It impresses that most of them give more than one leading motive (Fig.2).

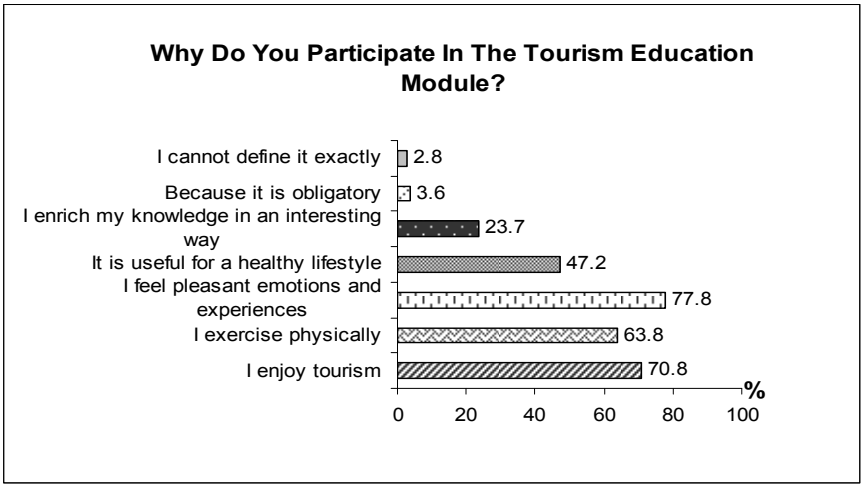

Fig. 2

The motive which weights first, is related to pleasant emotions and experiences (77,8 %), followed by a more general motive "I enjoy tourism" (70,8 %). An important place holds the motive for the usefulness of a healthy lifestyle as well as the one related to physical exercising. To 23,7% it is important that they have the possibility to enrich their knowledge in an interesting way. Undoubtedly there are pupils with the so called negative motivation, where the participation is only because of obligation (2,8%). The fact that 3,6% point to the answer "I cannot define it exactly" proves that sometimes people, especially in school age, find it difficult to articulate what stimulates them or not for action.

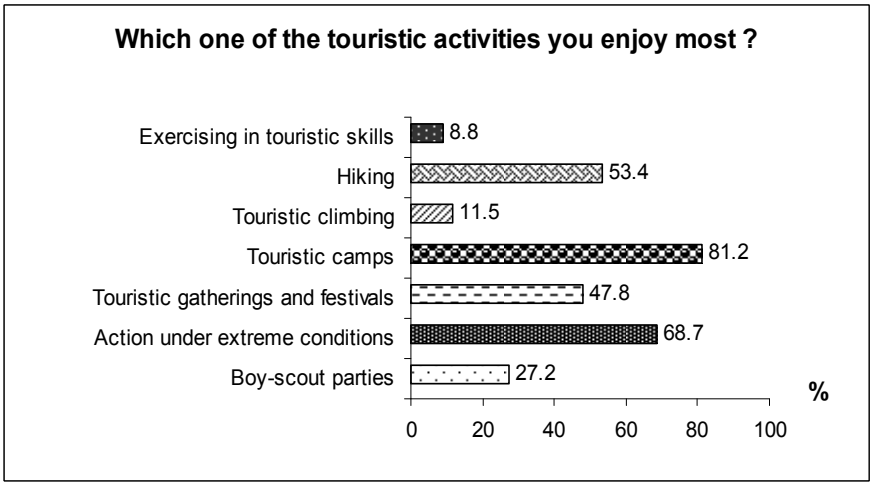

Fig. 3

The answers to the question **„Which one of the touristic activities you enjoy most"** show a wide range of preferences. The answers spread evenly over the four types of activities (fig. 3). Tourist hiking, camping and action under extreme conditions are most preferred. For many of the seventh graders the exercising in touristic skills, as well as tourist gatherings and festivals are less attractive. We suppose that this is due to the fact that at this age the pupils prefer activities which provide preconditions for more active social contacts in a non-formal environment.

Indicative, although surprising, are the answers to the question **„Would you like to discuss topics from life such as friendship, love, sex, communication, children's rights etc. during touristic activities?"** Despite the willingness of the majority to discuss interesting life topics and the problems of young people during hiking and camping (56,94 %), it is surprising that about 33,33% do not want to speak about them, and for 9,72 % such conversations are of no importance. This, according to us, confirms the tendency of deepening of existing inertness and apathy among pupils, lack of desire to share, dispute etc., which is an acute social problem and it should be solved in time and with joint efforts.

The results from the survey give reason for the following **conclusions**:

1. The Tourism education module complements the studies contents of the physical education and sport programme for the seventh grade at Secondary Schools. It has a significant importance for the integral development of the teenagers and affects positively their outlook and habits for a healthy lifestyle.
2. Seventh grade pupils from the two schools in the towns of Elena and Gabrovo are positively motivated to participate in the Tourism education module. Irrespective whether they participate obligatorily or not, most of them are willing to get involved in various touristic activities.
3. There is most interest and activity in touristic hiking, camping and action under extreme conditions, where the seventh graders receive the expected physical exercising and emotional satisfaction.
4. In view of the complete socialization at a school age, it is necessary that the sports educators increase the pupils' motivation for systematic participation in touristic activities, in particular in provoking on purpose the necessities to share and discuss.

REFERENCES

Geron, E., Y. Mutafova (2004). *Motivation at physical activity and sport*. S.: NSA PRESS, 2004. *Law on the education degree, education minimum and curriculum* /ДВ, бр.67, 1999; бр. 95, 2002/.

Mutafova, Y., I. Ilieva, S. Boneva (2002). *Problems of the studies process motivation in physical education and the role of the teacher in it.* // In: Personality, Motivation, Sport. Sport Education. Nr. 1, S.: Prosport, 2002.

Nedkova, A. (2010). *Module education: an alternative to the traditional education modules.* http://www.btu.bg/Godishnik_2010/Tom_2/T2-39. *Instructions and work documentation for the third and additional class in physical education and sport*. Order Nr RD–09–1038 from 27.07.2004 of the Minister of education and science.

Tsonkova, D. (2007). *Touristic and sports practices at school.* V. Turnovo, Faber http://planini.eu/planini/center.php

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THE EFFECTS OF HAND-EYE COORDINATION OVER POSTURAL BALANCE

COSMIN PRODEA[1], ADRIAN PĂTRAŞCU[1], LUCIA ANA-MARIA STANCIU[1]

ABSTRACT. *Premises.* Balance can be improved through physical exercises, both aerobic and anaerobic. Coordination and skills are motional customs also contributing to this action. Research in the field shows the importance of vestibular, visual and somatosensory system receptors in maintaining and improving balance. We will show that physical exercise influences and improves balance. *Objectives*. The objective of this study was to determine if the AMTI Netforce platform can be used as an objective measurement tool for the effects of hand-eye coordination over postural balance. *Methods*. We used the AMTI Netforce platform for all our measurements, focusing on two characteristics: the center of pressure's trajectory area and length. *Results*. These results suggest that the coordination movements really do have an effect over the postural balance. Specifically, our results suggest that when the subject executes coordination movements, the trajectory's length increases, thus consolidating our presumption that the force platform can give us an objective measurement tool for the coordination effects over postural balance. *Conclusions*. We have proven that the force platform does in fact offer us a reliable and objective way of identifying any difference between different positions or movements. Completing this first stage means that we found the objective tool to use in the next part of the research.

Key words: balance, hand-eye coordination, AMTI Netforce

REZUMAT. ***Efectele coordonării mână-ochi asupra echilibrului postural***. *Premize*. Menţinerea echilibrului poate fi îmbunătăţită prin exerciţii fizice atât aerobe cât şi anaerobe. Coordonarea şi îndemânarea sunt deprinderi motrice care contribuie şi ele la această acţiune. Studiile din domeniu arată importanţa receptorilor vestibulari, vizuali şi ai sistemului somato-senzitiv în menţinerea echilibrului şi îmbunătăţirea acestuia. Noi vom arăta că exerciţiul fizic influenţează şi îmbunătăţeşte echilibrul. *Obiective*. Obiectivul acestui studiu a fost de a determina daca platforma AMTI Netforce poate fi folosită ca o metodă obiectivă de măsurare a efectelor coordonării mână-ochi asupra echilibrului. *Metode*. Am folosit platforma AMTI Netforce pentru toate măsurătorile, concentrându-ne pe două caracteristici: lungimea şi aria centrului de presiune. *Rezultate*. Rezultatele

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sugerează că mişcările ce presupun coordonare influenţează echilibrul postural. În special, rezultatele noastre sugerează faptul că atunci când un subiect execută mişcări de coordonare lungimea traiectoriei centrului de presiune creşte, astfel consolidând presupunerea noastră că platforma de forţă AMTI poate fi utilizată ca un instrument obiectiv de măsurare a efectelor coordonării asupra echilibrului. *Concluzii*. Am demonstrat că platforma de forţă ne oferă o metodă obiectivă şi fiabilă de a identifica orice diferenţă dintre diferite poziţii şi mişcări. Finalizând această primă etapă înseamnă că am descoperit o unealtă obiectivă pentru următoarele etape ale cercetării noastre.

Cuvinte cheie: chilibru, coordonare mână-ochi, AMTI Netforce

Background

Nowadays, research is becoming more and more thorough and detailed. The involved effort is increasingly complex, this being the reason why we propose this research. The central subject refers to balance. Coordination and skills are only a few of the motional customs influencing balance, along with the type of effort, aerobic or anaerobic. Of course, the examples can go on, but for the beginning, we will detail these items.

Balance is defined also as „the complex process involving the reception and organization of sensorial input and the schedule and execution of movements, elements which insure an erect posture, meaning the permanent keeping of the center of gravity within the support base". Or, shorter: „balance is the ability of maintaining or mobilizing the body without falling". The permanent control of posture is a feature of a healthy nervous system, allowing stability and the initiation of the desired movements. Any disturbance in balance or posture control highly impedes the efficiency of our actions (Sbenghe, 1999, page 262).

As we will later see, most studies refer to balance from the point of view of kinetotherapy, and not from that of physical exercise.

Balance can be improved through physical exercises, in aerobic and anaerobic effort, along with coordination and skills. All of the aforementioned types of effort can improve balance. (Grosu, Emilia, ”Psychomotricity”, 2009, GMI Publishing House, Cluj-Napoca)

For instance, walking and jogging contribute to the improvement of balance. Normal walking and crawling, quality execution jumping, for instance, jumping over a stretched string.

Static exercises for developing balance: balance on tiptoes, walking on tiptoes, support on one leg only (simple types of exercises). We can also add to these types of exercises, movements of the upper limbs or with balancing objects on the head, body control exercises (for instance, picking up objects scattered on the ground), thus becoming complex exercises for balance development. A fixed

string is used at the extremity, and someone spins it, adapting to the capacities of the person about to jump. When he/she manages to dose and reinitiate the force according to the various movements of the string, the passing of the string along with the movement of the body will be prevented. Thus, coordination of movements is also improved through the jumping and spinning of the string on his/her own, "reentering" the string.

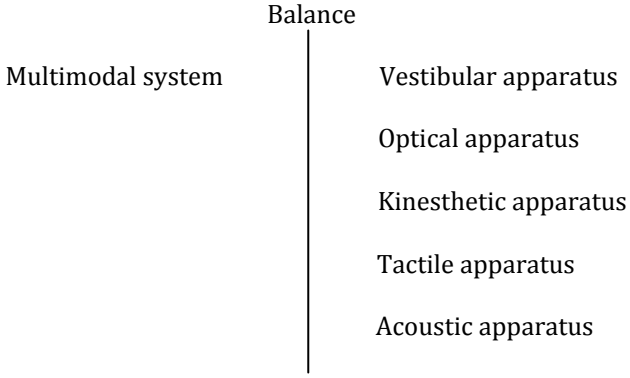

Fig. 1. *The balance chart* (Grosu, Emilia, *Psychomotricity* – 2009, GMI Publishing House, Cluj-Napoca, page 429)

According to Sbenghe, (p.263), the dynamic balance is a result of three factors: the individual, with his/her anatomical and functional capacities, the activities/movements performed by the individual at a certain point and the environmental conditions where the individual performs his/her activities. These activities are "daily activities", such as balance walking on a plank, various jumps, landing, walking over obstacles, light jogging on various types of soil, over obstructions, on narrow surfaces etc. Balancing tasks contribute to achieving motional and performance specific customs.

Furthermore, there are three main sources of peripheral inputs contributing to posture control, coming from somatosensorial, visual and vestibular receptors (bilateral). These sources are:

1. The peripheral somatosensory system (receptors in joints, ligaments, tendons, skin, muscles, etc.)
2. Visual receptors that offer central/focal information assisting us in orienting in the environment or peripheral/ambient information helping us to anticipate movements;
3. Vestibular receptors (internal ear), in charge of the movements of the body according to the gravitational line and head movements.

The performance of balance action is achieved by the locomotive system (posture and movement amplitude, movement force, endurance, coordination, ability), which keeps the body balanced. Walking represents a common activity which permanently challenges an individual's balancing system. These abilities can be trained through exercise. Also, the attention, memory and muscles contribute to keeping balance.

Examples of tests used to test balance: the classic Romberg test, the pushing test, the unipodal test, the postural stress test, the Tinetti balance test, the school of walking assessment. (Grosu Emilia, Florina (2001), *Motional learning and performance in sports,* GMI Publishing House, Cluj-Napoca, Vol. II)

Hypothesis

The AMTI Netforce platform can be used as an objective measurement tool for the hand-eye coordination movement's effects over the postural balance.

Methods and materials

Subjects

The subjects of this study were 170 students between the ages of 20 and 22 years old, all of them students of the Faculty of Physical Education and Sport, Babes Bolyai University. There were 120 boys and 50 girls that did both the initial and the final test.

Methods and the Steps of the Research

We used the AMTI Netforce for the initial and final balance tests. The tests consisted of measuring the postural balance of the subjects without and with some standard hand-eye coordination.

We measured and observed the evolution of two characteristics of postural balance: center of pressure's trajectory length and center of pressure's trajectory area. These two give us a clear and objective way to identify any modification in the postural balance prior and after the hand-eye coordination movements.

Results

A paired-samples t-test was conducted to compare the values of the two items that we registered during the initial and the coordination test.

When measuring the center of pressure's trajectory length for the boys, there was a significant difference in the scores for the initial test (M=10423.53, SD=5914.13) and the coordination test (M=289930.76, SD=113749.17); t(119)= - 28.13, p=.000. These results suggest that the coordination movements really do have an effect over the postural balance. Specifically, our results suggest

that when the subject executes coordination movements, the trajectory's length increases, thus consolidating our presumption that the force platform can give us an objective measurement tool for the coordination effects over postural balance.

When measuring the center of pressure's trajectory length for the girls, there has been a significant difference in the scores for the initial test (M=3776.53, SD=1656.06) and the coordination test (M=19199.09, SD=3738.68); t(119)= - 65.817, p=.000.These results suggest that the coordination movements really do have an effect over the postural balance. Specifically, our results suggest that when the subject executes coordination movements, the trajectory's length increases, thus consolidating our presumption that the force platform can give us an objective measurement tool for the coordination effects over postural balance.

When measuring the center of pressure's trajectory area for the boys, there was a significant difference in the scores for the initial test (M=4217.49, SD=19402.21) and the coordination test (M=19402.21, SD=3764.04); t(49)= - 36.610, p=.000. These results suggest that the coordination movements really do have an effect over the postural balance. Specifically, our results suggest that when the subject executes coordination movements, the trajectory's area increases, thus consolidating our presumption that the force platform can give us an objective measurement tool for the coordination effects over postural balance.

When measuring the center of pressure's trajectory area for the girls, there was a significant difference in the scores for the initial test (M=14, SD=2.93) and the coordination test (Mc=15.29, SDc=7.23); tc(13)= - 0.60, pc=0.557. These results suggest that the coordination movements really do have an effect over the postural balance. Specifically, our results suggest that when the subject executes coordination movements, the trajectory's area increases, thus consolidating our presumption that the force platform can give us an objective measurement tool for the coordination effects over postural balance.

Tabel 1. The 2-tailed t-test final results(both boys and girls)

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence				
					Lower	Upper			
Pair 1	LUNG_B_1 - LUNG_B_2	-279507.2326	108834.96825	9935.22786	-299179.9760	-259834.4891	-28.133	119	.000
Pair 2	AREA_B_1 - AREA_B_2	-15422.5592	2566.90424	234.32523	-15886.5466	-14958.5719	-65.817	119	.000
Pair 3	LUNG_F_1 - LUNG_F_2	-311002.7716	102077.22778	14435.89999	-340012.7988	-281992.7444	-21.544	49	.000
Pair 4	AREA_F_1 - AREA_F_2	-15184.7180	2932.84472	414.76688	-16018.2232	-14351.2128	-36.610	49	.000

Tabel 2. The correlation values

		N	Correlation	Sig.
Pair 1	LUNG_B_1 & LUNG_B_2	120	.839	.000
Pair 2	AREA_B_1 & AREA_B_2	120	.818	.000
Pair 3	LUNG_F_1 & LUNG_F_2	50	.733	.000
Pair 4	AREA_F_1 & AREA_F_2	50	.677	.000

Discussion of the results

Considering the fact that the p values are lower than α=.05, and also there is a very strong correlation between the initial and after tests (over 0.7), we can surely conclude that our stimuli, the coordination movements, did in fact have a big influence over the postural balance. These results are encouraging because they open the way to an even bigger research in the domain. The fact that now we are sure the force platform gives us an objective result during coordination tests, we can now move forward and start the pilot test on the effects of maximal anaerobic effort over postural balance during a standard, computer assisted, hand-eye coordination test.

We have proven that the force platform does in fact offer us a reliable and objective way of identifying any difference between different positions or movements. Completing this first stage means that we found the objective tool to use in the next part of the research.

REFERENCES

Bull, Stephen (2011), *Guidelines for performance optimization,* Trei Publishing House, Bucharest

Grosu, E.F. (2009), *Psychomotricity,* GMI Publishing House, Cluj-Napoca

Grosu E.F. (2001), *Motional learning and performance in sports,* GMI Publishing House, Cluj-Napoca, Vol. II

Roman, Gh., Batali, Fl. (2007), *Sports training - Theory and methodics,* Napoca Star Publishing House

Sbenghe, T. (1999), *Theoretical and practical basics of kinetotherapy,* Medical Publishing House, Bucharest

Sbenghe, T. (2002), *Kinesiology – The science of movement,* Medical Publishing House, Bucharest

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SOURCES OF KNOWLEDGE ACQUISITION OF COACHES: A REVIEW OF LITERATURE

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ABSTRACT. The purpose of this study was review the existing literature on coaches' knowledge sources. The review highlighted coaches' knowledge is built from a broad range of sources. It is influenced by a complex mix of formal, non-formal, informal directed and self-directed learning experiences. However, this developmental mix for coaches is largely individualised and ad hoc. While the literature suggests the balance tends to be toward informal learning, the optimal mix of learning experiences needs to be addressed. In this respect, the researches available on coaching knowledge are limited by a tendency to focus on expert or elite coaching practitioners. This group of coaches has been shown to favour self-directed learning and therefore engage in activities to match.

Key words: learning situation, coaching science; coaching education and coaching experience.

Introduction

Coaching can be considered as a unique occupation in which coaches play multiple roles such as teacher, motivator, strategist, supervisor and character builder. Furthermore coaches perform various duties such as guiding the practice of skills, providing instruction and feedback, monitoring learning and performance and supervision (Gould, 1987). For these reasons, coaches are expected to understand and use an increasingly specialized body of knowledge (Martens, 1997). Coaches' knowledge is considered to be one of the bases for the athletes' enhancement, development and health (Durand-Bush, 1996; Jones et al., 2003), in so far as, as stated by the expert coaches studied by Abraham et al., (2006), it is not possible to teach or develop a matter without understanding it. Because of importance of coaching knowledge, research on coaching has been changing focus from coaches' behaviours and performance towards thoughts and knowledge that undergird coaches' actions (Gilbert & Trudel, 2004).

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The knowledge base in coaching can be divided into two large domains: sport—specific knowledge and general coaching knowledge (Abraham & Collins, 1998). Sport-specific knowledge includes techniques, tactics, mental skills, and physical attributes of a particular sport (Wilson, 2008). The general knowledge of coaching evolves from the nature and extent of information and facts that a person must understand to do acceptable work as a coach in any sport. This information includes steps, procedures, practices, rules, policies, theories, principles, and concepts common in the coaching field (Corso, 1992). In other words general coaching knowledge refers to the knowledge required to create optimal learning environments (Wilson, 2008). Beyond identifying the extensive knowledge base required for coaching, it is important to establish an understanding of how these coaches acquire their knowledge.

This study review and discuss the researches that focused on the avenues through which coaches learn and acquire knowledge. In order to achieve this, the review is structured around Coombs and Ahmed's (1974) conceptual framework of formal, non-formal, and informal learning.

Learning that has occurred in a formal situation is defined by Coombs and Ahmed (1974) as something that has taken place in an, institutionalised, chronologically graded and hierarchically structured educational system. Formal programs have characteristically required candidates to demonstrate prerequisites outlined in admissions guidelines, before embarking on a course that enforces compulsory attendance, standardised curricula and culminates in certification of some kind. Activities conforming to this definition of coach learning include large-scale coach certification programs developed by the governing bodies of sport and higher education courses relating to coaching and the sport sciences (Nelson et al., 2006).

Learning in informal situations has been identified as the lifelong process by which every person acquires and accumulates knowledge, skills, attitudes and insights from daily experiences and exposure to the environment (Coombs & Ahmed, 1974). Thus learning takes place in a wide variety of contexts; the majority of which occur in an informal setting beyond dedicated formal learning institutions (Brookfield, 1986; Merriam & Caffaella, 1999). Consistently, coaches learn through various avenues, including previous experiences as an athlete, informal mentoring, practical coaching experiences, and interactions with peer coaches and athletes.

In addition to the avenues already identified, other forms of informal or self-directed learning are exploring the Internet, as well as reading coaching manuals, books and journal articles and magazines. Coaches also watch educational sports science videos, footage of coaching sessions and recordings of the performances of their and other coaches' athletes.

Learning that has occurred in non-formal situations has been conceptualised as, any organised, systematic, educational activity carried on outside the framework

of the formal system to provide select types of learning to particular subgroups in the population (Coombs & Ahmed, 1974). Examples of non-formal learning include coaching conferences, seminars, workshops and clinics (Nelson et al., 2006). Although formal and non-formal learning share many similar characteristics, non-formal learning differs from the former as it tends to present a particular subgroup of a population (e.g. high-performances coaches) with alternative sources to those of the formal structured learning pathway (e.g. short courses typically focused on a specific area of interest).

Aim of Study

This study aimed to review the qualitative researches focused on the coaches' sources of knowledge acquisitions. The authors planned to provide a greater understanding of coaches' preferences for how they learn their craft. The specific purpose of this study was to analyze the various types of coaches' learning opportunities and their contribution to coach accreditation and development.

Materials and Methods

This paper aims to review and conceptually locate qualitative literature exploring how sports coaches acquire the knowledge that underpins their professional practice according to Coombs and Ahmed's framework of formal, non-formal, and informal learning as the analytical framework.

The researchers attempt to map the existing approaches in which coach can learn and acquire appropriate knowledge to their athletic and professional development.

The review considered the relevant English language research focus on coach learning with work in relevant domains and disciplines.

The review includes published articles from a wide range of electronic database, including Sport Discus, ISI Science, ProQuest, PubMed, Elsevier, Citation Index, and ISI Social Science Citation Index and the reference list of each published research paper as well as books/book chapters, theses and dissertations. Search terms included 'coach education', 'coach learning', coach learning and development', 'coach and professional development' 'coach learning and education', 'source of coach knowledge' and 'coaching knowledge' 'informal learning'.

Researchers reviewed each paper independently. Results were compared and discrepancies discussed. Data were extracted using a review schema developed by the research team. In most cases, the original author's own words were used in an attempt to convey the intended meaning and to allow for more realistic comparison between studies.

Results

The training of coaches is considered central to sustaining and improving the quality of sports coaching and the ongoing process of professionalisation. To achieve this aim sports coaches participate in a range of learning opportunities that contribute to their development to varying degrees. In this article, we present our collective understanding on the varying types of learning opportunities and their contribution to coach accreditation and development.

An extensive review of literature on coaching science and coach education highlighted that coaching knowledge is built from a broad range of sources from personal coaching and playing experiences to more explicit formal, informal and non formal learning situations.

Results indicated that coaches primarily acquired knowledge and learned how to coach through coach education program (Gilbert & Trudel, 2004; Trudel & Gilbert, 2006). Abraham et al., (2006) also found that coaching courses are first source of coaches' knowledge. This result is consistent with Fleurance and Cotteaux (1999) and Irwin et al., (2004). It is speculated that coaches who have gone through coaching programs will have completed coursework from a wide array of disciplines (e. g., skill activity courses, sport psychology, pedagogy), which may facilitate the development of both sport-specific and coach-specific knowledge.

Although coach education programs seem to be valued by coaches, some researchers have shown that current formal education programs do not adequately prepare coaches for their task (Abraham & Collins, 1998; Nelson et al., 2006; Trudel & Gilbert, 2006). They founded that in contrast to formal courses, experiential sources such as learning by doing, working with experts, observing and talking to other coaches and interacting with peer coaches are more important sources than to the formal learning situations provided by the national coaching certification programs. In these researches coaches have repeatedly cited their initial coaching experiences as assistant coaches at the high school or university as major sources of knowledge (Cregan et al., 2007; Schinke et al., 1995; Trudel & Gilbert, 2006). Their findings are in accordance with previous research with youth (Gilbert & Trudel, 2005) and elite level coaches (Bloom & Salmela, 2000; Werthner & Trudel, 2006). Results of review showed that coaches learned from observing and talking to other coaches (Bloom et al., 1998; Gilbert & Trudel, 2001; Sage, 1989; Werthner & Trudel, 2006), interactions with other coaches and high level athletes (Abraham et al., 2006; Erickson, et al., 2008; Fleurance & Cotteaux, 1999; Gilbert & Trudel, 2001; Irwin et al., 2004; Jones et al., 2003; Wright et al., 2007) as well as mentoring by more experienced coaches during their careers (Bloom et al., 1998; Cregan et al., 2007; Irwin et al., 2004; Jones et al., 2004; Salmela, 1995; Trudel & Gilbert, 2006). More specifically, the acquisition of coaching knowledge through competitive sport experiences (Cregan

et al., 2007; Schinke et al., 1995), have been identified as sources coaches used to develop coaching knowledge and sport-specific knowledge. Small bodies of researches which have identified the career development patterns of expert coaches (Cregan et al., 2007; Irwin et al., 2004; Jones et al., 2003, 2004; Salmela, 1995; Schinke et al., 1995; Werthner & Trudel, 2006) have concluded that previous athletic experiences were viewed as a valuable source of coaching knowledge acquisition providing coaches with basic knowledge of their sport. Coaches always reported learning from their athletic time as another key strategy for gaining sport—specific knowledge.

Although research has highlighted the dynamism of informal, social learning, this is not to say that coaches do not see any value in more formal and non formal learning opportunities. Many studies exist which confirm that coaches still draw information and knowledge from participation in professional clinics, seminars and workshops (Wilson, 2008; Wright et al., 2007). Coaches are most likely to attend coaching conferences to get new information. In addition, taking account of the Internet's growing popularity as a knowledge resource, coaches appear to be increasingly citing its usefulness in terms of information acquisition (Erickson et al., 2008; Lemyre et al., 2007; Wright et al., 2007). Furthermore, reading books (Abraham et al., 2006; Lemyre et al., 2007; Wright et al., 2007) and magazines (Reade et al., 2008) and watching coaching videos (Reade et al., 2008; Wright et al., 2007) have been also emphasized as valuable learning sources.

Discussion

The purpose of this study was review the literature of sport coaches' sources of knowledge acquisition from earliest sport participation to current coaching position. All the sources considered in this study were emphasized by researchers as being either important or very important to the development of coaches' knowledge indicating that they recognized a broad range of sources as valuable for coach development. Coaches acquire knowledge from their physical education program, athletic experiences, observations and interactions with other coaches, mentoring, as well as from clinics, seminars, the Internet and books. Indeed, not much difference was even found between distinct sources.

It is not surprise that most of coaches described the knowledge necessary to coach any sport in terms of what they learned from the course. Comprehensive coach education programs have been implemented in many countries to help coaches develop coaching competencies by increasing coaches' knowledge and confidence in their coaching abilities (Douge & Hastie, 1993). For example coaches acquired organizational, planning and teaching skills from their pedagogy courses. Likewise, their psychology courses helped them to be more understanding of their athletes' needs and exposed them to different ways of dealing with athlete

behavior (Wilson, 2008). However, formal coach education programs are only one of the many opportunities to learn how to coach. Aside from acquiring knowledge through teaching-oriented courses which may offer courses in their curriculum such as sport psychology, coaches acquired knowledge through their experiences. In particular, coaches learned from their mistakes and gained confidence in their decisions with each passing season.

The process of becoming an expert coach is influenced by situational coaching experiences, observations of peers. These informal learning situations allowed participants to network with other coaches and gain valuable coaching experience. Yet it is widely acknowledged that the simple accumulation of years of involvement does not guarantee that one will become an effective coach (Douge & Hastie, 1993).

In developing this work of how coaches learn, a vital role has been given to the process of reflection in terms of how experience is transformed into coaching knowledge and competence (Gilbert & Trudel, 2001; Martens, 1997). Such reflections can often be triggered by conversations with others, which have led to claims for mentoring as an important way of increasing coaches' development. Mentoring by more experienced coaches allowed younger coaches to acquire knowledge and helped shape their coaching philosophies and beliefs (Bloom, 2002; Bloom et al., 1998).

Interactions among the coaches can provide important learning situations in which they discuss coaching issues and develop, experiment with, and evaluate strategies to resolve these issues. Results suggested that although coaches recognized the potential to learn by sharing their knowledge, time and space to meet were important limiting factors.

Athletic experiences also played an important role in both a coach's career progression and development of expert coaching knowledge such as rules of the game and the technical skills to demonstrate. Coaches accumulated hours of experience as athletes in a number of different sports.

Reading books and coaching magazine helped coaches acquire new training ideas and learn about coaching practices. According to studies, the Internet also was an important resource for both acquiring and refining their repertoire of practice drills.

Although researches have highlighted the dynamism of formal and informal, social learning, this is not to say that coaches do not see any value in non formal learning opportunities like seminars, workshops and etc. Many coaches felt they acquired valuable knowledge at these clinics, including new aspects of their sport and a basic understanding of sport science and pedagogical practices.

Generally speaking, the current review suggests that a wide variety of learning sources were available for coaches to acquire and refine their coaching skills. On the one hand both cognitive learning, which could occur through

coaching specific academic courses, experiential learning, observations and practical coaching experiences under supervised conditions were equally important in learning to become a coach, and on the other hand although reading books, using the Internet, attending in coaching clinic and seminars may not have been the most important factors in knowledge acquisition for coaches, they were still viewed as potential learning tools.

REFERENCES

Abraham, A. & Collins, D. (1998). Examining and extending research in coach development. Quest, 50(1), 59-79.

Abraham, A., Collins, D. & Martindale, R. (2006). The coaching schematic: validation through expert coach consensus. Journal of Sports Sciences, 24(6), 549-564.

Bloom, G. (2002). Coaching demands and responsibilities of expert coaches. In J.M. Silva. & D.E. Stevens (Eds.), Psychological Foundations of Sport (pp. 438-465) Boston: Allyn and Bacon.

Bloom, G.A., Durand-Bush, N., Schinke, R. & Salmela, J.H. (1998). The importance of mentoring in the development of coaches and athletes. International Journal of Sport Psychology, 29, 267-281.

Brookfield, S.D. (1986). Understanding and facilitating adult learning. Milton Keynes: Open University Press.

Carter, A.D. & Bloom, G.A. (2009).Coaching knowledge and success: Going Beyond Athletic Experiences. Journal of Sport Behavior, 32(4), 419-437.

Cregan, K., Bloom, G.A. & Reid, G. (2007). Career evolution and knowledge of elite coaches of swimmers with a physical disability. Research Quarterly for Exercise and Sport, 78, 339-350.

Coombs, P.H. & Ahmed, M. (1974). Attacking rural poverty: how non-formal education can help. Baltimore: John Hopkins University Press.

Corso, M.E. (1992). Coaches' perceptions of the knowledge, skills, and experiences necessary to fulfill their coaching role. PhD thesis. University of Northern Corolado, USA.

Douge, B. & Hastie, P. (1993). Coach effectiveness. Sport Science Review, 2(2), 14-29.

Durand-Bush, N. (1996). Training: Blood, Sweat, and Tears. In J. Salmela (Ed.), Great job Coach! Getting the edge from proven winners (pp. 103- 139). Ottawa, ON: Potentiun.

Erickson, K., Bruner, M., MacDonald, D. & Côté, J. (2008). Gaining insight into actual and preferred sources of coaching knowledge. International Journal of Sport Science and Coaching, 3(4), 527-538.

Fleurance, P. & Cotteaux, V. (1999). Construction de l''expertise chez les etraîneurs sportifs d'athlètes de haut-niveau Français, Avante, 5(2), 54-68, cited in: Wright, T., Trudel, P. & Culver, D. (2007). Learning how to coach: the different learning situations reported by youth ice hockey coaches, Physical Education and Sport Pedagogy, 12(2), 127-144.

Gilbert, W. & Trudel, P. (2001). Learning to coach through experience: Reflection in model youth sport coaches. Journal of Teaching in Physical Education, 21(1), 16-34.

Gilbert, W.D. & Trudel, P. (2004). Analysis of coaching science research published from 1970-2001. Research Quarterly for Exercise and Sport, 75(4), 388-399.

Gould, D. (1987). Your role as a youth sports coach. In V. Seefeldt (Ed.), Handbook for youth sport coaches (pp. 17-32). Reston, VA: American Alliance for Health, Physical Education, Recreation, and Dance.

Irwin, G., Hanton, S. & Kerwin, D.G. (2004). Reflective practice and the origins of elite coaching knowledge. Reflective Practice, 5(3) 425-442.

Jones, R.L., Armour, K.M. & Potrac, P. (2003). Constructing expert knowledge: a case study of a top-level professional soccer coach. Sport, Education and Society, 8(2), 213-229.

Jones, R.L., Armour, K.M. & Potrac, P. (2004). Sports coaching cultures: from practice to theory. London: Routledge.

Lemyre, F., Trudel, P. & Durand-Bush, N. (2007). How youth-sport coaches learn to coach. The Sport Psychologist, 21, 191-209.

Martens, R. (1997). Successful coaching. Champaign, IL: Human Kinetics.

Merriam, S.B. & Caffarella, R.S. (1999). Learning in adulthood. 2nd ed. San Francisco: Jossey-Bass.

Nelson, L.J., Cushion, C.J. & Potrac, P. (2006). Formal, non formal and informal coach learning: a holistic conceptualization. International Journal of Sports Science and Coaching, 1(3), 247-259.

Reade, I., Rodgers, W. & Spriggs, K. (2008b). New ideas for high performance coaches: a case study of knowledge transfer in sport science. International Journal of Sports Science and Coaching, 3(3), 335-334.

Salmela, J.H. (1995). Learning from the development of expert coaches. Coaching and Sport Science Journal, 2(2), 3-13.

Schinke, R.J., Bloom, G.A. & Salmela, J. H. (1995). The career stages of elite Canadian basketball coaches. Avante, 1(1), 48-62.

Trudel, P. & Gilbert, W. (2006). Coaching and coach education. In D. Kirk, D. Macdonald & M. O'Sullivan (Eds), The handbook of physical education (pp. 516-539). London: Sage Publications.

Werthner, P. & Trudel, P. (2006). A new theoretical perspective for understanding how coaches learn to coach. The Sport Psychologist, 20, 198-212.

Wilson, L.M. (2008). Sources of knowledge acquisition: Perspectives of the high school teacher/coach. Master thesis, McGill University, Montreal, USA.

Wright, T., Trudel, P. & Culver, D. (2007). Learning how to coach: the different learning situations reported by youth ice hockey coaches. Physical Education and Sport Pedagogy, 12(2), 127-144.

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MOTIVATIONS AND PERCEIVED CONSTRAINTS TOWARD PEOPLE'S PARTICIPATION IN PHYSICAL ACTIVITIES AND SPORTS: A REVIEW OF QUALITATIVE STUDIES

HAMIDREZA MIRSAFIAN[1], AZADEH MOHAMADINEJAD[1]

ABSTRACT. This paper aimed to review the most recent qualitative studies which are measured the people's motivations and perceived constraints toward participation in sporting activities. The focusing groups include children, teenagers, adults, older adults, students and people with obesity. Several databases were used to find the relevant studies. It is found that people are more motivated by intrinsic motivations than extrinsic one. Also, various intrapersonal, interpersonal and structural constraints affect their participation to sporting activities. In conclusion it is stated that different social and cultural characteristics are affect people toward participation in sports. Therefore, planning the sport programs based on people's dominant motivations and perceived constraints in sports might improve their participation in regular activities.

Key words: Physical activity, motivation, barrier, qualitative approach, regular activity.

Introduction

Physical activity in general associated with several physical and mental benefits and it affects the people's functional ability and their quality of life (Powell & Pratt, 1996). People who lead to have an active life are lead to live longer and less lead to provide serious diseases (Batty & Lee, 2004; Batty & Thune, 2000). In general, many different problems are associated with sedentary life style; obesity, hypertension, diabetes, back pain, poor joint mobility and psychosocial problems are some of the common problems (Kiess et al., 2001). In these years, sedentary life style is a major challenge of public health in the developed societies and is recognized as a global epidemic (Chief Medical Officer, 2004). Within the United States, the rate of childhood obesity is expected to reach

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40% in the next two decades (Kopelman, 2000) and the Type 2 diabetes is expected to affect 300 million people worldwide within the same time (Allender et al., 2006). In England, the number of physically inactive people (less than one occasion of 30-min activity per week) was increasing and that this trend was consistent for both genders and across all age groups (Petersen et al., 2004). Also it is reported that interest and participation in physical education gradually declines with increasing the people's age (Van Wersch et al., 1992; Papaioannou, 1997). Therefore, study on the motivational factors encouraged people to participation in physical activities on one hand, and constraints reducing or removing people's participation in regular activities are important. Qualitative research is an appropriate approach for finding why people do or do not participate in sporting activities. In this paper researchers planed to review the qualitative studies which are considered the encouraging and constraint factors influence people's participation in sporting activities.

Materials and Methods

The method of this study was review of the qualitative studies. The researchers planed to consider the most recent studies which are focused on the encouraging factors motivated various groups of people toward participation in physical activities as well as constraints reducing or removing people's engagement is regular activities.

Research papers were sourced in four ways. For the first part, a wide range of electronic databases were used to find the relevant articles, including Sport Discus, ISI Science, ProQuest, PubMed, Elsevier, Citation Index, and ISI Social Science Citation Index.

In the second step, relevant references from published literature were followed up and included where they met inclusion criteria.

Third, additional 'gray' literature not identified in electronic searches was sourced through individuals who were likely to have knowledge in this area, including librarians and researchers active in the field. This third step ensures inclusion of papers which may not be submitted to peer review journals including reports for government bodies.

In fourth step researchers focused to the relevant references from published literature. Search terms included; *regular activity*, *sports*, *physical activity*, *physical education, qualitative approach*, *exercise*, *motivation, barriers*, and *constraints*.

The related articles were entered into the next steps of the review. These steps include:

- The aim of the study. The aim of the research must explore the participants' experiences in sports and reasons for participation or nonparticipation.
- The method of study must be including the qualitative approach.

Selected articles were independently reviewed. Results were compared and discrepancies discussed. Data were extracted using a review schema developed by the research team. In most cases, the original author's own words were used in an attempt to convey the intended meaning and to allow for more realistic comparison between studies.

Results

Generally, most of participants had appropriate knowledge about the physical and mental benefits associated with physical activities. However, this is not the main reason they participate in sports. Other factors such as weight management, enjoyment, social interaction and support were more common reasons for people being physically active. Considering to this issue, results of various researches are reported based on participants' different age groups.

Children

Results indicated that children are more enjoying to participate in physical activities which are not force them to compete and win. Also, they encourage experimenting various activities. MacPhail et al. (2003) reported children are more encourage engaging in sports when many different types of physical sport opportunities are available for them. On the other hand, some factors such as support and enjoyment from parents were also crucial (Mulvihill et al., 2000). Parents have an effective role for providing sport opportunities for children to be physically active. Bostock (2001) found that mothers with young children discouraged their children from playing in environments perceived as unsafe.

Teenagers

Teenagers are more encouraged participating in physical activities for improving their fitness, body abilities, and reducing the body size and body weight. Many studies indicated that pressure to conform based on popular ideals of beauty is as an important reason for young girls being physically active (Cockburn & Clarke, 2002). Improved fitness, developing new social networks, learning new skills, and improving self-esteem are some of the most motivations encourage very active young girls for participating in sports (Flintoff & Scraton, 2001). Also, having support from family and significant others at 'key' transitional phases (such as changing schools) is essential to maintaining participation (Coakley & White, 1992). Those who continued participating through these transitionary periods recalled the importance of positive influences at school in becoming and staying physically active.

Adults

Several studies considered the adults' motivation in sports (Robertson, 2003). Generally speaking, it is indicated that adults in different cultural and social levels (e.g. South Asian and Black communities, runners, gays, disabled groups, etc.) are mostly participate in physical activity and sports for improving a sense of achievement, increasing the skill, and to spend 'luxury time' on themselves away from daily responsibilities (Crone-Grant & Smith, 1999).

Studies in GP exercise referral schemes found that the medical reasons are great motivators for adults' participation in sports (Singh, 1997). Other benefits reported by referral scheme participants were the social support network created and the general health benefits of being active (Crone-Grant & Smith, 1998). Among disabled men, exercises provide an opportunity to positively reinterpret their role following a disabling injury (Robertson, 2003). For this group, displaying and confirming their status as active and competitive is beneficial. Participants in this study described the support network offered by participation as the real value of physical activity and sport. In particular, meeting other disabled men and sharing similar experiences is a key motivator. The building of skills and confidence is another motivator for disabled men for participating in sports (Allender et al., 2006; Arthur & Finch, 1999).

The enjoyment and social networks offered by adults who are the races competitors. Joggers were more motivated by the health benefits of running and the increased status afforded to them by non-exercisers who saw them as fit and healthy. Sport and physical activity are clearly important motivators for many different groups of people aged between 18 and 50 years. The reasons for participation can, however, differ subtly between people within a single group. For example, Smith (1998) interviewed members of a running club and found a distinction between 'runners' and 'joggers'. Runners were elite members of the club and were motivated by intense competition and winning. Conversely, joggers did not consider themselves competitive in races but aimed to better their own previous best time. Joggers were more motivated by the health benefits of running and the increased status afforded to them by non-exercisers who saw them as fit and healthy (Allender et al., 2006).

Elderly

Several studies indicated that older adults highly participate to physical activities and sports for improving the physical and mental health as well as environmental factors (Hardcastle & Taylor, 2001). These adults reported they participate in physical activities in order to reduce the effects of aging as well as being fit and able to play with grandchildren (Finch, 1997). While, Stathi et al. (2003) argued that encouraging the older people for participating in exercise

appears to be maintained through enjoyment and strong social networks. On the other hand, Cooper and Thomas' (2002) reported that having traditional expectations and improving social communication are some factors influence on maintaining older people's participation in regular activities.

Students

Hassandra et al. (2003) in the study tried to find the factors associated with students' intrinsic motivation in physical education. They interviewed with sixteen PE students. Analyses of interview transcripts revealed that factors associated with intrinsic motivation for participating in physical education are both social-environmental and individual differences. Individual differences in perceived competence, perceived autonomy, physical appearance, and goal orientation influenced students' intrinsic motivation. Social and environmental factors included lesson content, the physical education teacher, classmates, and school athletic facilities, as well as physical activity behaviors of the family and family encouragement, participation in out-of-school athletic activities, media, cultural values and social preconceptions. Mirsafian et al. (2013b) also indicated that Iranian students are mostly motivated by having fun and experiencing joy, having physical and mental health, having a fit body, and improving self esteem, preventing of diseases and being with friends, respectively. Also they reported that there is a considerable difference between students regarding demographic, social and educational characteristics.

Constraints toward Participation in Physical Activities and Sports

In contrast to motivational factors encouraging people for participating in physical activities, constraints have reducing or removing effects on people's participation in sports. Lack of time, lack of knowledge, overcrowding, long distance to activity areas, family problems, and lack of money and companion are indicated as the most significant recreational constraints in many studies (Kara & Demirci, 2010; Maher & Thompson, 1997; Samdahl & Jekubovich, 1997; Smith, 1995; Wilkinson, 1995). Also, fear of assault, lack of facility, gender, race, high entrance fee, lack of care and broken equipments are other factors affecting people's preferences and participation in sporting activities (Payne et al., 2002; Shores et al., 2007; Walker & Virden, 2005).

In considering the qualitative studies Coakley and White (1992) reported that negative experiences during PE classes at school are the strongest factor discouraging young girls' participation in sports. For many females, impressing males and other peers is found more important than other benefits of physical activities. While many females want to be physically active, a tension existed between wishing to appear feminine and attractive and the sweaty muscular

image attached to active women (Cockburn & Clarke, 2002). Orme (1991) reported that females are bored by the traditional sports offered in PE courses. Also, females are disappointed with the lack of variety in PE and would rather play sports other than football, rugby and hockey (Mulvihill et al., 2000). Being unable to demonstrate competency of a skill to peers in class also made students uncomfortable with PE. (Flintoff & Scraton, 2001). Also, Mirsafian et al. (2013a) indicated that Iranian female university students experience various social, cultural, intrapersonal and structural constraints toward participating in sports.

Adults

Crone-Grant (1998) in his study indicated that lack of partner or friend to participate with, poor body image, lack of coordinating to gyms' culture, anxiety and lack of confidence about entering unfamiliar settings (sport clubs) were the main constraints that adults perceive toward participating in sports. Participants in that study reported that lack of proper "role models" and also lack of realistic exercise leaders would be more effective in encouraging participation (Crone-Grant, 1998). The lack of realistic role models was also mentioned by members of the South Asian and Black community (Rai & Finch, 1997). This group did not see physical activities as a black or Asian pursuit, but rather as white, middle-class, male domain. The authors argue that there were few opportunities or facilities available to this group. Self-perception is incredibly important in motivating people to participate in all types of physical activity. The stigma attached to being socially disadvantaged was shown to decrease exercise among low-income women in the Midlands (Bostock, 2001). They reported that participants in their study did not want others to see them walking due to the social stigma attached with not owning a car (Allender et al., 2006).

Elderly

This group of people also reported that lack of realistic role models in community is the main constraints toward participation of them in physical activities (Finch, 1997). Also, Porter (2002) found that older people were anxious about returning to sports and identified cost and time constraints as the main problems. On the other hand, most of them were unsure about the sufficient amount of physical activities that they need in their ages (Finch, 1997).

People with Obesity

Most of researchers stated that in general, over weight and bad body position are two main barriers for people with obesity (Wiklund et al., 2010). These people reported that appearing in public is uncomfortable for them and they do not have a good felling to participate with others in sports. Also, they

cannot find appropriate activities proper for their levels and there is not any activities programmed for them. Most of activities are programmed for normal people. Also, participating in sports with other persons is difficult to them because they do not have enough fitness compare to normal people. In some cases exercising alone is the only option for them. Furthermore, their expectations from others are reducing their activities (Wiklund et al., 2010).

Discussion

Motivation and Sporting Activities

Motivation is known as an essential factor for starting and continuing regular activities. Intrinsic motivation remains an important construct, reflecting the natural human propensity to learn and assimilate. However, extrinsic motivation is argued to vary considerably in its relative autonomy and thus can either reflect external control or true self-regulation. The most basic distinction is between intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, which refers to doing something because it leads to a separable outcome. Over three decades of research has shown that the quality of experience and performance can be very different when one is behaving for intrinsic versus extrinsic reasons.

In this paper researchers aimed to review the qualitative studies which are considered to motivational and constraint factors affect people toward participation in physical activities and sports. It is indicated that people in different ages are motivated by intrinsic and extrinsic motivational factors. Children and teenagers are mostly motivated by intrinsic motivations. They prefer to participate in sports for having fun and joy or challenge entailed rather than because of external prods, pressures, or rewards.

Youth, for instance university students, as well as adults and older people are more motivated by intrinsic motivations however the extrinsic motivations also have an effect on their participation in sporting activities. Handicapped persons are more affect by extrinsic motivations.

In order to improve the people's motivation toward participating in sporting activities various activities could be planned. Parents play a key role for improving the children's participation in recreational sport activities. Parents should inform about the benefits of sports for children. They should realize that sporting activities do not make any problems for their children. Also, children's sport programs should be programmed as an enjoyable environment (e.g. including music, dance, etc.). Moreover, encouraging parents for participating with their children to sports could be an effective factor for making the intrinsic motivations for children because parents could provide a perfect "role model" for them.

On the other hand, providing sporting programs with the aim of stimulating the extrinsic motivations for youth and adults is important. For instance, planning the grouping sport activities for improving the sense of belongingness to sport teams or groups might be influence for improving their participation to sports.

Sporting activities provide the special environment for handicapped persons. Participation in sports makes an opportunity for them to leave the sedentary life style. Also, they have a chance to have interaction with other handicapped, play together and share their ideas and problems. Indeed, participation in sport is a special factor for improving the physical, social and moral aspects of handicapped persons. Therefore, planning and organizing the grouping sport activities for handicapped people might be effective for increasing their intrinsic and mostly extrinsic motivations to sports.

Generally speaking, sport programs should be organized based on people's dominant motivations to sports. Sporting environments can facilitate or forestall people's intrinsic motivation by supporting versus thwarting the needs for autonomy. Also, support for improving the sense of competence to people in participating in sports is important. Moreover, the groundwork for facilitating internalization is providing a sense of belongingness and connectedness to the persons, sport group, or culture disseminating a goal, or a sense of *relatedness*.

Constraints and Physical Activities

Constraints refer to subsets of causes for non commitment to a specific behavioral pattern (Jackson, 1988). Crawford and Godbey (1987) laid the foundations for the classic theoretical model of research into constraints, categorizing them into 3 groups: intrapersonal, interpersonal, and structural.

Intrapersonal constraints refer to an individual's psychological state and attitude, which prevail in interacting with preferred activity rather than interfere with preference and participation (Crawford, Jackson & Godbey, 1991). Antecedent constraints belong to this group; they preexist in the individual, before s/he is faced with the possibility of participating in physical activities. Antecedent constraints are intrapersonal factors of sociocultural content in the sense of stereotypes, which often restrict or exclude participation (Henderson, 1993).

Interpersonal constraints result from interpersonal interactions or relations among persons who participate in an activity (Crawford, Jackson & Godbey, 1991). An example of an interpersonal constraint is a person's dependence on their "important others" (family members, partners, friends).

Structural constraints are also known as interference factors; these are parameters that interfere with preference/intention for participation and actual participation. Examples of structural constraints are the lack of financial resources, lack of time or lack of appropriate facilities/services/programs.

Results of reviewed studies indicated that various groups of people experience different constraints. Teenagers and youth experience intrapersonal constraints more than structural barriers. Intrapersonal and mostly interpersonal constraints are more perceived by adults regarding participation in sports. Also, mature females reported that intrapersonal and structural constraints mostly reducing or removing their participation. Older people mostly affected by structural constraints whereas people with obesity problem perceive intrapersonal, interpersonal and structural constraints.

In general, attitude to sports grows at the first decade of people's life and develops almost at the second decade of life. Therefore, planning in order to creating and improving the positive attitude to young people regarding sporting activities is very important. As mentioned, intrapersonal constraints and psychological problems are the most barriers young people experienced.

Interpersonal constraints (social aspects of sporting activities) are the most factors reducing or removing the adults' participation in sports. In other words, lack of partner, lack of friend or somebody to participate and communicate with in sports reduces the adults' engagement in regular activities. Therefore, attention to their needs and interests could be affect their participation in sports.

Old beliefs, old and traditions, and negative attitudes to women sport are still remained in developing countries. Women's duties as a wife and mother in one hand, and lack of opportunities for participating in sports on the other hand, reducing or even removing their engagement in physical activities. People with obesity also experienced all types of constraints. In other words, due to their body position, they have the negative attitude to sports and exercise. Also, they have no partner to participate with and moreover, the sport activities are not appropriate for them. In this regards, sport responsible should take more attention to these people and provide specific sport opportunities for them (e.g. water games) in order to changing their attitude to sports, connecting them to other persons with same problem, and help them for changing the sedentary lifestyle.

Generally speaking, people in different societies experience different level of barriers. Because, various factors (e.g. cultural, social, economic, religion, etc.) affect the level of constraints people experienced toward participating in sports. Therefore, study the constraint factors, and also people's motivations, to sports based on people's cultures and nations are important.

Conclusion

This study planned to find the factors affect people's participation in sporting activities. Several studies are reviewed and results are classified based on the participants' ages. It is indicated that people are more motivated by intrinsic than extrinsic motivations. Also, various groups of people experience

different constraints toward participation in sports. In this regards, sport responsible and sport managers should have higher knowledge about the motivations encouraged people to participation in sports. Also, they should inform about the barriers experienced by people in different age groups and organize the sport programs based on their needs and interests. It would be a valuable step to reduce the constraints toward people's participation and help to improve their engagement in sporting activities.

REFERENCES

Allender, S., Cowburn, G. & Foster, C. (2006). Understanding Participation in Sport and Physical Activity among Children and Adults: A Review of Qualitative Studies. Health Education Research, 21(6), 826-835.

Allender, S., Peto, V. & Scarborough, P. (2006). Coronary Heart Disease Statistics. London: British.

Arthur, S. & Finch, H. (1999). Physical Activity in Our Lives. Qualitative Research among Disabled People. London: Health Education Authority.

Batty, D. & Lee, I.M. (2004). Physical Activity and Coronary Heart Disease. British Medical Journal, 328, 1089-90.

Batty, D. & Thune, I. (2000). Does Physical Activity Prevent Cancer? British Medical Journal, 321, 1424-5.

Bostock, L. (2001). Pathways of Disadvantage? Walking as a Mode of Transport among Low Income Mothers. Health and Social Care in the Community, 9, 11-8.

Chief Medical Officer. (2004). At Least Five a Week: Evidence on the Impact of Physical Activity and Its Relationship to Health: A Report from the Chief Medical Officer. London: Department of Health.

Coakley, J. & White, A. (1992). Making Decisions: Gender and Sport Participation among British Adolescents. Sociology of Sport, 9, 20-35.

Cockburn, C. & Clarke, G. (2002). Everybody's Looking At You: Girls Negotiating the Femininity Deficit They Incur in Physical Education. Women's Studies International Forum, 25, 651-65.

Cooper, L. & Thomas, H. (2002). Growing Old Gracefully: Social Dance in the Third Age. Ageing Society Journal, 22, 689-708.

Crawford, D. & Godbey, G. (1987). Re-Conceptualizing Barriers to Family Leisure. Leisure Sciences, 9, 119-127.

Crawford, D.W., Jackson, E.L. & Godbey, G. (1991). A Hierarchical Model of Leisure Constraints. Leisure Sciences, 13, 309-320.

Crone-Grant, D.M. & Smith, R.A. (1998). Exercise Adherence: A Qualitative Perspective. Journal of Sports Sciences, 16, 75.

Crone-Grant, D.M. & Smith, R.A. (1999). Broadening Horizons: A Qualitative Inquiry on the Experience of Patients on an Exercise Prescription Scheme. Journal of Sports Sciences, 17, 12.

Flintoff, A. & Scraton, S. (2001). Stepping into Active Leisure? Young Women's Perceptions of Active Lifestyles and their Experiences of School Physical Education. Sport, Education and Society, 6, 5-21.

Finch, H. (1997). Physical Activity 'At Our Age': Qualitative Research among People over the Age of 50. London: Health Education Authority.

Hardcastle, S. & Taylor, A. (2001). Looking For More than Weight Loss and Fitness Gain: Psychosocial Dimensions among Older Women in a Primary-Care Exercise-Referral Program. Journa of Ageing in Physical Activity, 9, 313-28.

Hassandra, M., Goudas, M. & Chroni, S. (2003). Examining Factors Associated With Intrinsic Motivation In Physical Education: A Qualitative Approach. Psychology of Sport and Exercise, 4, 211-223.

Henderson, K. (1993). A Feminist Analysis of Selected Professional Recreation Literature about Girls/ Women from 1907 - 1990. Journal of Leisure Research, 25(2), 165-181.

Jackson, E. (1988). Leisure Constraints: A Survey of Past Research. Leisure Sciences, 10, 203-215.

Kara, F. & Demirci, A. (2010). An Assessment of Outdoor Recreational Behaviors and Preferences of the Residents in Istanbul. Scientific Research and Essay, 5(1), 093-104.

Kiess, W., Galler, A., Reich, A. (2001). Clinical Aspects of Obesity in Childhood and Adolescence. Obesity Reviews, 2, 29-36.

Kopelman. P.G. (2000). Obesity as a Medical Problem. Nature, 404, 635-43.

MacPhail, A., Gorley, T. & Kirk, D. (2003). Young People's Socialization into Sport: A Case Study of an Athletic Club. Sport, Education and Society, 8, 251-67.

Maher, F.A. & Thompson, M.K.T. (1997). Learning in the Dark: How Assumptions of Whiteness Shape Classroom Knowledge. Harvard Education Review, 67, 321-349.

Mirsafian, H., Doczi, T. & Mohamadinejad, A. (2013a). Attitude of Iranian Female University Students to Sports and Exercise. Iranian Studies. In Press.

Mirsafian, H., Mohamadinejad, A., Homaie, R. & Hédi, C. (2013b) Motivation of Iranian University Students for Participation in Sporting Activities. Physical Culture and Sport Studies and Research. In Press.

Mulvihill, C., Rivers, K. & Aggleton, P. (2000). Physical Activity at Our Time: Qualitative Research among Young People Aged 5 to 15 Years and Parents. London: Health Education Authority.

Orme, J. (1991). Adolescent Girls and Exercise: Too Much of a Struggle? Education for Health, 9, 76-80.

Papaioannou, A. (1997). Perceptions of Motivational Climate, Perceived Competence, and Motivation of Students of Varying Age and Sport Experience. Perceptual and Motor Skills, 85, 419-430.

Petersen, S., Peto, V. & Rayner, M. (2004).Coronary Heart Disease Statistics. London: British Heart Foundation.

Porter, S. (2002). Physical Activity: An Exploration of the Issues and Attitudes of Parents of pre Fives. London: Scott Porter Research and Marketing.

Powell, K.E. & Pratt M. (1996). Physical Activity and Health. British Medical Journal, 7, 313-126.

Rai, D. & Finch, H. (1997). Physical Activity 'From Our Point of View'. London: Health Education Authority.

Robertson, S. (2003). If I Let a Goal In, I'll Get Beat Up: Contradictions in Masculinity, Sport and Health. Health Educational Research, 18, 706-16.

Samdahl, D. & Christensen, H. (1985). Environmental Cues and Vandalism: An Exploratory Study of Picnic Table Carving, Environment and Behavior, 174, 445-458.

Singh, S. (1997). Why Are GP Exercise Schemes So Successful (For Those Who Attend)? Results from a pilot study. Journal of Management in Medicine, 11, 233-7.

Smith, B.E. (1995). Crossing the Great Divides: Race, Class, and Gender in Southern Women Organizing, 1979-1991. Gender and Society, 9, 680-696.

Smith, S.L. (1998). Athletes, Runners, and Joggers: Participant-Group Dynamics in a Sport of ''Individuals''. Sociology of Sport Journal, 15, 174-92.

Stathi, A., McKenna, J. & Fox, K. (2003). The Experiences of Older People Participating in Exercise Referral Schemes. Journal of the Royal Society of Health, 124, 18-23.

Van Wersch, A., Trew, K. & Turner, I. (1992). Post-Primary School Pupils' Interest in Physical Education: Age and Gender Differences. British Journal of Educational Psychology, 62, 56-72.

Walker, G.J. & Virden, R.J. (2005). Constraints on Outdoor Recreation. In E.L. Jackson (Ed.), Constraints to leisure (pp. 201-219). State College PA: Venture Publishing.

Wiklund, M., Olsén, M.F. & Willén, C. (2010). Physical Activity as Viewed by Adults with Severe Obesity, Awaiting Gastric Bypass Surgery. Physiotherapy Research International, 16, 179-186.

Wilkinson, D.Y. (1995). Gender and Society Inequality: The Prevailing Significance of Race. Daedalus, 24, 167-178.

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THE PROJECT OF LEISURE AREA PRUNDU BÂRGĂULUI - SECU VALLEY - HENIU MARE (BISTRIŢA-NĂSĂUD COUNTY). PRELIMINARY STUDY

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ABSTRACT. The Heniu Mare massif is part of the Bargau Mountains and is located in the eastern part of Bistriţa-Năsăud County, on the territory of the municipalities of Prundu Bârgăului, Tiha Bârgăului, Ilva Mică and Leşu. The southern flank of the massif, facing lane Bistriţa Ardeleană valley, distinguishes itself through a high attractive potential, marked by the presence of spectacular landforms and TV Relay, insufficiently exploited by tourism activities. For this reason, the present work proposes a project for upgrading the Secului Valley-Heniu Mare sector relying some items of favorability, such as: the proximity of Prundu Bârgăului village and geographical axis Bistriţa-Prundu Bârgăului-Vatra Dornei, road access to the Secu Valley, lift line and tourist path from Fundu Secului to TV Relay on Heniu Mare Peak and the electric network from Prundu Bârgăului to Heniu Mare. Therefore, the proposed project involves the use of these elements in order to achieve a tourist complex in the Fundu Secului-Heniu Mare sector: structures for visitors, parking, location of a cable car line, identification and marking of tourist routes for hiking and cicloturism, location of a platform for the launch of paragliding on the Heniu Mic Peak, establishment of stopover places and scenic points, etc. Stakeholders involved in the realization of this project could be: Bistriţa-Năsăud County Council, Mayor of Commons Prundu Bârgăului, Josenii Bârgăului and Tiha Bârgăului, Radiotelevision Direction of Cluj, Fold Forest Service Broadcaster Prundu Bârgăului, Rescue Public Service Bistriţa-Năsăud, Water Management Company Bistriţa-Năsăud, LAG Bârgău-Călimani, NGOs, private investors, the high school Prundu Bârgăului, the Faculty of Tourism Geography and the Faculty of Physical Education and Sport from Bistriţa, the local community.

Key words: Heniu Massif, tourism planning, sport tourism, activ leisure, tourist cluster

REZUMAT. ***Proiectul zonei agrementale Prundu Bârgăului - Valea Secului - Heniu Mare (Judeţul Bistriţa-Năsăud). Studiu preliminar.*** Masivul Heniu Mare aparţine Munţilor Bârgău şi este situat în partea de est a judeţului Bistriţa-Năsăud, pe teritoriul comunelor Prundu Bârgăulkui, Tiha Bârgăului, Ilva Mică şi Leşu. Flancul sudic al masivului, orientat spre culoarul Bistriţei Ardelene se distinge

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printr-un potenţial atractiv ridicat, marcat de prezenţa unui relief spectaculos şi a releului de televiziune, insuficient exploatat prin activităţi turistice. Din această cauză, studiul de faţă propune un proiect de relansare a sectorului Valea Secului-Heniu Mare, bazându-se pe câteva elemente de favorabilitate, cum ar fi: proximitatea localităţii Prundu Bârgăului şi a axei geografice Bistriţa-Prundu Bârgăului-Vatra Dornei, drumul de acces de pe valea Secului, linia de telecabină şi traseele turistice dinspre Fundu Secului spre releul de televiziune şi vârful Heniu Mare, precum şi reţeaua electrică de la Prundu Bârgăului spre Heniu Mare. Prin urmare, propunerea de proiect implică folosirea acestor elemente pentru realizarea unui complex turistic în sectorul Fundu Secului-Heniu Mare, reprezentat prin: structuri de primire a turiştilor, parcare, staţie de telecabină, identificarea şi marcarea traseelor turistice pentru drumeţie şi cicloturism, amplasarea unei platforme de lansare a parapantelor pe vârful Heniu Mic, stabilirea unor locuri de popas şi platforme de observare a peisajului, etc. Actorii implicaţi în implementarea acestui proiect ar putea fi: Consiliul Judeţean Bistriţa-Năsăud, Primăriile comunelor Prundu Bârgăului, Josenii Bârgăului şi Tiha Bârgăului, Direcţia de Televiziune Cluj, Ocolul Silvic Prundu Bârgăului, Serviciul Public Salvamont Bistriţa-Năsăud, Societatea de Gospodărire a Apelor Bistriţa-Năsăud, GAL Bârgău-Călimani, organizaţii nonguvernamentale, investitori privaţi, Liceul Prundu Bârgăului, Facultatea de Geografia Turismului şi Facultatea de Educţie Fizică şi Sport din Bistriţa, comunităţile locale.

Cuvinte cheie: Masivul Heniu, amenajare turistică, turism sportiv, agrement activ, cluster turistic

Introduction

Bistriţa-Năsăud County benefits from important tourism resources, natural and anthropogenic, that are insufficiently used through profile activities. One of these resources is Heniu Massif from Bârgăului Mountains, which by its genetic and structural features can be distinguished by several attractive elements such as: insularity and dominance from the lane adjacent regions represented by Bistriţa Ardeleană Valley, and Bistriţa Hills, and large difference of level (1100-1200 m from Bistriţa Valley and Leşu Valley), the presence of television relay of top Heniu Mare (1611 m), 360^0 panorama of the surrounding landscape (Bârgău, Călimani, Rodna Mountains, Bistriţa Hills). When they add on it southern flank: the proximity of DN 17-E 58 (Dej-Bistrita-Vatra Dornei), the city of Bistriţa (24 km) and the communities of Bistriţa Valley and Bârgău Valley, easy access to it base to Secu and Tureac valleys.

Given these considerations, this paper aims to outline a possible model for the development and tourist exploitation of the massif on the southern flank, with the reference to Prundu Bârgăului-Secu Valley-Heniu Mare peak axis, because the sector has already some infrastructure elements, namely: acces road to Secu valley, lift line from Fundu Secului to television relay, electricity network and tourist path to the peak Heniu Mare.

The most representative forms of tourism and recreation in the Bărgăului Mountains and within the Heniu massif are mountain biking and hiking. They involve the most significant tourist flows, cycling due to the attractive potential of the area and hiking because of its popularity as a generally recreational form, having the widest target audience of the present in the region. Also included some forms that address a small number of practitioners, such as: ecotourism, rafting, paragliding and fishing.

Mountain hiking is one of the most "free" forms of tourism who can be practiced throughout the entire massif on short or longer distances more difficult, along marked trails.This diversity of lengths and difficulty degrees of trails, makes by hiking the form of travel with the widest target audience.

Tourists of all ages, with any degree of training and fitness, will be able to identify the right way to practice this form of tourism, from short walks, along trails or side roads, no steep slopes or difficult obstacles to overcome, thus having a relatively low degree of difficulty. Cycling routes not served the purpose, calling on existing communication infrastructure, county roads or forest roads, and specific sectors of hiking trails. Paragliding is a recreational form of tourism which finds favorable conditions in the region studied, due to major differences in level, but there is no feature to launch.

Metodology

The arsenal methodology used in the study design meets, what is natural, the logistic elements of two sciences: geography and sports science, interfaced to the topic addressed. To achieve this study were the following stages:

- consultation of papers in tourism planning (Cocean, P., Dezsi, Șt., 2010) and mountain tourism (Stanescu, I., 2002; Tigu, Gabriela, 2002);
- consultation of documents of county and municipal landscaping planning (PATJ, PATZ, PUG) and the sustainable development strategy of the village Prundu Bârgăului;
- crossing the literature for Heniu massif (Athanasiu, I., 1956; Sârcu, I., 1957; Bleahu, M., et al., 1968; Naum, T., Moldovan, Gr., 1984; Rusu, E., 1999, Ureche, I., 2000);
- analysis of geological and topographic maps, scale 1:25 000, for Heniu massif;
- conducting field research for mapping certain geographical aspects and tourist inventory of Heniu massif;
- designation of trails for active leisure practice, but also in the idea of carrying out of competitions, mountain sporting and outdoor events (tourist-orientation, mountain biking);

- engaging students from the Faculty of Geography of Tourism and Sport and Physical Education in the practical work of mapping and marking of walking trails;
- the development of educational activities in collaboration with schools units to popularize the concept of mountain leisure;
- implementation in residents consciousness the practical values and economic and financial benefits in the medium and long induced term by such activities;
- conduct environmental cleanup activities in the mentioned area;

Study Area

Heniu massif is located in the eastern part of the county Bistriţa-Năsăud on the west outskirts of Bârgău Mountains, on the territory of the municipalities Prundu Bârgăului, Tiha Bârgăului, Ilva and Leşu (fig. 1) and belongs to the central group of neogene eruptive chain of the Eastern Carpathians (Ţibleş-Toroiaga-South Rodna-Bârgău), the South Bârgău sector (fig. 2). The massif is bordered by Strâmba Valley and Mountain Valley to the west, Ilva Valley to northwest, Leşu Valley to the north, Tureac Valley to the east and Bistriţa Ardeleană Valley to the south (fig. 3).

From the geological point of view, the Heniu massif is a magmatic intrusive body, lacolite shapped, composed of andesite and pyroxene diorite, intruder in the Bârgău Mountains miocene sedimentary formations (sandstones, marls, clays).

Its geomorphological pattern is specific to magmatic exhumed massif by the action of sculptural agents on sedimentary cover. Therefore, there are two morphostructural levels: the level of sedimantary cover and the level of magmatic massif, whose contact is marked by the presence of slope breaks located at 1000-1200 m.

Mountain building is dissected by radial-diverging valleys, routed to local erosion bases (Bistriţa Ardeleană, Ilva, Leşu, Tureac, Strâmba), separated by sharp ridges on magmatic formations and flaring ridges on sedimentary rocks, looking for spurs, cut in the end at 600-800 m. The mains valleys (Secu Muncel, Lescior, Strâmba) have carved the deep pools at the origins on the magmatic formations, characterized by energy and high slopes.

By morphofunctional aspect distinguishes a main ridge, winding sinuously from west to east, between Strâmba Saddle (700 m) and Muncel Coast (1222 m), marked by Tomnatec (1203 m), Heniu Mic (1543 m), Heniu Mare (1611 m) and Muncel (1542 m) peaks, from which starts diverging secondary ridges.

On southern flank, inside the magmatic massif was opened by upper Secu valley, which has a flared catchment, dominated by Heniu Mic, Heniu Mare and Muncel peaks, marked by numerous torrential valleys and steep slopes, and

the geomorphometric parameters in this sector have high values, which emphasize toughness and intensity of erosion of igneous rocks, outlining the massive tourist personality. Thus, the relief energy is between 300-400 m/km^2, relief fragmentation is between 4,0-5,0 km/km^2 and the slopes often reaching 35-45^0 (fig. 3).

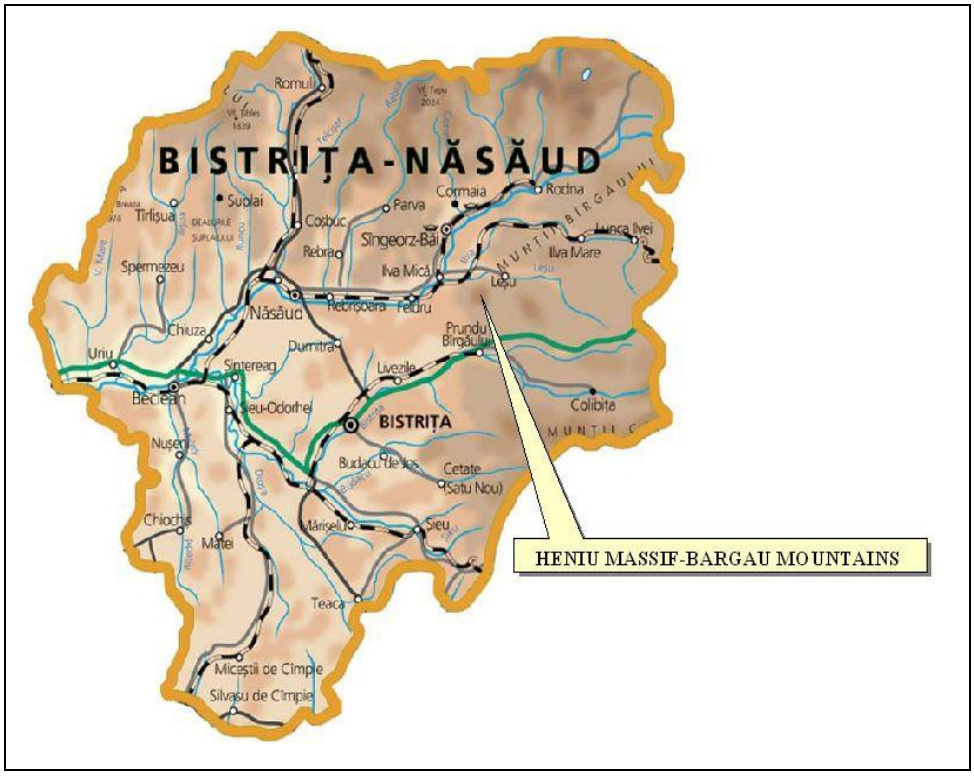

Fig. 1. The geographic localization of Heniu massif within Bistrița-Năsăud County

Given the opening of the valley to the Prundu Bârgăului village, the presence of Heniu Mare peak, as a major attractive target, the existing road access and the lift line to TV relay on Heniu Mare peak, this sector is characterized by a high degree of attractiveness and may be subject to a recovery project planning and to local and regional tourism valorization.

Fig. 2. The intrusive magmatic sector South Rodna-Bârgău from intrusive magmatic area of Easthern Carpathians (after Ureche, 2000, with modifications)

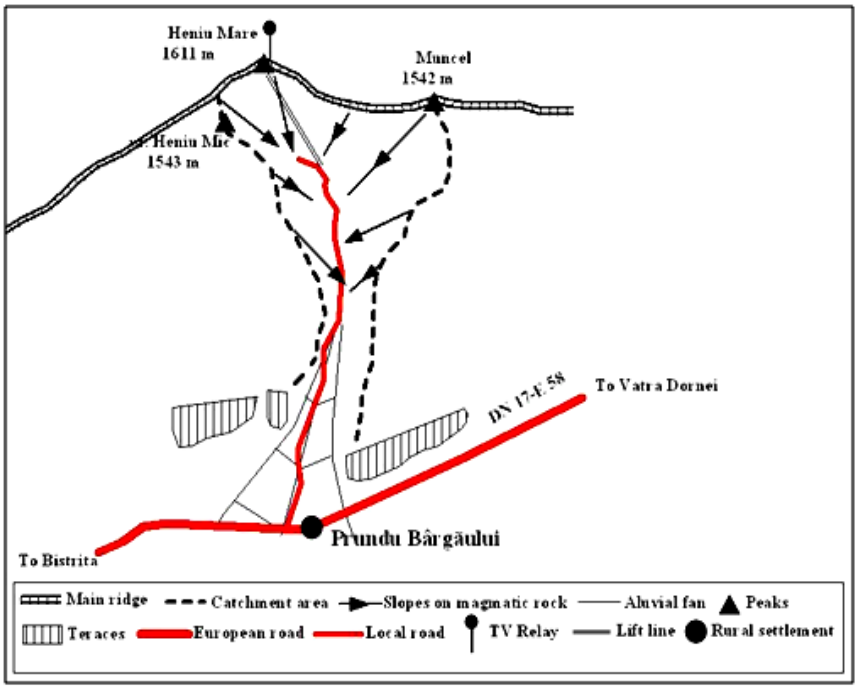

Fig. 3. Geomorphologic sketch of Secu catchment area

Results and Discussion

In preparing the proposal for the planning and tourist exploitation of the southern flank of the Heniu massif have considered the following elements:

- attractive potential of the landscape in this area;
- existence of the access road to Secu Valley, lift line serving TV relay and electricity distribution infrastructure;
- mountain location near the geographical axis Bistriţa-Prundu Bârgăului-Vatra Dornei;
- presence of Prundu Bârgăului village (5 km) at the foot of the massif as a receipt and redistribution center for tourists;
- -proximity to tourist-emitting centers, respectively Bistriţa town (23 km) and the localities of Bistrita Valley and Bârgău Valley (Livezile, Rusu Bârgăului, Josenii Bârgăului, Prundu Bârgăului, Bistrita Bârgăului, Tiha Bârgăului, Tureac, Mureşenii Bârgăului);
- -easy access on DN 17-E 58 (Bistriţa-Vatra Dornei) and on the railway Bistriţa-Bistriţa Bârgăului.

The main activities of the project could be:

1) Upgrading of access road to Secu Valley from Prundu Bârgăului to Fundu Secului. This road has a length of 5 km and currently only 3 km are paved;
2) The works to regulate minor riverbed of Secu;
3) Installation of a gondola on the current lift line route between Fundu Secului and Heniu Mare peak. The current line has a length of 2.5 km, the station of departure (Fundu Secului) is located at 730 m and arrival station (Heniu Mare) is located at 1611 m, resulting in a difference of 881 m;
4) The building of tourist structures in the Fundu Secului and Heniu Mare peak (tourist lodges, guesthouses, tourist information centre, etc.);
5) Establish a parking space in the Fundu Secului;
6) Identify, layout and marking of tourist trails for hiking and cycling.

   Among these routes one can remember the following:
   - Fundu Secului-Red Ravine-Heniu Mare peak;
   - Fundu Secului-Parâng Saddle-Muncel peak;
   - Prundu Bârgăului-Secu Valley-Tărnicior-Muncel peak;
   - Strâmba-Tomantec peak-Heniu Mic peak-Heniu Mare peak-Muncel peak (east-west main route);
   - Tureac Valley-Tălpaş Ridge-Muncel Meadow-Muncel peak;
7) The building a paragliders launching platform to the Heniu Mic peak (1543 m);
8) Establishment of resting areas, lookout points and the wildlife observation platforms on Heniu Mic, Heniu Mare, and Muncel peaks, and in Tomantec and Muncel Glades;

9) Location of informative panels and some trails direction indicator;
10) Location of waste storage containers on Secu Valley, in the Fundu Secului and on Heniu Mare peak;
11) Establish a tourist information center in the Prundu Bârgăului village;
12) Ensuring the public transport aon Prundu Bârgăului-Secu Valley-Fundu Secului route;
13) Planning of a ski slope and a lift on the northern slope of the Heniu massif, atop which emerges from the Heniu Mare peak to Lescior Valley (fig. 4). The ski slope would have a length of 1.3 km, a level difference of 230 m and an average slope of 5,6‰, being arranged on two levels: 1610 m-1570 m and 1570-1380 m, with an opposed slope to the finish.

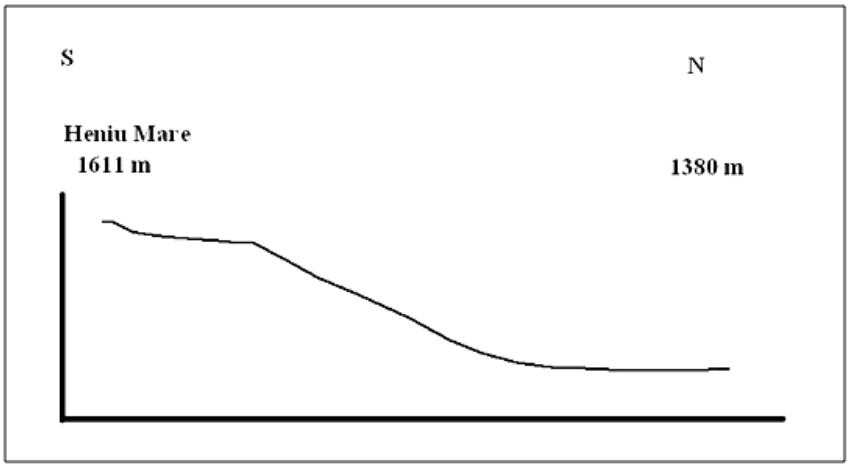

Fig. 4. Geomorphologic section an the northern flank of Heniu massif highlighting a possible ski slope

The stakeholders involved in the implementation of such a large project could be:

- Bistriţa-Năsăud County Council;
- The Mayor's offices Prundu Bârgăului, Josenii Bârgăului and Tiha Bârgăului;
- Cluj Broadcasting Division;
- Forest Office Prundu Bârgăului;
- Bistriţa-Năsăud Rescue Public Service;
- Bistriţa-Năsăud Water Management Society;
- Local Action Group Călimani-Bârgău;

- NGOs;
- private investors;
- Prundu Bârgăului High School;
- Faculty of Tourism and Geography and Faculty of Physical Education and Sport from Bistrița;
- local communities.

This project proposal has certain advantages for the local community, such as:

- optimal exploitation of the natural potential offered by the Heniu massif;
- the image-promoting in tourism and increasing the attractiveness for tourism investors;
- the creation of jobs;
- reviving agriculture and traditional customs;
- building of structures for tourists on Secu Valley;
- the recovery of Heniu Hotel;
- increasing local incomes;
- increasing concerns for the protection and conservation of tourism resources.

In a broader context, at regional level, the sector Prundu Bârgăului-Secu Valley-Heniu Mare can be integrated into a tourism cluster project alongside tourist areas Piatra Fântânele (leisure, winter sports tourism, monachal tourism), Colibița (leisure, water sports) and Bistrița Valley-gorge sector and rafting controlled segment.

In this case, you could shape The Bârgău Tourist Area, with a varied and complementary offert in recreational sports (hiking, clean air and sunshine, swimming and sailing, adventure), in which Prundu Bârgăului village would become a reception and redistribution center of tourists.

Conclusions

The dominant position they occupy in the Bârgău Mountains and detail geomorphological elements that distinguish, the Heniu Mare massif is a major attractive target in Bistrița-Năsăud County, insufficiently exploited in tourism.

Because massif is located near the geographical axis Bistrița-Piatra Fântânele-Vatra Dornei and near Prundu Bârgăului village, its southern flank is subject to the tourist development project in the segment Prundu Bârgăului-Secu Valley-Heniu Mare peak, advocated the following elements:

- significant natural potential of Heniu Mare massif;
- proximity of Prundu Bârgăului village with relatively developed infrastructure;

- access road, largely modernized, electricity network on Secu Valley;
- lift line serving TV relay, section Fundu Secului-Heniu Mare peak;
- ample opportunities to practice active mountain leisure and organization of outdoor events and competitions;
- enlarging the horizon of local economy by developing a network of tourist services.

REFERENCES

Atanasiu, I. (1956). *Geologia regiunii Prundu Bârgăului* Bucureşti: DDSSCG, XL.

Bleahu, M., Bombiţă, G., Krautner, H.G. (1968), *Notă explicativă la Harta Geologică a RSR. scara 1:200 000,* Bucureşti: *Foaia Vişeu,* CSGIG.

Naum, T., Moldovan, Gr. (1984). *Bârgău-ghid turistic*. Colecţia Munţii Noştri, Bucureşti: Ed. Sport-Turism.

Rusu, E. (1999). *Munţii Bârgăului. Studiu fizico-geografic*. Iaşi: Ed. Universităţii Al. I. Cuza.

Sârcu, I. (1957). *Câteva aspecte de geomorfologie din Munţii Bârgăului*. Probleme de geografie, IV, Bucureşti.

Ureche, I. (2000). *Petrologia magmatitelor neogene din Munţii Bârgăului*. Teză de doctorat, Facultatea de Geologie, Cluj-Napoca: Universitatea Babeş-Bolyai.

Stănescu, I. (2002). *Potenţialul turistic românesc - Eldorado al viitorului*. Bucureşti: Ed. Paco.

Ţigu G. (2002). *Turism montan*. Bucureşti: Ed. Uranus.

*** *Strategia de dezvoltare durabilă a comunei Prundu Bârgăului 2007-2013*, Primăria comunei Prundu Bârgăului.

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DORIN MARCEL GIURGIUCĂ

ŞERBAN DOBOŞI[1], ŞTEFAN MAROTI[2], PAULA APOSTU[1]

ABSTRACT. During a period when the table tennis from Cluj recorded outstanding results Dorin Giurgiucă, along Radu Negulescu, Gheorghe Cobârzan and other players had a great contribution to the prestigious successes at national and international championships. During the documentation phase the authors studied papers on the history of sports from Cluj in general, but mainly papers on the history of table tennis, news articles presenting the events, the athletes, the coaches and the results obtained within this branch of sports, evidence documents of the sports structures. Additionally the coach notebooks of Paneth Farkas, as well as the records of some former athletes, personal documents and photographs made available to us by Dorin Giurgiucă and Ms. ... were of great help. In the first part the paper presents the situation of table tennis in Cluj during the period when Dorin Giurgiucă was one of the best players of this sport in Romania. Then his first years of activity within table tennis are presented, his results at national level, his contribution in obtaining medals and leading positions in official international championships, as well as in international championships in countries such as England, Austria, Federal Republic of Germany, Hungary and others. Through its content the paper is of interest for those who deal with the history of table tennis from Cluj, for those who want to know the players, who had an acknowledged contribution in obtaining sports performances, belonging to the heritage of Romanian sports.

Keywords: sports history, table tennis, players, Dorin Giurgiucă

REZUMAT. ***Dorin Marcel Giurgiucă*.** În perioada în care tenisul de masă clujean avea rezultate deosebite Dorin Giurgiucă, alături de Radu Negulescu Gheorghe Cobârzan şi alţi jucători, a avut o contribuţie importantă la succesele de prestigiu obţinute în campionatele naţională şi competiţiile internaţionale. În procesul de documentare autorii au studiat lucrări care tratează trecutul sportului clujean în general, dar mai ales cele care se referă la istoria tenisului de masă, articole de presă care prezintă evenimentele, sportivii, antrenorii şi rezultatele obţinute în acestă disciplină sportivă, documente de evidenţă ale structurilor sportive. De asemenea, de un real folos ne-au fost caietele de antrenor ale lui Paneth Farkas,

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însemnările unor foşti jucători, documentele personale, fotografiile puse la dispoziţia noastră de Dorin Giurgiucă şi doamna ... În prima parte, lucrarea prezintă situaţia în care se găsea tenisul de masă din oraşul Cluj în perioada în care Dorin Giurgiucă a fost unul dintre cei mai buni jucători ai acestei discipline sportive din România. În continuare, sunt evocaţi primii săi ani de activitate în tenisul de masă, rezultatele sale pe plan naţional, contribuţia sa la obţinerea unor medalii şi locuri fruntaşe în competiţiile internaţionale oficiale, precum şi la Campionatele internaţionale ale unor ţări percum Anglia, Austria, Germania Federală, Ungaria şi altele. Prin conţinutul său, lucrarea prezintă interes pentru cei care sunt preocupaţi de istoria tenisului de masă clujean, pentru cei care doresc să cunoască jucătorii care au avut o contribuţie recunoscută la obţinerea unor performanţe sportive care fac parte din patrimoniul sportului românesc.

Cuvinte cheie: istoria sportului, tenis de masă, jucători, Dorin Giurgiucă

Introduction

Already form the beginning of practicing table tennis in the first cities of Transylvania, Cluj was one of the cities where this sport was highly popular and which was of great interest for pupils, youngsters, students and intellectuals, whereas the players recorded notable results. (Postolache, 1995) Five decades later table tennis was amongst the most successful disciplines, bringing fame to the city of Cluj through the results obtained at international and national competitions.

During the years valuable athlete generations succeeded one another in Cluj, who were part of the Romanian national teams, who were national champions, who won medals at the World Championships, European Championships, Balkan Games, and who won front-rankings in other important international championships. Out of these the following distinguished themselves through value and rank: Vladone Victor, Goldberg Marin Vasile, Diamandstein Erwin, Paneth Farkas, Kolozsvári Szász Sári, Weisz Éva, Cobârzan Gheorghe, Negulescu Radu, Réthi Adalbert, Giurgiucă Dorin, Crişan Carmen, Doboşi Şerban, Böhm Zsolt Georg and others. Due to everything achieved within this sports discipline, table tennis earned a place of honor in the history of Cluj sports and without its contribution this history would be poorer, lacking a gem which completes its glory.

Studying the Bibliography of Physical Education and Sports (Postolache & Postolache, 1983) and nonetheless the glorious past of table tennis, we found only little papers dealing with the history of this sports in Cluj. Even if many players from Cluj had remarkable contributions and were famous for their results both at national and international level, no books, research articles or popular articles were written in order to present these representative players from Cluj,

except maybe ”Paleta și planeta” (Paneth, 2003) [The racket and the planet] and ”Din enciclopedia sportului clujean” (Cristea, 1968) [From the Encyclopedia of Cluj Sports].

We consider that studying this sport and writing some papers in order to present the activity and performance of some athletes contribute to younger generations getting to know different aspects of the past of this discipline and at the same time represents a recognition of the value of this discipline, a tribute to the ones who were amongst the valuable table tennis players from Romania. Dorin Giurgiucă is considered to be one of the best table tennis players from Romania, due to his value, the performances achieved within the team of the Workers' Sporting Club Cluj at the European Champions Cup, and he represents the main reason for us to write this paper.

At the beginning in table tennis

Dorin Marcel Giurgiucă was born in 1944, on December 8th in Mihalț, Alba county. During his first years he moved with the parents and other family members to Dej. Here he became acquainted with table tennis, a sport which he began to play in 1956. In 1958 he takes part in his first official championship and shortly after that he is noticed by the coach Paneth Farcas during a game within the championship of the Cluj region, taking part in Bistrita, within a game between the teams from Dej and Bistrita. The versed eye of one of the best table tennis coaches of the time immediately saw the distinctive qualities of Dorin Giurgiucă for this sport, his true possibility of becoming one of the best players in Romania within a short period of time and a player who can also come to the fore at international level. (Blag, 2002)

Beginning with the summer of 1959, Dorin Giurgiucă was transferred to the table tennis department of the Workers' Sporting Club Cluj, and as a student of the Ady-Șincai Highschool Cluj. During this period male table tennis from Cluj was in the ascendancy. At international level this sport was going through important transformations regarding the materials used, (*** 1959) the activation of the game by limiting the time span of a set and introducing the activation rule, (*** 1961), but also as a result of the novelties emerging from the Japanese players using a new technical procedure, called by that time „the Tokyo devil ball”. (Ardeleanu, 1963) Nonetheless they enforced the evolution of technique, the change in the game conception, taking on new tactics based on offensive playing, while rethinking the preparation and participation process in championships of table tennis players (Comarnischi, 1961).

During this period of time, when specialists were looking for solutions in order to meet the demands imposed by the evolution of table tennis, the visionary mind of the coach Panteh Farkas understood the potential of Dorin Giurgiucă, his responsiveness and his qualities in order to meet to the demands of the modern

game, especially for using the topspin with good results. Results did not fail to come. After one year of preparation, Dorin Giurgiucă very much progresses and his ascension to performance went fast: he was included in the senior team of the Workers' Sporting Club Cluj, national champion, taking part in the Europe Champions Cup, he became national champion and was promoted to the junior representative of Romania. (Paneth, 1962)

Results at national level

He had role models worth following in Cluj in Gheorghe Cobârzan and Radu Negulescu, he had other team members who helped him prepare and Paneth Farcas was a skilled coach, who knew how to improve his qualities, his indisputable talent for table tennis. At the table tennis department of the Workers' Sporting Club Cluj, Dorin Giurgiucă was offered some of the best preparation conditions. Under these circumstances his talent, reliability and diligence with respect to his training allowed him to have a fast ascension.

During the years that followed he obtained results in national championships which placed him amongst the best table tennis players in Romania. Between 1960 and 1962 he won six medals in the Republican Championships. At the national senior competitions taking part between1962 – 1972 he twice won the first place in the men's single category. His performance also includes a gold medal in mixed double category, results obtained together with players like Maria Alexandru, Carmen Crişan. As a member of the team of the Workers' Sporting Club Cluj, he contributed to winning eleven national team titles. In total he received more than twenty champion titles (*** 2002).

In 1962 he was awarded the title sports master for the results obtained. (*** 1994)

Dorin Giurgiucă in the international arena

Dan Giurgiucă continued the tradition of obtaining good results in table tennis at national and international championships for over a decade, counting as one of the most valuable table tennis players from Romania and amongst the Romanian players most appreciated in Europe.

He took part in the World Championships at Prague 1963, Ljubljana 1965, Stockholm 1967 and Sarajevo 1973. In Stockholm he won the bronze medal together with Maria Alexandru in the mixed double event category. In these events he made it three times within the first sixteen and four times within the first thirty-two. As part of the Romanian team he came ninth in Stockholm, eleventh in Ljubljana, thirteenth in Prague and fifteenth in Sarajevo within the men's team category.

At the European Senior Championship in Lyon 1968 he came second together with Maria Alexandru, and at the 1966 edition in London he won the bronze medal, also together with Maria Alexandru. Other important results consisted in coming within the first eight in the men's single category in the European Championships 1966, and men's double in 1968, coming within the first sixteen in the men's single category in 1964 and 1968. In 1964 Dorin Giurgiucă was placed second within the ranking of the best players of the European Table Tennis Union, after the Swedish Alser (1).

Table 1. Medals obtained at official international championships 1961 – 1971 (*** 1972)

Year	Category											
	Men's single			Men's double			Mixed double			Teams		
	I	II	III	I	II	III	I	II	III	I	II	III
World Championship												
1967									x			
World's Youth Festival												
1962		x				x						
European Senior Championship												
1966									x			
1968								x				
European Junior Championship												
1961		x										
1962	x											
Balkan Championship												
1964				x			x			x		
1965	x			x			x			x		
1966	x											

Dorin Giurgiucă proved to be a valuable junior player. At the Junior European Criterion in Bled 1962 he won the gold medal in the men's single category and came second in the men's double and mixed double category. He was declared the best junior participant at that edition of the European Championship. (Ferarini, 1962)

The World's Youth Festival in Helsinki 1962 also represented an international competition where Dorin Giurgiucă brought glory to Romanian sports by obtaining the silver medal in the men's single category and the bronze medal together with Adalbert Réthi in the men's double category. (Blag, 2002)

As a member of the team of the Workers' Sporting Club Cluj he contributed in obtaining four first places, one second place and one third place at the European Champions Cup. (Paneth, 2003)

As a valuable player, with medals from official international competitions Dorin Giurgiucă was invited to participate and obtained good results in international competitions in countries such as England, Austria, Czechoslovakia, France, The Republic of Federal Germany, Sweden, Hungary and others. He came first in the men's single category within international championships in England, Austria, The Republic of Federal Germany (*** 2002)

For the obtained results, for his achievements in his entire sporting activity the Romanian Table Tennis Federation conferred him the title of sports master, the highest sports distinction possible to receive during the respective period. (*** 1994).

Conclusions

During the period of table tennis adapting to the requirements of modern games at the beginning of the 1960s Dorin Giurgiucă was considered the most gifted Romanian player, which could meet these demands.

Dorin Giurgiucă record consists of more than twenty gold medals, won in national championships.

Dorin Giurgiucă won or contributed to the winning of medals in World Championships, Senior European Championships, Junior European Championships, World's Youth Festival, Balkan Championships.

His proven value led to him being invited to take part in international championships in countries with the most valuable table tennis of the times, England, Austria, Czechoslovakia, Hungary, The Federal Republic of Germany, France, Sweden, where he was unanimously appreciated for the obtained results.

He contributed in obtaining four fist places, one second place and one third place at the European Champions Cup by the Workers' Sporting Club Cluj.

For his achievements he was awarded the title of sports master in 1962, and the title of emeritus sports master in 1994.

During the successful period of Cluj table tennis in the seventh decade of the twentieth century Dorin Giurgiucă was one of the most valuable players from Romania due to the obtained results and counted as one of the Romanian players of international recognition.

Annotation

This paper is part of a cycle of articles referring to the history of table tennis from Cluj.

We would like to thank all those who helped us under different perspectives during the documentation process. We are especially grateful to Dorin Giurgiucă, who was kind enough to make available albums and a series of documents on table tennis from Cluj for research purposes.

REFERENCES

Ardeleanu, A. (1963). Aspecte din pregătirea tinerilor jucători de tenis de masă, în: Cultură Fizică şi Sport, XVI, nr. 3, Bucureşti, 43 – 45

Blag, O. (2002). Supercampionii. Dorin Giurgiucă sau povestea muşchetarului cel stângaci, în: Adevărul de Cluj, miercuri, 25 septembrie, 7

Comarnischi, C. (1961). Noutăţi tehnice de la cea de a XXVI-a ediţie a Campionatelor mondiale de tenis de masă de la Pekin (interviu cu antrenorul emerit Farkas Paneth) în: Cultură Fizică şi Sport, XIV, nr. 2, Bucureşti, 16 – 18

Cristea, H. (1968). Din enciclopedia sportului clujean, în: Sportul XVI, nr. 23, 4 – 5

Ferarini, M. (1962). De vorbă cu Dorin Giurgiucă, campionul european de juniori la tenis de masă, în: Informaţia Bucureştiului, iulie, 3

Paneth, F. (1962). Cel mai bun junior din Europa, în: Sportul Popular, 26 iunie, 2

Paneth, F. (2003). Paleta şi planeta, Întâmplările unei vieţi talmăcite şi redactate de Gheorghe I. Bodea, Ediţia a II-a, revăzută şi adăugită, Cluj-Napoca: Editura Viaţa Creştină

Postolache N. (1995). Istoria sportului din România. Date cronologice, Bucureşti: Editura Profexim

Postolache, M. şi Postolache N. (1983). Bibliografia educaţiei fizice şi sportului, Bucureşti: Editura Sport-Turism

*** *Enciclopedia sportului din România* (2002). volumul I, Bucureşti: Editura Aramis

*** Giurgiuca Dorin (1972). ITTF Statistics data, Internationale Table Tennis Federation, Lausanne

*** *ITTF Statistic Data (1972).* International Table Tennis Federation, Lausanne

*** *Modificări ale Regulamentului FITM privind limitarea tipurilor de palete utilizate în tenisul de masă (1959)*. Congresul Federaţiei Internaţionale de Tenis de Masă

*** *Regulamentul tenisului de masă (1961).* Federaţia Română de Tenis de Masă, Editura Uniunii de Cultură Fizică şi Sport, Bucureşti

*** *Titluri onorifice: antrenori emeriţi, maeştri emeriţi ai sportului, maeştri ai sportului (1994).* în: Buletin oficial, Federaţia Română de Tenis de Masă

*** Historical Statistics Links, http://www.ittf.com

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INFLUENCING BALANCE AND WATER ORIENTATION SKILLS THROUGH AN AQUATIC AND MOVEMENT INTERVENTION PROGRAM IN CHILDREN WITH CEREBRAL PALSY

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ABSTRACT. The aim of this paper is to determine the aspects and results following the application of an aquatic intervention program adjusted as part of the neuromotor rehabilitation treatment in children with cerebral palsy concerning their water orientation, independence in the water and balance skills. The 6-month aquatic therapy program consisted of 2 weekly sessions. The average length of a session was of 45 minutes. Water temperature was of 36º C. In addition to aquatic therapy sessions, children underwent 2 physiotherapy sessions included in the rehabilitation program of the institution of origin. The program included 24 children with different clinical types of cerabral palsy. The mean age was 12.5 ± 2.7 years. The evaluation methods included: the Pediatric Berg Balance Scale (PBS), a modified Water Orientation Skills (WOS) rating scale. The results obtained for the Pediatric Balance Scale showed statistically significant differences. ($p<0.001$) The average baseline score was 21.67, with a standard deviation of 14.349, the average total score was 30.00, with a standard deviation of 16.876. The Water Orientation Skills (WOS) rating scale indicates significant improvements. ($p<0.001$) The average baseline score was 6.92, with a standard deviation of 5.397, the average total score was 102.96, with a standard deviation of 36.643. A strong direct correlation between WOS and PBS score values has been observed ($r = 0.770$, $p<0.001$). The applied program had a statistically significant effect on improving children's balance as well as their learning abilities to move in the water and even to swim.

Keywords: cerebral palsy, balance, independence in the water, water orientation skills

REZUMAT. ***Influenţarea echilibrului şi a abilităţilor de orientare în apă în urma unui program terapeutic acvatic la copii cu paralizie cerebrală.*** În lucrarea de faţă ne-am propus să urmărim aspecte şi rezultate în urma aplicării

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unui program acvatic de intervenţie adaptat şi integrat în tratamentul de reeducare neuromotorie a copiilor cu paralizie cerebrală asupra echilibrului, independenţei şi abilităţilor de orientare în apă. Programul acvatic terapeutic a avut o durată de 6 luni, 2 şedinţe săptămânale. Durata medie a şedinţelor a fost de 45 de minute. Temperatura apei a fost de 36 º C. Pe lângă şedinţele de terapie acvatică copiii participă la 2 şedinţe de kinetoterapie inclusă în programa de recuperare a instituţiei de provenienţă. Au participat un număr de 24 de copii cu diferite forme clinice de paralizie cerebrală. Media de vârsta a fost de 12,5 ± 2.7 ani. Metodele de evaluare au fost Scala Pediatrică pentru Echilibru Berg (PBBS), Scala de Evaluare a Abilităţilor de Orientare în Apă - modificată (WOS). Pentru Scala Pediatrică pentru Echilibru Berg rezultatele obţinute au arătat diferenţe semnificative din punct de vedere statistic ($p<0,001$). Media scorului iniţial a fost de 21,67 cu o deviaţie standard de 14,34, media scorului final a fost de 30,00 cu o deviaţie standard de 16,87. Scala de Evaluare a Abilităţilor de Orientare în Apă (WOS) demonstrează îmbunătăţiri semnificative ($p<0,001$). Media scorului iniţial a fost de 6,92 cu o deviaţie standard de 5,39 şi media scorului final a fost de 102,96 cu o deviaţie standard de 36,64. Am observat o corelaţie puternică directă între valorile scorului WOTS şi BERG ($r=0,770$; $p<0,001$). Programul aplicat a avut un efect semnificativ statistic asupra îmbunătăţirii echilibrului şi de asemenea asupra învăţării abilităţilor copiilor de a se mişca în apă şi chiar a abilităţilor de a înota.

Cuvinte cheie: program acvatic terapeutic, funcţie motorie grosieră, spasticitate, mobilitate articulară, paralizia cerebrală

Introduction

Swimming and aquatic therapy are beneficial activities for children with neuromotor disabilities. (Adams-Cubbin 1991, Broach-Datillo 1996, Cole-Becker 2004, Fragala-Pinkam et all 2010, Routi at all 1997) They provide an oportunity to improve physiological and psychological achievements. Water activities influence the entire body without causing stress or excessive pressure on certain parts of the body. (Adams-Cubbin 1991, Broach-Datillo 1996)

An additional therapeutic quality of the aquatic environment is the effect of buoyancy, which enables the initiation of certain independent movement possibilities which are unlikely to be achieved on land. (Harris 1978, Hutzler 1998, Styler 1994)

As other therapeutic methods practiced within neuropediatric physical therapies, the main purpose of aquatic therapy is to improve activities of daily living and body functions.

There is a relationship between mechanical effects of fluids and mechanisms of body adaptation. It is widely accepted that the physical properties of any

environment are a constraint to maintain balance and require adapted motor behavior (e.g. widening the support area, using hands for support, hardening the body in order to stabilize the center of gravity). (Lambeck 2000)

Adapted motor behavior in the presence of hydrodynamic elements leads to a psycho-sensory-motor learning program. Generally accepted hydrodynamic elements that influence water therapy also play an important role. However, the metacentric effect is the most important mechanical effect of fluids. The term metacentre is used in naval architecture to describe a point where an imaginary vertical line (through the center of buoyancy) intersects another imaginary vertical line (through a new center of buoyancy) (Archimedes). Both gravity and buoyancy are equally important and influential and any small change to either of the two leads to imbalance. (Lambeck 2000, Lambeck 2001)

The shape, density and symmetry of a body will influence the metacentre (balance). In water, balance occurs when the body makes the necessary adjustments to make gravity and buoyancy forces equal and opposite. When these forces are not equal and collinear, the body will become unstable and will twist to achieve balance. The body uses automatic reactions to balance and stabilize its position. When the lack of balance can not be well coordinated, the body uses movement schemes based on primitive reflexes, such as: the asymmetrical tonic neck reflex (ATNR), the tonic labyrinthine reflex (TLR). These reactions may block unwanted rotations, especially those on the medial axis, in order to stabilize the position of the body. These reactions can be used to achieve symmetry on the medial axis as the starting point for controlling coordinated twisting. (Lambeck 2000, Lambeck 2001)

Purpose of research

This paper intends to observe the effects of a 6-month aquatic and land therapy program on water independence, balance and water orientation skills. This paper analyzes these abilities before and after carrying out an aquatic rehabilitation program.

It also aims to describe the relationship between water orientation skills and balance.

Materials and methods

General information about the group

The study included 24 children diagnosed with different clinical types of cerebral palsy (Spastic cerebral palsy: Paraparesis 5, Tetraparesis 10, Hemiparesis: right 2, left 2, Dyskinetic cerebral palsy: 4, Ataxic cerebral palsy 1); enrolled in two of the special schools in Cluj County. The study participants were aged between 8 and 16, 18 boys and 6 girls. Inclusion criteria were as follows: diagnosis, ability to

follow simple verbal instructions. None of the children has ever participated in an aquatic therapy intervention program.

Methods

The Gross Motor Function Classification System. The mobility of children and teenagers at home, at school and in the community can be best assessed with the expanded and revised version of the gross motor function classification system (GMFCS -E&R). GMFCS covers a wide range from Level I, where individuals work at an advanced level, being able or having the potential to walk without restrictions, to Level V, for individuals who are very limited in their ability to move by themselves and require a very high level of assistance.

Pediatric Berg Balance Scale. Pediatric Berg Balance Scale comprises a set of 14 tasks of increasing difficulty. These tasks are used to assess functional activities that are relevant for everyday life, such as getting up from sitting to standing, stretching forward exceeding the support surface. The tasks were designed in order to test the patient's ability to maintain and change body position. Support surface decreases to the end of these tasks. These tasks are performed within a well-established time limit or body positions need to be maintained for a defined period of time.

Each task is shown and/or instructions are given as indicated. The assessment observes the response category applicable for each task. At most points, the subject is asked to remain in a certain position for a certain period of time. Progressively, more points are deducted if the time or distance requirements are not met, if the performance involves supervising or if the subject uses external support or receives assistance from the examiner. Subjects must understand that they need to maintain balance while trying to achieve the given tasks. The choice of which leg to stand on or how much to stretch is up to the subject. Poor logic will negatively influence performance and accumulated points.

The equipment required for testing consists of a stopwatch or a watch with three moving hands (indicating hour, minutes, seconds). The chairs used for the tests should be of reasonable height. The tasks range on an ordinal scale from 0 to 4, with the maximum score reaching 56 points. A higher score indicates better balance abilities. (Kembhavi 2002)

Water Orientation and Swimming Skills (WOS) Rating Scale - amended version. An adapted version of the Water Orientation Scale (Hutzler et al. 1998) containing 23 tasks was used to assess the level of adaptation to the aquatic environment and the swimming abilities. Our list contains 29 tasks on a 6-step scale ranging from 0 (unachieved task) to 5 (independently achieved task). The

maximum score is 145. Achieving all tasks means the ability to independently swim at least 25 m in a raw form of any swimming style (back stroke, front crawl and breast stroke).

The following tasks were added in our study:

W4 A – Maintaining orthostatism by controlling the lateral inclination of the body around a sagittal plane.

W6 – Barrel (the subjects trust that water supports them).

W9 B – Sliding back, instructor-induced movement without physical contact.

W10 B - Changing position – from floating on the back to orthostatism (near the bar by the side of the pool), (rotation around a transverse plane).

W11 B – Changing position – from floating on their back to orthostatism, in the middle of the pool (shallow water), (rotation around a transverse plane).

W17 B – Twisting using combinations of twists (around a longitudinal plane and a transverse plane).

Aquatic therapy program. The aquatic therapy program is a strategy for learning how to swim, useful in people with neuromotor impairments. The concept is based on the principles of fluid mechanics in order to allow subjects to achieve stability and controlled movement in the water.

The aquatic therapy program was conducted over a period of 6 months, consisting of 2 weekly sessions. Each session was 45 minutes long. Water temperature was 36^0C.

The aim of the method is independence which occurs through coordinated movements. Maintaining balance in the water requires accommodation with the mechanical changes of the aquatic environment. This accommodation is the result of a psycho-sensory-motor learning process, enabling the individual to learn how to maintain balance in an unstable environment. Together with balance (stability), movement can be initiated and controlled. (Lambeck 1996)

SPSS version 20 was used for **statistical analysis**. Data was classified as nominal or quantitative. Frequency and percentage were used for nominal variables, and average (mean) and standard deviation or median and 25th and 75th percentiles were used for quantitative variables, depending on the situation. Kolmogorov-Smirnov test was used to check the normality of the quantitative data.

To determine whether there are changes between pairs of variables we used the T test for pairs of variables or marginal homogeneity testing.

GLM repeated measures were used to check the influence of a parameter on value variation of pairs of variables. Statistical significance was set at a threshold value of 0.05.

Pearson correlation was used to emphasize the correlation between two continuous variables with normal distribution. Cronbach's Alpha coefficient was assessed to test internal consistency reliability of the modified WOS score.

Results

Berg Balance Scale

A significant increase in balance score was observed for the study group following completion of the aquatic therapy program.

Table 1. Pediatric Balance Scale Scores

	total initial score	total final score	initial % score out of maxim	final % score out of maxim
Media	21,67	30,00	38.68%	53,567%
Standard deviation	14,34	16,87	25.62%	30,13%
Minimum	0	1	.00%	1,78%
Maximum	48	53	85.71%	94,64%

The outcome of the Pediatric Berg Balance Scale, showed high statistically significant increases between pre and post-test scores. ($p<0.001$).

The average baseline score was 21.67 ± 14.34, the average final score was 30.00 ± 16.87.

The average of the maximum possible percentage score was 38.68% ± 25.62% for the baseline score, and 53.56% ± 30.13% for the final score.

For GMFCS Level II, the average baseline score was 34.30 ± 7.00 and the average total score was 43.50 ± 5.52. The result indicates high statistically significant differences ($p <0.001$).

For GMFCS Level III, the average baseline score was 37.27 ± 10.98 and the average final score was 58.03 ± 11.99.

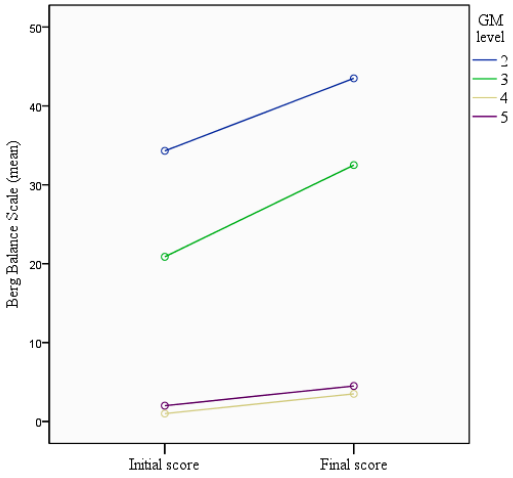

Chart 1. Berg Balance score evolution in children with GMFCS level II and III.

The result indicates high statistically significant differences ($p<0.001$).

We showed that patients enrolled in a lower GMFCS level (II, III) will achieve significantly higher increases in Berg test score ($p<0.001$; Chart 1).

There were no statistically significant differences in children with higher GMFCS level (IV, V), ($p = 0.1$).

Water Orientation Score (WOS)

Major changes in water orientation skills were noticed at the end of the 6-month aquatic intervention program.

We calculated a reliability coefficient or the internal consistency for the modified WOS. A value greater than 0.7 of Cronbach's Alpha coefficient indicates a scale with good internal consistency. In our case, Cronbach's Alpha reliability coefficient equals 0.828 and indicates a scale with good internal consistency.

Water Orientation Scores (WOS) indicated highly significant increases between pre and post-test scores. ($p <0.001$)

Table 2. Water Orientation Scores

	total inițial score	total final score	inițial % score aut of maxim	final % score aut of maxim
Media	6,92	102,96	4,77%	71,00%
Standard deviation	5,39	36,64	3,71%	25,26%
Minimum	0	19	0%	13.10
Maximum	14	142	9,65%	97,93%

The average baseline score was 6.92 ± 5.397 and the average final score was 102.96 ± 36.643.

There was a significant change between the initial and the final assessment, from 4.77% to 71.00% of the maximum value of 100%.

For GMFCS Level II, the average baseline score was 10.3 ± 3.94 and the average final score was 125.60 ± 16.78. The results indicate an increase from 7,10% to 86,62% of the maximum 100%. ($p<0.001$)

For GMFCS Level III, the average baseline score was 7.63 ± 4.59 and the average final score was 110.25 ± 28.01. The results indicate an increase from 5.26% to 76.03% of the maximum 100%. ($p<0.001$)

For GMFCS Level IV, the average baseline score was 0 ± 0 and the average final score was 61.5 ± 13.43. The results indicate an increase from 0% to 42.41% of the maximum 100%. ($p= 0.04$)

For GMFCS Level V, the average baseline score was 0.5 ± 1 and the average final score was 52.5 ± 34.10. The results indicate an increase from 0.34% to 36.20% of the maximum 100%. (p= 0.05)

We demonstrated that patients with a lower GMFCS level (II, III) will indicate significantly higher increases in Water Orientation Scores (p<0.001; Chart 2).

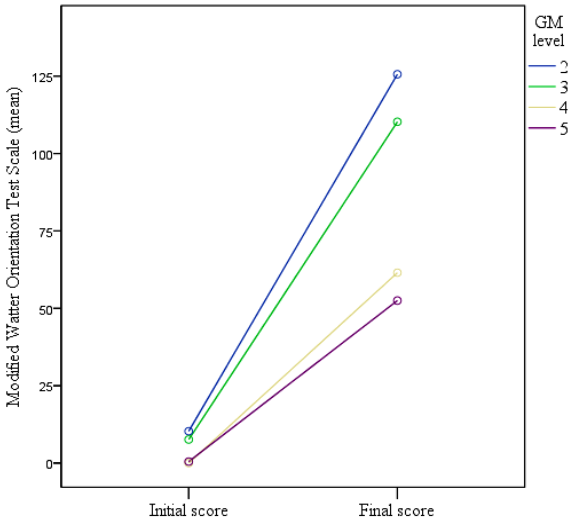

Chart 2. Evolution of Water Orientation Scores (WOS).

Correlation between Water Orientation Score and Berg Balance Scale

There is a strong direct correlation between Water Orientation Score and Berg Balance Scale (r=0.770, p<0.001).

Discussion

This study evaluated aspects and results influencing the level of adaptation to the aquatic environment and the swimming abilities in children with cerebral palsy after applying a 6-month aquatic intervention program overlapped with a physical therapy program.

For the Pediatric Balance Scale, results indicated high statistically significant increases between the baseline and the final scores (p<0.001), the average baseline Berg score was 14.34 ± 21.67 and the average final score was 30.00 ± 16.87.

In a study on the effects of aquatic exercises on motor function and balance conducted on two groups, Hoon-Kang (2012) indicated a significant increase in the Berg score from the average baseline score of 14.27 ± 10.69 to the average final score of 18.27 ± 11.52 (p<0.05) for the group undergoing aquatic therapy

alone, and significant results from the average baseline score of 14.73 ± 7.08 to the average final score of 17.93 ± 6.47 ($p<0.05$) for the group undergoing land rehabilitation sessions.

The study conducted by Hoon-Kang included 15 children aged 8.40 ± 2.19 and lasted for 8 weeks with 3 weekly sessions. The results show significant increases in Berg scores in both groups (Hoon- Kang 2012).

Our research study detected improvements in balance caused by two factors: aquatic therapy and physiotherapy sessions performed simultaneously, the scores being higher than those obtained by Hoon-Kang. We could not establish the share of these two factors in their influence on the outcome, but higher scores in our study could be an indicator for the simultaneous use of the two types of therapy that leads to higher Berg scores.

In a study conducted on a group of 9 patients with spastic diplegia, aged 7 through 31 years, Thorpe (2000) assessed balance using the Functional Reach test which coincides with task 8 of the Berg Balance Test. Thorpe's (2000) conclusion is that aquatic exercises improve balance.

At the end of the 6 months of intervention sessions, we observed major changes in achieving water orientation skills. The average baseline score was 6.92 ± 5.397, the average final score was 102.96 ± 36.643. ($p<0.001$).We showed a significant change between the initial and the final assessment, from 4.77% to 71.00% of the maximum of 100%. ($p<0.001$).

Hutzler et al. (1998) conducted a 6-month study on the effects of a movement and swimming program on vital capacity and water orientation skills including 46 children (23 children in the control group receiving four weekly 30-minute physical therapy sessions, 23 children in the experimental group receiving one physiotherapy session and two aquatic therapy sessions of 30 minutes per week), aged 5 through 7 years.

They achieved significant results in terms of water orientation skills score improvements and the final conclusion of the study was to highly recommend the use of aquatic therapy in the rehabilitation program for children with cerebral palsy. (Hutzler et al 1998)

The same author achieved significant results in terms of water orientation skills improvement in a study on the effects of a movement and swimming program on water orientation skills and self-esteem in 1998. (Hutzler et al 1998)

Various authors have used different tests and have estimated statistically significant increases in achieving and improving water orientation skills.

Declerck et al. (2010) determined significant improvements (average increase was 14.8%, $p=0.018$) using the Water Orientation Test of Alyn 2 (WOTA 2) in a group of seven children with a mean age of 10.2 ± 2.3, through a 6-week aquatic program with 2 weekly sessions.

Sršeň et al. (2010) determined significant improvements in water orientation skills using the Swim Test.

Fragala-Pinkam et al. (2010) applied the Swimming Classification Scale to a group of 16 children aged between 6 and 12 and achieved highly statistically significant results ($p<0.001$) in improving swimming skills. The program lasted 14 weeks and consisted of 2 weekly sessions.

Following a 6-week aquatic therapy program consisting of 2 weekly sessions, using the WOTA 2 test, Dimitrijevic et al.(1012) achieved significant results ($p<0.01$) in improving water orientation skills. The age of participants ranged between 5 and 14 years. (8)

Bijan Jorgic et al. obtained significant results ($p=0.02$) for increased water orientation skills scores, from 35.62% to 60.85% of the maximum of 100%, using the WOTA 2 test. The study was conducted over a period of six weeks with two weekly sessions and included 7 children with a mean age of 9 years and 5 months ± 1 year and 3 months and consisted of Halliwick therapy sessions and swimming exercises of 45 minutes each.

The results of the above studies indicate that regardless of the tests used, aquatic therapy programs improve water orientation skills, swimming skills and enable children with cerebral palsy to learn how to move in the water and to swim without help from others. (Bojan et al 2012)

Conclusions

After analyzing the results of this study we conclude that an aquatic program combined with physical therapy sessions can significantly improve balance, water orientation abilities and swimming skills.

Thus, aquatic activities have enabled children with cerebral palsy aged 7 through 16 years to improve balance and water orientation skills.

Our research study detected improvements in balance caused by two factors: aquatic therapy and physiotherapy sessions performed simultaneously. We could not establish the share of these two factors in their influence on the outcome, but results could be an indicator for the simultaneous use of the two types of therapy that leads to higher Berg scores.

Aquatic program can provide major improvements in water orientation skills, therapeutic quality of the aquatic environment enables the initiation of certain independent movement possibilities which are unlikely to be achieved on land.

Aquatic program enable children with cerebral palsy to learn how to move independent in the water and to swim without help from others.

REFERENCES

Adams, C.R, Mc. Cubbin, J.A. (1991), Games sports and exercises for the physically disabled. fourth edition, Philadelphia, Lea & Febiger

Broach, E., Datillo, R. (1996), Aquatic therapy: a viable therapeutic recreation intervention. *Ther. Rec*., 15, 213-229

Bojan, J., Dimitrijevic, L., Aleksandrovic, M., Okicic, T., Madic, D., Radovanovic D. (2012), The swimming program effects on the gross motor function, mintal adjustment to the aquatic enviroment, and swimming skills in the children with cerebral palsy: a pilot study. *Specijalna Edukacija i Rehabilitacija*, 11(1), 51-66

Cole, B., Finch, E., Gowland, C. et al. (1994), Physical Rehabilitation Outcome Measures. 2nd ed. Toronto, Canadian Pshyotherapy Association

Cole, A.J., Becker, BE. (2004), Comprehensive aquatic therapy, second edition. Butterworth-Heinmann Medical

Declerck, M. (2010). Effect of aquatic intervention on the gross motor function and quality of life of children with cerebral palsy. Master thesis. Leuven: Faculty kinesiology and rehabilitation sciences

Declerck, M., Feys, H., Daly, D. (2013), Benefits of swimming for children with cerebral palsy: apilot study. *Serbian Journal of Sport Sciences*, 7(2): 57-69

Dimitrijevic, L., Aleksandrovic, M., Madic, D., Okicic, T., Radovanivic, D., Daly, D. (2012), The effect of aquatic intervention on the gross motor function and aquatic skills in children with cerebral palsy. *Journal of Human Kinetics,* 32: 167-174

Dimitrijević, L., Bjelaković, B., Lazović, M., Stanković, I., Čolović, H., Kocić, M., Zlatanović, D. (2012), Aquatic exercise in the treatment of children with cerebral palsy. *Srp Arh Celok Lek.,* 140 (11-12):746-50

Fragala-Pinkham, M., O'Neil, M.E. & Haley, S.M. (2010) Summative evaluation of a pilot aquatic exercise program for children with disabilities. *Disability and Health Journal, 3* (3), 162-170

Harris, S.R. (1978), Neurodevelopment treatment approach for teaching swimming to cerebral palsied children, *Phys Ther*, 58: 979-83

Hoon Kang, S., Hyeon Bae Y. (2012), Comparation between the effect of aquatic exercise program and land exercise program in spastic cerebral palsy on motor function and balance. *Korean Journal of Sport Medicine*, 30(2):116-122

Hutzler, Y., Chacham A., Bergman, U., Reches, I. (1998), Effect of a movement and swimming program on water orientation skills and self-concepts of kindergarten children with cerebral palsy. *Perceptual and Motor Skills*, 86, 111-118

Hutzler, Z., Chacham, A., Bergmen U., Syeinberg, A. (1998), Effects of a movement and swimming program on vital capacity and water orientation skills of children with cerebral palsy. *Developmental Medicine & Child Neurology*, 40:176-181

Kembhavi, G., Darrah, J., Magill-Evans, J., Loomis, J. (2002), Using the Berg Balance Scale to distinguish balance abilities in children with cerebral paly. *Pediatric Physical Therapy,* Lippincott, Williams & Wilkins Inc.

Killian, K.J., Joyce Petrovich, R.A., Menna, L., Arena, S.A., (1984), Measuring water orientation and beginer swim skills of autistic individuals. *Adapted Physical Activity Quarterly,* 1, 287-295

Lambeck, J., Stanant, F., The Halliwick Concept (2000), Part 1. *Journal of Aquatic Physical Therapy Fall,* 8(2): 6-11

Lambeck J., Stanant F., The Halliwick Concept (2001), Part 2. *Journal of Aquatic Physical Therapy Fall,* 9(1): 7-12

Lambeck, J. (Ed). (1996), Neurophisiological Basis for Aquatic Therapy: Teoretical Topics. Spokane, Constellate

McMillan, J. (1977), The role of water in reabilitation. *Fysioterapeuten*, 45: 43-6, 87-90, 236-40

Routi, G.R., Morris D.M., Cole A.J. (1997), Aquatic rehabilitation. Philadelphia: Lippincott

Srsen, K.G., Vrecar, I. & Vidmar, G. (2010), The Halliwick concept of teaching of swimming and assessment of swimming skills. *Rehabilitacija*, *9* (1), 32-39

Styler-Acevedo, J., Cirullo J. (1994), Integrating land and aquatic approaches with a functional emphasis. *Orthop Phys Ther Clin North Am,* 3: 165 -78

Thorpe, D.E., Reilly M. and Case L., Glenn, A.B., Hubbard, M.L., Ollendick, K., Petersen, K.E. (2000), The effects of an aquatic resistive exercise on strenght, balance, energy expenditure, functional mobility and perceived competence in persons with cerebral palsy. *Pediatric Physical Therapy*, 12(4):231

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APPEARANCE OF SPECIAL EDUCATIONAL NEEDS IN HIGHER EDUCATION: HUNGARIAN AND POLISH PHYSICAL EDUCATION TEACHER EDUCATION STUDENTS' KNOWLEDGE AND INFORMATION ABOUT ADHD

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ABSTRACT. Attention Deficit Hyperactivity Disorders (ADHD) is considered one of the most frequent child and youth psychiatric disorder all over the world. Researchers observed that children with ADHD had lower performance in some aspects of motor skills and they are less successful in sporting events compared to the normative data. Sports can help teach crucial social skills to healthy emotional development, but children with ADHD have difficulty in sport settings in a numerous aspects. When children exhibit ADHD symptoms in school, teachers are often the first who recognize the problems. Teachers play a key role in classification decisions in the intervention process in the classroom or in the P.E. lesson. ADHD has also become a relevant educational issue, so according to us, it is important what future P.E. teachers know about ADHD? The purpose of this study was to assess Physical Education Teacher Education students' knowledge and experience on ADHD and the integration of ADHD students in school setting. Hungarian (n=125) and Polish (n=211) junior and senior PETE students filled out a closed ended questionnaire at two major institutes in Hungary and Poland (SU-AWF). Although most of the students have already heard the term hyperactivity, a half of both said that they had no specific information about ADHD during their PETE courses. Beside lack of information, most participants believed that ADHD students could take part in the regular PE lesson, but they did not know how. They think it is important to learn about ADHD during university studies. Since a growing number of public school teachers have to face issues relating ADHD in some way in these countries, it is important to include these issues in their PETE programs. Our opinion is to worth teaching some information about special educational needs (SEN) including ADHD, integration and some other practical and pedagogical methods during university studies.

Keywords: attention deficit hyperactivity disorder; physical education teacher education program; knowledge about ADHD

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Introduction

Attention Deficit Hyperactivity Disorders (ADHD) is considered one of the most frequent child and youth psychiatric/neuropsychiatric disorder, and it is affecting about 3-5% of the world's population under the age of 19 (Polanczyk et al., 2007). Boys are diagnosed ADHD three times more than girls (Barkley, 1998).

According to the Diagnostic and Statistical Manual of Mental Disorder (DSM-IV, DSM-IV- TR) ADHD is a neurobehavioral disorder with early childhood onset, characterized by three main symptoms: inattention, hyperactivity and impulsivity (American Psychiatric Association, 2000; Grönlund, Renck and Weibull, 2005).

Inattention manifests as the individual having difficulty sustaining attention in tasks or playing activities, does not seem to listen when spoken to directly, has trouble following through on instructions, often loses things necessary for activities and often forgetful in daily activities.

Hyperactivity can be described as fidgeting with hands or feet, excessive talking and inability to remain seated or still when it is expected.

The best way to describe impulsivity is a tendency to blurt out answers before question have been completed, inability to wait for their turn and frequently interrupts others.

ADHD has three sub-types: ADHD predominantly inattentive type (ADHD-PI), ADHD predominantly hyperactive-impulsive type (ADHD-HI) and ADHD combined type (ADHD-C) (American Psychiatric Association, 2000).

Many studies have found that over 50% of people diagnosed ADHD also meet the diagnostic criteria for one or more additional psychiatric, behavioral and/or developmental disorder such as: Oppositional-defiant disorder, Obsessive-compulsive disorder, Tourette-syndrome, Specific learning disorders (Chu, 2003; Waugh and Sherill, 2004), Developmental coordination disorder (Grönlund, Renck and Weibull, 2005; Chu, 2003; Piek and Dyck, 2004; Miranda, Jarque and Tárraga, 2006) and so on. Barkley (1998) suggested approximately 30% of children with ADHD suffer from learning disability.

Researchers observed that restlessness just one part of their problems. On the other hand they have problems with their clumsiness, namely children with ADHD had lower performance in gross and fine motor skills, coordination, balance and physical fitness compared to the normative data (Harvey and Reid, 1997; 2003; Dewey et al., 2002; Piek, Pitcher and Hay, 1999; Pitcher, Piek and Hay, 2003; Steger et al., 2001). They are at risk for developing movement skill difficulties and to have poor levels of physical fitness (Harvey and Reid, 2003). Piek, Pitcher and Hay (1999) have found that children diagnosed ADHD-PI type were most likely to have fine motor problems, while ADHD-C type were at risk for gross motor problems (Kooistra et al., 2005).

But which sports are recommended an ADHD child? Furthermore, little information existed about daily physical activities or sport- specific skills of children with ADHD, although it was suggested that these children do not fare well in team or competitive situations (Alexander, 1990). For many children with ADHD, the most formidable opponents on the playing filed are themselves, and they have the same difficulty with sports than they have in the classroom: they become distracted by what is around them and they will often miss instructions (ADDitude, 2009).

Sports – of course – can help teach social skills crucial to healthy emotional development, but children with ADHD have difficulty in sport settings: they become distracted, have difficulty following directions, have difficulty waiting their turn and have low frustration tolerance (ADDitude, 2009). They often become aggressive with not just the opponents but their team member also (Johnson and Rosén, 2000).

According to the literature team contact sports are not recommended for ADHD children, but they are more likely to succeed with individual sports such as swimming, wrestling, martial arts, tennis, horseback riding, track and fields and so on. It is easier for ADHD children to focus when they have one-on-one with their coach and they are able to concentrate on just one opponent. Naturally they often are on teams, just the efforts and instructions are individual (Atkins és Stoff, 1993; Johnson és Rosén, 2000; Hindawi, 2003; Alexander, 1990). One group of activities that almost everybody who research this topic promotes for nearly all ADHD children are martial arts such as taekwondo, karate, judo, because in martial arts are all about control and kids learn to control their body. The movements are smooth and its use of rituals such as bowing to the instructor. There are good for ADHD children because they make behavior automatically.

Despite the pitfalls of team sports, many children with ADHD are strongly motivated to join them, because learning to be a part of a team is a thrilling and therapeutic experience for kids who are up to the task and they could be successful on their peer relations, self-esteem and social development. Nevertheless modifications in team sport should be designed to keep the child active and motivated. For example: changing field position frequently, putting the ADHD child in an active field position as much as possible, giving opportunities to be group leader, team captain or referee and keep the task simple (ADDitude, 2009).

Children with ADHD are often rejected by their peers and have fewer friends than other children in their age compared to the normative data (Lullo and Van Puymbroeck, 2006).

ADHD children are at risk for peer rejection due to poor basic motor-skill development, poor coordination and low levels of athletic skills (Lopez-Williams et al., 2005). Children who exhibit attention-seeking behavior, or behavioral disorder like as ADHD are less successful in sporting events and sport settings and have low self-efficacy (Armstrong and Drabman, 2004; Pelham et al., 1990).

Perhaps is it possible that through improving sports performance children with ADHD can improve their social status and motor skills in the same time, in their life and school settings also?

Grönlund, Renck and Weibull (2005) - whose cited by Barkley - said: "Children with ADHD benefit the most- more than any other disorder- from regular exercise, because movement exercises increase dopamine in the human brain, just like the stimulus does (p. 65)."

Movement is a treatment process for ADHD children because in this form they can reach inhibition in their nervous system and they could learn and concentrate their attention to theirs tasks (F. Földi, 2004).

When children exhibit ADHD symptoms in school, teachers often are the first who recognize the problems. Teachers play a key role in classification decisions and to implement an intervention in the classroom or in the P.E. lesson (Vereb and DiPerna, 2004). Many of the students with ADHD become increasingly difficult to teach. Individual behaviors became more difficult to manage.

ADHD has also become a relevant educational issue, so according to us, it is important what future P.E. teachers understand ADHD and how it influences the teaching-learning process?

The purpose of this study was to assess Physical Education Teacher Education (PETE) students' theoretical knowledge and experience on ADHD and the integration of ADHD students in school settings and to make a comparative analysis between Polish and Hungarian students and between genders.

Material and methods

We had sent altogether 520 questionnaires into both countries and we received back 336 that we can use in our research (return proportion= 64,6%). 211 had come back from Poland and 125 from Hungary. The probable cause of the large difference is that AWF is a larger institution than TF, so students' numbers on AWF are substantially taller (cca. two times more), than TF students' numbers.

Participants were all the Polish, all the Hungarian university's III., IV., V. year students (Table 1).

Table 1. Proportion of the participants

		Poland	Hungary	Total
Participants (N/%)		**211**/62,8	**125**/37,2	**336**
Gender (N/%)	**Female**	**134**/ 63, 5	**97**/ 77,6	**231**
	Male	**77**/ 36,5	**28**/ 22,4	**105**
Year in program (N/%)	**III. year**	**85**/ 40,2	**75**/ 60	**160**
	IV. year	**44**/ 20, 9	**16**/ 12,8	**60**
	V. year	**82**/ 38,9	**34**/ 27,2	**116**

In Poland the highest level P.E. training happens in AWF, where students could learn in P.E teacher education, coach education, tourism and recreation education and rehabilitation. In our research we just asked those people who are studying for P.E teacher, coach and recreation specialist.

In Hungary we have asked students who are learning in P.E. teacher education, P.E. and health teacher education and P.E. and recreation education.

In both countries students filled out the questionnaire on native language, because we have it translated onto Polish language with a Hungarian ancestry assistant professor, who teach in AWF. We have used just closed ended questions and also Likert Scale in the questionnaire, because of the lingual bar and difficulty.

In this research we try to find the answers to the following questions: Do PETE students have any information about ADHD and could they recognize it if it would be necessary? Have they learnt anything about ADHD during their university studies and they would like to learn more about it or not? What is their opinion about the integration of ADHD students into P.E. lessons?

In the question of the characteristics of ADHD children had used 12 statements of DSM-IV. Every student had to value these statements from 1 to 5, where 1 meant: I do not agree with this statement, 5 meant: I strongly agree with this statement.

Descriptive and Chi-square functions were employed in data analysis, the level of $p \leq 0.05$ being considered significant. SPSS 14.0 software for Windows and Stratified Random Sampling was used.

Results

Recognize of ADHD

First step we would like to know respondents really know what is ADHD and what are the symptoms of ADHD. So we had used the DSM-IV statements with the characteristics of ADHD children but not to the all statements. The first five refer to the inattention of ADHD children (DSM-IV includes 9 statements related to inattention). Statement 6 through 9 relate to the ADHD children's hyperactivity (4 from 6 statements of DSM-IV) and the statements 10 through 12 refer to the impulsivity of ADHD children (all about DSM-IV). DSM-IV statements about ADHD are shown in Table 2.

Table 2. DSM-IV statements for ADHD in the questionnaire

DSM-IV statements of ADHD	Characteristics of ADHD
1. Often fails to give close attention to details or makes careless mistakes in schoolwork or tasks	*Inattention*
2. Often has difficulty sustaining attention in tasks or play activities	
3. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties	

DSM-IV statements of ADHD	Characteristics of ADHD
4. Often avoids, dislikes, or reluctantly engages in tasks requiring sustained mental effort	
5. Often is distracted by extraneous stimuli	
6. Often fidgets with hands or feet or squirms in seat	*Hyperactivity*
7. Often leaves seat in classroom or in other situations in which remaining seated is expected	
8. Often runs about or climbs excessively in situations in which it is inappropriate	
9. Often talks excessively	
10. Often blurts out answers before questions have been completed	*Impulsivity*
11. Often has difficulty awaiting turn	
12. Often interrupts or intrudes on others	

If respondents choose 4 (I agree with this statement) or 5 (I strongly agree with this statement) answer in the 5 grades Likert Scale, we may claim that they really know what is ADHD and we think they could recognize it, if it would be necessary.

In the highest percentages (more than 87%) students agree and strongly agree that an ADHD child often has difficulty sustaining attention in tasks or play activities (statement 2.) (Table 3).

We have found significant differences between Polish and Hungarian students in four statements. Polish students significantly more often stated that they agree and strongly agree with the first and fourth statements (statements of inattention). However in the second (inattention) and sixth (hyperactivity) statements Hungarian students agreed more often ($p<0.05$) (Table 3).

Table 3. Agree and strongly agree with DSM-IV statements among Polish and Hungarian respondents

		Sum Total (%)	Poland (%)	Hungary (%)
Statement 1.	Inattention	45,3	**50,35***	**40,3**
Statement 2.		***87,45***	**81,8**	**93,1***
Statement 3.		40,05	44,65	35,45
Statement 4.		44,38	**67***	**21,75**
Statement 5.		71,95	74,9	69
Statement 6.	Hyperactivity	79,33	**70,2**	**88,45***
Statement 7.		64,48	68,9	60,05
Statement 8.		66,23	62,4	70,05
Statement 9.		36,08	39,25	32,9
Statement 10.	Impulsivity	49	55,1	42,9
Statement 11.		81	75,6	86,4
Statement 12.		51,98	55,5	48,45

We have found 8 significant differences in Polish answers according to genders, namely that Polish women said significantly more agree and strongly agree with statement 1, 2, 5, (inattention) 6, 7, 8, (hyperactivity) 10 and 12 (impulsivity) (Table 4).

Table 4. Agree and strongly agree with DSM-IV statements among Polish women and men

		Polish women (%)	Polish men (%)
Statement 1.	Inattention	**59,7***	**41**
Statement 2.		**89,5***	**74,1**
Statement 5.		**71,6 ***	**62,4**
Statement 6.	Hyperactivity	**78, 4 ***	**71,4**
Statement 7.		**85,9 ***	**54,5**
Statement 8.		**75,4 ***	**62,4**
Statement 10.	Impulsivity	**75,4 ***	**49,4**
Statement 12.		**83,6 ***	**67,6**

2 significant differences were found in Hungarian answers according to genders, namely Hungarian women significantly more often agreed and strongly agreed than Hungarian men in statement 1(inattention) and 12 (impulsivity), exactly ADHD children often fail to give close attention to details or make careless mistakes in schoolwork or tasks (45,4%-35,2%) and they often interrupt or intrude on others (44,3%-21,5%).

In the aspects of genders comparison to the two countries, there were differences in three questions between Hungarian and Polish women. Polish female students significantly more often stated than Hungarian women that an ADHD child "often fails to give close attention to details or makes careless mistakes in schoolwork or tasks (statement 1.)" (59,7%-45,4%) and he is "often distracted by extraneous stimuli (statement 5.)" (71,6%-54,6%). While Hungarian women significantly more often agreed (94,8%) this statement: "An ADHD child often fidgets with hands or feet or squirms in seat (statement 6.)" than Polish women (85,9%).

Finally, we found 5 differences between Polish and Hungarian men. In the 2 (inattention), 6 (hyperactivity), 10, 11 (impulsivity) statements Hungarian men significantly more often stated that they agree and strongly agree with these statements than Polish men, while Polish men significantly more often agreed and strongly agreed with statement 8: An ADHD child often runs about or climbs excessively in situations in which it is inappropriate than Hungarian men (Table 5).

Table 5. Agree and strongly agree with DSM-IV statements among Polish and Hungarian men

		Polish men (%)	Hungarian men (%)
Statement 2.	Inattention	**74,1**	**96,5 ***
Statement 6.	Hyperactivity	**71,4***	**59,7**
Statement 8.		**62,4**	**82,1***
Statement 10.	Impulsivity	**49,4**	**67,9***
Statement 11.		**67,6**	**89,3***

General experience and knowledge about ADHD

We have collected 4 very important and informative questions and the answers of these questions in Table 6.

Table 6. Answers about ADHD, university studies on this topic and the integration of ADHD students in P.E. lesson

	Poland (%)			Hungary (%)		
	Yes	No	I do not know	Yes	No	I do not know
Have you ever heard the term hyperactivity or ADHD?	**94,8**	3,3	1,9	**99,2**	0,8	0,0
Have you learned anything about ADHD at university?	**41,7**	49,3	9,0	**36,8**	52,0	11,2
Do you think the information about this topic is important to learn about during your studies?	**92,4**	3,8	3,8	**92,0**	2,4	5,6
What do you think an ADHD student could take part in P.E. lessons?	**85,8**	3,8	10,4	**80,8**	8,0	11,2

The majority of students have already heard hyperactivity or ADHD, as a term (97%). 99,2% of Hungarian students and 94,8% of Polish students said that they had known this term. No significant differences were found between countries and in the comparison between Polish/Hungarian women, Polish/ Hungarian men and Hungarian men/women. Nevertheless, Polish female students significantly more often stated (97,8%) that they had already heard the term „hyperactivity" than Polish men (89,6%).

When asked about respondents have learned anything about ADHD at university, 47,1% of Polish respondents said yes and 49,3% said no. 36,8% of Hungarian respondents have already learned about ADHD at university and 52% said they have not learned anything about ADHD during university studies. There were no significant differences between the two countries, male and female students from each country, Polish/Hungarian women, and Polish/Hungarian men.

Both countries students' thought that it is important to learn some things about ADHD during their studies. Almost every Polish (92,4%) and Hungarian students (92%) stated that it could be very important and useful to learn something about it. Similarly to the previous question we did not find any significant differences between the two countries, genders in the same country and genders in the relation of the two countries.

Respondents deemed positively the integration opportunities of ADHD students in P.E. lesson. 85,8% of Polish students and 80,8% of Hungarian respondents believe, that an ADHD student could take part on a P.E. lesson.

According to them, P.E. lesson employment is solvable. Like as the previous question there were no significant differences between countries and genders in both aspects in this question.

87,7% of Polish students think that they will meet with ADHD students in school settings in their work, while 88,8% of Hungarian respondents think the same.

Discussion

More than 90% of respondents stated that they have already heard the term ADHD, although their knowledge is defective and just 39% have been remembering to learn something about it during their university studies and more than 44% said that they have not learnt anything about it. On the other hand, if they learn something about this topic, it would be just theoretical, not practical information about ADHD and the integration of ADHD students.

Our opinion is that both Polish and Hungarian PETE students do not know how it would be solve the integration of ADHD students, despite of almost every respondent (more than 83%) believed that an ADHD child could be integrated into P.E. lessons.

According to the literature, ADHD pupils have a lot of problems in his motor skills also, so hyperactivity or restlessness just one part of their disorder (Harvey and Reid, 1997; 2003; Dewey et al., 2002; Piek, Pitcher and Hay, 1999; Pitcher, Piek and Hay, 2003; Steger et al., 2001). Due to these problems, they have many accidents not just home but other places also, like as school settings. In this form, teachers' task to help the appropriate development and to keep in safety these children in the class and in the P.E. lesson equally. Nonetheless, due to the lack of the information and training, it is not easy to realize.

In both countries, both genders consider learning some information about ADHD important during their P.E. studies. More than 90% of Polish and Hungarian respondents thought that ADHD is a relevant problem in the present educational system. ADHD students are in conventional educational institutes, so almost every teacher have to know what ADHD is, and have to identify, treat and solve ADHD children's problems.

At the assessment of characteristics of ADHD children it was generally a high percentage, because a lot of students answered they agree and strongly agree with the statements. Almost every statement the ratios were more than 40% expect statement 9, namely ADHD child talks excessively.

In spite of we found differences in many cases in the question of the characteristics of hyperactive children between the countries, genders and other aspects of the comparisons, our impression is that students in PETE program could recognize who has ADHD and who has not, but theirs knowledge has some defect not just in practice but in theory also due to the lack of formal training in this topic.

Maybe it is possible that we are out in this, but it is sure that almost nobody knows what is ADHD exactly. We have a lot of theory but researchers argued. Some researchers stated that it is a neuropsychological disorder (Daley, 2006; Barkley, 1998; Polanczyk et al., 2007), some others said that this is a behavioral disorder (Vereb and DiPerna, 2004; Piek and Dick, 2004) and other claims that this is an aptitude (Hartmann, 1993). On the other hand DSM-IV. stated, that 6 or more of the 9 symptoms of inattention and 6 or more of the 9 symptoms of hyperactivity-impulsivity have persisted for at least 6 months, we could say sure that child has ADHD. Nowadays this is the relevant diagnostic criteria.

In the literature there is little information of the integration of ADHD students both in Poland and Hungary. In Hungary, according to Szűcs (2003 a,b,c) the obstacle of the school integration of ADHD students is that school teachers are not prepared for dealing with them, on the other hand they do not want to deal with this problem.

We do not agree with Szűcs with relation to P.E. teachers, because in our previous research (Kiszela et al., 2008) and in this research also we have found that P.E. teachers and PETE students are interested in special educational needs and ADHD also, and they would like to know more about these topics in the interest of their better job.

Conclusions

Our conclusion is that it would be necessary to make information available for every student in the teacher training program in Hungary and Poland also.

According to us, it is a huge shortcoming that in P.E. lesson we just measure the performance of students and we have paid no attention to the deficits of motor skills, in spite of we have already known that a lot of students have motor deficiencies nowadays. It would be worthy to use not just performance but skill measured assessments also in P.E. lesson.

In our next research we will try to find the most effective, useful and accurate movement skill assessment that we could use in P.E lesson intervention and treatment also.

If P.E. teachers would like to improve their ADHD children's motor skills and they would like to help them, first step they have to know what their deficiencies are and how they could develop that. In the lack of this our ADHD students do not be able to frame well.

It seems that we try to build up a house without footing and try to begin it with the roof. Buildings like this will never be perfect and will never be finished, so in this form our ADHD children's skills will never be perfect and efficient also.

REFERENCES

ADDitude (2009): The Best Summer Sports for ADHD Kids. Baseball? Karate? Which sports best suit an ADD child? Retrieved February 23, 2009 from http://www.additudemag.com/adhd-web/aricle/print/571.html

Alexander, J.L. (1990): Hyperactive children: Which sports have the right stuff? *Physician and Sport Medicine, 18* (4), 105-108.

American Psychiatric Association (2000): *Diagnostic and statistical manual of mental disorders, 4th Text Revised Edition (DSM-IV-TR)*. Arlington, VA, American Psyshiatric Publishing, Inc.

Armstrong, K., Drabman, R. (2004): The clinical use of sports skills tutoring with grade school boys referred for school behavioral problems. *Child and Family Behavior Therapy*, *16*, 43-48.

Atkins, M.S., Stoff, D.M. (1993): Instrumental and hostile agression in childhood disruptive behavior disorder. *Journal of Abnormal Child Psychology*, *21* (2), 165-178.

Barkley, R.A. (1998): *Attention –deficit hyperactivity disorder: a handbook of diagnosis and treatment (2nd ed.),* New York, Guilford Press.

Chu, S. (2003): Attention deficit hyperactivity disorder (ADHD) part one: a review of the literature. *International Journal of Therapy and Rehabilitation*, *10* (5), 218-227.

Daley, D. (2006): Attention Deficit Hyperactivity Disorder: a review of the essential facts. *Child: Care, Health and Development*, *32* (2), 193-204.

Dewey, D., Kaplan, B.J., Crawford, S.G., Wilson, B.N. (2002): Developmental coordination disorder: Associated problems in attention, learning, and psychosocial adjustment. *Human Movement Science*, *21*, 905-918.

F. Földi Rita (2004): Neuropszichológiai vizsgálatok jelentősége a tanulási és viselkedészavarok diagnosztikájában. *Magyar Pszichológiai Szemle, 1*. 19-40.

Grönlund, E., Renck, B., Weibull, J. (2005): Dance/Movement Therapy as an Alternative Treatment for Young Boys Diagnosed as ADHD: A Pilot Study. *American Journal of Dance Therapy, 27* (2), 63-85.

Hartmann, T. (1993): *Attention Deficit Disorder: A Different Perception by Thom Hartmann*. Mythical Intelligence Inc. in Hungarian translation: Hartmann, T. (2006): *Betegség, vagy adottság? A figyelemzavar és a hiperaktivitás új értelmezése*. Budapest, Pro Novum Kft.

Harvey, W.J., Reid, G. (1997): Motor performance of children with attention-deficit hyperactivity disorder: A preliminary investigation. *Adapted Physical Activity Quarterly*, *14* (3), 189-202.

Harvey, W.J., Reid, G. (2003): Attention-deficit/hyperactivity disorder: A review of research on movement skill performance and physical fitness. *Adapted Physical Activity Quarterly*, *20* (1), 1-25.

Hindawi, O.S. (2003): *The influence of early physical activity: Sampling in ADHD males and physical education teaching majors. Unpublished* doctoral dissertation, Iowa State University.

Johnson, R.C., Rosén, L.A. (2000): Sports Behavior of ADHD Children. *Journal of Attention Disorders*, *4* (3), 150-160.

Kiszela K., Révész L., Bognár J. (2008): Hiperaktív gyermekek a testnevelés órán. *Kalokagathia*, *1*, 60-73.

Kooistra, L., Crawford, S., Dewey, D., Cantell, M., Kaplan, B.J. (2005): Motor Correlates of ADHD: Contribution of Reading Disability and Oppositional Defiant Disorder. *Journal of Learning Disability*, *38* (3), 195-206.

Lopez- Williams, A., Chacko, A., Wymbs, B.T., Fabiano, G.A., Seymour, K.E., Gnagy, E.M., Chronis, A.M., Burrows-Maclean, L., Pelham, W.E., Morris, T.L. (2005): Athletic Performance and Social Behavior as Predictors of Peer Acceptance in Children Diagnosed With Attention-Deficit/Hyperactivity Disorder. *Journal of Emotional and Behavioral Disorders*, *13* (3), 173-180.

Lullo, C., Van Puymbroeck, M. (2006): Recreation can enhance the lives of children with ADHD. *Park and Recreation*, 20-23.

Miranda, A., Jarque, S., Tárraga, R. (2006): Intervention in School Settings for Students With ADHD. *Exceptionality*, *14* (1), 35-52.

Pelham, W.E., McBurnett, K., Harper, G., Milich, R., Clinton, J., Thiel, C., Murphy, D.A. (1990): Methylphenidat and baseball playing in ADD children: Who's on first*? Journal of Consulting and Clinical Psychology*, *58*, 130-133.

Piek, J.P., Dyck, M.J. (2004): Sensory-motor deficits in children with developmental coordination disorder, attention deficit hyperactivity disorder and autistic disorder. *Human Movement Science*, *23*, 475-488.

Piek, J.P., Pitcher, T.M., Hay, D.A. (1999): Motor coordination and kinaesthesis in boys with attention deficit-hyperactivity disorder. *Developmental Medicine and Child Neurology*, *41*, 159-165.

Pitcher, T.M., Piek, J.P., Hay, D.A. (2003): Fine and gross motor ability in males with ADHD. *Developmental Medicine and Child Neurology*, *45*, 525-535.

Polanczyk, G., de Lima, M.S., Horta, B.L., Biederman, J., Rohde, L.A. (2007): "The worldwide prevalence of ADHD: a systematic review and metaregression analysis". *American Journal of Psychiatry, 164* (6): 942–948.

Steger, J., Imhof, K., Coutts, E., Gundelfinger, R., Steinhausen, H.C., Brandeis, D. (2001): Attentional and neuromotor deficits in ADHD. *Developmental Medicine and Child Neurology*, *43,* 172-179.

Szűcs M. (2003a): *Esély vagy sorscsapás? A hiperaktív, figyelemzavarral küzdő gyerekek helyzete Magyarországon.* Budapest, Nemzeti Tankönyvkiadó.

Szűcs M. (2003/b): A részképességzavarokkal is küzdő hiperkinetikus gyermekek iskolai integrációjának akadályai. *Új Pedagógiai Szemle, 7*. 162-176.

Szűcs M. (2003/c): Miért válnak a hiperkinetikus szindrómás gyermekek az iskolai szelekció áldozataivá? *Új Pedagógiai Szemle, 11*. 85-94.

Vereb, R., DiPerna, J.C. (2004): Teachers' Knowledge of ADHD, Treatments for ADHD, and Treatmnet Acceptability: An Initial Intervention. *School Psychology Review*, *33* (3), 421-428.

Waugh, L.M., Sherill, C. (2004): *Dyslexia- implication for physical educators and coaches*. Palaestra, http://findarticles.com/p/articles/mi_hb6643/is_3_20/ai_n29152778/?tag=content;col1

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INFLUENCING THE GROSS MOTOR FUNCTION, SPASTICITY AND RANGE OF MOTION IN CHILDREN WITH CEREBRAL PALSY BY AN AQUATIC THERAPY INTERVENTION PROGRAM

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ABSTRACT. The aim of this paper is to track the aspects and results of applying an aquatic therapy intervention program adapted and integrated in the treatment of neuromotor reeducation of children with cerebral palsy on gross motor function, spasticity and range of motion. The aquatic therapy program had duration of 6 months, 2 weekly sessions. The average duration of a session was 45 minutes. The water temperature was 36° C. Besides the aquatic therapy sessions the children participate in 2 physical therapy sessions which were included in the rehabilitation program of the institutions they belonged to. 24 children diagnosed with cerebral palsy have participated in this study. The average age was 12,5 ± 2,7 years. The assessment methods used are: Gross Motor Function Measure - GMFM-88 for the assessment of the evolution of the gross motor function, goniometer assess range of motion and the Modified Ashwort Scale for the assessment of the spasticity level. The gained results for the evaluation of the gross motor functions have shown significant statistical differences: patients with higher level of GMFCS will achieve significantly higher score of the subsection A (lying and rolling) (p=0,002), B (sitting) (p=0,002), C (crawling and kneeling), (p=0,001). Patients with a lower GMFCS level will achieve significantly higher score for the subsection E (walking, running, jumping) (p=0,001). We observed statistically significant differences between the initial and final evaluation for the achieved scores on spasticity of the left triceps sural muscle (p=0,003); for the right triceps sural muscle (p=0,001); for the adductor muscles of the hip (p=0,001). With regards to active and passive range of motion we noticed a significant statistical difference between the initial and final evaluation for the coxofemoral abduction movement and scapulohumeral flexion ($p < 0,001$). The results of the study have shown significant statistic differences with regards to the increase of passive and active range of motion, decrease of spasticity and improvement of gross motor functions in all studied dimensions. The aquatic therapy program is a factor which influences these parameters together with the classic rehabilitation program.

Key Words: aquatic therapy program, gross motor function, spasticity, range of motion, cerebral palsy

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REZUMAT. ***Influenţarea funcţiei motorii grosiere, a spasticităţii şi mobilităţii articulare la copii cu paralizie***. Lucrarea de faţă îşi propune să urmărească aspecte şi rezultate în urma aplicării unui program de intervenţie terapeutică acvatică adaptat şi integrat în tratamentul de reeducare neuromotorie a copiilor cu paralizie cerebrală asupra funcţiei motorii grosiere, a spasticităţii şi mobilităţii articulare. Programul terapeutic acvatic a avut o durată de 6 luni, 2 şedinţe săptămânale. Durata medie a şedinţelor a fost de 45 de minute. Temperatura apei a fost de 36 C. Au participat un număr de 24 de copii cu diagnosticul de paralizie cerebrală. Media de vârsta a fost de 12,5 ± 2,7 ani. Metodele de evaluare au fost: Scala de Evaluare a Funcţiei Motorii Grosiere - GMFM-88 pentru aprecierea evoluţiei motricităţii grosiere, goniometrul pentru aprecierea gradelor de mobilitate articulară şi Scala Ashwort modificată pentru aprecierea nivelului spasticităţii. Rezultatele obţinute au arătat diferenţe semnificative din punct de vedere statistic: pacienţii încadraţi într-un nivel mai mare GMFCS vor obţine creşteri semnificativ mai mari ale scorului subsecţiei A (decubit şi rostogolire) (p=0,002), B (aşezat) (p=0,002), C (târâtul şi pe genunchi, (p=0,001). Pacienţii încadraţi într-un nivel mai mic GMFCS vor obţine creşteri semnificativ mai mari ale scorului subsecţiei E (mersul, alergatul, săritul) (p=0,001). Am observat diferenţe semnificative statistic între evaluarea iniţială şi finală pentru scorurile spasticităţii tricepsului sural stâng (p=0,003); pentru scorurile spasticităţii tricepsului sural drept (p=0,001); pentru adductorii coapsei (p=0,001). În ceea ce priveşte mobilitatea articulară activă şi pasivă am observat o diferenţă semnificativă din punct de vedere statistic între evaluarea iniţială şi finală pentru mişcarea de abducţie coxofemurală, flexia scapulohumerală (p<0,001). Rezultatele studiului au arătat diferenţe semnificative statistic asupra creşterii mobilităţii articulare atât pasive cât şi active, în ceea ce priveşte scăderea spasticităţii şi îmbunătăţirea motricităţii grosiere în toate dimensiunile studiate. Programul terapeutic acvatic este un factor în influenţarea acestor parametrii alături de programul de recuperare clasic.

Cuvinte cheie: program acvatic terapeutic, funcţie motorie grosieră, spasticitate, mobilitate articulară, paralizia cerebrală

Introduction

Aquatic exercise programs can be a beneficial therapy form for children and adolescents with cerebral palsy, especially for those with significant motor/ movement constrains for which physical activities on land are difficult.

For children and adolescents who suffer from cerebral palsy throughout the severity spectrum it is more likely to have a lower physical activity level than their peers, thus they risk to suffer more negative consequence with regards to their health. (Morris 2008) A published systematic review (2006) on the topic of aquatic intervention on children suffering from cerebral palsy has come to the conclusion: proofs that this therapy is efficient exists but they are insufficient.

(Getz et al. 2006) Swimming is one of the most frequent encountered physical activity for children and adolescents with cerebral palsy. That is why information on how safe and beneficial this therapy is, are necessary, especially for those who suffer from a more severe form of cerebral palsy.

It is possible that programs of aquatic exercise to be of significant benefit for this population (Kelly et al. 2005, Fragala-Pinkam 2008). The unique attributes of water offer a favorable environment for children and adolescents with cerebral palsy. (Ondrak-Thorpe 2007) For example, requirements of weight bearing, amount of trunk control, joint load and the effects of gravity are reduced in water. (Ondrak-Thorpe 2007) As a result the aquatic physical activity is more protective for the integrity of the joints compared to physical activity on land. (Thorpe 2005) The warm aquatic environment of 32-33°C reduces the muscular tonus which enables a more efficient movement in children with a higher muscular tonus. Studies have reported that the execution of movements in water can increase the self confidence level and can decrease reluctance in trying more difficult tasks in comparison with exercise on land. (Fragala-Pinkam 2009) Moreover, activities in water can be more fun and innovative for children, with potential to increase motivation and interest. (Retarekar 2009)

Purpose of the Study

The aim of this paper is to observe the effects of an aquatic therapy intervention program on gross motor function, spasticity and range of motion in children with cerebral palsy.

Material and Method

Table 1. Main characteristics of the participants

Number of participants	24		
Age of participants	average	12,5 ± 2.7 years	
Gender of participants	boys		18
	girls		6
Clinical forms	Spastic cerebral palsy		
	Paraparesis		5
	Tetraparesis		10
	Hemiparesis	right	2
		left	2
	Dyskinetic cerebral palsy		4
	Ataxic cerebral palsy		1
GMFCS Level			
Level I			
Independent walk, restrictions of the advanced ability of movement			0

Level II	
Walking without aid, restrictions of the walk in the outdoor environment or on accidental ground	10
Level III	
Walking with assistive mobile devices, restrictions of the movement outdoor or in the community	8
Level IV	
Diminished mobility, the child is transported or needs other means of transport outdoors or in the community	2
Level V	
Independent mobility is severely restricted even with technical support	4

This study involved 24 children suffering from different clinical forms of cerebral palsy from the Cluj County, enrolled in different rehabilitation centers.

The age of the participants in this study was between 8 and 16 years. The criteria of inclusion in this program were: diagnostic, capacity to follow simple verbal instructions. None of the children have ever participated in aquatic therapy intervention programs.

Methods

Gross Motor Function Classification System. The level of mobility of children and adolescents at home, in school and in the community can be best described with the system of classification of the extended and revised gross motor function (GMFCS E&R). GMFCS covers an ample range from the level I, at which the individual functions at an advanced level being capable or having potential to walk without limitations up to level V for individuals with own very restricted mobility which required a high level of assistance.

Gross Motor Evaluation. The gross motor evaluation was done by using the Gross Motor Function Measure Scale (GMFM - 88) in all 5 dimensions: A: lying and rolling B: sitting C: crawling and kneeling D: standing E: walking, running and jumping. The scores were calculated for each dimension in turn and then a total score was calculated for all dimensions. The Gross Motor Function Measure Scale (GMFM) is a standardized observational instrument designed to measure the gross motor functions in time for children with cerebral palsy, a test which is well documented in the specialized literature. (Nordmark et al. 1997, Russel et al. 1998)

Modified Aschworth Scale. For the evaluation of the level of pyramidal spasticity we used the Modified Aschworth Scale, which is a common measuring tool in the evaluation of resistance to passive movement for children with cerebral palsy. (Ahloborg et al. 2006,Bohannon 1987). This system ensures a gradual supervision of the resistance level experienced by the examiner. It includes 5 levels of rigidity of the muscular tonus graded from 0 to 4. Bohannon

modifies the scale introducing the level 1+. The evaluation of spasticity was done at the level of the spastic muscles of the upper member – for the extension of the elbow – brachial biceps and of the lower member – for the hip abduction – adductor muscles of the hip, for the knee extension – knee flexors (hamstrings muscles), for the plantar dorsiflexion – plantar flexors (sural triceps).

Range of Motion. We evaluated the active and passive movement amplitude for the scapulohumerale abduction, scapulohumerale flexion, scapulohumerale internal and external rotation, scapulohumerale abduction, coxofemoral abduction, with plastic goniometer of 30 cm, 360 g. (2 rulers in cm, rotation of 360 degrees, gradation in 360 degrees with pace of 1 degree) (McDowell et al. 2000) by standard positions and methodology. (Norkin-White 1985)

The **Aquatic Therapy Program** is a strategy to teach persons with neuromotor disabilities swimming. The concept uses principles from the mechanics of fluids to enable the subjects to gain stability and controlled movement in water.

The aquatic therapy program which lasted over a period of 6 months comprised 2 weekly sessions. The duration on the sessions was 45 minutes. The water temperature was 36 º C.

The purpose of this method is independence which is demonstrated by coordinated movements. Keeping the balance in water required accommodation to the mechanical changes of the environment. The accommodation is the result of a psycho sensory motor learning process, which offers to the individual the possibility to learn how to keep balance in an instable environment. Once balance is gained (stability) movement can be initiated and controlled (Lambeck 1996).

For the **statistical analysis** the program SPSS version 20 was used. The data was classified as nominal or quantitative. For the description of the nominal variable the frequency and percentage was used and for the quantitative variable we used the average and standard deviation or median and percentile 25 and 75, depending on the situation. For the verification of the normality of the quantitative data the Kolmogorov-Smirnov test was used. In order to determine if there are changes between pair variables we used the Wilcoxon test or marginal homogeneity test, depending on the situation. In order to check the influence of a parameter upon the value variation of a pair variable we used the GLM test for repeated measures. The statistical signification was set at a threshold value of 0.05.

Results

Gross Motor Function Measure – GMFM

Table 2 presents the difference between the initial and final evaluation of each dimension of the GMFM individual and total test.

Table 2. Score GMFM – dimensions: A, B, C, D, E (%)

		A initial	A final	B initial	B final	C initial	C final	D initial	D final	E initial	E final
Median		100,00	100,00	97.00	100.00	66.66	86.90	55.12	79.48	46.52	65.27
	25	77,45	86,27	69.75	77.75	48.20	64.28	19.22	61.53	11.10	16.31
Percentile	**75**	100,00	100,00	100.00	100.00	91.06	97.01	69.23	84.61	60.76	76.38
P		**A: p=0,008**		**B: p=0,001**		**C: p<0,001**		**D: p<0,001**		**E: p<0,001**	

The results indicate significant increase from statistical point of view for all the dimensions. For dimension A (lying and rolling) at percentile 25% we notice an increase between the initial and final evaluation of: 8.82%; from 77,45% to 86,27%. For dimension B (sitting) at percentile 50 we observe an improvement of 3%; from 97,00% to 100,00%. For dimension C (crawling and kneeling) we notice a significant increase from 91.06 to 97.01% at the percentile 75%. The highest increases we notice at dimension D (standing) and E (walking, running and jumping) p< 0,001(D: from 69.23% to 84.61%, E: from 60.76% to 76.38%).

Table 3 presents the differences between the initial and final evaluation for the total scores GMFM. We noticed significant statistical differences p < 0,001. The value of the median increases from 73,03% to 85,24%, at the percentile 25 it increases from 45,74% to 54,92%, at the percentile 75 the increase is from 80,48% to 89,90 %.

Table 3. GMFM Score –Total (%)

		Total initial	Total final	
Median		73.03	85.24	
Percentile	**25**	45.73	54.92	
	75	80.48	89.90	
P				**Total: p<0,001**

We showed that patients from a lower GMFCS level will gain significantly higher scores at the subsection E (walking, running, jumping) p < 0,001;

We showed that patients from a higher GMFCS level will gain significantly higher increase of the total score p = 0,05;

In order to determine if there are also other factors which influence the evolution of the total scores, besides therapy, we applied the GLM test (general linear model). We transformed logarithmically the initial and final scores. We didn't determine a significant statistical change due to change of parameters: age, body mass index, diagnostic subtype (p>0,05).

Evaluation of Spasticity

We excluded from this assessment the 4 children with the diagnostic of diskinetic cerebral palsy, and 1 child with ataxic cerebral palsy.

Significant results were registered for the hip adduction (ADD) p < 0,001 for both the lower right and lower left member, left knee flexors(F) p = 0010, right p = 0,001, right sural triceps(TRIC. S) p< 0,001, left p = 0,001, right brachial biceps(BB) p = 0,010 left p = 0.005. (Table 4)

We noticed significant results from statistical point of view with regards to correlation between spasticity and clinical diagnostic. Children diagnosed with spastic tetra paresis have recorded the results with the highest statistical significance p < 0,001 by comparison to the other forms of cerebral palsy.

Table 4. Modified Aschworth Scale

		INIȚIAL	FINAL	P
B. B. left	MEAN	1,26	0,89	=0,05
	ST DEVIATION	1,19	0,80	
B.B.right	MEAN	1,26	0,95	=0,010
	ST DEVIATION	1,19	0,91	
Hip ADD. left	MEAN	2,11	1,53	<0,001
	ST DEVIATION	1,10	0,90	
Hip ADD right	MEAN	2,16	1,58	<0,001
	ST DEVIATION	1,16	0,90	
Knee. F. left	MEAN	1,74	1,42	=0,010
	ST DEVIATION	0,99	0,83	
Knee F. right	MEAN	1,89	1,42	=0,001
	ST DEVIATION	1,04	0,83	
Tric. S.left	MEAN	1,95	1,47	= 0,001
	ST DEVIATION	0,97	0,84	
Tric. S. right	MEAN	2,05	1,47	<0,001
	ST DEVIATION	1,07	0,84	

Range of Motion

Passive mobility

Following the analysis of the initial and final data of the passive mobility we noticed a highly significant statistical change p<0,001.

The distribution of the study group is non normal which is the reason why we used the median and percentile 25% and 75% for expressing the results.

The values of the passive mobility for the initial and final evaluation can be found in Table 5, 6, 7, 8, 9.

Table 5. Passive mobility – scapulohumerale abduction

		initial DR	final DR	initial STG	final STG	P
Median		163,50	178,50	164,50	178,00	
Percentile	**25**	127,50	146,75	133,50	151,25	
	75	173,00	180,00	173,50	180.00	
P						p<0,001

Table 6. Passive mobility – scapulohumerale flexion

		initial DR	final DR	initial STG	final STG	
Median		161,50	175,50	157,50	175,00	
Percentile	**25**	118,00	136,75	122,50	141,25	
	75	173,00	180,00	175,00	180,00	
P						p<0,001

Table 7. Passive mobility – scapulohumerale internal rotation

		initial DR	final DR	initial STG	final STG	
Median		75,00	88,00	78,00	89,00	
Percentile	**25**	48,50	60,00	47,75	60,00	
	75	85,00	90,00	87,00	90,00	
P						p<0,001

Table 8. Passive mobility – scapulohumerale external rotation

		initial DR	final DR	initial STG	final STG	
Median		73,50	85,50	78,00	89,00	
Percentile	**25**	46,25	58,50	45,00	61,75	
	75	83,00	90,00	87,75	90,00	
P						p<0,001

Table 9. Passive mobility – coxofemoral abduction

		initial DR	final DR	initial STG	final STG	
Median		30,00	40,00	27,00	36,50	
Percentile	**25**	23,25	31,50	23,00	30,00	
	75	87,75	90,00	35,00	42,00	
P						p<0,001

Active mobility

Following the analysis of the initial and final data of the active mobility we noticed a highly significant statistical change p<0,001.

The distribution of the study group is non normal which is the reason why we used the median and percentile 25% and 75% for expressing the results.

The values of the active mobility for the initial and final evaluation can be found in Table 10, 11, 12, 13, 14.

Table 10. Active mobility – scapulohumerale abduction

		initial DR	final DR	initial STG	final STG	P
Median		147,00	165,00	145,00	164,50	
Percentile	**25**	112,50	134,00	116,25	135,50	
	75	167,00	176,00	160,00	175,00	
P						p<0,001

Table 11. Active mobility – scapulohumerale flexion

		initial DR	final DR	initial ST	final ST	
Median		134,50	155,50	133,50	160,00	
Percentile	**25**	104,50	123,00	105,00	125,00	
	75	170,00	180,00	173,75	180,00	
P						p<0,001

Table 12. Active mobility – scapulohumerale internal rotation

		initial DR	final DR	initial ST	final ST	
Median		63,50	75,00	65,00	77,00	
Percentile	**25**	38,50	51,00	40,00	50,50	
	75	81,75	90,00	86,50	90,00	
P						p<0,001

Table 13. Active mobility – scapulohumerale external rotation

		initial DR	final DR	initial ST	final ST	
Median		61,50	75,00	63,00	75,00	
Percentile	**25**	35,50	47,75	36,25	50,50	
	75	79,75	90,00	87,00	90,00	
P						p<0,001

Table 14. Active mobility – coxofemoral abduction

		initial DR	final DR	initial ST	final ST	
Median		23,50	32,00	23,00	32,00	
Percentile	**25**	17,75	26,25	17,25	25,00	
	75	27,00	37,00	28,00	36,75	
P						p<0,001

Discussions

The present study wished to follow the aspects and results in the development of the gross motor function, influencing range of motion and spasticity in children with cerebral palsy during an aquatic therapy intervention program.

The results indicate changes with positive statistical significance on the gross motor function. For the dimensions A (lying and rolling), B (sitting), D (standing) we observe a significantly higher increase between the initial and final evaluation in children with higher GMFCS level (IV, V). For the dimension E (walking, running and jumping) significantly higher results were gained by children with a lower GMFCS level (II, III).

Gorter-Currie (2011) in a review of the articles written between 2005 - 2011 about aquatic programs for children and adolescents with cerebral palsy claims that most studies involve children with the GMFCS level I, II, III and one single participant with level IV. None of these studies involved participants of GMFCS level V. For these reasons the results of the studies could not be generalized for children suffering from severe neuromotor disabilities. As a result of the discussions Gorter-Currie claims that information is missing regarding the population who could potentially benefit most from the effects of a therapeutically aquatic intervention. (11) The water is a gentle environment by comparison with the land and could allow children especially with level GMFCS IV, V to move in the water more freely than on land. (Fragala-Pinkam 2009)

Our study involved 6 participants with level GMFCS IV (2 participants) and V (4 participants).

We have shown that patients with a higher GMFCS level will gain significantly higher score in the subsection A ($p = 0,002$), subsection B ($p = 0,002$), subsection D ($p<0,001$).

The gained results for the GMFM test are in conformity with Mackinon (1997), Thorpe et al. (2005), Fragala-Pinkham et al. (2009).

Makinnon (1997) observes an increase of the total GMFM score from 91% to 96% in a case study of a patient suffering from spastic diplegia following an aquatic program of 6 weeks with one weekly session. Thorpe et al. (2005) have established an increase of the E dimension of 7% ($p=0,01$) after applying an aquatic program of 10 weeks with a frequency of 3x per week of 45 minutes.

Chrysagis et al. (2009) determines an improvement of the E dimension of 6,02% after a program of 10 weeks with a number of 6 participants in an experimental group.

In our study in the case of the E dimension at the 25% percentile we observed an increase of 5,21%, at the 75% percentile an increase of 15,62% and at the median an increase of 18,75%.

The distribution of the study group is non normal which is the reason why we used the median and percentile 25% and 75% for expressing the results.

Fragala-Pinkham et al. (2009) determined a significant statistical improvement for the total score GMFM of 7,53% following a program of 12 sessions which took place over 6 weeks, 60 minutes a session: 8 sessions of aquatic therapy, 4 sessions of physical therapy.

In our study for the total score GMFM we observed the following improvement: at the 25% percentile an increase by 9.19%, at the percentile 50% an increase of 12,21% and the 75% percentile an increase of 9,41%.

Our higher scores can be attributed to the extended intervention program duration of 6 months which is 3 or 4 times longer than the duration of the aquatic programs mentioned in the previous studies.

The results achieved in this exploratory study and the analysis of the former studies indicate the fact that aquatic programs with a frequency of 2-3x per week and a duration of 45-60 minutes have a positive influence on the development of the gross motor function.

The program application duration, in the case of our study of 6 months compared to the duration of maximum 14 weeks in the case of the former studies can suggest the fact that the extended application of an aquatic program contributes to the significant increase of the GMFM scores.

The fact that we included 6 participants with a GMFCS level IV and V and the fact that they showcased significant statistical results in the dimensions A, B, D confirms Gorter-Currie (2011) theory that these children could potentially benefit most from the effects of an aquatic therapeutic intervention.

Range of motion has increased both for the active and passive mobility in the case of scapulohumerale abduction, scapulohumerale flexion, internal and external scapulohumerale rotation and coxofemoral abduction which is in agreement with the findings of Pegannof's study (1984) who achieved improvement at the level of the scapulohumerale flexion of 15 degrees both for the passive and active movement and 10 degrees for the scapulohumerale abduction both for the passive and active movement.

In the case of our study for the active scapulohumerale abduction we observed at the 50% percentile an increase of 18 degrees (right), 19 degrees (left), at the 75% percentile an increase of 9 degrees (right), 15 degrees (left), at the 25% percentile an increase of 22 degrees (right) and 19 degrees (left).

For the passive scapulohumerale abduction we observed at the percentile 50% an increase of 15 degrees (right), 13.50 degrees (left), at the percentile 75% an increase of 7 degrees (right), 7 degrees (left), at the 25% percentile an increase from 19,25 degrees (right) and 17 degrees (left).

For the active scapulohumerale flexion we observed at the 50 % percentile an increase of 21 degrees (right), 26 degrees (left), at the 75% percentile an increase of 10 degrees (right), 6,25 degrees (left), at the 25% percentile an increase of 18,50 degrees (right) and 20 degrees (left).

For the passive scapulohumerale flexion we observed at the 50 % percentile an increase of 14 degrees (right), 18 degrees (left), at the 75% percentile an increase of 7 degrees (right), 5 degrees (left), at the 25% percentile an increase of 18,75 degrees (right) and 18,75 degrees (left).

These changes can occur as a result of the reciprocal movement of the arms during backstroke which activates the flexors and abductors of the shoulder. (Peganoff1984, Kelly-Darrah 2005) The floatability of water confer people with cerebral palsy the opportunity to feel their body freed from the limitations which they experience in the movements against gravity. (McMillan 1977) The warm aquatic environment with the temperature of 32-33 °C reduces the muscular tonus and allows more efficient moves in the case of children with high muscular tonus. (Adams et al. 1991)

Getz-Hutzler (2005) in a review of the articles written from 1966 to 2005 about the effects of aquatic interventions for children with neuromotor disabilities claims that an important factor in the aquatic environment is water temperature. The reactions of the body immersed in warm water of different temperatures has been well documented. (Routi et al. 1997) Four articles out of the review have mentioned an average of the water temperature of 33° C.

The results for spasticity in our study could be owned to the water temperature of 36 ° C; the influence of this temperature on the muscular tonus for children with cerebral palsy has not been studied in other articles.

Warm water and alternative movements of the lower members without the scissoring movement could contribute to the reduction of spasticity in hip adductors. (Lepore et al. 1998, Bromley 1998)

Nash et al. (1989) affirms that the degree of spasticity can vary from one day to the other in the case of cerebral palsy.

Dimirijevic et al. (2012) achieved significant changes with regards to decrease of spasticity p>0,001, after applying an aquatic program with a duration of 12 weeks.

Chrysagis et al. (2009) achieved significant statistical results for the spasticity of the hip abductors (p=0,002) by applying an aquatic program of 10 weeks.

Within our study significant results were registered for the hip adduction muscles spastisity decrease p=0,001for both the lower right member and the lower right member; for the flexors of the left knee p=0,014, right p=0,003; right sural triceps p=0,001, left p=0,003; right brachial biceps p=0,014 left p=0.008.

Conclusions

The present paper has aimed to track the effects of an aquatic therapy intervention program on the gross motor function, spasticity and range of motion in children with cerebral palsy. The results of the study have shown significant statistical differences with regards to the increase of both active and passive range of motion, decrease of spasticity and improvement of gross motor function in all the studied dimensions.

The aquatic program beside land base exercise improve the gross motor function. For the dimensions A (lying and rolling), B (sitting), D (standing) a significantly higher increase between the initial and final evaluation was gained by children with higher GMFCS level (IV, V). For the dimension E (walking, running and jumping) significantly higher results were gained by children with a lower GMFCS level (II, III). Patients with a higher GMFCS level gained significantly higher score in the subsection A ($p = 0,002$), subsection B ($p = 0,002$), subsection D ($p<0,001$).

Also children with higher GMFCS level (IV, V) could benefit from the effects of an aquatic therapeutic intervention.

Range of motion increase both for the active and passive mobility in the case of scapulohumerale abduction, scapulohumerale flexion, internal and external scapulohumerale rotation and coxofemoral abduction after the aquatic therapeutic intervention.

The floatability of water confers people with cerebral palsy the opportunity to feel their body freed from the limitations which they experience in the movements against gravity. (McMillan 1977)

The warm aquatic environment with the temperature of 36 °C could reduces the muscular tonus and allows more efficient moves in the case of children with high muscular tonus.

Warm water and alternative movements of the upper and lower members could contribute to the reduction of spasticity.

Aquatic exercise programs can be a beneficial therapy form, a pleasant alternative for children and adolescents with cerebral palsy including those with significant motor / movement limitations for whom physical activities on land are difficult.

REFERENCES

Adams, C.R., Mc. Cubbin, J.A. (1991), Games Sports and Exercises for the Physically Disabled. Philadelphia, 4th edition, Lea & Febiger

Ahloborg, L., Andersson, C., Julin, P. (2006), Whole-body Vibration Training Compared with Resistance Training: Effect on Spasticity Muscle Strength and Motor Performance in Adults with Cerebral Palsy. *Journal of reabilitation medicine* 38, 302-308

Bromley, I. (1998), Tetraplegia and Paraplegia: A Guide for Physiotherapists, London: Churchill Livingstone

Bohannon, W.S., Smith, B.M. (1987), Interrater Reliability of a Modified Ashwort Scale of Muscle Spasticity. *Physical Therapy* 67, 206-207

Chrysagis, N., Douka, A., Nikopoulos, M., Apostopoulou, F., Koutsouki, D. (2009), Effects of an Aquatic Program on Gross Motor Function of Children with Spastic Cerebral Palsy. *Biology of Exercise*, 5: (2), 13-25

Dimitrijević, L., Bjelaković, B., Lazović, M., Stanković I., Čolović, H., Kocić, M., Zlatanović, D., (2012), Aquatic Exercise in the Treatment of Children with Cerebral Palsy. *Srp Arh Celok Lek.,* Nov-Dec, 140 (11-12), 746-50

Fragala-Pinkham, M.A., Dumas, H.M., Barlow, C.A. and Pasternak, A. (2009), "An Aquatic Physical Therapy Program at a Pediatric Rehabilitation Hospital: A Case Series. *Pediatric Physical Therapy*, 21: (1), 68–78

Fragala-Pinkham M., Haley S.M. and O'Neil M.E., (2008), Group Aquatic Aerobic Exercise for Children with Disabilities, *Developmental Medicine and Child Neurology*, 50 (11), 822–827

Gamper, U.N. (1995), Wasserspezifchie Bewegungstherapie und Training. Stuttgart: Gusta Fischer Verlag

Getz, M., Hytzler, Y., Vermee, R.A. (2006), Effects of Aquatic Interventions in Children with Neuromotor Impairments: A Sistematic Review of the Literature. *Clinical Reabilitation,* 20, 927-936

Gorter, J.W., Currie, S.J. (2011), Aquatic Exercise Programs for Children and Adolescents with Cerebral Palsy: What We Know and Were Do We Go? *International Journal of Pediatrics,* 10.1155

Kelly, M. and Darrah, J. (2005), Aquatic Exercise for Children with Cerebral Palsy. *Developmental Medicine and Child Neurology,* 47 (12), 838–842

Lambeck, J. (1996), Neurophisiological Basis for Aquatic Therapy: Teoretical Topics. Spokane: Constellate

Lambeck J., Stanant, F. (2000), The Halliwick Concept. Part 1. *Journal of Aquatic Physical Therapy Fall*, 8 (2), 6-11

Lambeck. J., Stanant. F. (2001), The Halliwick Concept. Part 2. *Journal of Aquatic Physical Therapy Fall*, 9 (1), 7-12

Lepore, M., Gayle, G.W. & Stevens. S. (1998), Adapted Aquatics Programming. A professional guide. Champaign IL: Human Kinetics.

Maartin, J. (1981), The Halliwick Concept. *Phisiotherapy,* 67, 288-291

Mackinnon, K. (1997), An Evaluation of the Benefits of Halliwick Swimming on a Child with Mild Spastic Diplegia. *APCP Journal*, 22, 30-37

McDowell, C.D., Hewitt, V., Nurse, A., Weston, T., Baker, R. (2000), The Variability of Goniometric Measurements in Ambulatory Children with Cerebral Palsy. *Gait and Posture,* 12, 262-265

McMillan J. (1977), The Role of Water in Reabilitation. *Fysioterapeuten,* 45, 43-46

Morris, P.J. (2008), Physical Activity Recommendations for Children and Adolescents with Chronic Disease. *Current Sports Medicine Reports,* 7 (6), 353–358

Nash, J., Neilson, P., O'Dwyer, N. (1989), Reducing Spasticity to Control Muscle Contraction of Children with Cerebral Palsy. *Developmental Medicine and Child Neurology,* 31, 471-480

Nordmark, E., Hagglund, G., Jarno, G.B. (1997), Reability of the Gross Motor Function Measure in Cerebral Palsy. *Scandinavian Journal of Reabilitation Medicine,* 29, 25-28

Norkin,. C.C., White, D.J. (1985), Measurement of Joint Motion; A Guide to Goniometry. Philadelphia: PA: F.A. Davis Company

Ondrak, K.S. and Thorpe, D.E. (2007), Physiologic Responses of Adolescents with CP when Walking on Land and in Water: A Case Series. *Journal of Aquatic Physical Therapy,* 15, 10–15

Peganoff, S.A. (1984), The Use of Aquatics with Cerebral Palsied Adolescents. *American Journal of Occupational Therapy,* 38, 469–473

Retarekar, R., Fragala-Pinkham, M.A. and Townsend, E.L. (2009), Effects of Aquatic Aerobic Exercise for a Child with Cerebral Palsy: Single-Subject Dsesign. *Pediatric Physical Therapy,* 21, (4), 336–344

Reid-Campion, M. (1997), Hydroterapy: Principles and Practice. Oxford: Butterworth-Heinemann

Routi, G.R., Morris, D.M., Cole, A.J. (1997), Aquatic Rehabilitation. Philadelphia: Lipincott

Russel, D.J., Rosenbaum, P.L., Cadman, C.D., Gowland, C., Hardy, S., Jarvis, S. (1989), The Gross Motor Function Measure: Means to Evaluate the Effects of Physical Therapy. *Developmental Medicine & Child Neurology,* 31, 341-352

Thorpe, D.E., Reilly, M. and Case, L. (2005), The Effects of an Aquatic Resistive Exercise Program on Ambulatory Children with Cerebral Palsy. *Journal of Aquatic Physical Therapy*, 13, 21–35