The College of Physical Education and Sport PALESTRA, L.t. d

EDUCATION TO WELLNESS,

EDUCATION THROUGH WELLNESS

Editors:

Milada KREJČÍ
Pavel TILINGER
Ludmila VACEK

PRAGUE 2016

Rewiewers:

Prof. PaedDr. Karol GÖRNER, PhD.
(Matej Bel Unіniversity, Banska Bystrica, Slovak Rebublic)

Prof. Dr. Peter REHOR, PhD.
(Centre for Sport and exercise education, Pacific institute for Sport excellence, Canada)

Cataloguing:

Wellness
Well-being
Education in wellness
Healthy lifestyle

Editors: Prof. PaedDr. Milada KREJČÍ, PhD.
Assoc. Prof. PhDr. Pavel TILINGER, PhD.
RNDr. Ludmila VACEK, PhD.

Technical redaction: Alena Malcová

© The College of Physical Education and Sport PALESTRA, L.t. d

Prague 2016

All rights reserved, including also the reproduction of any part in print or electronic media.

ISBN 978-80-87723-23-4 (print)
ISBN 978-80-87723-26-5 (pdf)

CONTENT

Part 3
WELLNESS AND HANDICAPPED PEOPLE

Part 4
WELLNESS AND SENIORS

INTRODUCTION

VÁCLAV HOŠEK

Wellness is a phenomenon of such magnitude and with such potential impact that it cannot be ignored professionally. The obstacle of solid studies is the fragmented approach to wellness and same way the major understanding of its social functions as something of a luxury, responsive to the needs of hedonistic spoiled clients. A substantial contribution to this understanding brings advertising, emphasizing the exclusivity of some wellness facilities related to the commercialization of the entire area. On the contrary, the presented monograph derives from the author's team concept that wellness is not a luxury extras in the care of a man but that its social function is based on the Salutogenetic care leading to permanent improvement of human health inducing through the bio-psycho-social well-being. It can happen in many contexts, in a different social context using the different formative means. That is why the content of the study is relatively diversified reflecting conditions of individual studies, different approaches and diverse, applied and interpreted outcomes. In this regard, it is significant also the trend in wellness, known as the "selfness" which emphasizes self-meliorative care of everyone on his/her own. In this approach is necessary to educate people, which is the basic credo of the presented monograph.

Contemporary people are not in an easy situation. More studies considering pessimal trends of contemporary Euro-American civilization pointing out certain symptoms of the decadence of today's society comparing the current state with moments of the collapse of ancient civilizations. These alarming symptoms also include some information about current population. Techno sphere development and advancing domestication of contemporary human beings undermines their energy balance, causes obesity, decreases efficiency, durability, contributes to the emergence of lifestyle diseases of a degenerative nature. Consumer lifestyle leads to a "debt traps" to tension, stress and anxiety. Classic family function suffers from concerns about career which has harmful demographic consequences and causes intergenerational conflicts. Conflict-free is not man's relationship to the natural environment either. The list of potential disturbing moments could be continued; we make noticeable especially those in which the greater use of wellness approaches could bring improvements, so

called Salutogenetic "resuscitation" of contemporary people. The essence of wellness is harmonization, efforts to eliminate imbalances, balance in terms of physical, biological, psychological, social and environmental purposes. This trend effort is also an unifying principle of the introduced monograph. We see the potential benefits for today's population and topicality of the presented book.

The monograph is diverse, includes historical context and overview of basic concepts, showing the centre of gravity which is in the experimental nature of the intervention approaches in school and sports environment and specific population of seniors with disabilities. The common denominator is wellness and its issues and the unified methodological approach. The team of authors considers the text as the opening of the issue and will be grateful for any professional response.

Part 1

HISTORICAL AND BASIC CONTEXT OF WELLNESS

CHAPTER 1.1

THE BASIS FOR WELLNESS EDUCATION: UNDERSTANDING AND DISTINGUISHING BETWEEN CONCEPTS OF WELLNESS AND HEALTHY LIFESTYLE

JANA STARÁ, MICHAL CHARVÁT

Abstract: *This article presents findings of a literature review that sought to answer the following question: How are the terms "wellness" and "healthy lifestyle" used in current scientific literature and what are possible implications of their use for wellness education? A review of scientific literature published in 2015 was conducted, involving online database keyword searches, additional searches of other studies and resources, screening abstracts, assessing their relevance to the review, and integrating the findings with regard to the topic of wellness education. Conclusion: Healthy lifestyle is defined as behavior that leads to better health; as such it is used in current scientific literature. Wellness is used as a broader term across different contexts. It is used as a synonym or accompanying term to health as defined by WHO, encompassing similar dimensions – physical, mental, social and spiritual (and many more).*

Authors suggest that wellness education should promote wellness with regard to an individual's actual state and needs, using designs and methods that not only spread and support practices and knowledge about healthy living, but that empower inner motivation and responsibility across all dimensions of health and wellness.

Keywords: *Wellness, healthy lifestyle, health, literature review, teaching methods*

INTRODUCTION

"Wellness" and "lifestyle" are terms associated with health within scientific discourse. More broadly, these terms are found in public discourse as represented in marketing and media communications.

With the increasing requirement for an evidence-based approach in "professional" practice, there is an imperative to understand the current use of the terms so we can clearly outline further implications for wellness education.

In this article we will present findings of a literature review that sought to answer the following question: *How are the terms "wellness" and "healthy lifestyle" used in current scientific literature and what are possible implications of their use for wellness education?*

Although the scientific debate about concepts seem distinct from the everyday practice of an educator, coach or, more specifically, a wellness practitioner, it is important to clarify and fully understand the basic terminology used in all professional practice. Science provides us with testable explanations and predictions about the universe (Wilson, 1999) and to a certain extent is free from the everyday limitations of a group session, lecture hall or a wellness center. Scientific papers bear the current knowledge and therefore create the basis for development of new approaches, practices and methods applied in professional education and subsequently in practice itself.

OBJECTIVE

The purpose of this paper is to clarify the terms *wellness* and *healthy lifestyle* currently in use in scientific articles, journals and books by outlining the basic concepts of those terms in the context of health, and clarifying their coherences and their applications for education toward wellness.

METHODOLOGY

A review of scientific literature published in 2015 was conducted, involving online database keyword searches, additional searches of other studies and resources, screening abstracts, assessing their relevance to the review, and integrating the findings with regard to the topic of wellness education.

Searches were conducted in the following databases:

Table 1 *Number of search results in scientific and grey literature databases (November 2015)*

Database	Wellness	Healthy lifestyle
ERIC	1 742	429
PubMed	7 618	3 236
Scopus	8 956	6 575
SPORTdiscuss	6 412	1 038
ScienceDirect	19 246	13 357
SAGEpub	8 888	3 048
Web of Science	6 154	3 092
Grey literature	**Wellness**	**Healthy lifestyle**
British Library	6 723	1 683
Google Scholar	531 000	96 300

RESULTS AND DISCUSSION

A brief definition of each of the examined terms *healthy lifestyle* and *wellness* will be presented, accompanied by the results of a literature review that shows how those terms are currently used in an academic context. A conceptual outline of the coherences and differences between wellness, health and healthy lifestyle will propose a possible framework for using these terms. Finally, suggestions will be made regarding how to use the current knowledge for educating towards wellness.

Healthy lifestyle

The World Health Organization (WHO) developed what has become the most commonly referenced definition of health: “a state of complete physical, mental and social wellbeing and not merely the absence of disease.” (World Health Organization, 1948) This definition recognizes that health is more than physical health, and efforts to

improve health thus should be comprehensive. (Bezner, 2015). Recently, the organization added the spiritual dimension (World Health Organization, 1998) into the public, academic and political debate, but has not yet formally included it into the its Constitution.

Lifestyle is “the typical way of life of an individual, group, or culture“ (Merriam Webster Dictionary, n.d.). Jansa defines lifestyle as a dynamic process of individual’s being that is determined by genetic, ethnical, social, cultural, professional and generational factors. (2010, p. 58)

Research that examines the combined effect of lifestyle factors on mortality is plentiful, and data have been gathered in a meta-analysis that validated that adherence to a healthy lifestyle is associated with a lower risk of mortality. (Loef & Walach, 2012)

“The ideal qualities of a healthy lifestyle [illustrates an individual that is] physically active to optimal levels on a daily basis, consuming a healthy and nutritious diet, maintaining a healthy body weight and not smoking: particularly in combination with associated ideal health metrics: normal blood lipid and glucose levels and normal resting blood pressure.” (Arena, Lavie, Hivert, et al., 2015, p. 2) This description follows healthy lifestyle as represented by the recommendations of most health oriented nongovernmental organizations: WHO (World Health Organization, 2015) and European research HELENA (Ottevaere et al., 2011), which focus on nutrition, physical activity and body weight. In America, the CDC (Centers for Disease Control and Prevention, n.d.) and AHA (The American Heart Association, n.d.) add the topic of alcohol use and smoking.

The literature review has revealed that the dimension of physical activity appears most often.

Physical activity was the most mentioned dimension. For some reviewed life-style programs physical activity was central to healthy lifestyle (Cadavid & Sáenz, 2015). Shipway and Holloway (2010) proposed that physical activity in their research, as represented by running, is essential to a healthy lifestyle. This positive outcome doesn’t necessarily work both ways, though. The findings of a study on distance education students indicated that healthy lifestyle behaviors were not indicators of physical activity level in the examined group. (Özkan, 2015).

Table 2 *Healthy lifestyle dimensions in recent scientific literature (November 2015)*

Author	physical activity	nutrition	no smoking	body weight / BMI	no alcohol	mental/stress, depression, anxiety, perceived quality of life
Arena (2015)	1	1	1	1		
Huerta (2015)	1	1	1			1
Gooding (2015)	1	1	1	1		
Larsson (2015)	1		1	1	1	
Willcox (2015)	1	1		1		
Colantonio (2015)	1	1	1		1	1
Darvili (2015)	1		1	1		1
Kozica (2015)				1		
Erdich (2015)	1	1	1	1	1	
Onyenwenyi (2015)	1	1	1	1		
Chomistek (2015)	1	1	1	1	1	
Dayoub (2015)	1		1		1	
King (2015)	1	1	1	1	1	
Westergaard (2015)	1		1	1		
Teuscher (2015)	1	1				
Lynch (2015)	1	1				
Özkan (2015)	1	1				1
Petrone (2015)	1	1	1	1	1	
Booth (2015)	1	1	1			

The majority of reviewed articles consistently used a quantitative approach with clearly defined measures of the behavioral components of healthy lifestyle. Only a few authors mentioned a mental component of healthy lifestyle. Rodríguez Huerta pointed out the following benefits of engaging in a healthy lifestyle: “A reduction in fatigue, anxiety and depression, as well as improved quality of life, is also suggested though evidence for these outcomes is limited.” (2015) Segar proposed connecting physical activity to its deeper motivations. (Segar, 2015; Segar, Eccles, & Richardson, 2011)

The body of research proving the health benefits of regular exercise, and healthy lifestyle in general, is now being joined by studies showing the importance of engaging the mind and emotions

in terms of program adherence and its long-term effect on individual health.

Psychosocial stress, emotional outlook, and perceptions of overall health are important factors for chronic disease prevention and prognosis. (Puett et al., 2014) Van Norman mentions the power of personal belief, expectations and intent to influence behaviors and outcomes. “Many non-athletes are also aging with amazing vitality and demonstrating that simply staying fully engaged in life offers the opportunity for vitality, meaning, purpose and quality of life throughout the lifespan.” (Van Norman, 2010, p. 7).

Wellness

The Stanford Research Institute has conducted an extensive review of wellness definitions concluding that “most of the leading definitions of wellness include a model that presents anywhere from 2 to 14 or more dimensions, which frequently include physical, mental, spiritual, and social dimensions”. (2010, p. 6) There have been various models for the dimensions that encompass wellness, including physical, emotional, intellectual, occupational, spiritual, and social, as defined by the National Wellness Institute (Bill Hettler, 1976). Bezner defines wellness as “the sense that one is living in a manner that permits the experience of consistent, balanced growth in the physical, spiritual, emotional, intellectual, social, and psychological dimensions of human existence”. (Bezner, 2015).

Stanford Research Institute (SRI) revealed the following generalizations: Wellness is multi-dimensional; it is holistic; it changes over time and along a continuum; it is individual, but is also influenced by the environment; wellness is a self-responsibility. (2010).

The literature review has shown that wellness doesn’t follow strictly defined dimensions, as healthy lifestyle did. The term was used across various topics and areas clustered into codes that are briefly described below.

General use of the term

The term wellness and health are being used concurrently (Bashir & May, 2015; Becker, Chaney, Shores, & Glascoff, 2015; Bezner, 2015; MacRae & Strout, 2015; Thompson & Rew, 2015). Depending

on the purpose of their papers, authors clearly state the distinction between those terms (Bezner, 2015) or use the terms interchangeably (Bashir & May, 2015; MacRae & Strout, 2015).

In the medical context the meaning is related to a physical state of functioning (Guan et al., 2015) or as a synonym for preventive inspection as defined by the Affordable Care Act. (Hu, Jensen, Nerenz, & Tarraf, 2015).

Dimensions of wellness

Wellness is by definition multi-dimensional, and this trend was apparent in the review as well. Some authors focus on a specific dimension - physical (Larkin, 2015a), social (Bashir & May, 2015), mental (Boksa, Joober, & Kirmayer, 2015; Sitzer & Stockwell, 2015) or spiritual (Modise & Johannes, 2015); some on their interrelations, and some authors apply the holistic approach to the concept of wellness (Hagensen, 2015). Holistic wellness is ==also applied in the context of self-care (MacRae & Strout, 2015), mindfulness (Byron et al., 2015) and personal development (Larkin, 2015b).

Wellness programming

A recurring topic in the literature review was “wellness programming.” Various intervention programs are conducted for different groups of participants including: employees (Buer, 2015; Thompson & Rew, 2015); medical staff (Byron et al., 2015); university students and staff (Butler, Clark, Burlis, Castillo, & Racette, 2015; Melnyk, 2015; Sellers, Baghurst, Volberding, & Brown, 2014); programs for the elderly (Ryan, 2015; Van Norman, 2010); children (Kharofa, Copeland, Sucharew, & Meurer, n.d.);youth at risk (Sitzer & Stockwell, 2015); or, persons with disabilities (Menear, Preskitt, Goldfarb, & Menachemi, 2015; Young, Erickson, Johnson, Johnson, & McCully, 2015).

Among the addressed topics in these interventions, all dimensions of healthy lifestyle could be found: physical activity (Butler et al., 2015; Hagensen, 2015), nutrition (Polak, Sforzo, Dill, Phillips, & Moore, 2015), smoking (Lucey & Mathis-Gleason, 2015), and alcohol consumption (Burnhams, London, Laubscher, Nel, &Parry, 2015).

Methods

Various methodologies are being applied when promoting wellness. From standard designs toward coaching based methods (Polak et al., 2015; Young et al., 2015) and media and technology for personal empowerment and engagement of participants. (Naci & Ioannidis, 2015)

Applications

Beyond the applications of the wellness concept in workplace, educational, medical and personal development settings described above, others also appear. These include tourism (Stănciulescu, Diaconescu, & Diaconescu, 2015), spa business (Dimitrovski & Todorović, 2015), ancient practices (Bian, Liu, & Li, 2015), and nature (Bashir & May, 2015; Ramsland, 2015).

Outlining the concepts – a proposal

There are many topics in the field of wellness and health. Conceptual debates could also be held about the terms well-being (McMahon, O'Shea, Tapsell, & Williams, 2014; G. Miller & Foster, 2010; Modise & Johannes, 2015), fitness (Corbin & Pangrazi, 2001) or spa (Stănciulescu et al., 2015; Stanford Research Institute SRI, 2010). In this paper we will focus on the relationship between terms wellness – health and wellness – healthy lifestyle.

Wellness and health

Although some authors do not distinguish between health and wellness (Thompson & Rew, 2015), others differentiate between the terms, advocating that health is a broader and comprehensive concept (Bezner, 2015; Corbin & Pangrazi, 2001) This conceptual debate could be explained by tracing the very origins of the wellness concept.

"It was in the context of demographic changes then being brought about by the conquest of infectious disease that [Halbert Dunn] found the Constitution of the World Health Organization, which had been promulgated a decade earlier, particularly helpful. For him the WHO constitution propagated a notion of "positive health" that was in

principle identical with wellness. At its root was a holistic concept of health." (J. W. Miller, 2005, p. 88)

Dunn defined high-level wellness as "an integrated method of functioning which is oriented toward maximizing the potential of which the individual is capable. It requires that the individual maintain a continuum of balance and purposeful direction within the environment where he is functioning". (Dunn, 1959, pp. 4–5)

Over the decades, there have been many criticisms of the positive definition of health (Üstün & Jakob, 2005; Yach, 2013). It is hard to achieve and/or maintain a state of complete well-being in all dimensions. It is more likely that one experiences highs and lows in different dimensions simultaneously, such as when an individual who is physically healthy yet struggles with relationships or spiritual pursuits, or some other area of their lifestyle. Disease is incompatible with health, but not with wellness. A person suffering from a specific disease can lead a productive and satisfied life full of wellness. (Bezner, 2015; Naci & Ioannidis, 2015)

Another difference between health and wellness is the bearer of responsibility for one´s state of health. In the medical paradigm it is the doctor who is responsible while in the wellness paradigm it is the individual who needs to make changes in order to be healthier and "weller". (Naci & Ioannidis, 2015; Travis & Ryan, 2004).

Wellness emerged as a new term that would broaden the focus from physical health and would integrate the body, mind and spirit of an individual within the social context in which they exist, while empowering them to take responsibility for the state of their health at any given moment. Unfortunately, the former understanding of health as an absence of disease has remained, not only within the minds of the public, but also in scientific approaches to health, and most especially in the medical field.

Wellness vs. healthy lifestyle

Healthy lifestyle is a more clearly defined concept that is well established in the scientific paradigm due to its measurability and scientifically proven impacts on human health. "Any movement toward improving lifestyle and associated health metrics likewise improves disease prognosis and, if done so early enough, significantly reduces the risk of non-communicable diseases development." (Arena, Lavie, Hivert, et al., 2015, p. 2)

Currently there is a significant body of research in the wellness area that is conducted in the medical setting, on patients with specific conditions and/or disabilities (Arena, Lavie, Cahalin, et al., 2015; Erdrich, Zhang, Giovannucci, & Willett, 2015; Gooding et al., 2015; Jahangiry et al., 2015; Onyenwenyi & Ricardo, 2015).

Little is known about what affects wellness, as opposed to what causes disease. Lifestyle choices and behaviors (eg, physical activity, meditation, and nutrition), technology, social participation and engagement, genetics, work, school, neighborhood, and other environmental exposures, may all shape wellness. (Naci & Ioannidis, 2015, p. 121)

In the Iceberg model of health and disease (Travis & Ryan, 2004) the actual state of health is an outcome of several underlying levels, with lifestyle serving as the foundation.. What one eats, how much he/she moves, what he or she does or doesn't do… all of these factors have a direct impact on the body and therefore on overall health. Meanwhile, human behavior is driven by sociocultural influences, but maybe more importantly by individual mental processes that are based in the emotions and values.

So when promoting health in all four dimensions of health as defined by WHO, we cannot focus only on the behavioral part represented by the concept of healthy lifestyle, because we also have to take into account individual cognitive and affective characteristics. Ultimately, the term wellness should be superior to healthy lifestyle, since the latter refers to a how individual wellness manifests in an individual's life. (Melnyk, 2015).

Though wellness in its subjective and situational nature is hard to measure and describe scientifically, it offers a conceptual basis for practical applications when one is creating strategies for health promotion across all dimensions.

The basis for education towards wellness

Throughout this review, several insights have emerged that are relevant to education and wellness and health promotion. (The authors are aware that this summary cannot encompass the full extent of the wellness field today, as it only reviewed a limited number of resources. However, it can be used as a starting point for further exploration and development of wellness curriculum.).

The scientific approach to health and wellness is mostly recognized in the medical sense, as the common goal is the healthy and satisfied human being. If we want to educate towards wellness, it is necessary to incorporate wellness programming into society generally, and into the everyday life of people, so that they are not reactive and waiting to become sick (Arena, Lavie, Cahalin, et al., 2015).

A new healthcare system that recognizes primordial prevention as much as secondary and that supports the training of health professionals in this field (Arena, Lavie, Hivert, et al., 2015; Bezner, 2015) might be a long-term goal, but smaller changes in paradigm can be done on the level of an individual.

The prevalence of non-communicable diseases has fueled the growth of the healthy lifestyle movement. However, as health levels continue to deteriorate due to growing obesity, continued smoking behaviors, and more it is becoming clear that that people simply don't follow the recommendations of their doctors toward healthy lifestyle. Another shift is needed, a shift from fitness focus to a whole-person wellness focus that engages individuals as full partners in well-being, rather than customers of healthcare services. (Van Norman, 2010)

Collantonio et al. see "the key to success in sustained engagement, based on the promotion of behavior change towards wellness as a whole and long-term health objectives. Enhancing wellness is an effective way to promote participation and motivate people to change their habits." (2015, p. 34).

Wellness contains more than the behavioral level of healthy lifestyle, and not everybody starts his journey towards wellness with physical activity or of change in diet (Shipway & Holloway, 2010; Van Norman, 2010). Therefore it is important to integrate multiple dimensions into any wellness promoting program.

Equally important is to know and meet the needs of the program participants. There are many reasons why people join and drop off health promoting activities and programs and for a program designer it is important to be aware of the personal, social, cultural and other possible factors that influence human motivation (Kozica et al., 2015; McMahon et al., 2014; Teuscher et al., 2015). In a year-long research study from the University of Michigan, participants who adhered to a long-time exercise regime did not want to lose weight, but rather to "enhance their daily life and wellness". (Segar et al., 2011).

When promoting wellness, we cannot focus on the instructional influence of human behavior, and teaching the cognitive mind is also

not enough. Therefore, incorporating non-formal methods of coaching (Arloski, 2007; Holland, Greenberg, Tidwell, & Newcomer, 2003; Polak et al., 2015), new media and technologies (Colantonio et al., 2015; Naci & Ioannidis, 2015), combined with evidence-based best practices in behavior change strategies, (Van Norman, 2010), should provide a stronger basis for the advanced design of programs supporting health and wellness.

Educating towards wellness and through wellness needs to encompass affective parts of the human being and it has to make sense in the context of our beliefs and social existence in family, community, society and the world.

CONCLUSION

Due to the extensive body of research that has been developed since the 1960´s focused on enhancing health of the population, we can now answer question *How does it work?*, but still we struggle with answering the question *How do we make it work?* In other words: We know what people should do to be healthy, but we don't know the key to engaging them in the motivation and determination to do it.

There are multiple terms used in the context of health, including the positive definition of health, wellness, well-being, healthy lifestyle, fitness, spa etc. The challenge we face today is to clearly communicate the messages and methods we want our students and clients to hear, remember and use in their practice and life. For this reason it is important to clearly define the terms we use in our texts, lectures and publications. Authors have used the terms health, wellness and healthy lifestyle interchangeably which we now know are distinct, separate, and require different approaches and methods to achieve.

In this paper we have stated that:

- Healthy lifestyle is defined as behavior that leads to better health; as such it is used in current scientific literature. This concept includes daily physical activity at optimal levels, healthy diet and nutrition, maintaining a healthy body weight, and preferably not smoking or abusing alcohol.
- Wellness is used as a broader term across different contexts. It is used as a synonym or accompanying term to health as

defined by WHO, encompassing similar dimensions – physical, mental, social and spiritual (and many more). A lot of attention is given to wellness programming for various groups and methods being used. The term has also been used in the context of spa, ancient practices and nature.

Wellness is a holistic model of health and as such broadens the former physical notion of health. It integrates the body, mind and spirit of an individual within the social context in which he or she exists while empowering him to take responsibility for the state of health at the very moment. Individual wellness is on the behavioral level manifested in that person's lifestyle, but is inseparably connected to his internal cognitive and affective states. This makes wellness subjective by nature, and is thus conditioned by the actual situation of an individual.

Ultimately, when we promote education towards wellness, it is necessary to do so with regard to an individual's actual state and needs, using designs and methods that not only spread and support practices and knowledge about healthy living, but that empower inner motivation and responsibility across all dimensions of health and wellness.

CHAPTER 1.2

WELLNESS IS HERE TO STAY

LUDMILA VACEK

Abstract: *The fact, that wellness as an important of healthy life is generally respected not only by populations of all ages and nationalities but also by government of all levels, health insurance companies and regulatory institutions. In last ten years, the wellness developed itself to today's format, despite of non-regulatory environment and rocky times. As published by Global Wellness Institute, the wellness related personal services provided by wellness industry in 2014 present over three trillions $ and hundreds of thousands of jobs globally. The wellness related services present a complex personal services business including not only fitness and other recreational sports activities and nutritional counselling, but also personal services for better face and body looks, mind and spiritual guidance and selected modalities from complementary and alternative medicine. The understanding of wellness as an important part of heathy lifestyle and disease prevention will provide tool for saving costs for an expensive medical treatments of important chronic diseases resulting from poor lifestyle choices. The wellness also deliver on personal satisfaction and more productive life.*

Keywords*: Wellness, Global Wellness, Health Lifestyle.*

INTRODUCTION

Wellness, as seen today is a state of physical, mental and social well-being. It is generally understood, that wellness play an important party population of healthy life style and satisfying and productive life. As is well known, some trends come and go. Yet other seem to be more predictable, Predominantly those trends derived from well observable and socio- cultural shifts In our societies. As such today wellness is recognised. This reality is recognized not only by global population of all ages, many governments of all levels, but also by corporations and businesses. Many others, including medical

professionals understand, that without proactive approach to human health and personal involvement in management of our own health, there is no hope for better medical treatments outcomes and generally better health of global population. A preventative approach to health should also result in better management of financial resources available for health care.

OBJECTIVE

To inform on present on global status of wellness as understood today and to review some of the personal services supporting wellness.

METHOD

The review and analysis of selected resources of information published on line and in wellness related conferences abstracts.

RESULTS

Wellness is a modern word with ancient wit ancient roots. As a modern concept has gained currency since 1950s 1960s and 1970s when writings and leadership of the informal network of physicians and thinkers in the USA largely shaped the way we talk about wellness today. The origins of wellness, however, are much older, even ancient. The aspects of the wellness concepts are rooted in several intellectual, religious, and medical movements In Europe and North America in 19th century. The tenets of wellness can be also traced to ancient civilizations of Greece, Rome, and Asia whose historical traditions have influenced the modern wellness movement.

With chronic diseases such as cardiovascular problems, diabetes and obesity crisis raging worldwide in this century leading to unsustainable health care costs, traditional medical establishments and governments are shifting the focus to prevention and wellness. According to studies funded by GWS (Global Wellness Summit) and GWI (Global Wellness Institute) in years 2010 - 2013 and conducted by SRI (Stanford Research Institute) and published in 2014, the global wellness and lifestyle industries has grown 74 % within 3 years from $ 1.4 trillion to $ 3.4 trillion.

Wellness lifestyle industries as classified in 2014

	Estimated Global Market (in billions US$)
Bauty and anti-aging	1, 026
Nutrition and weight control	574
Fitness, mind and body	494
Wellness tourism	446
Preventative and personalized medicine	433
Complementary and alternative medicine	187
Spa indudustry	94
Thermal and hot springs	50
Workplace wellness	41
Wellness realestate	100

The study also confirmed unpredictable grow in some type of wellness lifestyle industries between 2010 – 2014 (wellness tourism 366%, nutrition & weight loss 108%, fitness & body and mind 14%).

This complex approach to wellness and variety of industries providing personal services reflects new recognition of need of these services b to prevent diseases and healthy lifestyle and to support better quality of life. The recognition of the fact that personal involvement in own health management is the only way to prevent diseases before they need expensive medical treatments seem to be the main reason why we see wellness industry growing.

There has been other reasons why we see interest in healthy lifestyles is booming:

- **Democtratization**
  Wellness is no more considered luxury as more individuals from all social groups recognize benefits of services supporting healthy lifestyle are ready to invest in personal wellness services. This is also happening in new economies such as India and China where average disposable income is growing.
- **Easy point of entry**
  The establishments offering personal services (spas, fitness clubs and centers, health food stores…) are popping–up everywhere (hotels, main streets, airports, work places and more)

- **Shift in spending pattern**
  Younger generation mostly born after 1980 (in English literature called “millenials“) spend larger portion of disposable income on health and wellness supporting services instead other luxuries such as expensive jewelry and cars and other luxurious items.

Companies and businesses recognizing importance of healthy and productive emploees are supporting programs aiming in healthy lifestyle and wellness including general heath preventing culture.

General trust in a significant benefits of wellness personal service for heath prevention and personal satisfaction.

From the global perspective, there are over hundred thousands of business, government supported as well as academic establishments offering personal wellness services and programs supporting disease prevention and wellness. Some of the benefits of selected procedures and other interventions directly effecting human health and well- being has been well documented and results documented and published in peer- reviewed magazines and other scientific publications. (for some results see www.wellnessevidence.com). Other procedures and programs need scientific evaluation in well designed studies. Definitely more research and more funding is needed to measure benefits and identify pitfalls.

As wellness procedures and programs became widely available, the mostly utilized establishment offering wellness services are:

- spa and wellness centers
- fitness centers and other sport facilities offering recreational indoor and outdoor programs
- beauty clinics offering non- invasive facial and body procedures
- nutrition and weight control clinics
- integrative health clinics including genome testing laboratories
- workplace wellness programs

Depending on concept and business models most of the above mentioned businesses offer mixture of services and programs including:

- body and face treatment services (massages, selected physiotherapy services, body and face treatments, hydrotherapy including steam and sauna, bath, water exercise)
- personalized and general fitness programs including other outdoor activities
- body and mind programs (yoga and pilates and other)
- nutrition counselling and lifestyle couching
- non-invasive body and face procedures utilizing variety of physical energies such as light, ultrasound, radiofrequency waves or their combination
- other procedures utilizing selected procedures from CAM (Complementary Alternative Medicine) such as acupuncture, acupressure and other
- spiritual activites such as meditation

The volume of wellness related business has been monitored for many years. As published by GWI in 2014 the USA, Germany and Japan have ranked as three top wellness markets (measured by revenues). In 2013 China for first time entered the top five for the first time.

The growing interest in wellness and wellness related travel in recent years presents not only better business for involved parties and hope for better disease prevention, but also a major challenge for the industry as whole. Is wellness industry ready and qualified to provide effective quality results delivering wellness services? This fact has been recognized by industry leaders, professional wellness related organizations and associations as well as regulatory bodies. The issues about qualifications and skills of managers, program directors and personnel offering services seem to be major issue within industry today. For example, at this time, there are globally 130 -180.00 positions of wellness center managers and only 4000- 5000 students enrolling wellness manager education programs world-wide.

The quality and suitable curriculum seem to vary. There is general consent within industry and other involved, that more cooperation between educational institutions and industry is needed. A some

initiatives are starting recently under leadership of GWI. The internship program will offer 6 month of practical experience in selected wellness centers and spa establishments, the mentorship will offer mentor‘s advice, and carreership offering an advise in development of new educational programs or adjustment of existing ones. This initiatives are designed to address complex challenges such as an appropriate costumer service, adequate technical and academic knowledge, sound financial management and other important issues. All these steps and many more will influence destiny of wellness movement in the nearest future.

CONCLUSION

The wellness as a tool for better lifestyle and prevention of chronic diseases resulting from way the people tend to live these days is here to stay. For wellness industry as seen in 2015 it presents not only a great opportunity, but also major challenge to fulfill the expectations of the individuals as well as societies we live in today. To achieve this more must be done. An excellent education programs and continuing education within wellness industry itself must become a standard. A well designed and targeted education campaigns of general public, media, and medical professional community must deliver long lasting message. A well designed and funded research studies must be conducted to document positive outcomes and health benefits of wellness programs and procedures. The only complex and professional approach will deliver on promise the wellness trend is offering.

CHAPTER 1.3

PUBLIC AWARENESS ABOUT THE IMPORTANCE OF WELLNESS FOR HUMAN LIFE

MILADA KREJČÍ, TOMÁŠ URBANÍK, ZUZANA KORNATOVSKÁ

Abstract: *Wellness is a complex phenomenon, which concerns optimal balance and functioning in life style and health support. Current research in wellness is mainly focused in the two general areas: in the "hedonic area" focused on happiness and defines wellness in understanding of pleasure attainment and pain elimination; and in the "eudemonic area" focused on relating or contributing to happiness, e.g. producing happiness and well-being or tending to produce happiness and self-realization, defines wellness in sense of the degree to which a person is "fully functioning". New methods of scientific work accept multilevel composition of research and allow researchers to formulate new questions for the wellness field. The paper considers pilot research on the Public awareness about the importance of wellness for human life, realised in Czech Republic in 1200 respondents, aimed on the wellness from both named general areas. In the paper, we discuss perspectives concerning the nature of wellness and public awareness about the wellness in the Czech milieu. The research is actually plan to continue as an intercultural research across different cultures for next two years.*

Keywords: *Wellness, Stress management, Education to wellness life style, Health, Czech and Slovak specifics.*

INTRODUCTION

Wellness and quality of life definition

In a modern wellness research it is relevant to analyse how human health associates with physiological changes generated through the action of autonomous nervous system. Mental activity in the form of our perceptions (including proprioception), emotions, cognitive ability (predictions, anticipation, imaginations and needs), cognitive transcriptions in dreams, and mental activity during communication

(inner – out), etc., can causing in imbalance in organism. Stress state in fact is also a state of autonomic imbalance, does not matter, if sympathetic or parasympathetic activity increased, because resulting is the same reality - in many different kinds of disorders. Diseases as arthritis, a back pain, *cardiovascular disease, type 2 diabetes* mellitus, digestive disorders, hypertension, hypotension, spondylitis, etc. have origin in harmless of human organism. Postmodern living period - so called "Period of Stress" education to wellness and education strategies to resilience building for good health keeping are crucial (Rehor, Krejčí, 2015). The ultimate aim of education is a positive behavioural modification, defined as the Self - Transformation. To understand better "Self" is a great help for healing process. In the chapter is presented public awareness about wellness like a process of complementary attributes of wellness according the wellness definition of WHO (2000) in comparison of Czech and Slovak samples of respondents – young adults, middle age adults. We try to show and define on the research base current situation of awareness about wellness within a context with educational sector.

Human responsibility for the state of wellness is in relation of individual knowledge and skills leading to the reduction or elimination of excessive mental and physical stress in daily life on the knowledge of "Self" and a development of individual potentials. It includes art to be aware of "Self" and own feelings, to have empathy to other people and be able to use the information contained therein. Education to wellness stresses the positive orientation in the individual life, development in beliefs about the sense of human life. Wellness becomes a part of the protection and promotion of mental health in young athletes with a tendency to initiate self-education. It contributes to the cultivation of young sportsmen actions and behaviour (Krejčí, 2013; Krejčí, Tuli, Krásová, 2014)

Dunn (1959), in his important article from the view of awareness about wellness, concretized the goal of high-level wellness, it is essential to shift from considering sickness and wellness as a dichotomy toward thinking of disease and health as a graduated scale. Dunn created concept of the "Scheme of Health Grid, its Axes and Quadrants (Dunn, 1959), which is not very known in Czech and Slovak milieu (see Figure 1). In Figure 1, we can study the schema, consisting of the health axis, the environmental axis, and the resulting health and wellness quadrants, that are poor health in an unfavourable

environment, protected poor health in a favourable environment, emergent high-level wellness in an unfavourable environment, and high-level wellness in a favourable environment. Dunn described that environmental axis includes not only the physical and biological factors of the environment, but socioeconomic components affecting the health of the individual. The health axis ranges from death at the left extremity to "peak wellness" at the right. The area in between the extremes proceeds through serious and minor illnesses into the area of positive health or freedom from illness. Thereafter, it moves into an area of good health at present largely uncharted and undifferentiated, toward a goal as yet but dimly perceived which is indicate as peak of wellness. This goal represents the extreme opposite of death, that is, performance at full potential in accordance with the individual's age and makeup. To make effective headway toward this goal, we need to crystallize our concept of what the goal is, not only for the individual but also for the family, the community, and society generally. Since the nature of this goal is ever changing and ever expanding, we will probably never reach it in absolute terms; but we can come to know and appreciate its essential characteristics in relative terms. As the goal, at first seen far above us, becomes clearer and stirs response from deep within us, we will reach out toward it and fight for high-level wellness even as we have fought so valiantly and so long against sickness and death. When we learn how to diagnose high-level wellness through objective measures, we shall probably find that a substantial amount of creative expression, altruism, and love in daily life is essential for the approach to a high state of well-being. Through the development and application of these values in daily life, we will achieve self-confidence and faith in ourselves. This in turn will bring growth of “Self”, development toward fuller maturity, and a balanced wellness of body, mind, and spirit.

Dunn believed that the goal of high-level wellness for man and society can be achieved, but not easily. The needs are for a clear-cut concept and dedication to it; for money and research; for understanding, courage, and a reassessment of basic values; for a positive orientation toward life and society Dunn (1959).

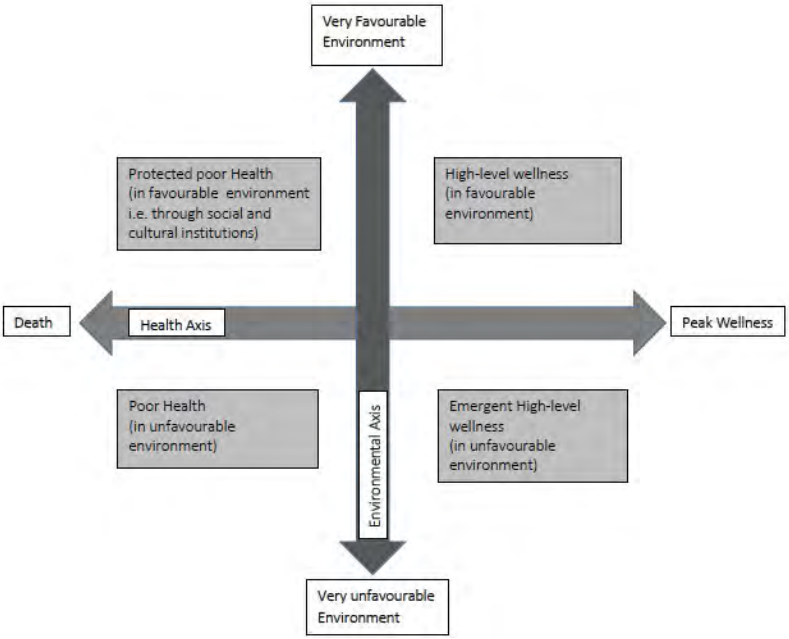


Figure 1 *Dunn´s Scheme of Health Grid, its Axes and Quadrants (Dunn, 1959)*

OBJECTIVES

There were two objectives of field study:

- To realize an international research with participation of researches from Czech Republic and Slovak Republic in 2014 – 2016.
- To compare the basic data of samples represented Czech and Slovak intact population and Czech population of people with disability.

Research questions and hypotheses

Research questions:

- What is the public awareness about wellness?

- Are there existing differences according the age period?
- Are there existing differences between males and females?
- Are there existing differences between intact population and population with disability?
- Are there existing intercultural differences?

Hypotheses

H1 Young adolescents are more informed then middle aged adolescents about wellness.

H2 Females do something for wellness and health support significantly more than males.

H3 Between intact population and population with disability are no significant differences in using of wellness procedures.

METHODOLOGIES

Material and procedure

In the research study, in sum 1371 persons participated in the investigation.

Data we completed from three experimental samples.

Description of the samples according type of samples, age, and sex and education level is present in next text and Table 1 and in Table 2.

Table 1 *Sums according age, sex and type of samples (N=1371, 624 males, 747 females)*

AGE	SEX	ES1 CZ Intact	ES2 CZ Disability	ES3 SK Intact	Σ
20-39	MALE	167	55	104	326
	FEMALE	181	53	220	454
40-59	MALE	166	34	98	298
	FEMALE	174	39	80	293
Σ		688	181	502	1371

Table 2 *Sums according age, sex and education of respondents (N=1371, 624 males, 747 females)*

AGE	SEX	ES1 CZ Intact Education level			ES2 CZ Disabled Education level			ES3 SK Intact Education level			Σ
		Primary	Secondary	Tertiary	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary	
20 - 39	M	5	92	70	4	27	24	16	60	28	326
	F	6	101	74	3	27	23	24	125	71	454
40 - 59	M	11	96	59	1	20	13	27	50	21	298
	F	5	94	75	5	20	14	18	36	26	293
Σ		**27**	**383**	**278**	**13**	**94**	**74**	**85**	**271**	**146**	**1371**
%		**3.1**	**55.7**	**40.4**	**7.2**	**51.9**	**40.9**	**16.9**	**54.0**	**29.1**	**100 %**

- **Experimental sample 1 (ES1)** – Czech intact persons (in sum 688; 333males; 355 females) divided in 2 groups according age – Young adults (20-39 years old) and Middle aged adults (40-59 years old). See details in the Table 1.
- **Experimental sample 2 (ES2)** – Czech persons with disability (in sum 181; 89 males; 92 females) divided in 2 groups according age – Young adults (20-39 years old) and Middle aged adults (40-59 years old). See details in the Table 1.
- **Experimental sample 3 (ES3)** – Slovak intact persons (in sum 502; 202 males; 300 females) divided in 2 groups according age – Young adults (20-39 years old) and Middle aged adults (40-59 years old). See details in the Table 1.

We try in the actual chapter main part of the results of “Evaluation I” to present. In “Figure 2”, whole procedure of the international research project is present.

Founder and principal investigator of the project is the College of PE and Sport PALESTRA, which is also guarantee for investigation in Czech Republic. Investigations are running in Slovak Republic, in Bulgaria, Greece and in Canada, see Figure 2. The research time for the project is since 2013 - 2016, when the final “Evaluation II” will be complete in 2016.

Figure 2 *Scheme of planned investigation procedure in the international research project*

Methods

- Planning of the project periods, randomization.
- Stratified random sampling of 1371respondents in the three experimental samples – ES1 Czech intact persons (in sum 688; 333males; 355 females); ES2 – Czech persons with disability (in sum 181; 89 males; 92 females) and ES3 **-** Slovak intact persons (in sum 502; 202 males; 300 females).
- Questionnaire "Well_Awar_In" (Krejčí, Vacková, 2013) – consists from 10 interrogation to monitor the state of public awareness on the impact of wellness for life;
- Data collection, data editing and Contingent tables' creation.
- Statistical analysis - Correlation of tables of absolute rates; Pearson correlation, Spearman non-parametric correlation (STATISTICA 9 and MATLAB 7.8 - R2009).

RESULTS

Results are thematically present in next five parts:

I. Association of Wellness with Health optimizing
II. Wellness in workplace
III. Including wellness activities in daily life
IV. Preferences of wellness procedures
V. Obstructions to implement wellness into daily life

RESULTS I – "Association of Wellness with Health optimizing"

Results analyses show how respondents from experimental samples associate health and wellness. Hošek presents that people often combine free terms "wellness" and "health" and often use the terms in conjunction with each other (Hošek, 2013). The terms have different definitions, but health aspects and support are main in both of them.

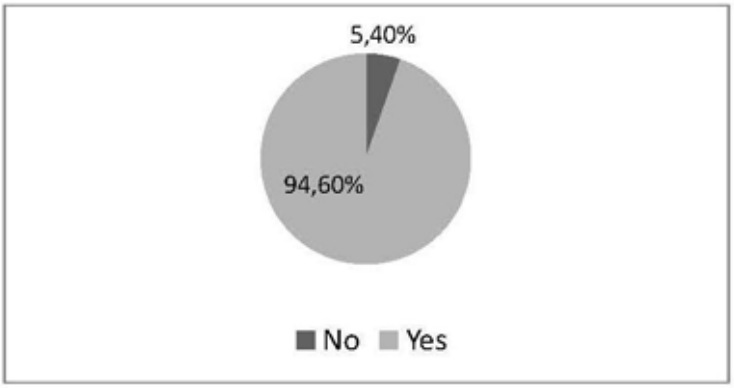


Figure 2 *Percentage of association of „anything", if to hear the word "wellness" of all respondents (N=1371, 624 males, 747 females)*

Ideas of people of words and meaning of "wellness" are differ and unite too, at the same time. Our perception of reality, words, people, and objects emanate from individual knowledge and environmental influences where we come from, where we live and create value. Interestingly, the Czech and Slovak respondents indicate almost identical categories, in their view wellness at the forefront of research. While in representatives of Czech intact population (E1) in the first place is relaxation and well-being, approaching half (40.7%), Slovak representatives of intact population (E3) attribute relax values reflecting in 75% of the total survey sample. It can be conclude, that people in the Czech Republic and Slovakia as well, clearly regarded wellness as relaxation, and i.e. it means a form of relaxation and gain of new powers.

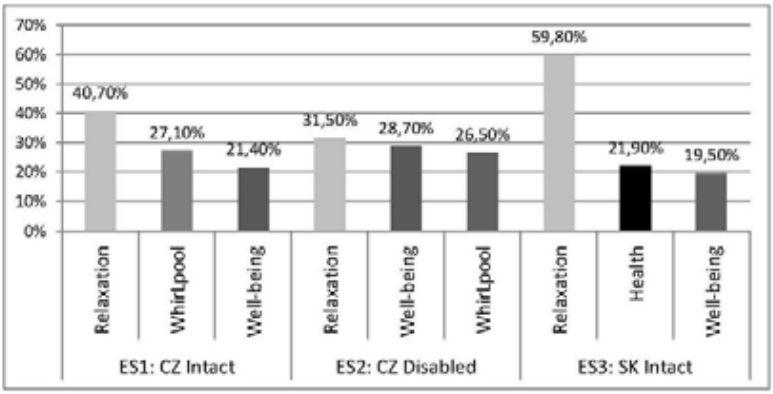


Figure 3 *Percentage of the most often wellness associations in samples ES1, ES2, ES3 (N=1371 ES1: 688, ES2: 181, ES3: 502)*

In residents of Slovakia were always known as tenacity, toughness and diligence. Options of contemporary world offers them a choice, how to spend leisure time, where and with whom to relax. Probably, therefore, the word relax is so high. Just need to "turn off" and that they manage to activities where they do not lift heavy implements to develop strength and hard work or activity. It is very interesting, that in the second place representatives of Slovak intact population (E3) designated “Health”. The phenomenon of the nowadays, a healthy lifestyle, clearly alter the perception of wellness. Ask our parents and grandparents, how many times a week visiting a sauna, swimming pool and fitness centre, when they had to fill the five-year plan. Never had people so big choice of activities, which revitalize, rejuvenate, harden, burn fat, and regenerate a preventive health and healthy lifestyle, as is the case of nowadays. Nevertheless, there are existing individuals, especially in North part of Slovak Republic, whom make a problem distance in wellness activities, or poor offer of wellness activities in the locality. Apart from them, it is a quantum leap in the perception of wellness, in the coasts of northern Slovakia (see Figures 2-5).

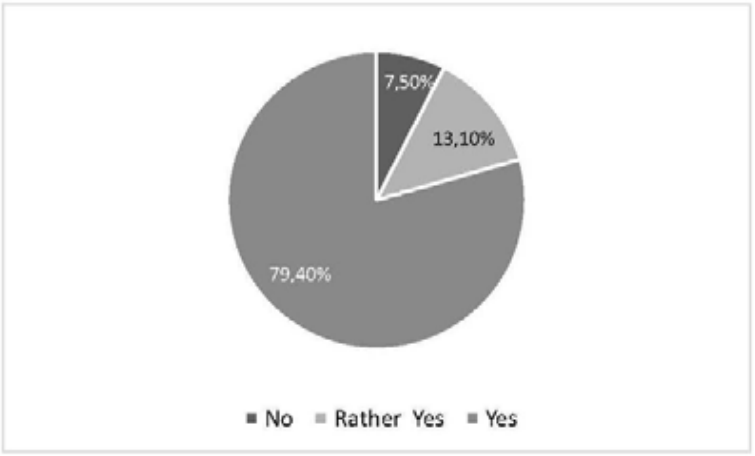
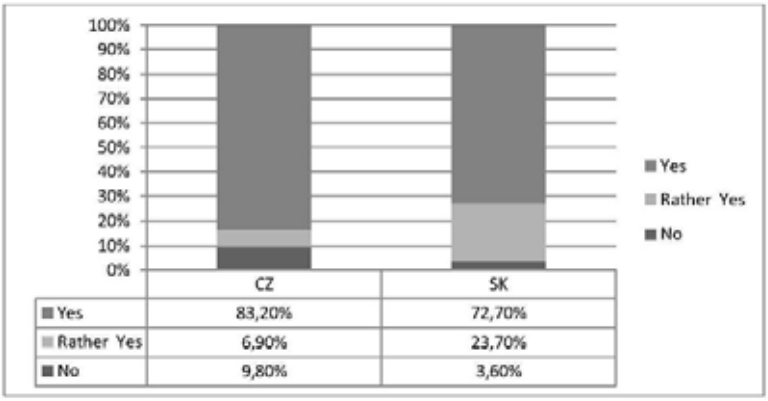


Figure 4 *Percentage of Association of „Wellness" with Health optimizing in together of all respondents (N=1371, 624 males, 747 females)*



	CZ	SK
Yes	83,20%	72,70%
Rather Yes	6,90%	23,70%
No	9,80%	3,60%

Figure 5 *Association of „Wellness" with Health optimizing – CZ versus SK (CZ: N=869, 422 males, 447 females; SK: N= 502, 202 males, 300 females)*

Following the previous presented results in Figures 3-5, it shows the reality of Czechs and Slovaks in these charts. Slovak respondent states in the minimum extent, that wellness is not so simply and

directly associated with health. The rest of the sample is inclined to this idea.

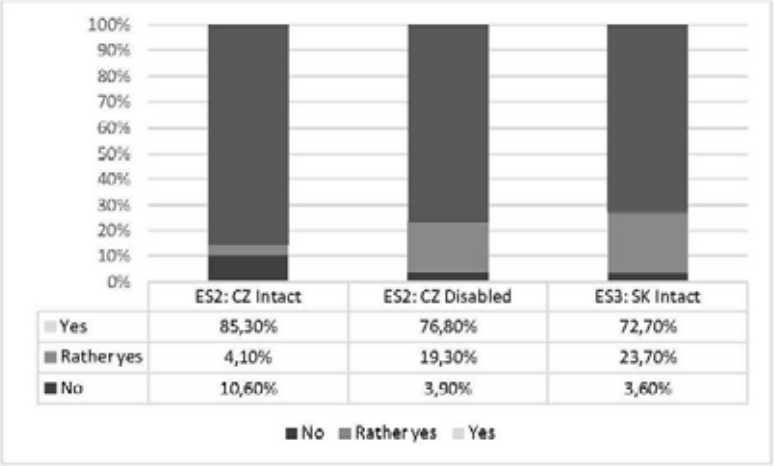


Figure 6 *Association of „Wellness" with Health optimizing according experimental samples (N=1371 ES1: 688, ES2: 181, ES3: 502)*

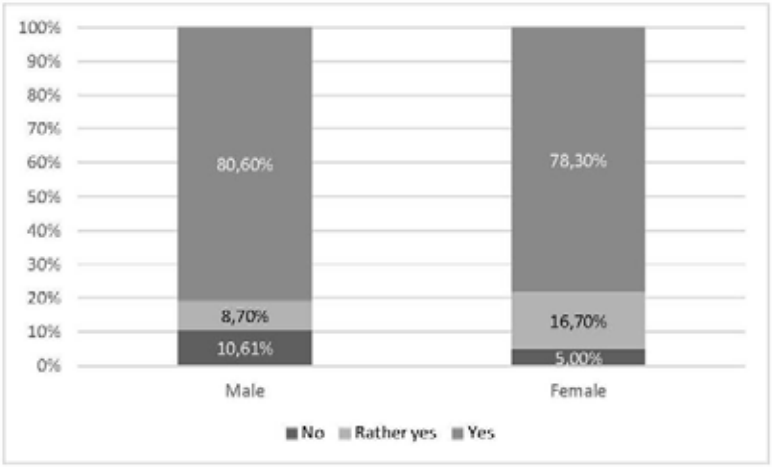


Figure 7 *Association of „Wellness" with Health optimizing - Males versus Females (N=1371, 624 males, 747 females)*

Health and healthy lifestyle represent not since long time a privilege subject of medicine and physicians only. That is a positive trend. If we should to compare the number of people receiving drugs and chemical middles and preparations in the past and today, there is a big difference. That is why it is gratifying for us, that the Czech and Slovak respondents clearly named their vision and they are prepared to deal with their preventive health, see Figures 6-7.

RESULTS II - "Wellness in workplace"

The analysed results of area "Wellness in workplace" are very bad and "poor", see Figure 8 and the Figure 9.

According to Vackova (2014) analyses phenomenon wellness should also emphasize how the program fits in to a broader agenda of workplace development. It is not easy to change behaviours, best way remain to be discover.

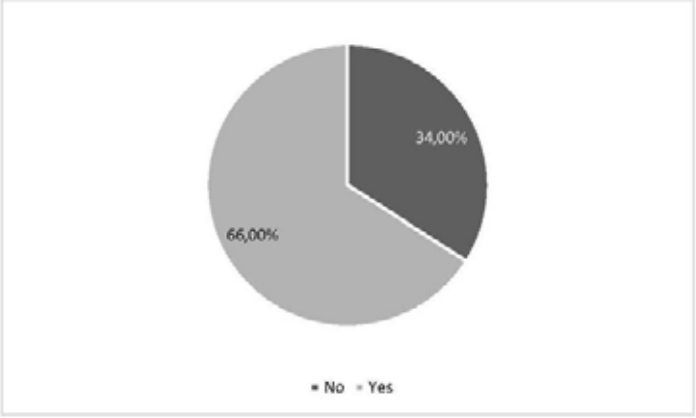


Figure 8 *Percentage of „Wellness" support in workplace in together of all respondents (N=1371, 624 males, 747 females)*

The issue is inherently complex. Experts in behaviour modifications and risk factors suggest that success require two types of initiatives. One approach target high – risk individuals with incentives, education and counselling. The other approach presents deals with the environment within and beyond the workplace. It encompasses everything that is supportive of employees' well-being and is

conductive to healthy life style. It may include work team, sports clubs, social support group, on-line social networks and above all – family. Health is necessary to link with prevention and prevention with wellness again. WHO definition (WHO, 2000) declares very clearly the meaning and importance of this sector, which is experiencing in our latitudes a big boom.

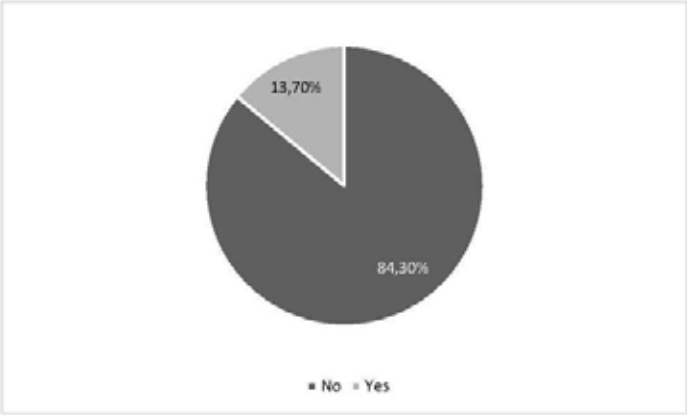


Figure 9 *Percentage of „Holidays" support in workplace in together of all respondents (N=1371, 624 males, 747 females)*

RESULTS III - "Including wellness activities in daily life"

Analysing wellness definition (WHO, 2000) we come to result, that „phenomenon wellness" presents a full integration of states of physical, mental, social, spiritual and economic well-being. Some experts present differences and determinants of social, emotional, spiritual, environmental, occupational, intellectual and physical wellness (Hošek, 2013):

- **Social Wellness** is the ability to communicate in style of "Health communication"; it means to be able to establish positive relationships.
- **Emotional Wellness** is the ability to manage situations and challenges of daily life. The ability to resilience development, to master stress reduction, to provide regularly health

compensation and mental hygiene to compensate and eliminate feelings of anger, fear, sadness or stress.

- **Spiritual Wellness** is the ability to Self-transformation to humanity, peace and harmony, ability to return and establish balance according ethics, human values and actions.
- **Environmental Wellness** is the ability to exist as man in role of protector, not as destructor, to recognize responsibility for the environmental principles in protection of earth, quality of the air, water in global aspect.
- **Occupational Wellness** is again about ability of balance in community live, to find balance between professional and personal live, to be positive, creative with joy of the occupation, to clean desires which are obstacles to freedom feelings in job.
- **Intellectual Wellness** is to care about concisions life, to accept changes as nature part of existing. It is important not to be dogmatic and to provide self-analyses to our complexes in personal, group and community interaction. The enjoy happiness from new learning and new challenges.
- **Physical Wellness** is the ability to keep and care about condition parameters through daily activities and adequate movement regime, nutrition and modern medical care, especially to use rights for preventive checking.

The main attribute is that all declared dimensions of daily life act interact and support individual and global health and quality of life.

From the presented results in Figures 10-12 is clear that prevention, fitness, relaxation, wellness nutrition are very common from the view of health support and wellness. Human preferences are determined of the known context of preferences and needs (Martens, 2012; Maslow, 1987). The final level of needs of respondents is possible to study in Figure 13 and in Tables 3-4. The analysed preferences in the ES1, ES2 and ES3 are very different. Extremely interesting are results in ES2, when price is “not important”, but scenery and nature. We would like to make notice that among respondents were also people with visual and physical disabilities. Perhaps green, nature smell and fresh air are in base of needs.

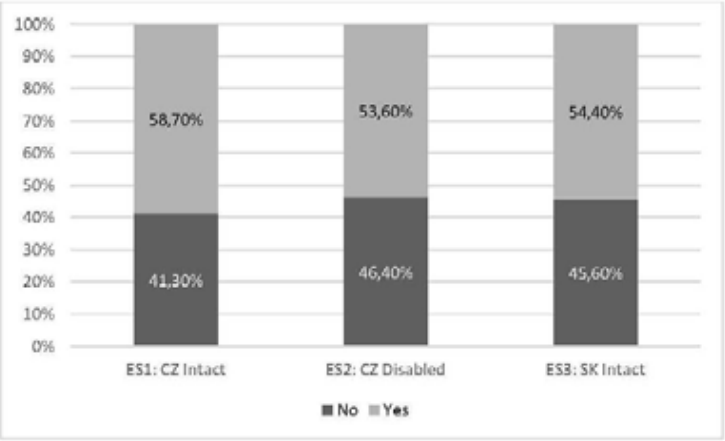


Figure 10 *Percentage of including of wellness activities in daily life according experimental samples (N=1371 ES1: 688, ES2: 181, ES3: 502)*

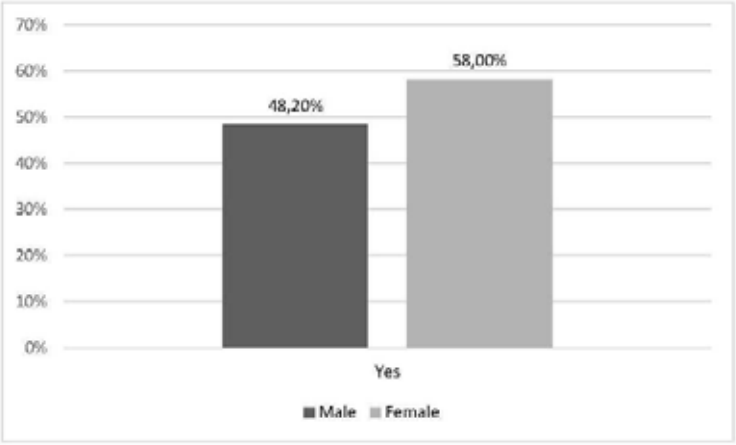


Figure 11 *Percentage of including of wellness activities in daily life according sex (N=1371, 624 males, 747 females)*

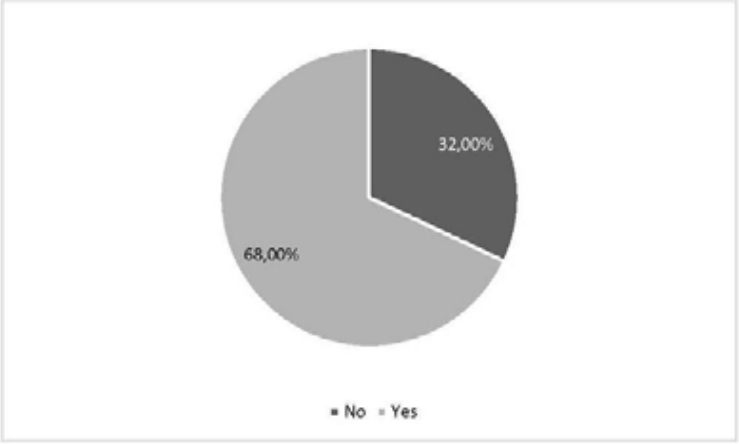


Figure 12 *Percentage of Wellness stay" absolving in sum of all respondents (N=1371, 624 males, 747 females)*

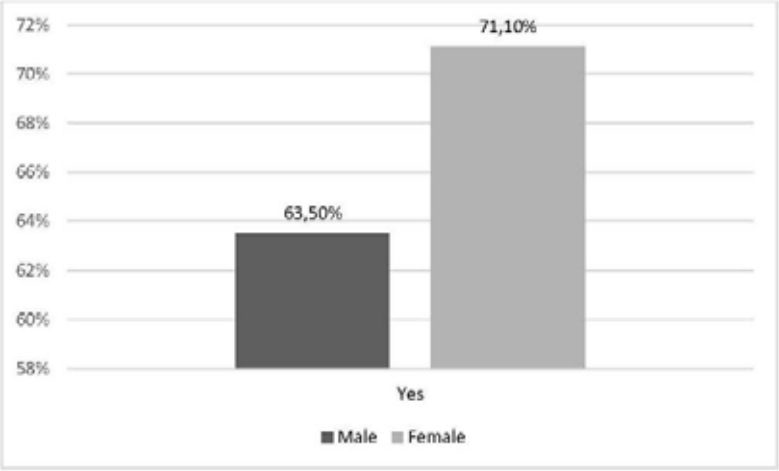


Figure 13 *Percentage of Wellness stay" absolving* ***-*** *Males versus Females (N=1371, 624 males, 747 females)*

Table 3 *Preferences in wellness stay according the experimental samples (N=1371 ES1: 688, ES2: 181, ES3: 502)*

SAMPLE	Preferences	M %	FM %
ES1 CZ Intact	Nature, scenery	18.6	20.2
	Availability - Price	15.6	19.1
	Quality of Accommodation	14.1	19.7
	Quality of Service	25.8	30.7
ES2 CZ Disabl	Nature, scenery	48.3	66.6
	Culture	35.9	27.5
	Quality of Accommodation	25.8	29.8
	Quality of Service	32.5	36.7
ES3 SK Intact	Nature, scenery	14,8	15.3
	Culture	25.7	21.6
	Availability - Price	37.6	52.0
	Quality of Service	33.1	15.3

Table 4 *Preferences of wellness procedures according the experimental samples (N=1371 ES1: 688, ES2: 181, ES3: 502)*

SAMPLE	WELLNESS PROCEDURES	20-39		40-59	
		M %	FM%	M %	FM%
ES1 CZ Intact	Massage	60.5	75.1	63.3	70.1
	Outdoor	50.3	40.3	34.9	37.9
	SPA	34.1	45.9	39.8	48.3
ES2 CZ Disabled	Yoga	10.9	26.4	14.7	35.9
	Massage	49.1	56.6	44.1	66.7
	Outdoor	43.6	34.0	47.1	30.8
	SPA	29.1	32.1	26.5	51.3
ES3 SK Intact	Massage	27.9	25.0	12.2	40.0
	Meditation	26.9	30.0	16.3	32.5
	Face Lifting	14.4	24.5	17.3	22.5
	Outdoor	23.1	25.0	17.3	23.7
	Pilates	17.3	29.5	11.2	22.5

RESULTS IV "Preferences of wellness procedures"

Table 5 *Expectations of wellness stay according the experimental samples (N=1371 ES1: 688, ES2: 181, ES3: 502)*

SAMPLE	EXPECTATION	20-39		40-59	
		M %	FM %	M %	FM %
ES1CZ Intact	Relaxation	78.4	86.7	80.1	82.8
ES2 CZ Disabled	Relaxation	50.9	73.9	52.9	19.0
ES3 SK Intact	Relaxation	19.2	30.0	13.3	42.5
	Health Support	30.8	40.0	25.5	25.0

It is an important determinant for discussion - if persons with disability present quite big potential for wellness. On the base of results analyses is clear, that 25.4% of the young men with disability declare no obstructions to participate in wellness activities. However, a problem could be here connected with financial demands, how it was presented in 41.8% of the young men with disability.

RESULTS V "Obstructions to implement wellness into daily life"

Slovak young women answered "No obstructions to participate in wellness activities" in 0.09% only! After that, middle-aged Slovak women answered "No obstructions to participate in wellness activities" in 2.5%. In opposite Czech women answered "No obstructions to participate in wellness activities" in Czech young women 19.9%, in middle-aged Czech women in 21.8% and women with disability even in 30.8%, see Tables 6-8.

Slovak young men it was present no obstruction in 12.5%, in middle-aged 9.2%. However, the Czech middle-aged men presented no obstructions in 21%, disability 25.5! It is to discussion if Czech men have more leisure time, and how to motivate them to use the time for wellness, see Tables 6-8.

Table 6 *What does obstruct to implement wellness into your daily life? (N=1371 ES1: 688, ES2: 181, ES3: 502)*

SAMPLE	OBSTRUCTION	20-39		40-59		∑
		M %	FM %	M %	FM %	%
ES1 CZ Intact	Lack of time	58.1	66.3	61.4	62.1	62.0
	Finance	31.1	32.0	23.5	31.0	29.5
	Laziness, passivity	13.2	4.4	7.8	8.0	8.4
ES2 CZ Disable	Lack of time	36.4	35.8	47.1	35.9	38.0
	Finance	41.9	50.9	26.5	30.8	44.0
	Laziness, passivity	14.5	9.4	23.5	12.8	15.5
ES3 SK Intact	Lack of time	22.1	62.7	31.6	66.3	48.8
	Finance	55.8	59.5	16.3	50.0	48.8
	Distance	10.6	16.4	13.2	26.3	16.0

Table 7 *Types of obstruct to implement wellness into daily life of respondents (N=1371, 624 males, 747 females)*

OBSTRUCT	%
Lack of time	54.85 %
Finance	39.24 %
Nothing	15.24%
Distance	7.43 %

Table 8 *Percentage of "No obstructions to implement wellness into daily life" according experimental samples and sex*

SAMPLE	20-39		40-59		∑%
	M %	FM %	M %	FM %	
ES1: CZ Intact	21.0	19.9	19.9	21.8	20.6
ES2: CZ Disabled	25.5	15.1	20.6	30.8	22.7
ES3: SK Intact	12.5	0.9	9.2	2.5	5.2

DISCUSSION

On the base of presented results we can discuss that level of public awareness in Czech Republic and in Slovak Republic is relatively good, on middle level. It is required more public education, incorporating wellness principles generally into the public field - to change attitudes to wellness in its original context, defined very well in WHO definition of wellness, as it was mentioned several times in this

chapter (WHO, 2000). Wellness presents an interesting behavioural change, philosophical shift to self-esteem, self-confidence and self-efficacy as well. We can summarise main target questions, which are fix in the Figure 14.

Figure 14 *Summary of results of the "Evaluation I" in the research project*

Target questions to discussion

- *Why Czech people associated the phenomena "Relaxation" most often? Why on second place is placed the phenomena "SPA"?*

The relaxation response is one of the most important skills for compensation of daily stress (physical, mental, social, etc.) Research projects oriented on simple relaxation exercising and mastering in biofeedback response declared decreasing of heart frequency, muscle tension, blood pressure, skin conductance. On mental level, it was decreasing of fatigue states, sleep disorders including restoration of sleep, anxiety and irritability.

There are basic conditions of high quality vitality and effective stress management. Specificity of easy yoga practicing is the active correction of movement stereotypes, positives influence on muscle and mental tensions and synchronizing of breath and movement, which results in harmony state of mind. Basic yoga breathing techniques lead to breathing control and breathing capacity development. These techniques relatively easy can be trained (Kornatovská, 2014; Krejčí, et al., 2014; Liba, 2007).

- *It seems very necessary to promote wellness in workplace in Czech Republic and in Slovak Republic. Is it real in Czech and Slovak milieu in next decade?*

We are not very optimistic in that, but we will support and investigate this trend "wellness in workplace" very intensively in coordination with the science and research priorities of the College of PE and Sport PALESTRA and Dept. of PE and Sport of Faculty of Arts of Matej Bel University. The basic moment perhaps can be in fact, that *Czech Republic* and Slovak Republic follow the European tradition of Spa and are in this point of view word known. According Vacková (2014) in whole Europe there is not big emphasis on *workplace wellness*.

- *Why more than 62% of women feel as the main obstruction lack of time? Could it be in relation with value orientation of women?*

Lack of time is a well-known argument of women in case of physical activity providing. Of course, in Czech Republic and in Slovak Republic women devote much time to mission of mothers and wives, to professional life as workers, to care about home as housekeepers (Bartík, 2014; Kováč, 2001). However, it is not examine, why women barriers reflect so often. Women often suffer of sedentary style in work and it is necessary to compensate it with adequate movement regime. Our findings can be used to future investigation in women about lack of time in context to health life style of young women and problem of availability for wellness activities.

CONCLUSIONS

First we can conclude, that the goal of the "Evaluation I" was achieved. We received actual knowledge about public awareness in wellness on the base of running international project initiated, guided and realized in first step by support of the College of PE and Sport Palestra in Prague.

We can conclude that comparison of experimental samples ES1, ES2, ES3 brought into profession of wellness specialist new view on

the problem, which is solve and publish first time in Czech and Slovak milieu.

Hypotheses evaluation

Hypotheses H1, that "Young adolescents are more informed then middle aged adolescents about wellness" was not verified.

Hypotheses H2, that "Females do something for wellness and health support significantly more than males", was verify.

Hypotheses H3, that "Between intact population and population with disability are no significant differences in using of wellness procedures", was not verified.

On the base of the provided "Evaluation I." we recommend in the end of the conclusion the next points to solution:

- For discovering of solutions, it is necessary to provide further analysis covering aspects of places of residence, because probably there are different offers to wellness procedures and experiences in town and cities as in villages.
- A great benefit for the research focus will be the comparison of Czech and Slovak results with the results from respondents of Greece and Canadian milieu in 2016.

Basic strategies to promote wellness and quality of life presents development of human responsibility for the state of wellness. Knowledge and skills leading to the reduction or elimination of excessive mental and physical stress in daily life bring to a man the knowledge of "Self „and a development of the potentials in sense of appropriate and real-life perspectives implementation. High-level wellness in the context with Dunn definition includes art to be aware of "Self" and own feelings, to have empathy to other people and be able to use the information contained therein.

Education to wellness stresses the positive orientation in the individual life, development in beliefs about the sense of human life as Urbaník expressed: „Love is very important for our life and it is necessary to develop love, because love is freeing whole being. Do not be afraid to make mistakes. Try to be in well, try to accept, to listen, to understand and to develop "Self", and to deliver it further. Important is to give yourself a space - space for yourself and for others.

Everyone wants to love and to be beloved, to shift, but yet makes mistakes. Do not worry about it, but learn from it. Love is unlimited and unites. It is a big happiness to create love, to be creative in love (Urbaník, 2011).

Wellness becomes a part of the protection and self-promotion with a tendency to initiate self-education. It contributes to the cultivation of actions and behaviour.

Part 2

EDUCATION AT SCHOOL AND SPORT ENVIRONMENT

CHAPTER 2.1

HEALTH AND STYLE OF LIFE OF ADOLESCENTS´

PAVOL BARTÍK, ELENA BENDÍKOVÁ

Abstract: *As a result of the insufficient physical activity, the number of secondary school students with major or minor health issues is increasing. This paper presents a observation of a selected health determinant relating to the body weight of students, in particular the physical activities of their exercise regime. The observed group consisted of 102 fourth-year female students of secondary schools from the city of Banská Bystrica. Diagnostics of the primary indicators of the somatic nature as well as other determinants were implemented in 2015, with the help of primary care physicians, based on standardized medical and pedagogical diagnosis, and personal medical history. The results demonstrate that already at such a young age, these students have minor health problems occurring of various combinations, as well as increased body weight and obesity, which probably resulted from their sedentary lifestyle combined with other risk factors.*

Keywords*: xercise, body weight, health, female students, lifestyle.*

INTRODUCTION

Nowadays, there is an upward trend in the occurrence of obesity which affects nearly all age, social and economic population groups. It causes metabolic and cardiovascular complications and in this way poses a risk to health, shortening the average life expectancy by approximately 6 - 7 years and leading to a 10 - 13 % increase in morbidity and mortality, as stated by Marko (2013). Also for these reasons, the WHO has declared obesity to be the epidemic of the 21st century (EURO WHO, 2006).

Overweight is the initial stage of obesity, sometimes referred to as its first stage. It increases the risk of health complications. According to the criteria of the WHO, overweight is defined by the body mass index (BMI) ranging from 25 to 30 for European populations. For

Asian and Pacific populations, it is defined by the BMI ranging from 23 to 25, sometimes 23 to 27. A BMI value of over 30 in the white European populations is defined as obesity (Krahulec, 2004). Many people who belong to this category of body weight with the BMI of 25 - 29.9 become obese in the course of their life. An disadvantage of BMI is that it does not distinguish between the weight of fat, muscle or water in the organism.

Slovakia is also affected by the obesity epidemic: more than 1.5 million people suffer from overweight and obesity. Up to 16 % of children and 32 % of adult Slovak citizens have a BMI greater than 30. On the basis of the available data, it has been possible to observe and monitor the trend in the gradually increasing occurrence of overweight and obesity in the Slovak Republic since the 1960s. There is an alarming percentage of cases with the so-called exogenous obesity. In up to 96 % of cases, childhood obesity is caused by bad eating habits and lack of exercise in combination with genetic factors. Today it is known that if one of the parents are obese, a child is three times more likely to develop obesity; and if both of them are obese, the probability is ten times higher. Basic eating habits are being developed already at an infant age and it is primarily a baby's family that participates in their development because the lifestyle of a baby is based on the eating and exercise habits of the parents (Lahti-Koski, Pietinen - Heliövaara - Vartiainen, 2002; Ginter - Havelková, 2004; Machálová – Kubátová et al., 2009).

The epidemiological study IDEA Slovakia (Dukát – Lietava - Krahulec, 2006) demonstrated a high predominance of overweight and obesity whereby abdominal obesity accounted for as much as 46.3 %, very predominant among women with 56.1 %. Up to 38 % of patients who visited their general practitioner (GP) were obese. One in three women were obese (34.7 %).

According to Béderová (2003), 7 - 12 % of children are obese and an additional 18 % are slightly overweight. Evidence for this trend was observed when a significant decrease in children and youth's attending the after-school sports clubs occurred, they were attended by 25 - 35 % of all pupils in the school year of 1989/1990. Today it is only 3 - 10 % of pupils.

Kožuchová and Bašková (2013) point out that with age, the occurrence of overweight and obesity decreases both among girls (from 8 % of the 11-year-old to 6 % of the 15-year-old) and boys (from 19 % of the 11-year-old to 9 % of the 15-year-old). They found out that

among the 13-year-old boys, occurrence of obesity was statistically significantly higher ($p = 0.003$). In the age group of the 11- and 15-year-old children, these differences were not statistically significant (the 11-year-old: $p = 0.011$; the 15-year-old: $p = 0.284$). The number of obese and overweight school-age children and adolescents in Slovakia is constantly rising but also in the world and this leads to many health and psychosocial consequences. It should be pointed out that serious obesity is linked to a twelve-fold increase in mortality for the 15- to 35-year-old people in comparison to non-obese people.

Overweight and obesity also affect the physical and mental health, which also encourage the development of the most serious chronic non-infectious diseases (Dattilo, Kris-Etherton, 1992; Lean – Han - Morrison, 1995; Hainer, 2004).

The occurrence of obesity is closely related to physical activity and its intensity. Physical activity is closely linked to the quality of life, lifestyle and health (Nowak, 1997). Pate & O'Neill (2008) also concurs with this statement and documented how the lack of physical activity has a significant impact not only on physical fitness and performance but also on working performance and the state of health, as shown by the statistics of health insurance companies of the European Union (EU), Slovakia included.

Health is a state of physical, mental and social well-being - a human comfort. It is a state of an organism which is capable of optimal self-regulation while its functions and the external environment are in equilibrium, the so-called homeostasis of the organism (Bendíková - Jančoková, 2013). According to the World Health Organization (WHO), 21 % of human health depends on the ecological conditions, 21 % on genetics, 8 % on the level of health care and up to 50 % on lifestyle. It follows from the above that people are not powerless in their struggle for health despite the prevailing diseases of civilization (Mýtnik et al., 2005; Adamčák – Bartík - Kozaňáková, 2011; Kostencka – Śmiglewska - Szark-Eckardt, 2012; Żukovska, 2012; Andrzejewska, 2013; Bendíková, 2014; Szark-Eckardt - Żukowska, 2015; Šmída, 2015), which also include obesity (Malátová et al., 2014). The first references to pathological obesity came from Hippokrates, Galen and Avicenna (Fobi, 2004).

The aim of this research was to source and spread the information about the current state of health of the secondary school female students with the focus on body weight in respect of exercise regime as one of the health determinants.

MATERIALS AND METHODS

The observed group consisted of 102 fourth-year female secondary school students of Banská Bystrica, in the school year of 2014-2015. The average age of the group was 18.6 years, with an average height of 168.9 cm. The research was carried out in February and March 2015 in a primary care physician's surgery. The principal method of obtaining data was clinical diagnosis that consisted of a clinical case report based on the primary somatometry.

When processing the obtained qualitative and quantitative data, we used the basic methods of mathematical statistics with the focus on frequency analysis in percentage terms. To evaluate the importance of the patient's answers to the doctor's individual questions in respect of the case history, we used the Chi-square test on the statistical significance level of 1 % ($p < 0.01$) and 5 % ($p < 0.05$). We also used the methods of logical analysis and synthesis together with inductive and deductive methods, comparison and generalization. All the data was processed with a differentiated approach in the form of tables and graphs.

RESULTS

Building on the sub-objective and role of the research, we present part of the results which are subject to further close observation and processing. The presented results cannot be generalized but should be seen in the general context as informative and as a point of reference when organizing leisure time for the secondary school students taking into account the consideration of their health.

State of health. When evaluating the current state of health of the observed group of students, we found out that the occurrence of minor persistent health problems was relatively high (57 %). These problems were statistically significant on the significance level of 1 % ($Chi = 10.663$, $p < 0.01$) and their symptoms include headache (as much as 53 %), back pain (32 %), joint pain (10 %), and dysmenorrhea (39 %). A smaller percentage was represented by problems of low blood pressure (12 %). Identified health problems occurred in various combinations already at this young age and what we consider as negative from the point of view of an upward trend in diseases of civilization.

26 % of the students said they were healthy but in poor physical condition while only 13 % of them said they were healthy and in good physical condition (Refer to Table 1). Only 2 % of the students said they had major health problems.

Table 1 *Current state of health of the students (n = 102)*

n/indicators	Percentage of representation
I am healthy and in good physical condition	11 %
I am healthy but in poor physical condition	28 %
I have minor health problems	57 % (Chi = 10.663; p < 0.01)
I have major health problems	4 %

Other identified health issues of the students that had already been diagnosed in the past included weakenings of the nervous system and also the senses represented by visual impairment (16 %), with short-sightedness predominating occurring more than long-sightedness, epilepsy (2 %) and other disorders of the nervous system (2 %).

Weakenings of the internal organs were represented as follows: disorders of the cardiovascular (5 %) and the respiratory system (37 % - allergies, asthma). We also identified metabolic disorders: obesity in 5.76 % of the cases, while none of the students suffered from diabetes, 2 % of them had digestive disorders and 46 % had gynaecological problems.

The students from the observed group were mostly ill in the winter (44 %; Chi = 8.921; p < 0.01) and in autumn (40 %) particularly characterized by influenza, tonsillitis or pneumonia of different levels of severity (Fig. 1). These illnesses can be caused by various objective and subjective factors (inappropriate clothing, footwear, weakened immunity, hand washing, hardening...).

With regard to the duration of illness, we found out that in more than a half of the students (54 %), significantly dominant (Chi = 9.332; p < 0.01) was an illness of 3 to 5 days. Only 7 % of the students are ill for more than a week throughout the year (Refer to Figure 2). 34 % of the students are usually ill for a week.

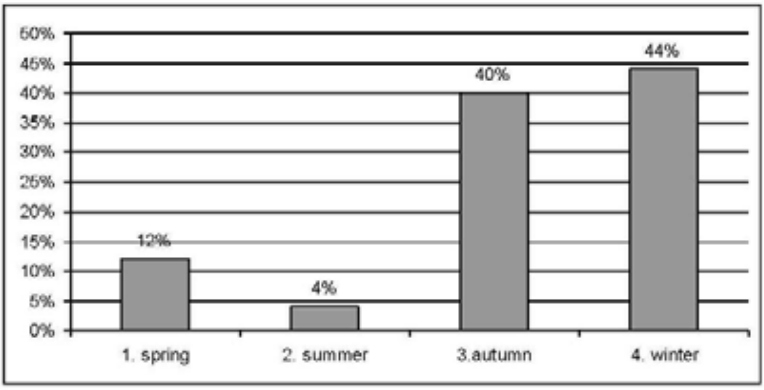


Figure 1 *The most common morbidity of the students according to the season of the year (n = 102)*

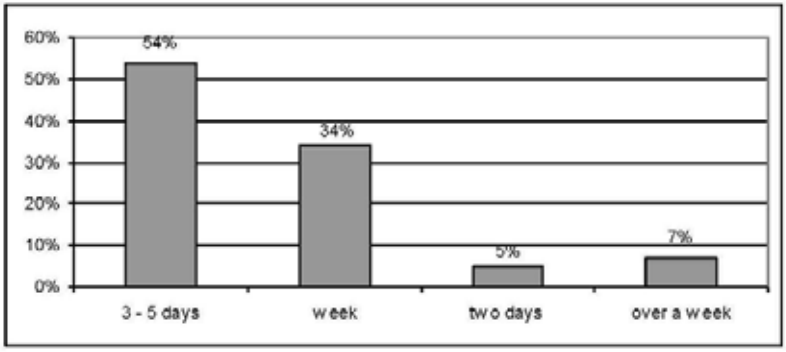


Figure 2 *Duration of illness (n = 102)*

BMI and **WHR** (Refer to Tables 2 and 3).

From the point of view of the physical development, it is important to mention the increased body weight that is necessary to be understood in the wider context as it affects their health. In the observed group, we found that 28.64 % of the students were overweight (BMI = 25.8±1.7) and 6.76 % were obese (with the risk to health, BMI = 31.1±3), also as the result of the increased WHR (0.96). This situation is probably caused by poor lifestyle and the ratio of the individual components (diet, water intake, exercise, rest,

stress, sleep...etc). We presume that an increased body weight of the students is related to fewer physical activities (with higher intensity) within the exercise regime. We would also like to add that obesity is quite an elusive problem because it implies the change in the lifestyle of young people, healthy diet, control of the portion sizes and more physical activities and exercise.

We found that 10.52 % of the students were underweight and their body fat accounted for 19.5±4 %. On the other hand, body fat of the overweight and obese students ranged between 36±3 % and 40±3 %.

There were 59 students with normal body weight ($p < 0.01$), which represents more than a half of the observed group. With the average body height of 168,9±5 cm, their body weight was around 58±5 kg with a BMI of 21.9±1 and the percentage of body fat was 27±5 %.

Table 2 *Principal determinants of somatometry of the students (n = 102)*

age:	Body height/cm	Body weight/kg	Waistline	BMI	Abdominal circumference	Neck circumference	Waist/height	% of body fat
18.2	168.9 ±4	60±13	72±8	22.3± 3.9	81±5	31±4	0.41± 0.06	31.3

According to the WHO, the number of obese children at the age range of 6 - 11 has more than doubled since the 1960s. About 20 % of the children in Europe are overweight and about one third of them are obese (EURO WHO, 2006), thus childhood obesity represents an acute health crisis. Only less than 4 % of all the childhood obesity cases are caused by hormonal system diseases or genetic disorders.

Exercise regime, from the point of view of the representation of the individual life, determinants that are an integral part of the students' lifestyle, is depicted in Table 4. It follows from the data that the passive way of life of the students is twice more often than the active way of life. On the other hand, general exercises (hygiene, way to school and back, movement at school and at home included) on average represents only 4 hours a day. Idle time

of the students ranges between 3.5 and 4.5 hours a day. This is equivalent to 24.5 - 31.5 hours of idle time a week. It follows from the above statement, that the students are not able to appropriately organize and regulate their daily and weekly regime, nor exercise regime, manage their time and take advantage of the opportunities for a general personal development from a physical and psychological point of view.

Table 3 *Categories of body weight of the students (n = 102)*

Levels BMI/n/factors	Body height/ cm	Body weight/kg	Waist-line	BMI	Abdominal circum-ference	Neck circum-ference	Waist/height	% of body fat
underweight (11.52 %)	168 ±5	48 ±4	62 ±4	17.5 ±1.1	67±4	30 ±1	0.37 ±0.5	19.5 ±4
normal weight (54.08 %)	167 ±5	58 ±5	69 ±5	21.9 ±1	70±5	31 ±1	0.42 ±0.04	27 ±5
overweight (28.64 %)	164 ±5	67 ±6	76 ±7	25.8 ±1.7	85±7	33 ±1	0.46 ±0.02	36 ±3
obesity (6.76 %)	166 ±5	79 ±12	86 ±9	30.1 ±3	93±7	34± 3	0.52 ±0.04	40 ±3

Adverse health consequences in the lack of physical activities of most students are intensified by their leisure time activities, that are mostly oriented towards physically undemanding activities.

As regards to the frequency of physical activities (Refer to Table 5), we found that 43 % of the students engage in sporting activities irregularly ($p < 0.01$). 25 % of the students engage in sporting activities once a week, 23 % twice a week. Only 4 % of the students do sports three times a week. Only 5 % engage in sporting activities more than three times a week.

Those students, who participate in sports regularly, engage in various sports, mainly downhill skiing at different levels of performance. From those secondary students who regularly engage in sporting activities, only 9 % do winter sports.

The average intensity of physical activities from the girls is low with a value of 54 % ($p < 0.01$), medium in 33 % and high in only 13 %, which is probably related to the girls who do sports professionally or to improve their performance (Refer to Table 6).

Table 4 *Daily and Weekly Regime of the adolescents (n = 102)*

Regime of a day/activity Daily regime		**Weekly regime**
Activity	**Time**	**Time**
sleep	7 – 8 hours	49 – 56 hours
hygiene	1 hour	7 hours
way to school and back	30 min	21 hours
time spent in school	6 – 8 hours	42 – 56 hours
diet	1 hour	7 hours
studying	1 hour - 2 hours	7 - 14 hours
cultural and social activities	0.30 - 1 hour	2.1 - 7 hours
sporting activities	2 hours	14 hours
private matters	1 hour	7 hours
idle time	3.5 - 4.5 hours	24.5 - 31.5 hours
	24 hours	**168 hours**

Table 5 *Frequency of sporting activities (n = 102)*

Frequency	**girls**
irregularly	52 %
once a week	21 %
twice a week	19 %
three times a week	4 %
more than three times a week	4 %

Table 6: *Intensity of sporting activities (n = 102)*

Intensity of sporting activities	**Girls**
low	54 %
medium	33 %
high	13 %

The factors (Refer to Table 7) that pose a risk to health of the students include mostly stressful situations (78 %; $p < 0.01$) but also smoking (24 %). Smoking and alcohol consumption, occasionally and irregularly, belong to the factors that can adversely affect the organism of the students and the development of disease symptoms.

Table 7 *Risk factors in the lifestyle of the students (n = 102)*

Factors	regularly	irregularly	Total
Stress	33 %	45 %	78 %
incorrect diet	28 %	19 %	47 %
lack of exercise	36 %	43 %	67 %
alcohol consumption	3 %	8 %	11 %
smoking	9 %	15 %	24 %
lack of sleep	8 %	19 %	27 %

DISCUSSION

A positive fact is that 23 % of the students do aerobics, Pilates, Zumba, or trampoline workouts. It follows from the above that the students prefer collective physical activities combined with music between 5 and 7 p.m. Exercise in fitness centres is also popular. In this connection Kasa (2005) considers it is important to stress the significance of the amount and frequency of exercise because if someone does exercise less than once a week or only once a week, they cannot feel the positive effects of physical activity that would lead to improvements in their health.

As much as 47 % of the students had bad eating habits and various studies affirm that a diet with a high fat content (Astrup et al., 2002), rich in energy (Bell et al., 1998) and a sedentary lifestyle (Fogelholm – Kukkonen - Harjula, 2000) are really the factors that are most closely related to the increased occurrence of obesity in our observed group.

Lack of sleep was present in 27 % of the students. In this connection, Liba (2000) claims that laboratory and epidemiological studies indicate that a reduction of sleep patterns can lead to the increased occurrence of diabetes and obesity. The relation between the lack of sleep, increased body weight and the risk of developing obesity can be caused by the change in glucose metabolism, increased appetite and decreased energy output.

There is a disturbing trend, as a significant decrease in purposeful and meaningful activities and particularly of spontaneous and organized sporting activities within the leisure time of the youth. This fact leads to the consideration of “the crisis of leisure time” which is related to the activities of family and the whole society (Bendíková - Kostencka, 2013).

CONCLUSION

This empirical research contributes to the spread of information about the state of health of the female students and the most common health problems that often result from their unhealthy lifestyle. We have found that minor health problems combined with several other health issues prevail significantly. It has also been found that regularity of various sporting activities with higher intensity is absent in their lifestyle and this combined with bad eating habits results in obesity and an increase in body weight. It should be pointed out that 11.52 % of the students are underweight in proportion to their body height. It follows from our findings that there are several factors which can negatively affect the future health of the students, therefore we recommend in terms of prevention, to increase the cooperation between physicians, teachers and families of the children and young people, but also enhance the public awareness through workshops, mass media and advertising. Last but not least, the national strategies should provide and create opportunities for the improvement of physical activities and support the availability and the access to healthy food through the involvement of various government sectors, society, private sector, and other people and organizations involved (Hainer, 2004).

CHAPTER 2.2

HEALTH EDUCATION IN HEALTH PROMOTING SCHOOLS – POLISH PERSPECTIVE

KATARZYNA BORZUCKA-SITKIEWICZ,
KATARZYNA KOWALCZEWSKA-GRABOWSKA

Abstract: *The purpose of this article is to present the opinion of school health promotion coordinators about the organization and implementation of health education. The schools that took part in the research are the members of the Health Promoting Schools National Network in Poland. The research was based on a specially designed questionnaire, and the results can help to improve the functioning of health promoting schools in Poland.*

Keywords*: health promoting schools, health education, Poland*

INTRODUCTION

Schools may play a special role in creating health behaviour. Since schools promote health, they may also influence attitudes and behaviours of students and their parents. This aim can be achieved by implementing health education in schools, which is supposed to:

- "build an understanding of the lifestyle and environmental factors which increase risk of disease and affect chances of health,
- influence values so that health is valued more highly and health-damaging behaviours less so,
- build skills so that people are empowered to adopt health-favouring behaviours more easily and can challenge health-harming environments,
- build understanding of the opportunities for government and authorities to influence health" (Kemm, 2015, p.96).

For this reason, over the years there have been attempts to introduce health education into the core curriculum in Polish schools.

Despite many years' attempts, health education was introduced as late as in 1997, but it was not included in the school timetable. Two years later, *i.e.* in 1999, 'health education' educational path was introduced in primary school and lower secondary school, and in 2002, 'health education' educational path was introduced in all types of schools. In 2008, a decision was taken to incorporate the 'health education' module in the core curriculum of physical education in lower secondary schools and upper secondary schools. The policy makers assume that it should be followed by the school at specific education stages within the scope of many subjects (Polish language, foreign language, social studies, biology, preparation for family life), but mainly during physical education classes.

A special place where health education can be acquired successfully by students is a health promoting school. "The three leading organizations, the European Commission (EC), the WHO Regional Office for Europe and the Council of Europe (CE), developed the idea of integrating health promotion into every aspect of the school setting, addressing all the people connected with it: pupils, their teachers, all other school staff, parents and eventually the wider community"(Noble, Toft, 2012, p.142). In the SHE (Schools for Health in Europe) network a 'health promoting school' is defined as "a school that implements a structured and systematic plan for the health and well-being of all pupils and of teaching and non-teaching staff. This is characterized as a whole school approach (or 'whole of school approach'). In the different European countries other terms are used such as 'healthy schools', 'good and healthy schools', but they all have a similar intention. School health promotion is another term that is used to describe health promoting schools"(Health Promoting Schools, 2015).

Schools being part of SHE network are taking actions based on the concept of positive health and good well-being, at the same time using the provisions of the UN Convention on the Children's Rights and European Convention on Exercising the Children's Rights. A superior objective of a health promoting school is a healthy lifestyle of the entire school community, under which acquiring life skills is a priority action (Flaschberger et al., 2013, p.993). "In enabling schools to become healthier places, SHE aims to integrate health promotion into every aspect of the curriculum, introduce healthy programmes and practices into schools' daily routines, improve working conditions and foster better relations both within the schools and between them and their

local communities"(Noble, Toft, 2012, p. 142). The differences arising from the traditional way of health education implementation at school and school health promotion programme are presented in the table below (Green, Tones, 2010, p.435):

Table 1 *Moving from traditional school health education to the health promoting school*

Traditional health education	**The health promoting school**
Considers health education only in limited classroom terms	Takes a wider view, including all aspects of the life of the school and its relationship with the community
Emphasizes personal hygiene and physical health to the exclusion of the wider aspects of health	Based on a model of health that includes the interaction of physical, mental, social and environmental aspects
Concentrates on health instruction and acquisition of facts	Focuses on active pupil participation with a wide range of methods, developing pupils' skills
Lacks a coherent, coordinated approach that takes account of other influences on pupils	Recognizes the wide range of influences on pupils' health and attempts to take account of pupils' pre-existing values, beliefs and attitudes
Tends to respond to a series of perceived problems or crises on a one-off basis	Recognizes that many underlying skills and processes are common to all health issues and that these should be pre-planned as part of the curriculum
Takes limited account of psycho-social factors in relation to health behaviour	Views the development of positive self-image and individuals taking increasing control of their lives as central to the promotion of good health
Recognizes the importance of the school and its environment only to a limited extent	Recognizes the importance of the physical environment of the school in terms of aesthetics and also direct physiological effects on pupils and staff
Does not consider actively the health and wellbeing of staff in the school	View health promotion in the school as relevant to staff wellbeing and recognizes the exemplar role of staff
Does not involve parents actively in the development of health education programme	Considers parental support and cooperation as central to the health promoting school
Views the role of school health services purely in terms of health screening and disease prevention	Takes a wider view of the school health services, which includes screening and disease prevention, but also attempts actively to integrate services within the health education curriculum and helps pupils to become more aware as consumers of health services

Source: Young and Williams, 1989, p.32

Polish schools more and more frequently apply for joining the SHE networks, increasing their standards and following the health ethics in school. The network comprises over 2,000 Polish schools, of which a Certificate of Health Promoting Schools National Network is currently held by 142 schools in Poland (Woynarowska-Soldan, Skoczek, 2014, p.77).

A key figure in the health promoting school is the school health promotion coordinator, which oversees the development and introduction of the health-related initiatives. Different schools have different practice of selecting coordinators. In some schools, teachers willing to act as the coordinator apply themselves, in others - coordinator is indicated by the principal. Coordinators may be teachers of different subjects, and they should be characterized by an open attitude towards the value of health.

OBJECTIVE

Understanding the contribution of the whole-school staff to health education is an important goal in health education research (Jourdan, D. et al., 2010, p. 519). The main objective of undertaken research was gathering the opinions of schools health promotion coordinators on the implementation of the health education content and their competencies in the field of health education. 103 coordinators from schools with a Certificate of Health Promoting Schools National Network took part in the research. Among the surveyed coordinators there were 39.81% of early childhood education teachers, 19.42% of physical education teachers, 9.71% of education for the family life teachers, 7.77% of the Polish language teachers, 6.80% of math teachers, 5.83% of computer classes teachers, 4.85% of technical classes teachers and biology teachers, and 2.91% of foreign languages, art teachers, physics teachers and education for safety teachers. Teachers of computer science, chemistry, geography, philosophy, history and society and music accounted for less than 2% of the surveyed population. Additionally, 18.45% of respondents chose the "other" category, indicating that they are teachers in the school common room or dormitory, teachers of practical training, teachers of revalidation classes or school counselors.

The survey was conducted to answer the following research questions:

1. What health education content is actually implemented in health promoting schools?
2. What is the way of health education programme realization in health promoting schools?
3. How schools support health education realization?

METHODOLOGY

The research was conducted in May and June 2015. The list of schools has been prepared on the basis of the data posted on the Team for Health Promotion in the School website. The Team is housed in the structures of the Centre for the Development of Education in Warsaw, which is the School Promoting Health project coordinator (Szkoły z Krajowym Certyfikatem Szkoła Promująca Zdrowie, 2011). A specially designed National Questionnaire on Health Promoting Schools prepared by University of Limerick's employees and adapted to Polish conditions in University of Silesia was sent to 142 schools. The tool has been addressed to coordinators with a request to send completed questionnaires till the 15 of June. 103 completed questionnaires were returned and they were carefully analyzed.

RESULTS AND DISCUSSION

Health education content in health promoting schools

The largest percentage of the respondents (over 99%) indicates that the content related to physical health is implemented in the programme of health education in their school. The least of the respondents (42.72%) have indicated the issues connected with relationships and sexuality, which shows that the content related to sex education is unfortunately not widely implemented in schools. The subject "Education for the family life" exists in Polish schools, however participation is not mandatory, and the issues related to sexuality are marginalized. Over 45% of the respondents completed the provided list of topics as follows: healthy food, care of one's body, the safety of others, environmental protection, mental health, inclusive education, coping with stress, cyberbullying, healthy

holiday, first aid, etc. The data described above are illustrated in Figure 1.

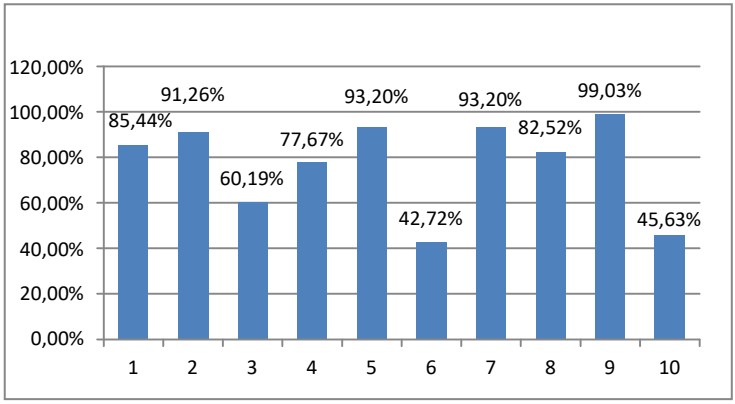


Figure 1 Health education content

(1. Belonging and integrating 2. Communication skills 3. Influences and decisions 4. Friendships 5. Emotional health 6. Relationship and sexuality 7. Personal safety 8. Substance use 9. Physical health 10. Others)

The idea of health promotion involves a holistic approach to health issues, so the balance between all aspects of health is very important also within content of health education programme. It is unacceptable that certain topics (eg. relationship and sexuality) are marginalized, especially in schools where health promotion is an integral part of the school programme.

The realization of health education programme in health promoting schools

An important element of the health promoting school concept is an active and creative involvement of the whole school community in the implementation of health education, which requires planning specific activities in this field. Therefore, the issues related to the way the of health education implementation are included in conducted research.

Nearly 73% of the coordinators strongly agree with the statement that health education has a place in teaching and organizational activities undertaken by the school, and the school has developed a programme of health education. Nearly 4% of the coordinators is not oriented in this issue. These data are demonstrated in Figure 2.

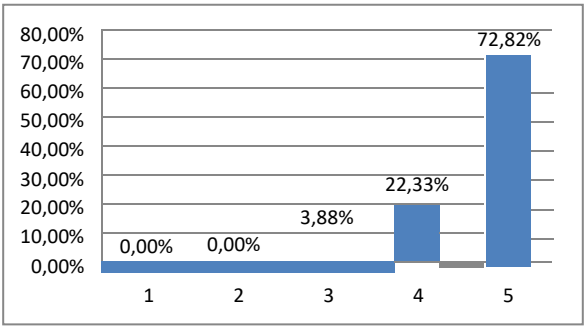


Figure 2 *Preparation of health education programme at school 1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree)*

The opinions of less than 4% of respondents indicating a lack of orientation in the health education programme developing process cause the major doubts, because having the programme is a necessary condition of obtaining the Health Promotion School Certificate. The discovered fact may indicate the low awareness of the school health promotion specifics and/or the lack of supervision over the implementation of the health promotion programme.

Coordinators were also asked about the way of health education implementation in their schools. In Poland there is no separate subject of health education and its content is implemented in different subjects (cross-path) with special emphasis on physical education in lower and upper secondary schools.

The data contained in Figure 3 illustrate the ways of health education realization in surveyed schools. More than 86% of the respondents stated that health education in their schools is carried out in a cross – curricular way. Nearly 12% of the respondents indicated that health education is not only implemented in different subjects, but in parallel a separate subject has been created. Nearly 38% of the coordinators pointed out other ways of health education realization, such as: educational projects, ad hoc actions, lectures, meetings with people working in the field of health care (nurses, doctors, nutritionists), school shops offer, courses, tours etc.

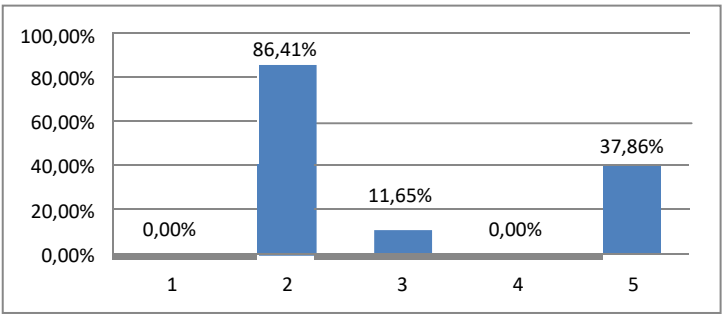


Figure 3 *Way of health education programme realization (1. A specific subject on the timetable, 2. Cross – curriculum, 3. Both, 4. None of the above, 5. Others)*

The support for health education realization in health promoting schools

More than 91% of the respondents agree or strongly agree with the statement that their school supports the practice of health education. Only 3,88% of the coordinators believe that their school does not sufficiently support practices related to health education or have no opinion on this issue. Surprisingly 4,86% of the respondents did not answer this question. Percentage distribution of answers is presented in Figure 4.

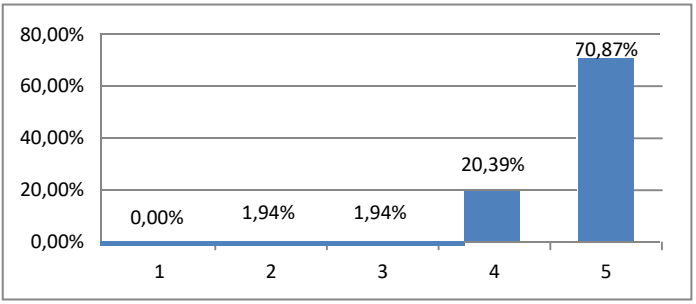


Figure 4 *School supports health education practices (1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree)*

85 % of the respondents agree or strongly agree with the statement that health education has adequate resources (human, material) in their schools. Only less than 3% of the coordinators felt that resources

for health education in their schools are inadequate and another 3% did not answer this question (Fig.5).

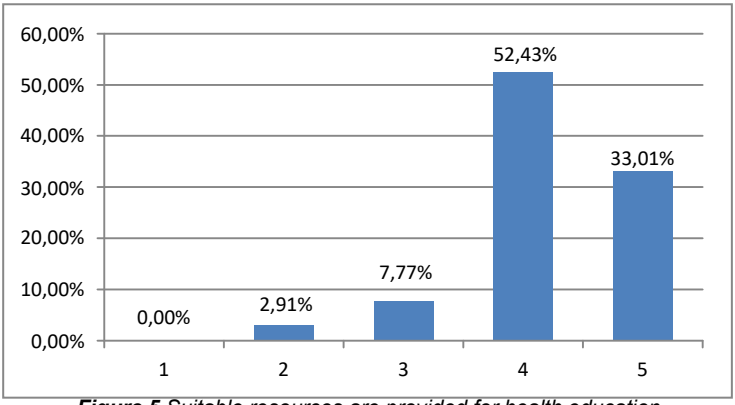


Figure 5 *Suitable resources are provided for health education*
(1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree)

Over 80% of the respondents agree or strongly agree with the statement that health education is a priority in their schools' timetabling. Less than 5% of the coordinators present the opinion that health education is not a priority when designing timetable, and 11,65% of the respondents have no opinion on that issue (Fig 6).

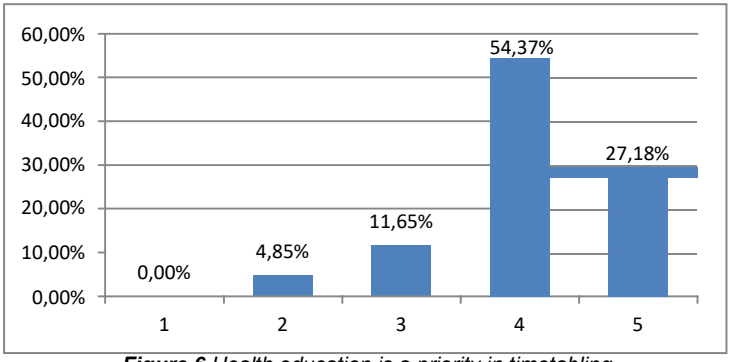


Figure 6 *Health education is a priority in timetabling*
(1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree)

Over 88% of the respondents agree or strongly agree with the statement that teachers in their schools have been trained in health education. 8,74% of the coordinators have no opinion on that issue and 3% of the respondents did not answer this question (Fig.7).

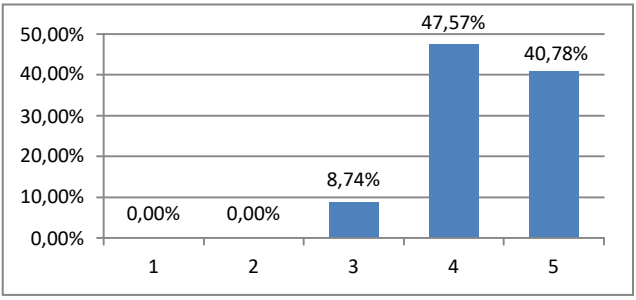


Figure 7 *The teachers have been trained in health education*
(1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree)

More than 93% of the respondents agree or strongly agree with the statement that teachers in their schools are convinced of the health education value. Less than 6% of the coordinators have no opinion on this topic (Fig.8).

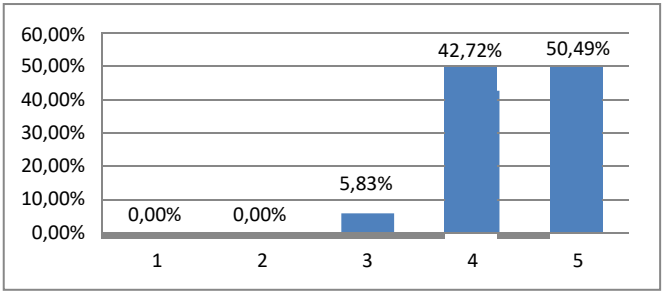


Figure 8 *All teachers are convinced of the value of health education*
(1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree)

Over 96% of the coordinators is convinced of the value of health education. About 1% have no opinion on this subject, and less than 3% did not answer this question, what was surprising due to the fact that the respondents were school coordinators responsible for supporting various initiatives in the field of health education and health promotion (Fig. 9).

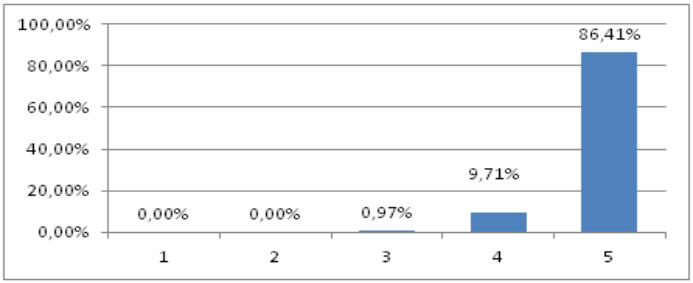


Figure 9 *The coordinator is convinced of the value of health education (1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree)*

Over 96% of the respondents agree or strongly agree with the statement that the principal supports activities in the field of health education. Less than 1% have opposite opinion, and less than 2% have no opinion on the subject (Fig.10).

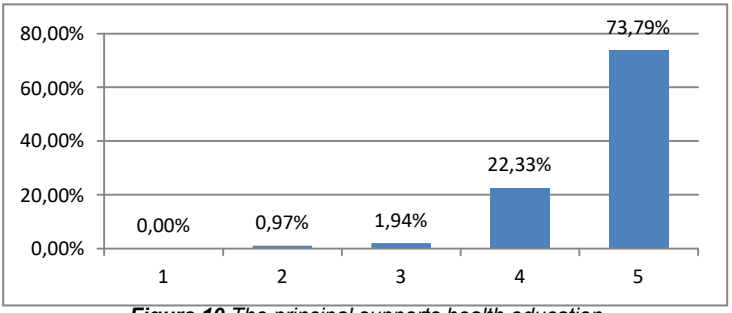


Figure 10 *The principal supports health education (1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree)*

Basically, the results advantageously demonstrate commitment to the goal of school health promotion. They point to the involvement of the whole school community to the idea of health promotion. Striking is the fact that about 4% of respondents systematically did not answer some of the questions.

Perhaps this is due to the fear of exposing the negative opinion and potential restrictions (research was conducted under the auspices of the Centre for the Development of Education in Warsaw supervising

Health Promoting Schools in Poland) or lack of involvement in health promoting activities resulting from coercion of being the coordinator.

CONCLUSIONS

Holistic content of health education is realized in most of the health promoting schools, however the issues related to relationships and sexuality are marginalized. In most of the schools the content of health education is carried out on many subjects, and in nearly 12% of the schools a special subject related to health education has been created, which is considered to be a very advantageous solution. Giving health education additional time and place in the organization of school life allows students to understand the importance of discussed issues and may bring substantial changes in their knowledge and skills. According to the coordinators' declarations the health education programme has been prepared in more than 95% of health promoting schools. The remaining percentage of respondents did not answer this question or had no opinion on the subject. This is surprising because only the schools with a certificate of the Health Promoting Schools National Network took part in the research, and writing the original programme of health education is one of the essential conditions for obtaining a certificate. It is assumed, therefore, that some of the respondents are not interested in the duties of the coordinator, hence the lack of knowledge, which may be due to the fact that some of them have been appointed to this role by the principals, and did not apply themselves. Nevertheless 96% of the coordinators is convinced of the value of health education. Noteworthy is the fact that according to the respondents school principals support all the actions related to health education initiated and implemented in schools, and only 1% of respondents disagree with this statement, what suggests that the opinion about the rightness of undertaken actions is also strong among administrative staff. Schools for Health in Europe motto „Promoting better schools, leads to a better life" should be disseminated in all schools, for the initiatives related to strengthening health have universal value.

CHAPTER 2.3

EDUCATION TO PROMOTE HEALTHY SLEEP HABITS IN ATLETHES

TETSUO HARADA, MILADA KREJČÍ, TOMOKO WAKAMURA, TAKAHIRO KAWADA AND HITOMI TAKEUCHI

Abstract: *Basic strategies to promote mental health in young athletes develop human responsibility for the state of health. Knowledge and skills leading to the reduction or elimination of excessive mental and physical stress in daily life (not only in sport life) bring to sportsmen the knowledge of "Self „and a development of the potentials in sense of appropriate and real-life perspectives implementation. Education to wellness stresses the positive orientation in the individual life, development in beliefs about the sense of human life. Wellness becomes a part of the protection and promotion of mental health in young athletes with a tendency to initiate self-education. It contributes to the cultivation of young sportsmen actions and behaviour. The intervention studies for promoting sleep and mental health of athletes consisted of three sessions. The first session was basic questionnaire study on the infants. The latter two sessions are intervention studies including milk intake at breakfast for the athletes and the infants. The intervention to Kochi university soccer team was performed for 21 days in November 2014. Seventy three participants continued to intake 200ml of cow milk which was distributed to all 73 soccer team members every morning for 21 days (experimental group), whereas milk intake was prohibited to 20 members for the 21 days (control group). Using a subjective evaluation method as performance questionnaire, soccer performance on playing (Assessment of the situation, field of vision, hardness of irritation, body balance, motivation to exercise) was improved after the intervention, whereas no change in the control group. Saliva melatonin level at 22 o'clock was higher after the intervention in the experimental group than that in the control group, whereas no difference in saliva melatonin at 23 o'clock between the two groups. This result would imply that milk intake at breakfast might lead to phase advance of circadian clock.*

Keywords: *Education strategies, Athletes, Intervention programs, Cow milk intake, Breakfast, Tryptophan, Serotonin, Melatonin, Health, Relaxation, Performance achievement.*

1 PROBLEM OF SLEEP BEHAVIOUR AND MENTAL HEALTH PROMOTION

1.1 Sleep habits and circadian clock in the context to sport performance

Mental disorders are on the rise in whole civilised word globally. Depression is already the most prevalent mental health problem in nowadays. Daily biorhythm is a natural cycle of the organism, includes power maxima and minima, periods for rest. Bad sleep regime has resulted in sportsman prone to depression, cardiac and vascular disease, gastric neurosis, in the best case, one has a bad mood, is inefficient and tired. The negative effects are more pronounced in females than in males and more in juveniles than in adults (Harada et al., 2012; Takeuchi et al., 2005). Sleep is an important part of human life. It is defined as the functional state of the organism, which is characterized by specific neurophysiological properties. The quality and length of sleep are very important factors in the quality of life. Sleep affects physical and mental performance, physical and mental health. Sleep is essential for the quality of mental health. Sleep is the most natural way unlocking all current, as in consciousness in the course of registration, the gradual processing of all daily sensory stimuli. It is advantageous in terms of mental health to fall asleep earlier in the evening and in the morning wake up sooner. In healthy adolescents and adults, it is the optimal to sleep around 22.00. People called “evening type” (E) have their temperature and maximum power shifted to later hours than the so-called “morning-type” (M) people. Compliance with the lifestyle rhythms, which is genetically determined, promotes proper functioning of physiological functions of the body. The fresh feeling after waking depends upon the representation of deep sleep (stage 3 and 4) during the night, but a very important factor is the number of past full sleep cycles. Most often a person wakes up in the morning after the REM phase, which each sleep cycle concludes. After the REM phase one feels energetic, does he challenge to find, is now able to "start". Nowadays, people sacrifice sleep because of a difference - work commitment, fun, worry, etc. Good quality of sleep is very important for the proper functioning and regeneration.

The optimal level of mental health, mental well-being and condition in athletes is a key resource for their success in sport performance. As Halson (2014) interpreted, sleep deprivation can have significant

effects on athletic performance, especially submaximal, prolonged exercise. Sleep has numerous important physiological and cognitive functions that may be particularly important to elite athletes. Recent evidence, as well as anecdotal information, suggests that athletes may experience a reduced quality and/or quantity of sleep. Compromised sleep may also influence learning, memory, cognition, pain perception, immunity and inflammation.

Sleep is a complex physiological and behavioural state that has two primary states based on physiological parameters. These are rapid eye movement (REM) and non-rapid eye movement (NREM) sleep. An electroencephalogram in which electrodes measure brain electrical activity is used to identify the two states. NREM sleep is divided into four stages, which are associated with a progressive increase in the depth of sleep. REM sleep is characterized by muscle atonia, bursts of REM and dreaming. Therefore, REM sleep is considered to be a condition with an activated brain in a paralysed body. Memory consolidation occurs during REM sleep.

The coaches, tutors and trainers should understand the physiological functions of the two states of sleep in their daily education of athletes. In juvenile athletes, education for sleep health promotion can be seen to be effective to solve the problems in action – "to manage the life". It means to lead the way to be healthy and able to fulfil goals in individual athletic life. It links to the circadian regime regulation and is expressed in the daily care of the release, sleep, nutrition, training regime, etc. The cycle of day and night is reflected as a rhythmic alternation-a primary zeitgeber to human circadian clock, and thus the man rhythmically alternates burden action and rest. Fatigue signals in athletes, especially in juvenile athletes, need to be eliminated through health sleep. Fatigue presents a protective mechanism against stress. Tired sportsman is irritated, causes conflict and can be aggressive or apathetic. When in the addition he was forced upon the tiredness, the rest is not of his free choice, with irritability and restlessness which grow.

Tiredness (especially physical) can help to asleep, but if sport training is implicated 1-2 hours before bedtime, it can bring complication in asleep. Therefore, as a rule of the sleep hygiene, sport training should be realized minimally 3 hours before bedtime. Athletes should pay attention to individual sleep regime and to try to eliminate sleep problems by following and keeping next guidelines:

To reduce or eliminate the time spent in front of any screen and other sources of “blue” lights late evening. Reading SMS, chatting, playing on computer, or any type of social IT “nettism” have a negative impact on sleep and quality of sleep, and scrolling on smart-phone in midnight shifts time to fall-asleep delayed to midnight.

The problem is that emit flashing of "blue" light (with the wave period of 460 nm which peak of absorption by melanopsin as a photo pigment: Provencio and Warthen, 2012) stimulates the activity of the brain, and if it brings in "combat readiness" and vice versa suppresses melatonin production at night. It is necessary for promoting and keeping of young sportsmen health and power to plan sport training activities in the morning time or in the afternoon time - in any case not to late evening, otherwise the effect will be the opposite.

To keep a weekly to monthly overview of not following a television, not played on computers, etc. with subsequent analysis and evaluation for the personal level of sleep hygiene.

This can still contribute to local conditions, such as high and dense development restricting access of natural light, all-day stay in rooms with insufficient daylight or with only artificial lighting, etc. A significant part of the population in such a deficit of daylight produced characteristic symptoms and problems, such as fatigue, drowsiness, decreased activity and performance, lethargy, body weight gain, headaches, etc. (Harada et al., 2007). These symptoms are referred as the “syndrome SAD” (seasonal affective disorder), which can be described as seasonal detuning organism. For example, in Czech Republic this syndrome is associated with period of October – March. Difficulties arising in this syndrome can be removed or at least substantially be reduced by the exposure to morning sun light, fluorescent lamps or LED lamps with sufficient blue lights with 460nm as a wave period after the consumption of protein-rich breakfast, because sufficient synthesis of serotonin in pineal occurs in the morning (Harada et al., 2007; Nakade et al., 2009, 2012). The serotonin synthesis diminishes the level of depression in the winter season.

Sleep during the day cannot replace lack of night sleep. Only in darkness during night time can be created melatonin. Sleep and circadian modulation control have an effect on the secretion of most hormones. Sleep not only affects hormones hypothalamic-pituitary axis, but also hormones control carbohydrate metabolism, appetite and

fluid and electrolyte management. After falling asleep (during non-REM sleep) hypothalamus plays an important role along with the pineal gland. Hormone which is involved significantly in the management of sleep and wakefulness is melatonin. The production of melatonin is influenced by the presence of light, diet and the use of certain types of drugs.

Melatonin is a "hormone of darkness", which is controlled by a light stimulus whose work begins to rise sharply in the dark, with a maximum value around the so-called subjective midnight (about 21.00 to 2.00 pm). Melatonin has an effect on specific clusters of neurons in the brain that trigger and induce sleep. Reducing the level of light in the outside world is a stimulus that activates the pineal gland to increase the secretion of the melatonin. Strong light melatonin secretion prevents the contrary.

The discrepancy between the course of alternating light and darkness, day regimen may produce lighter or very serious disorder. It is well known that such failures and the need to compensate for disturbances of circadian rhythm induces sudden displacement person in another time zone, for example during traveling to other continents. Therefore, athletes who participate in the international competitions are traveling from distant countries either immediately before the race, or better in sufficient time to make their circadian rhythm could fully cope with local conditions.

Examining of the quality of sleep is currently most widely used in the research area. Becomes the object of interest as the population of juvenile athletes and college students (see the authors´ publication outputs in this research area – e.g. Harada, Krejčí, et al. 2016) in connection with the creation and production of melatonin and serotonin. The description of the hormone melatonin effects is mined in the area of sport performance directly revolutionary. And not only that – it is an extremely important hormone for anyone. According law in many countries, including Czech Republic and Japan, it is not permitted melatonin to sale free in the form of Dietary Supplement. Melatonin molecule is chemically simple, arises from the essential amino acid tryptophan ¬ way through serotonin. Melatonin production is highest in infants (which are a reason, why they are sleeping too much), so this hormone in cooperation with the high production of growth hormone ensures rapid physical development. High production of melatonin is maintained in the range from one year up to about 15 years, followed by a rapid decline, so in the age of 50 years is one

sixth of the original. With advancing age continues to drop, and it is in correlation with insomnia and depression in the elderly. However, melatonin production is adversely influenced by many factors.

Melatonin is primarily a regulator of the circadian rhythms. Melatonin is also referred as an "anti-aging hormone", because its production is minimized in elderly. Melatonin reduces the risk of arthritis, slowing down the natural aging process, removes disorders resulting from shift work, supports the immune system, reduces the negative effects of prolonged adaptation when traveling across several time zones, eliminates most cases of insomnia, limits negative effects of radiation, reduces the risk of cataracts, acts as a preventative agent in the case of a genuine risk of breast cancer and as a treatment for women affected by cancer, limits the negative effects of chemotherapy the treatment of cancer, lowers cholesterol, and even reduces high blood pressure, eliminates problems with premenstrual syndrome, applied it in combination with minimal doses of progesterone in menopausal women.

The circadian rhythm in the secretion of melatonin is generated by an endogenous clock located in the suprachiasmatic nuclei (SCN) of the hypothalamus. The melatonin secretion rhythm is entrained to the dark period and the melatonin secretion can be acutely suppressed by light exposure during the night. Further, the intensity of light required to suppress the melatonin production is higher in humans than in most of the other animal species. However, there are reports that melatonin inhibition occurs even under low light intensity (Zeitzer et al., 2000; Gooley et al., 2011). Lewy et al. (1980) demonstrated that melatonin secretion in humans could be inhibited by an artificial light of sufficient intensity and duration. A dose-dependent effect of the suppression was observed between 500 and 2,500lux given for 2 hours from 2 a.m. to 4 a.m. at the first time (Lewy et al., 1980). In addition to that, the bright light acutely affected the core body temperature rhythm (Badia, Myers, Boecker, Culpepper, & Harsh, 1991). Due to the earth's rotation on its axis, the temporal alternative stimulation of light and dark on the retina synchronizes the SCN to a matching 24-h period. On the contrary, in the modern life, the increased use of electric power for the lighting at night and a sun-free environment during daytime indoor buildings could lead to lowered amplitude of light-dark cycle as an most important circadian zeitgeber for human. It is known that light intensities during night-time regulate the secretion of melatonin and affect circadian disruption.

Furthermore, changes in glucose metabolism and neuroendocrine function as a result of chronic, partial sleep deprivation may result in alterations in carbohydrate metabolism, appetite, and food intake and protein synthesis. These factors can ultimately have a negative influence on an athlete's nutritional, metabolic and endocrine status and hence potentially reduce athletic performance. Research has identified a number of neurotransmitters associated with the sleep–wake cycle. These include serotonin, gamma-aminobutyric acid, orexin, melanin-concentrating hormone, cholinergic, galanin, noradrenaline, and histamine. Therefore, nutritional interventions that may act on these neurotransmitters in the brain may also influence sleep. Carbohydrate, tryptophan, valerian, melatonin and other nutritional interventions have been investigated as possible sleep inducers and represent promising potential interventions. In this review, the factors influencing sleep quality and quantity in athletic populations are examined and the potential impact of nutritional interventions is considered. While there is some research investigating the effects of nutritional interventions on sleep, future research may highlight the importance of nutritional and dietary interventions to enhance sleep. (Halson, 2014)

Substances causing to increase melatonin production:

- Expose to intense sunlight during the day;
- During the night sleep must be absolute darkness;
- Hot bath before bedtime (the procedure is questionable since congestion increases brain and body temperature, reducing fatigue, and thus will not only increase the production of melatonin, but also growth hormone).

Substances causing to decline melatonin production:

- Non-steroidal anti-inflammatory drugs, like aspirin, in large doses causes a chronic decline by up to 75%;
- Ibuprofen and Indomethacin completely stop nocturnal melatonin production;
- Beta-blockers completely block the production of melatonin;
- The anti-anxiety drugs, as Diazepam, block the process of melatonin production;

- Antidepressants and inhibitors - fluvoxamine, desipramine (Pertofran) and MAO inhibitors (Nardil) increase the production of melatonin, but fluoxetine (Prozac) blocks it;
- Vitamin B12 - large doses reportedly reduce the production of melatonin. (This is a problem for bodybuilders and other athletes who use vitamin B12 and its derivatives - dibencozid);
- Caffeine - Caffeine reduces excess levels of melatonin, thereby causing insomnia, anxiety, arrhythmia, and stomach problems;
- Corticosteroids - causes sleep disorders by reducing melatonin;
- Tobacco reduces the level of melatonin;
- Alcohol reduces melatonin levels, if it is consumed just before bedtime.

Alcohol consumption also appears to have a causative effect in sports related injury, with an injury incidence of 54.8% in drinkers compared with 23.5% in non-drinkers ($p < 0.005$). This may be due in part to the hangover effect of alcohol consumption, which has been shown to reduce athletic performance by 11.4%. Education is the cornerstone for appropriate social use of this drug. Athletes and coaches need to be aware of the sports related adverse effects of alcohol consumption and its role in sports injury and poor physiological performance.

1.2 Relaxation and breathing development

Wellness is defined as “optimal state of health of individuals and groups. There are two focal concerns: the realization of the fullest potential of an individual physically, psychologically, socially, spiritually and economically, and the fulfilment of one´s role in the family, community, place of worship, workplace and other settings” (WHO, 2000). Wellness is defined as the principle by which individuals and groups of people learn to behave in a manner conducive to promotion, maintenance, or restoration of health and human potentials. Deductively it can be found out that educational aim of wellness is to develop in social life a sense of responsibility for health - as individuals, as members of families and as society members. Implementation of mental health promotion techniques in a person's sport life, whether

coach, trainer or athletes are targeted to actively promoting of good mental health. In sport milieu according to education to wellness a “Continuum of Self-transformation” was established in sense of procedural individual changes. The continuum comprises sectors: Relaxation - Adequate movement regime - Nutrition – Prevention medical care - Personal salutogenesis. Repeatability of the continuum is real in coherent cycles (Krejčí, 2013).

The base of relaxation is an internal attention, which can start with an observation of breathing process and consistent of the breath and movement. It helps effectively in a positive mood changes, control of emotions, esp. of anxiety, stage of fright, fear. Basis of release, as any jerkiness is a manifestation of repression experience and no fading, conflict situations. In the control of negative thoughts and ideas can help technique of "Self-Inquiry Meditation (Maheshwarananda, 2001). This technique presents a combination of relaxation and concentration techniques, which reduce stress and mental tension, develop self-esteem and satisfaction and evoke happiness. Just as a physical exercise manifests in physical fitness and muscle strength, similarly concentration enhances mental health (memory, reaction time, etc.) and self-control. Self-examination ("Self-Inquiry Meditation") develops freedom and inner peace, promotes intuition and empathy. It is a key technique to develop self-control and self-esteem, which is a strategy for mental health in young sportsmen. It shows that it is possible to live in the present moment. In this state of inner concentration gradually decrease emotional blocks, fears, phobias and anxiety.

The main aim is gradually to master the basic strategies of mental hygiene, circadian rhythms and habits skills through participating in intervention educational programs of trainers, coaches and especially young sportsmen. Another aim is to implement learning about circadian clock, sleep habits and techniques of mental hygiene in elementary schools for all pupils, sportsmen and non-sportsmen.

Therefore it seems essential to monitor and influence marks of the somatic and psychosocial development of appropriate regulatory teaching strategies in the field of solved problematic. The situation perceived as a threat to personal integrity, affect the reduction of self-esteem and self-image, which subsequently leads to undesirable changes in behaviour of health care, such as lack of interest in diet, excessive or inadequate food intake, drug use, physical activity on any level, violations of circadian rhythms, etc. However, it is important to work on the Self- transformation, which allows self-control and self-

esteem, and perceive variability of situations in life in a broader context, i.e. with understanding and insight.

Humanistic education is based on the thesis that man is a unique and free being, with a tendency towards personal growth and continuous development. The man is in terms of teaching strategies in the field of mental hygiene to maintain a holistic approach (holistic, shape and aspect system of mental hygiene) with emphasis on the present. At the change of school education towards health promotion (area "People and Health" in primary and secondary schools - the introduction of the subject "Health Education ") opens the opportunity for learning self-regulation techniques (in particular, relaxation and breathing techniques) that are valuable throughout life person. Self-regulatory techniques lead to improved homeostasis and positive effect on biological rhythms, including sleep and breathing rhythms.

However, mental health is closely related to social health - networking, health communication, relationships, environmental education, to the wellness and vitality. The most promising is the teaching of specific mental hygiene practices, together with the strengthening of self-confidence, dignity and autonomy. Anyone who respects “Self” can be more easily motivated to make something useful for themselves and the health of others.

1.2.1 Relaxation as a prerequisite of health sleep

Relaxation is the “cleansing” of the body from the so-called residual muscle and mental tensions. In the central nervous system are designed sensations from various parts of the body. The projection of physiological scheme shows, that it is useful during relaxation to pay more attention to fingers and toes, parts of the face (cheeks, chin, tongue), i.e. those parts which for the greater part of the motor and sensory areas of grey matter. Short relaxation can be classified like short refreshment during the day or it is inserted between the sport training periods. Short relaxation requires some experience with relaxation at all. The muscles of the better releases present the prior of practicing. Relaxation should be practise in a peaceful environment where they feel comfortable with the certainty that nothing disturbs suddenly.

1.2.2 Breathing techniques

Breath is one of the fundamental biorhythms, which can be easily monitored. It connects perfectly physical and psychological areas. Of breath we can regulate own health, but also our emotional expressions and movements. Short and shallow breath is unhealthy. Such breath causes restlessness, nervousness and tension in the body. The healthiest is calm, deep and slow breathing, which is characteristic for balanced and stabile persons.

Three types of breathing:

- Subclavian breathing is the least healthy breathing. It is short and fast. Short and rapid breathing associated with a short life.
- Chest breathing is the most common way of breathing in sport activities. Breathing is slower, but still shallow. The result is tension and nervousness.
- Abdominal breathing is the most effective of the three methods. It is slow and deep. Deep and slow breathing is an important prerequisite for a healthy and long life.

Emotional stress has a negative effect on the rhythm and depth of breathing. But it does mean that it can also adversely affect the regulation of breathing through intentional mental state. Controlled breathing can dissolve the consequences of untreated stress, activate attention, moderate pain, can overcome fatigue, facilitating peaceful sleep and calm aggression.

Breathing is a process driven visceral nerves, it is largely unconscious act. However, mere mechanical breathing exercises, without internal concentration, they are not effective enough. It is crucial, with the attention and experience breathing exercises are performed. The first step is to restore breathing through the nose and replace the emergency breathing through the mouth. Mouth breathing in childhood is one of the causes of poor performance of child, affects concentration, thinking and overall behaviour. The consequences of improper breathing may be reflected in the nasal mucosa in the form of adenoids, which then becomes the main obstacle breathing. With proper breathing through the nose, the air warms up and read in three transverse interconnecting channels of the nose. Mostly, however, is

used only channel bottom, which is the result of misuse shallow breathing. Most usually neglected passage is in the upper nose. It is precisely this passage of air just below the ridge of the nose is very important. This breath is achieved mild irritation of the pituitary gland, which affects the activity of the endocrine glands and hence the overall psychophysical balance.

Another consequence of improper breathing pattern is broken rhythm of breathing. With proper breathing exhalation is always longer than the breath that could occur after a momentary pause, required for new muscle tension and thereby to facilitate a deep breath. Rhythm harmonizing breath should reflect the ratio 3-5 times 5-7 times to inhale exhale. Inhalation is always associated with the activation and voltage, exhaling with release and calming. Breathing is only vegetative function that can directly influence in organism. Significance breath is that it enables intervention in an otherwise uncontrollable clearance activity of internal organs and thus opens the way to their possible regulation. Yoga breathing exercises affects not only the respiratory function, but also affect the psyche, muscle tension and the other internal organs. Central control of breathing has a significant effect on the whole central nervous system.

The basic postulates to the breathing development:

Breathing exercises for wellness development is based on principle that exhalation should be slightly longer than inhalation. Breathing exercises deepen the effect of physical exercise and also works well on cardiac function, blood circulation, on respiratory system and have a balancing effect on the autonomic nervous system. The body insufficient of oxygen reduces the metabolism and consequently greatly harms physical health. Regular exercise will gradually learn to eliminate bad breathing habits and replacing them with a deep relaxed breathing.

- Breathing is controlled centrally and peripherally, affects all cells in the body.
- Breathing is directed to all parts of the body can be any part of the body (relaxation, pain relief, etc.)
- Breathing is continuous. We can recognize it in every moment of life.

- Breathing can influence emotions, memories, thoughts, physical symptoms, self-esteem and self-image and even change the personality.
- Breathing is important for maintaining homeostasis - acid-base balance, electrolyte balance and oxygen and glucose).
- Breathing is very important for social contacts in verbal communication.
- Breathing is reflective nature complex, connects humans with the environment.
- Breathing exercises improves the flow of oxygen and release carbon dioxide from the body so the body can gradually again to restore the natural balance between the need and supply of oxygen. Breathing exercises may be carried out separately, preferably in a quiet, once, if necessary several times a day. Breathing is truly unique in its effect on the body performance and psychic benefits.

1.3 Circadian habits development and methods of effective sleep intervention

In this context Reger-Nash, Smith, Juckett (2015) interpret the next recommendations:

- Perform 30 minutes of daily physical activity.
- Retire at the same time every night, weekends included.
- Turn off your cell phone before retiring for the night.
- Avoid e-mailing and texting for one hour before going to bed.
- Avoid caffeine for at least six hours before going to bed.
- Sleep in a comfortable, dark, and quiet environment.
- Employ white noise (a soft, rhythmic, constant sound) to block disrupting sounds and provide a soothing environment.

Physical Activity and Sleep

Regular physical activity and exercise should be a part of everyone's daily life for many reasons, including its important contribution to a good night's sleep. On average, people who exercise regularly tend to have less trouble falling asleep compared with those who do not. Physical activity and exercise are at least as good as

hypnotic medications for the treatment of chronic insomnia. Although the Morning – Evening preferences can be life-long, they can change in older. All people benefit from a better understanding of their own circadian preferences. Core body temperature drops during the night (lowest temperatures are recorded at approximately 4 a.m.) and begins to increase back toward the baseline at about 7 or 8 a.m., which signals arousal. Sleep-related problems can be caused by everyday occurrences, such as stress, anxiety, and depression. A daily routine, regular physical activity, healthy eating, and mindfulness can help restore personal lifestyle balance and reduce stress and anxiety. Consider meeting with a mental health professional if stress, anxiety, and depression persist. Physical issues may be causing sleep problems independent of your best efforts to sleep. Note that negative emotional and psychological states will erode your sleep and diminish your quality of life. (Reger-Nash, Smith, Juckett, 2015).

2 INTERVENTION STUDIES TO PROMOTE SLEEP AND MENTAL HEALTH

2.1 Intervention study to promote sleep and mental health of Czech juvenile athletes

The intervention program "Development of the Rainbow" (“Program of Development of Mental Hygiene”) was based on the theory of Self-Transformation in 2 coherent cycles, when the first cycle of basic education is more or less general nature, in subsequent cycles is compounded education towards individualisation and emancipation, i.e. independence on educator (teacher, trainer, coach). The program included the palliative exercises that lead to release tension and create experience of wellness, as well as exercise of concentration. The ultimate goal of the intervention program was the complete independence, when the individual is able to:

- To use autonomously breathing and relaxation techniques to overcome mental fatigue and stress;
- To plan and implement adequate movement regime;
- To know the benefits of healthy eating, focus on the issue of drinks and food;
- To know importance of health sleep habits for success in tasks and effort;

2.1.1 Objective (hypothesis, research questions)

The hypothesis to be examined from the epidemiological view point is **that** intervention program will eliminate psychic problems in young sportsmen like depression.

2.1.2 Research procedure, material

118 teachers (92 women and 26 men) teachers and coaches from different regions of the Czech Republic were trained to implement the intervention program "Development of the Rainbow". In total 2367 pupils (sportsmen and non-sportsmen, pupils of primary schools and grammar schools in the age range 12-16 years old participated in the intervention program (Table 1). From that 385 randomly selected pupils (186 males, 199 females) in the age range 12-16 years (Median 13.4; SD 1.3) were monitored during the intervention program and were tested before and after the intervention program.

Tab. 1: *Basic characteristics of the participants (N=385, 186 males, 199 females)*

SAMPLE	11 years	12 years	13 years	14 years	15 years	16 years	All together
Males	9	45	44	37	45	6	186
Females	15	51	44	44	42	3	199
All together	24	96	88	91	87	9	385

2.1.3 Methods

Follow methods were used during the research process:

- Intervention program "Development of the Rainbow" (Krejčí, 2011);
- Test of circadian typology (Czech version of Krejčí, Harada, 2010);
- Statistical methods - Data were statistically processed by SPSS Kruscal - Wallis test, Fisher's exact test and of Wilcoxon test by Miyo Takeuchi, Kochi University in Japan.

2.1.4 Results and Discussion

In our intervention program and research applications of yoga techniques as a mental training for young athletes, developing of the concentration, rehabilitative effects, etc. were repeatedly rendered positive changes in emotional states. It can be said, that after the intervention program "Development of the rainbow" positive changes in the emotional state of young athletes were found out. Research assumptions were confirmed and behavioural problems were eliminated, especially the psychic states like depression, negative thinking, dissatisfaction, conflicts. Improvement of the self-control and self-esteem in participating athletes were experienced. After the intervention program participants could use relaxation techniques to overcome mental fatigue and stress, and then started with mental training independently individually in sport.

It was found that non-sportsmen participants of secondary schools felt overburdened more than sportsmen. All participants reported that they usually ashamed of shortcomings in their health and do not like to admit it. All participants – sportsmen and non-sportsmen were dissatisfied with the regime of leisure time. They reported lack of time for friends, family, and would welcome more time for walks, rest and sleep. All participants – sportsmen and non-sportsmen liked much to learn techniques of mental hygiene, particularly techniques which removes fatigue. Coaches reported that athletes could not require any special motivation or "pressure" to teach relaxation techniques and mental hygiene. Athletes and non-sportsmen as well were very proactive in learning of relaxation and breathing techniques.

Modes of analysis in non-sportsmen participants identified in 72 % disorders of the circadian rhythms (late sleep, interrupted sleep, lack of sleep) and improper dietary habits. On the other hand, surveyed non-sportsmen participants spent the day very long time playing games on the computer and the internet communications. In this context, we continue in the report of statistical analysis compared the relationship of active lifestyle in the research groups of participants: Athletes versus Non-sportsmen.

A significant gender difference in preferences M-E was not found (Mann-Whitney U-test: $Z = -0.87$, $P = 0.381$). Male sportsmen were significantly more morning typed then male non-sportsmen (Mann-Whitney U-test: $Z = -2.20$, $P = 0.028$).

One of research goals was to find a positive correlation between sporting and non-sporting participants and mental health. Surprisingly there were found out no significant differences between the sportsmen and non-sportsmen ($\chi 2$ test:$\chi 2$cal =8.47, df= 4, P =0.075). It is a very important result of the research procedure. Probably the competition sport brings disorder situations with negative impacts in mental state. It is also an important argument for mental training implementation in young athletes training process, because they have not enough empirical experiences how to overcome and manage stress situation and state-anxiety. But the reason of the psychic disorders (depression, anger, etc.) of monitored male and female young participants we can search in sleep disorders and in evening typology, which is developing with age very clearly (see Figures 1-5).

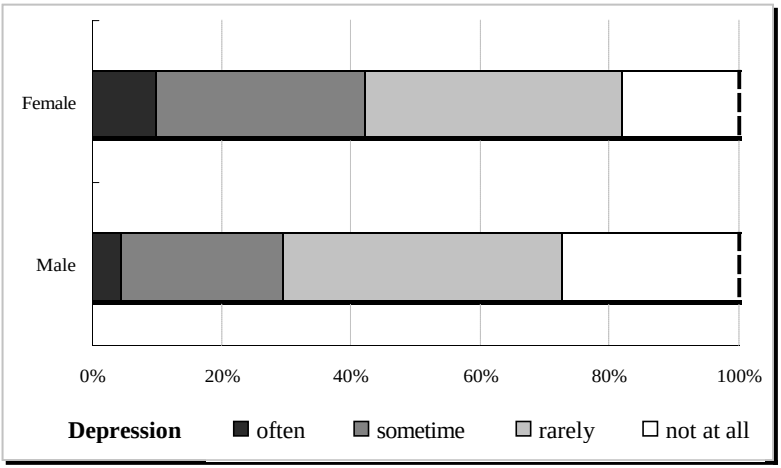


Figure 1 *Gloom and depressed mood in monitored sportsmen - boys and girls. Girls experienced significantly more depression status than boys ($\chi 2$ test: $\chi 2$ cal = 18.1, df = 3, P <0.001)*

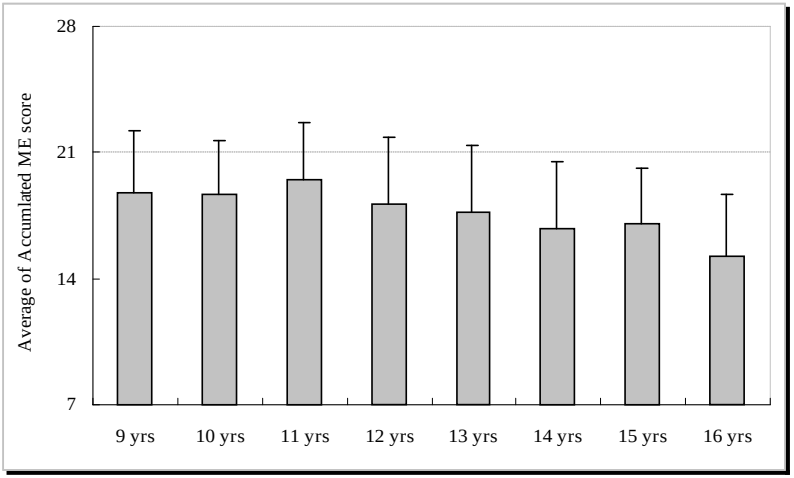


Figure 2 *The correlation between M-E score and age of the respondents. The average of M-E score decreases in all monitored boys and girls with age (age group 11-16 years) - Kruscal-Wallis test, $\chi 2 = 43.3$, df = 7, P <0.01.*

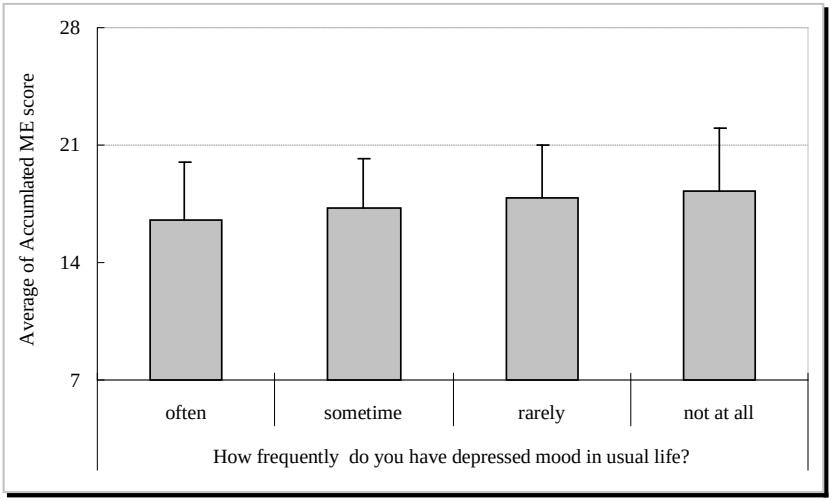


Figure 3 *Comparison of the frequency of depressive states to M-E score in the investigated respondents (Kruscal-Wallis test, $\chi 2 = 16.6$, df = 3, P <0.01)*
Note: The lower value of the score presents the higher rate of Evening type.

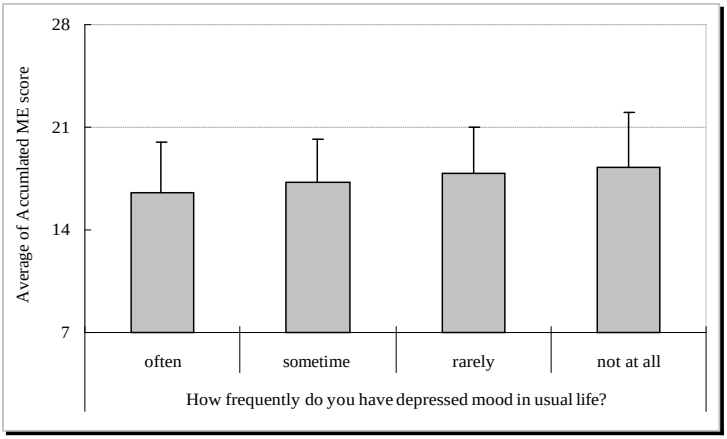


Figure 4 *Frequency of depressive states in correlation to my score in the investigated respondents (Kruscal-Wallis test, χ2 = 12.7, df = 3, P <0.01)*

It seems to be very interesting correlations between mental states and M-E typologies of students. The current lifestyle of young evening typed girls and boys (chat, SMS monitoring, computer games until midnight and after midnight). It can be developed sleep disorders An important part (especially in boys) of the educational strategies in mental health promoting school intervention, mental training effects in sport clubs have strong positive influence on sleep habits.

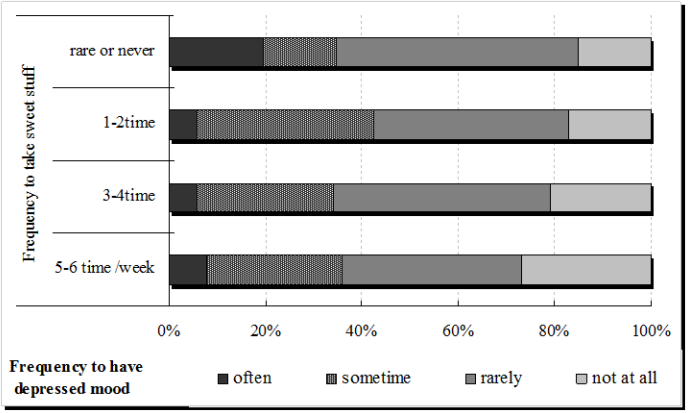


Figure 5 *The correlation between enjoyment of sweets and Frequency of depressive mood (χ2 test: χ2 cal = 24.7, df = 9, P <0.01)*

2.2 Intervention study to promote sleep and mental health of Japanese University Athletes especially focusing on intake of cow milk at breakfast

2.2.1 Introduction

Cow milk is an important supplying of protein resources for human infants and sports athletes because it is easy to be taken and possible for vegetarians. There is one research example to show the relationship between cow milk contents and sleep. Guesdon et al. (2006) reported that the casein hydrolysate could promote the sleep of rats. In this study, rats were exposed to chronic stress in the form of environmental disturbances, while some of them took the aS1-casein hydrolysate (CH) as content of foods. Sleep duration in control rats was reduced during the first 2 days of the stress period. However, the stress-induced sleep disturbance was prevented in the CH-treated rats which showed longer slow wave sleep in NON-REM sleep and also slight longer REM sleep than the control rats.

Some studies have been performed on the significance of human breast milk on human child health. For example, Cubbero et al. (2005) reported that tryptophan contents in the breast milk of mothers fluctuated with circadian rhythm with acrophase (peak time of day) at around 3:00. This rhythm was followed by another rhythm of the 6-sulfatoxymelatonin with the acrophase of 06:00 in the infants. This phase-delayed rhythm implies that tryptophan-serotonin-melatonin syntheses might be fundamental mechanism which would be related to the sleep quality of babies. As another report, infants who fed on exclusively breast milk showed significantly lower incidence of colic attacks, lower severity of irritability attacks and longer nocturnal sleep duration (Engler et al., 2012). They reported that breast milk (nocturnal) gave additional plasma melatonin, whereas artificial formula did not so. These results implied melatonin supplied to the infant via breastmilk might play a role in improving sleep and reducing colic inbreast-fed infants compared to formula-fed ones.

On the other hand, cow's milk has long been thought as a relaxation agent with sleep-inducing substances (Guesdon et al., 2006). Laird & Drexel (1934) reported that adults who consume a meal of cornflakes and milk showed a stronger tendency of un-interrupted night sleep. Brezinova & Oswald (1972) performed

electroencephalography and showed that older people who fed a milk and cereal meal at bedtime got an improved sleep quality.

How about the efficacy of protein consumption at breakfast on sleep health and circadian typology in human? Tryptophan intake at breakfast has been known to be effective on promoting better mental health and morning-typed life through serotonin and melatonin syntheses (Harada et al., 2007; Nakade et al., 2009, 2012; Wada et al., 2013). For Japanese children, cow milk seems to be important resource for taking tryptophan at breakfast because of limited meal time in the morning. Takeuchi et al.(2014) recently reported the relationship between circadian typology and mental health, and cow milk consumption at breakfast as follows. Infants who took milk at breakfast showed 21.2 of DTSS on average which tended to be higher than 20.7 (p = 0.085) shown by those who did not take milk. Infants who took carbohydrate (or carbohydrate and protein resource) plus milk at breakfast were significantly morning-typed than those who took only carbohydrate (or carbohydrate and protein resource) (p < 0.001). Infants who took milk at breakfast tended to be less frequently depressed than those who did not (p =0.098).

However, we cannot discuss the causal relationship of cow milk consumption at breakfast to human mental and physical issues including circadian typology and sleep health based on such questionnaire study. There have been no reports of intervention studies on the effect of cow milk intake at breakfast on circadian typology, sleep health and mental health of human. This study aims to access to the causal relationship from the view point of intervention study.

2.2.2 Objective (hypothesis, research questions)

The hypothesis to be examined from the epidemiological view point is that intake of cow milk at breakfast can promote sleep health of Japanese infants and university athletes via the increased synthesis of serotonin and melatonin from tryptophan included in the cow milk.

2.2.3 Methodology (project characteristics, research organization)

2.2.3-1. Pilot intervention study on whether cow milk consumption for two weeks enhance sleep quality of Japanese university soccer athletes (Takeuchi et al., unpublished)

An integrated questionnaire was administrated to 90 team members attending Kochi University soccer club just before, just after and one month after the intervention period of 2 weeks. Participants were divided to three groups which were asked to consume the 200ml package milk in the morning (~9:59), in the daytime (10:00~15:59) or in the evening (16:00~). Every day the package which includes 200ml of milk was distributed to 90 members for the two weeks from 26th November to 11th December. Sleep diary was kept by the participants for the intervention 2 weeks.

The integrated questionnaire includes questions on habits of milk consumption and meals, sleep habit, The Diurnal Type Scale Score (Torsvall & Åkerstedt, 1980) and mental health.

2.2.3-2. Intervention study on whether cow milk consumption for three weeks affects circadian typology, sleep health and mental health of Japanese university soccer athletes (Takeuchi et al., unpublished; Kawada et al., unpublished)

This intervention study was performed for 107 Japanese university students who attended Kochi university soccer team. An integrated questionnaire was administered just before (on 12th November 2014) and (on 10th January 2015) one month after the intervention three weeks from 13th November 2014 to 4th December 2014. A short questionnaire was also administered just after the intervention period. Ninety three participants (18-23 years old) answered the questionnaire before the intervention and occupied 88.6% of the 107 members. Twenty participants as control group members, actively, agreed with taking no milk through the intervention 3 weeks. The remained 73 participants were asked to take the 200ml cow milk, in the morning before 10:00, with natural contents which had been distributed every day for the three weeks. All 93 participants were asked to keep sleep diary for the intervention 3 weeks. The 93 participants had been

included in the three teams which were in accordance with the soccer performance achievement (Team A: with highest achievement, B: moderate; C: lower). No other intervention out of milk consumption at breakfast has been performed during the three weeks. The study schedule was shown in Fig. 3.

The integrated questionnaire which was administered before the intervention and also one month after that includes Food Frequency Questionnaire (FFQ), life habit questionnaire (bedtime, wake up time, difficulties for the sleep onset and offset, interrupted night sleep, sleep hours, The Diurnal Type Scale (Torsvall & Åkerstedt, 1980). Sleep diary which was kept for the 3 intervention period, consists of the questions on daily mood (judged as 0-100 scores), bedtime, sleep latency, sleep hours, interrupted times and duration for night sleep, satisfaction scores for fall-in-sleep (0-100 scores), feeling of the sleep deepness (0-100 scores), mood at fall-in-sleep (0-100 scores), lighting conditions at night, usage of PC, electric game and TV watching.

The change in the performance achievement from the beginning of the intervention was estimated with the questionnaire shown by Table 1. Sum of the 11 items (1: Assessment of the present situation, 2: Visual field on playing, 3: Movement of foot, 4: Rudimentary mistake, 5: The first touch, 6: Irritation on playing, 7: Running out of stamina, 8: Injury on playing, 9: Body balance, 10: Precision of long kick, 11: Motivation for the practice) was defined as the soccer performance achievement index (SPAI: lower scores show higher achievement).

Saliva from 12 participants in each of two groups (milk taken or no milk) were taken with the cotton cylinder (1cm diameter, 3cm long) which was set under the tongue for 3 min. Saliva was taken at 22:00 and 23:00 just before the intervention, 10 days and 20 days of the intervention at six times in total, and kept under -20℃ till the analysis of melatonin concentration. Data as melatonin concentrations in the saliva samples were measured using an ELISA kit. Melatonin concentration of 48 samples from 8 participants in the experimental group and 42 samples from 7 participants of the control group were correctly measured and statistically analyzed. The short version of questionnaire was administered to all 93 participants just after the intervention. This questionnaire includes questions on life habit, sleep habit, breakfast frequency and contents, and the frequency of cow milk consumption. SPSS statistical software (12.0 J for Windows, SPSS

Inc., Chicago, IL, USA) was used for all statistical analyses in this study.

A full explanation with the code of the guideline for a study targeting humans (Portaluppi et al., 2010) was performed all participants before the beginning of the study. This explanation included that the results of the study are used only for the academic purposes and to promote the health of athletes and securely kept under the control. The contents of the study have been examined before this study by the ethic committee of Laboratory of Environmental Physiology, Graduate School of Integrated Arts and Sciences, Kochi University and this committee judged this study was appropriate from ethic view point. All participants completely agreed with the participation in this study.

2.2.4 Results and discussion

2.2.4.1 Pilot intervention study on whether cow milk consumption for two weeks enhance sleep quality of Japanese university soccer athletes (Takeuchi et al., unpublished)

MAIN RESULTS

Only in the group which occupied the evening-typed 25% of all participants, the sleep quality was significantly improved when the distributed milk was taken in the morning (Wilcoxon-test: $z=-2.06$, $p=0.04$) (Fig. 1), whereas the sleep quality of the evening-typed participants were not improved when the milk was taken in the daytime and evening (Fig. 2).

DISCUSSION

Tryptophan included in the milk taken at the breakfast could be transferred to serotonin in the daytime in the pineal and melatonin could be synthesized at night from the serotonin in the brain. This melatonin might be possible to enhance the sleep quality of the evening-typed soccer team members which had shown originally lower quality of sleep.

2.2.4.2 Intervention study on whether cow milk consumption for three weeks affects circadian typology, sleep health and mental health of Japanese university soccer athletes (Takeuchi et al., unpublished; Kawada et al., unpublished)

MAIN RESULTS

Just before the intervention, the ration of milk consumer was 64%, and the participants to take milk every day occupied 27% and those to do it with the frequency of 0-1 time per week was 15% (Fig. 4A).Twenty four % of milk consumers took milk in 6:00-9:00, whereas in 9:00-12:00 15% of the consumers did it (Fig. 4C). There was no difference in the ratio of milk consumers among the three teams made due to the soccer performance achievement (χ^2 –test: χ^2-value = 3.602, df = 2, p = 0.165), and no difference in the frequency to take cow milk was shown among the three teams (χ^2–test: χ^2value = 10.553, df = 9, p = 0.308). Sixty-three % of the participants took breakfast and 69% of the breakfast consumers took it at regular time.

The participants who took breakfast with stable food (carbohydrates), main dish (protein) and side dish (vitamins and minerals) occupied only 44% of all participants. There were no significant differences in the ratio of participants who took breakfast among the three groups made due to the soccer performance achievement (χ^2-test: χ^2value = 3.410, df = 6, p = 0.756). The ratio of students who took breakfast with nutritionally balanced contents (carbohydrates, protein and vitamins & minerals) was higher in the team with highest performance achievement than the other groups (χ^2 –test: χ^2value= 17.543, df = 6, *p* = 0.007) (Fig. 4B). There were no differences in the regularity of breakfast time among the three groups (χ^2-test: χ^2value = 5.863, df = 4, p = 0.210).

The implementation of cow milk consumption was shown in Fig. 5, and 35 participants took cow milk distributed every day for the 3 weeks intervention period. The days when participants in the milk-intake group actually took cow milk distributed was 17.5 days (± 3.3 days of SD) on average. The students who actually took the cow milk distributed on all 21 days as intervention period and more than 15 days occupied 39.8% and 80.0%, respectively, of all participants of the milk-intake group.

In the control group, there are no significant change during the intervention 3 weeks in the diurnal type scale scores (DTSS), GHQ scores and sleep latency in the milk-intake group (Wilcoxon-test, DTSS: $z = -0.06$, $p = 0.952$; GHQ: $z = -0.702$, $p = 0.483$; Sleep latency: $z = -0.67$, $p = 0.50$), whereas the sleep quality was worse after the intervention than that before it ($z = -1.71$, $p = 0.09$) (Table 2). On the other hand in the milk-intake group, there were no significant change during the intervention 3 weeks in DTSS, GHQ and sleep quality (DTSS: $z = -0.406$, $p = 0.685$; GHQ: $z = -1.223$, $p = 0.221$; Sleep quality: $z = -4.43$, $p = 0.66$), whereas the sleep latency after the intervention was significantly shorter than that before it ($z = -2.80$; $p = 0.01$) (Table 2).

There were no significant difference in the distribution of the diurnal type scale scores among the three teams made due to soccer performance achievement before the intervention period (Mean ± SD = 16.32 ± 3.16 in all three teams) (Kruskal-Wallis test, χ^2-value = 1.554, $p = 0.460$) (Fig. 6). Participants were divided to two groups due to the diurnal type scale scores as the morning-typed half and evening-typed half for the further analysis.

In the morning-typed group, there were no differences in GHQ scores (mental health index), sleep quality and sleep latency during the intervention 3 weeks (Wilcoxon-test, GHQ: $z = -0.909$, $p = 0.363$; sleep quality: $z = -0.852$, $p = 0.394$; sleep latency: $z = -1.099$, $p = 0.272$). In the evening-typed group, there were no differences in GHQ and sleep quality, whereas DTSS was increased and sleep latency was shorter than those before the intervention ($z = -2.068$, $p = 0.039$; $z = -1.972$, $p = 0.049$) (Table 2).

The milk intake group felt the advance in performance both at 10 days and 20 days of intervention than the control group (Mann-Whitney U-test: the 10 days: $z=-2.698$, $p=0.007$; 10 days: $z=-3.058$, $p=0.002$). There was no difference in the amount of performance advance between 0-10 days and 0-20 days in the control group, whereas the milk-intake group felt performance advance with higher degree just after the 20 days intervention than just after the 10 days intervention (Wilcoxon-test: the milk intake group: $z=-3.96$, $p< 0.001$; the control group: $z = 0.00$, $p = 1.00$).

Salivary melatonin concentration at 22:00 significantly increased during the intervention in the milk-intake group (Friedman test, $\chi 2$-value=6.250, df=2, p=0.044), whereas there were no significant differences in the melatonin concentration during the intervention

period in the control group (Friedman test, $\chi 2$-value=0.286, df=2, p=0.867) (Fig. 7a). However, there were no significant differences in the salivary melatonin concentration during the intervention 3 weeks both in the two groups (Friedman test, the milk-intake group: $\chi 2$-value=1.750, df=2, p=0.417; the control group, $\chi 2$-value=0.286, df=2, p=0.867) (Fig. 7b). Wilcoxon-test was performed salivary melatonin concentration at the beginning of the intervention and that at the end of that and showed significant increase of it (z=-2.521, p=0.012). The difference in the melatonin concentration from the beginning to the end of the intervention 3 weeks in each participant salivary melatonin was calculated and the differences in the melatonin concentration of the milk-intake group were significantly larger than those in the control group Mann-Whitney U-test, z=-1.680, p=0.093).

DISCUSSION

The milk consumption at breakfast could make the phase advance of the start of melatonin synthesis in advance in this study. The beginning timing of the serotonin synthesis in the daytime and following melatonin synthesis at night might be in advance because of the cow milk consumption at the fixed time in the morning. Such advances in phase shift can make the phase of circadian clocks in human in advance which leads to more morning-typed life in the soccer team members. Why can the cow milk intake in the morning make the soccer performance achievement increased during the 3 weeks intervention period?

The three answers would be possible as follows.

Memory consolidation during REM sleep of newly learned soccer-techniques (1)

When the soccer team athletes get morning typed life, amount of REM sleep could increase and the temporal new memories taken at training or practice in the last day can be kept temporally in hippocampus (Huijgenand Samson, 2015). Such temporal memory can be fixed in the brain in the course of memory consolidation during REM sleep (Karni et al., 1994; Hornung et al., 2007; Landmann et al., 2015). Because whole memories might be reconsolidated in order, the correct and appropriate judgments on playing would be possible in some scenes of games, for example.

Mental health improved due to the well inner synchronization of main clock driving autonomic nervous system and slave clock driving sleep-wake cycle (2)

There are 2 separate internal biological clocks in our body. The de-synchronization shows that the two clocks become out of the phase-coupling which could lead to lower motivation (Golombek et al., 2013) and also lower mental health with a possibility of depression (Abreu & Bragança, 2015). Based on the epidemiological studies by Harada et al.(2012), the morning typed persons work the entrainment well to 24 hours fluctuation in environmental factors like as light-dark cycle, and so his/hers coupling of two biological clocks would be good and also his/hers mental health would be better.

Morning-typed life leads to intake of rich-protein breakfast which promotes serotonin synthesis enhancing concentration during game and practice (3)

The third mechanism would be via a higher amount of serotonin synthesis in the morning due to a rich-protein breakfast (Harada et al., 2007; Nakade et al., 2009; Nakade et al., 2012). The high concentration of serotonin in the body blood of the brain could improve the concentration on playing. The serotonin turns into melatonin at night, and it can promote sleep onset at night for the athletes. The melatonin orders our brain to go to bed earlier (Harada, 2004; Wada et al., 2013; Higuchi et al., 2014).

3 CONCLUSIONS

Behaviour depends on the degree of excitability of the nervous system, which can be facilitated or inhibited by the degree and type of motivation negotiation, i.e. the functional level of the limbic system. Psyche and its symptoms are always related to motivational headquarters, which not only controls the overall level of excitability, but lays the groundwork for the formation of memory traces and thus fix the physical chains that characterize a certain type of behaviour. Teachers, trainers and coaches should be alerted to the fact that the physical learning not only mediates changes in motor skills, but also influences changes in the psyche and social behaviour. The main

objective of intentional social learning is presented in learning of mental hygiene and social skills of young athletes.

Sleep deprivation can have significant effects on athletic performance, especially submaximal, prolonged exercise. From the limited evidence, it appears that athletes may be obtaining less than 8 h of sleep per night. Increasing sleep (sleep extension) or napping may be useful to increase the total number of hours of sleep. Changes in glucose metabolism and neuroendocrine function as a result of chronic, partial sleep deprivation may result in alterations in carbohydrate metabolism, appetite, food intake and protein synthesis. These factors may negatively influence an athlete's nutritional, metabolic and endocrine status, and hence potentially reduce athletic performance. While there is some research investigating the effects of nutritional interventions on sleep, future research may highlight the importance of nutritional and dietary interventions to enhance sleep.

The breakfast has a positive impact only if it is always freshly prepared, and if includes significant proportion of proteins (nuts, vegetables, milk, muesli, etc.). It is in fresh diet are well represented enzymes that are catalysts of biochemical processes in the body (bone structure, muscles, haematopoiesis). In contrast, semi-heated food, old food, foods with chemical additives has a negative impact on human health and cause mental and physical weakness and fatigue. This is how the athlete feels after the mental and physical very closely related to its diet. Healthy diet helps in the prevention of acute and chronic diseases and potentiates not only physical, but also mental development of young athlete; it can only strengthen his mental balance, and increase resistance to infection and increase training efficiency. The basic task of proper nutrition is to ensure optimal intake of energy and nutrients in the form of macro and microelements, as appropriate to the age, health and lifestyle. Cow milk intake at breakfast seems to be powerful for improvement of sleep and mental health for athletes through the metabolisms of serotonin and melatonin synthesis based on tryptophan intake at breakfast.

4 ACKNOWLEDGMENTS

This article was published in a supplement supported by the Research Foundation by Japan Dairy Association (J-MILK) (2013-2015).

CHAPTER 2.4

CARNOSINE AS A REMARKABLE NUTRITION SUPPLEMENT FOR IMPROVEMENT OF ATHLETIC PERFORMANCE AND WELLNESS

ZDENĚK VILIKUS, JITKA MASOPUSTOVÁ

Abstract: *Concentration of carnosine (ß-alanine-L-histidine) in the muscles of sportsmen is increased only by ß-alanine supplementation. This supplementation has become common practice among the competitive sportsmen of different sports. The physiologists, sports medicine physicians and other specialists have focused on this considerable nutritive supplement in the world literature. Eight review articles were published within last 5 years. This fact is a strong proof of increasing interest about carnosine. OBJECTIVE: The distributors of dietary supplements tend to heavily overestimate the effects of their products. The aim of this work is to evaluate objectively the effect of ß-alanine supplementation on the sports performance, based on the latest knowledge of the world scientific literature. METHODS: We used the databases of scientific articles Google Scholar, PubMed, Scopus and Sport Discus. Based on the key words we looked up works from the year 2000 to the present. We choose only the double-blind studies with a control group and a placebo. RESULTS: We found 112 studies of the required quality of the work and the 8 review articles (Artioli, 2010; Derave, 2010; Wilson, 2010; Sale, 2010; Hobson, 2012; Hoffmann, 2012; Bellinger, 2015; Trexler, 2015). Carnosine in the muscle cells increases muscular buffering capacity, reduces muscle fatigue and leads to easier regeneration of repeated bouts of high-intensity exercise. CONCLUSIONS: ß-alanine or carnosine improvement of sports performance remains equivocal. Recent data indicate that β-alanine supplementation may not only improve the sports performance. Beta-alanine operates also as a training aid to augment bouts of high-intensity training. We can regard the effect of carnosine on the increase of training volume a wellness effect because the sportsmen are able to perform the same training volume with less effort.*

Keywords: *carnosine, sports performance, wellness, cardiorespiratory fitness, anaerobic threshold,* VO_{2peak}

INTRODUCTION

Carnosine was discovered by a Russian biochemist Vladimir Gulevitsch (Gulewitsch, 1902) in meat in 1900. Another Russian scientist (Severin, 1953) found that carnosine was an efficient buffer of lactic acid in skeletal muscles. Increased interest about carnosine has appeared within the last 15 years (Bellinger, 2012). Parkhouse (1984) discovered a considerable fact of carnosine that its concentration in the muscles of sprinters is much higher than in the marathon runners. Derave (2007) and Tallon (2005) noticed that the muscular concentration of carnosine was about 5-10 $mmol.kg^{-1}$ in general, while in fast white fibers of type IIB the concentration was 20-40 $mmol.kg^{-1}$. It has been established that chronic β-alanine supplementation 1.6 - 6.4 $g.day^{-1}$ for a period of at least 4 weeks (Baguet, 2010; Derave, 2007; Hill, 2007; Smith-Ryan 2012; Harris, 2005) would lead to the increase of carnosine concentration in the muscles.

Carnosine is a multifunctional dipeptide. The most important role for sports performance is given by the imidazole group containing nitrogen atoms in its molecule which are ready to accept H^+ and so operate as an intramuscular buffer of lactic acid (Abe, 2000; Baguet, 2010; Donovan, 2012). Carnosine increases the non-bicarbonate buffering capacity in this way as much as 15 % (Hargreaves, 1998; Begum, 2005). Then the metabolic acidosis appearing at very high exercise intensity may be reduced by 19 % (Baguet, 2010). The role of Carnosine as a strong antioxidant (Boldyrev, 1999; Chasovnikova 1991) or as a substance regulating Ca^{++} secretion from sarcoplasmic reticulum (Bangsbo, 2008; Batrukova 1997) or preventing the glycosylation of protein chains (Boldyrev, 1999; Hipkiss 2001) may also support sports performance. Of these favourable effects, it is its ability to buffer the metabolic acidosis that presents the greatest potential to improve anaerobic exercise performance.

OBJECTIVE

The distributors of dietary supplements tend to heavily overestimate the effects of their products. The aim of this work was to evaluate objectively the effect of ß-alanine supplementation on the sports performance, based on the latest knowledge of the world scientific literature. The next objective was to found if carnosine may improve training of sportsmen from the wellness point of view.

METHODS

We used the databases of scientific articles Google Scholar, PubMed, Scopus and Sport Discus. Based on the key words we looked up works from 2000 to the present. We choose only the double-blind studies with a control group and a placebo. We found 112 articles including 8 reviews within last 5 years.

RESULTS AND DISCUSSION

ß-alanine supplementation and the sports performance of short duration

Let us have a look at the repeated very intensive interval exercise. Hargreaves (1998) found that the performance decreased with contemporary increased concentration of hydrogen ions H^+ and that stronger ability to reduce metabolic acidosis may delay fatigue and improve the sports performance. Theoretically, this type of exercise should unequivocally lead to better utilization of carnosine and to improve the performance but the results are often contradictory.

At first, let us mention the authors of the studies with positive effect of ß-alanine supplementation. Painelli (2013) confirmed the ergogenic effect of ß-alanine supplementation in the young elite swimming sprinters in 100 m resp. in 200 m distance (ß-alanine group was faster by 1.04 s resp. by 2.76 s than the placebo group; $p<0.07$ resp. $p<0.002$). Cuisinier (2012) described the improvement of interval sprints lasting 5 x 30 seconds in 15 well-trained athletes. Suzuki (2002) proved the improvement of the anaerobic performance in the last 10 seconds of the Wingate test in the cyclists. Tobias (2013) found significant improvement of the upper limbs Wingate tests in well-trained judo and jiu-jitsu fighters before and after 4 week supplementation of ß–alanine. Moreover, ß-alanine improved the immediate maximal cycling performance. Saunders (2012) found that 12 week supplementation of ß-alanine significantly improved the YoYo Intermittent Recovery Test 1 (IRT1) in the amateur football players. The results of YoYo IRT correlated very closely with the intensity of the short runs and total running distance of the referees Krustrup (2001) as well as of the football players Krustrup (2006). Furthermore, the longest running distance within the 5 minute time interval of the match correlated very closely with the results of YoYo IRT2 Krustrup (2006).

At the second, let us name the authors of the studies with negative effect of ß-alanine supplementation in the sports performances, which may be considered analogous to the above described ones. Chung (2012) on the contrary of Painelli (2013) did not find any performance improvement in the elite swimmers in the 50-200 m distance even after 10 weeks of supplementation. Saunders (2012) did not prove the efficiency of carnosine in Loughborough Intermittent Shuttle test. Smith-Ryan (2012) tried ß–alanine supplementation in interval running sprints of maximal intensity up to the exhaustion. She did not find any ergogenic effect either in the time to exhaustion, or in the critical running speed or in anaerobic running capacity. Hoffman (2012) did not find any improvement in the intermittent shuttle runs (3 × 35-43 seconds with two-minute breaks) in the players of American football. Sweeney (2010) found no ergogenic effect in the repeated sprints of the recreational sportsmen (2 sets of sprint bouts 5 x 5 seconds separated by 45 second rest).

ß-alanine supplementation and the performance of middle duration

Ducker (2013) applied ß-alanine (80 $mg \cdot kg^{-1} \cdot day^{-1}$) for 4 weeks in 800 m run at the recreational runners. The runners taking ß-alanine were significantly faster (by 3.64 ± 2.70 s; it is by 2.46 ± 1.80 %; $p = 0.02$) but not the runners with placebo (-0.59 ± 2.54 s; -0.37 ± 1.62 %). These improvements were most likely (99%) the benefits caused by beta-alanine. Stout (2007) found the increase of the ventilatory anaerobic threshold by 13.9 % in untrained females after 28 days of ß-alanine supplementation getting dose 3.2 - 6.4 $g.day^{-1}$. Jordan (2010) tested the effect of ß-alanine to the lactate anaerobic threshold in the runners (ß-alanine 6.0 $g.day^{-1}$ for 28 days). ß-alanine was efficient in the delay of the fatigue as the consequence of the delay of lactate anaerobic threshold and the increase of VO_{2AT} improvement as the per cent of VO_{2max}. This revelation is in good concordance of Zoeller (2007) who found a significant increase of the performance expressed in watts at the level of anaerobic threshold (W_{AT}) after 4 weeks of supplementation. Recent study of ß-alanine supplementation (Howe, 2013) proved significantly ($p = 0.04$) increased average isokinetic contraction (strength/number of repetitions). Donovan

(2012) demonstrated improvement in striking force and the striking rate for amateur boxers in the last 10 seconds after a simulated match lasting 3 x 3 min rounds (with a break of 60 s). This study was conducted on moderately trained boxers.

Ergogenic effect of ß-alanine was confirmed by rowing performance in 2000 m, in 17 elite rowers (Baguet, 2010). The same author showed a strong positive correlation between ß-alanine and rowing performance at 100 m, 500 m, 2000 m and 6000 m. Anaerobic threshold and VO_{2AT} increased in untrained men (Aartioli, 2010; Jordan ß-alanine increased the cycling performance (W_{max}) in elite cyclists (Howe, 2013).

In competitive cyclists, ß-alanine supplementation did not significantly improve 4-min cycling performance (Bellinger 2012) or 2000 m rowing ergometer performance (Ducker, 2012)

ß-alanine supplementation and the sports performance of longer duration

Several studies investigated the potential ergogenic effects of ß-alanine in a practical spirit. Highly practical studies show a significant improvement in the cycling sprint performance over previous endurance exercise - final finish abilities (Van Thienen, 2009). Seventeen moderately to highly trained cyclists applied 2-4 g of beta-alanine a day for eight weeks. The final finish was preceded by 110 minutes of simulated road race with an intensity varying between 50-90% of LA_{AT}. Then, 30 seconds sprint followed to the maximum. During the final sprint, ß-alanine group increased peak power by 11.4% (95% confidence interval = +7.8 - + 14.9%) and mean power respectively by 5.0% (95% confidence interval = +2.0 - + 8.1%), statistical significance at the $p < 0.05$ level. Placebo group did not increase either mean power (-0.8 %) or peak power (-2.3 %) respectively.

Supplementation of ß-alanine and the strength performance

ß-alanine supplementation did not affect maximal strength either in 1 RM bench press (Hipkiss, 2001), or in 1 RM squat (Hoffman, 2008) or whole body strength (Campbell, 2010), isokinetic force production or muscular endurance (Kendrick, 2008).

Supplementation of ß-alanine, physical working capacity and training aid

Sale (2012) found better performance from the point of view of the TTE (Time to Exhaustion) at the isometric load of the knee extensors at the level of 45% MVC (Maximal Voluntary Contraction).

Stout (2007) found the increase of physical working capacity at the level of fatigue threshold by 12.6% and the total time to exhaustion by 2.5 % in untrained females after 28 days of ß-alanine supplementation getting dose 3.2 - 6.4 $g.day^{-1}$.

Hill (2007) investigated the 4-10 weeks lasting substitution by ß-alanine on the cycling performance from the point of view of the Total Work Done (TWD) and the Time to Exhaustion (TTE) at the level of 110% VO_{2peak}. Four-week supplementation by ß-alanine led to the significant increase of TWD by 13 % and to the next increase of TWD by 3.2 % after 10 weeks. This detection was supported by Sale (2011), who proved the increase of TWD by 14.6 % after 4 weeks of substitution at the same exercise protocol. In recent meta-analyses, (Hobson, 2012; Derave, 2010) found that ß-alanine significantly improved physical working capacity ($p = 0.013$) compared with placebo. In summary, based on these experiments we can conclude that ß-alanine supplementation improved work capacity.

Currell (2012) objected that increased physical working capacity at submaximal intensities is irrelevant in trained athletes during the race conditions. However, the improvement of physical working capacity can be also important for trained athletes, since they regularly undergo the training load at which the maximum is achieved. If performance at the level of "Training Working Capacity" may be performed at a higher level, it will enable athletes 1) to train more intensively and so increase the training volume which may finally lead to the increased athletic performance; 2) to train at the same intensity and so keep the same training volume and to feel less tired or exhausted. The latter effect could make the sportsmen feel more comfortable during their training and so support their wellness.

CONCLUSIONS

ß-alanine is an amino acid which increases the concentration of carnosine in the muscles. In general, carnosine improves the sports performance at average by 3 % **(**$p = 0.002$). Its ergogenic effect is best

remarkable in exercise lasting 60 - 240 s ($p = 0.001$), less in exercise lasting more than 240 s ($p = 0.04$) and has not any significant ergogenic effect on the sports performance lasting less than 60 s (Hobson, 2012). Recommended daily allowance of ß–alanine is 1.6 - 6.4 g. day^{-1} or more accurately 65-80 $mg.kg^{-1}.day^{-1}$. The only one adverse effect of ß-alanine may be paresthesia. It is possible to prevent paresthesia by application lower single dose of ß–alanine than 800 mg. The most probable reason of contradictory results is an individual responsibility to carnosine. The sportsmen may be divided to the low responders and high responders (Baguet, 2010; Derave, 2007; Stellingwerff, 2012). After 4 weeks of supplementation by ß-alanine, the high responders increase their muscular concentration of carnosine as much as by 80 %, while low responders only by 15 %. Despite some conflicting results, ß-alanine is an effective performance enhancer**.** Recent data indicate that β-alanine supplementation may not only improve the sports performance. Beta-alanine operates also as a training aid to augment bouts of high-intensity training. We can regard the effect of carnosine on the increase of training volume a wellness effect because the sportsmen is able to perform the same training volume with less effort.

CHAPTER 2.5

THE EVALUATION OF EFFECT OF NORDIC WALKING ON THE MOVEMENT SYSTEM USING THE COMPUTER KINESIOLOGY (THE PILOT STUDY)

DOBROSLAVA JANDOVÁ, OTAKAR MORÁVEK, PAVLA FORMANOVÁ

Abstract: *The Authors present the original work - pilot research study of the influence of Nordic Walking on the musculoskeletal system using Expert Information System Computer Kinesiology B-plus to confirm the hypothesis that gait NW is as a whole more effective than walking without poles on the movement system, improves the function of the thoracic spine section Th3- Th 6 and more muscles are turned into activity with NW than with walking without poles. All hypotheses were confirmed. The authors recommend the Expert Information System CK-B plus as a valid method for objectification of changes in functions of the locomotorsystem.*

Keywords: *locomotor system, nordic walking, Computer Kinesiology*

INTRODUCTION

In accordance with experts of the field of rehabilitation and physical medicine, the authors understand bipedal walking of the man as phylogenetic variation of the locomotion. In the step cycle, the sole of the foot alternates as a fixed point and then as a 3D moving point while walking affects the whole body and all its systems by the demands on management and performance of motion. Walking with use of the special poles, called Nordic walking (hereinafter NW), is a physical activity suitable for all ages. This physical activity is convenient for people decided to invest in their health, regardless of age or current physical condition. NW walk is suitable for people with functional disorders of the spine and large joints (5, 6, 7, 13):

- even without limited range of motion

- or with limited movement for increased muscle tension, blockades, reduced connective tissues
- or with incipient degenerative changes of the spine and joints.

The contribution and efficacy of NW to the posture is generally proclaimed (5.13). NW straightens the spine, which becomes functional spring with increased rotations and inclinations. A rhythmic movement of the spine while walking, it is assumed to change the vertical pressure on the soft structures, including discs, and for this derives the possibility of improving their metabolism.

The general contribution of NW in the survey (5.9):

- Relieves the load-bearing joints of the lower limbs,
- Improves mobility of the costotransversary (CT) and sternocostal (SC) connections of the ribs
- Increased respiratory capacity (CV) of the lungs,
- Increases the circulation of blood and lymphatic circulation - despite the lower limbs muscle pump
- Accelerates general metabolic function,
- Increases the nonspecific immunity and mental condition,
- NW walk used regardless the weather increases resistance to cold and thus increases nonspecific immunity (immunity) to stressors, including typical physical effects (meteorological conditions, weather changes, temperature fluctuations, etc.)
- NW due to deepening breathing enhances inhalation of natural bioaerosole (i.e. resins, aromatic substances, medicinal pollens, negatively charged ions and other components ....)
- NW moderates hyperreactivity of autonomic nervous system through alternating tonic and sedative weak stimuli by changing sunny and shady places, places sheltered in the lee and the places in the open country, a place with water spray and vice versa places with lower relative humidity, walking over tectonic faults with a yield of biogenic elements and zones calm.

NW walking speed has to be adapted to the terrain and individual health condition of walkers, because each person has the individual optimum load, which should not be overloaded. When

walking NW we can apply a simple tool always valid in the field of RFM: should we go as fast, as we were able to talk fluently.

PILOT STUDY IMAGE

The authors present a pilot study of a group of non-sports people, volunteers with the prevailing sedentary job, without a history of serious illness, without medication, non-experienced in NW. The testing and evaluation of changes in the musculoskeletal system after NW is provided by use of modern information medical technology ie. The Expert Information System Computer Kinesiology System B-plus (hereinafter referred to as CK).

Hypotheses

The authors examined following three hypotheses:

H1."Walking NW is more effective than walking without poles on the movement system as a whole."
H2."Walking NW improves the function of the dorsal spine" (area segment and region segments Th3-Th4- Th6).
H3."Walking NW turns more muscles into the gait performance than walking without poles."

SUBJECTS AND METHODS

The pilot study includes 5 men and 5 women, of comparable parameter BMI (median, range 25-27), there are represented all the decade of the age between 1st to the 6th (9 years - 57 years), the average age is 36.5 years.

METHODS

Probands passed the explanation, training and a short walk NW in the first day. The third day probands went with instructors NW for 1hour with poles. The next day they went with the instructors at the same speed for 1 hour, the same route without poles. Expert Computer Information System Kinesiology CK B-plus were examined the 3rd and 4th day 15 minutes before walking and one hour after. Indexes of total dysfunction (CD) and PSS are specific algorithms CK

distinguishing both biomechanical variations both reflective relations myofascial from healthy population norms and expressing relations to the biological age, ie., express the current level of functional pathology (1,2,3,4,9).

RESULTS

The changes in system CK B-plus parameters were compared twice: before and after walking and for walking separately for walking without poles and walking separately NW. The authors made recalculations of numerical values of reflexive responses of musculoskeletal system in percents for clearer statement, there were shown the following changes:

- CD Index showed improvements to walking without poles by 14% compared to the situation before walking
- CD Index showed after walking with poles style NW improvement of 32%
- Index PSS (overall response of the musculoskeletal system) to walking without poles showed an improvement of 15%
- Index PSS (overall response of musculoskeletal system) after walking with poles style NW showed an improvement of 26%

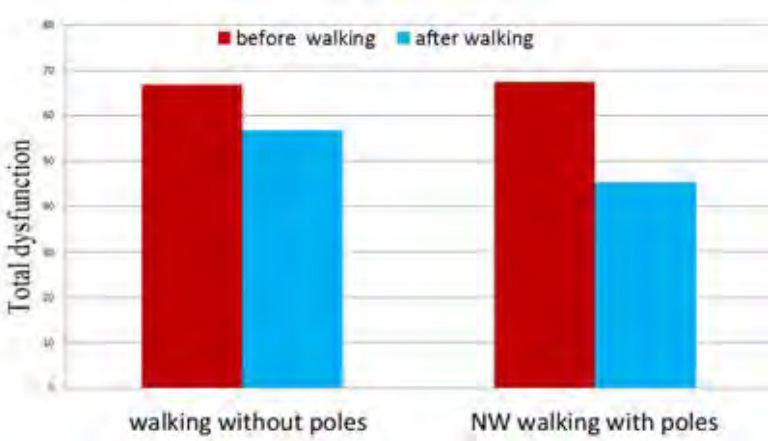


Figure 1 *Average values of total dysfunction obtained by Computer Kinesiology before and after walking and NW.*

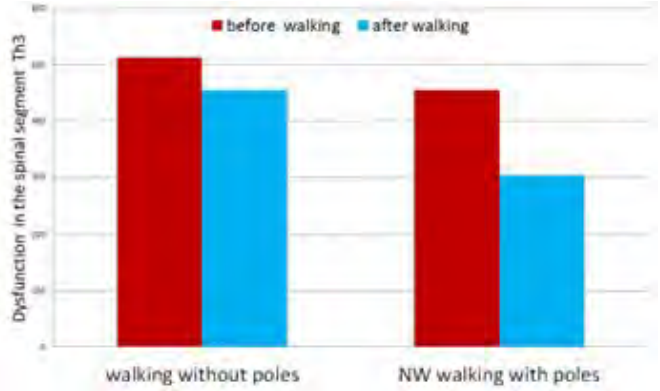


Figure 2 *Dysfunction in the spinal segment Th3 obtained by Computer Kinesiology before and after walking and NW.*

Dysfunction segment Th3 (reflexology relation to the bronchial tree and lung function) (1,2,12) reported after walking without poles improvement of 12%, and after walking with poles NW by 31%.

Dysfunction in segments Th4 to Th6 (reflexology area for cardiovascular function) (1.2, 12) reported walking without poles improvement of 16%, and after walking NW 36%.

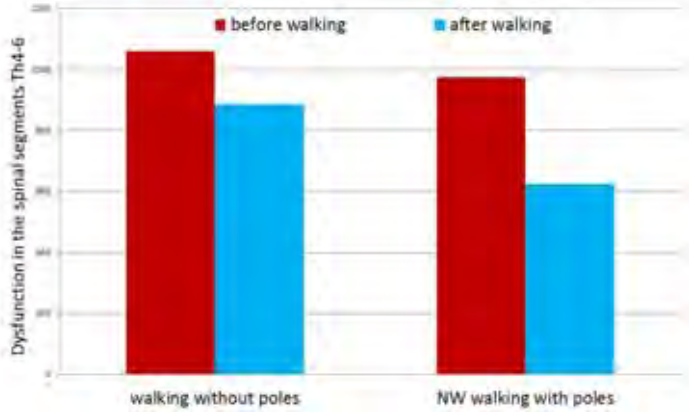


Figure 3 *Dysfunction in the spinal segments Th4-6 obtained by Computer Kinesiology before and after walking and NW.*

We compared the number of reflex function changes findings in soft tissues (trigger points), the biggest changes were recorded in musculus (hereinafter m.) m. Latissimus Dorsi: after walking NW decrease in the number of reflective findings (improvement) of 58%, while walking without poles occurred increase (worsening) of the number of findings by 6% compared to baseline. The second muscle with the largest decline in total numbers reflecting functional changes were m. Teres Maior with an improvement of 56% after walking NW and is worsening by 10% after walking without poles.

Comparing the graphs before and after walking NW clearly demonstrates increased activity of greater number of muscle and an increase in activity for certain muscles. Increased muscle activity was most pronounced after walking NW at 2 back muscles m. Latissimus dorsi, m.Teres Maior in both sides and the graph shows changes in 4 girdle muscular upper extremities bilaterally: m. Deltoideus, m.Serratus Posterior Inferior, m.Trapezius, m.Pectoralis maior.

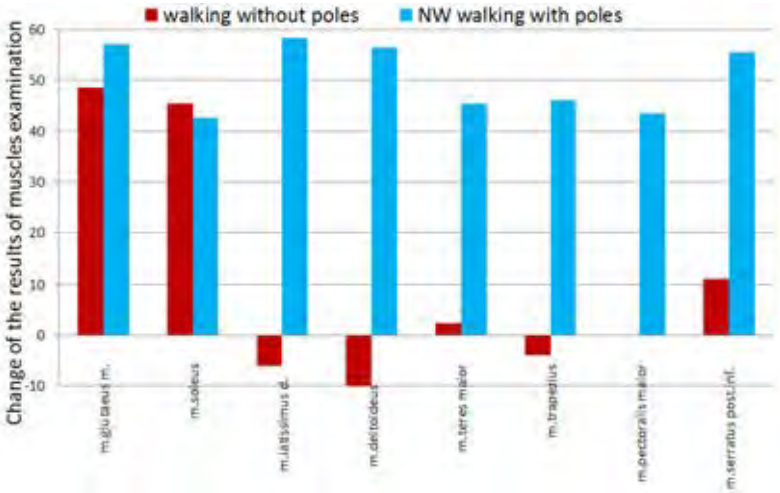


Figure 4 *Changes of the results of Computer Kinesiology before and after walking and NW on individual muscles (in % of the value before walking or NW). The columns above axis represent improvement; the columns below axis represent negative change.*

The results of the individual hypotheses

H1."Walking NW is more effective than walking without poles on the movement system as a whole" - hypothesis was confirmed

H2."Walking NW improves the function of the dorsal spine" (in reflex changes in the segment in the segments Th3 and Th4-Th64) - hypothesis was confirmed.

H3."Walking NW turns more muscles into the walk performance than walking without poles" - hypothesis was confirmed.

Positive changes in the thoracic spine and the entire musculoskeletal system, the authors objectified clinically in all subjects. Detailed comparison of kinesiology clinical analysis is not shown in this place because it is not the subject of this article.

DISCUSSION

In contemporary system of research subordinate to the rules of evidence based medicine, the authors present a pilot study of the effect of Nordic Walking on the musculoskeletal system using an Expert Information System Computer Kinesiology B-plus. This is the original pioneer project unprecedented in the wellness and medical wellness. Authors have 16 years' experience with the use of CK B-plus (and other subsystems CK) in the field of rehabilitation and physical medicine (1,2,3,4,6,9,12). It repeatedly shows that for the assessment of changes in the musculoskeletal system in terms of the biomechanical vectors and reflex changes of soft tissues in the locomotor system is the CK-B plus valid method for objectification and the possibility of statistical evaluation (4,5,6,8,12,13). Presented pilot study confirmed all the hypotheses. The authors recommend to use the system CK B-plus for explorations and research for Palestra university students as an objective valid method for evaluating changes of the musculoskeletal system.

CONCLUSION:

Nordic Walking is suitable for wellness lifestyle of the people decided to invest in their health, as was demonstrated by the monitoring with use of Expert Information System Computer Kinesiology B-plus. The authors demonstrated that walking NW is more effective than walking without poles on the movement system as a whole NW improves the function of the thoracic spine segment Th3- Th 6 and engages more muscles into the exercise than walking without poles.

Expert Information System CK-B plus t was verified as a valid method for objectification of changes in functions of the locomotor system.

Part 3

Wellness and handicapped people

CHAPTER 3.1

CONTROL PHYSICAL ACTIVITIES AS A WAY TO KINESIS-PROTECTION AND ANTHROPOMETRICS CHANGES IN CHILDREN WITH MENTAL DISABILITIES

ZUZANA KORNATOVSKÁ, PAVEL BLÁHA, VÁCLAV HOŠEK, MARTIN HILL

Abstract: *Anthropometric characteristics of height and weight in Czech intact children population were completed 6 times after the 2nd war in Czech Republic and on this base the Czech norms of children's weight, height and BMI were defined. The objectives of the chapter are presented in 2 points: first to compare anthropometric characteristics of a group of mental disability children with the norms of intact population of children in Czech Republic, in second to analyse an intervention influence of physical activity on the monitored anthropometric parameters of height, weight and BMI in the experimental groups. Together 180 participants with disabilities (90 males, 90 females, in the age 8-15) divided in experimental and control groups participated in the experimental study, when 3 times in one year period of the intervention program duration, the named anthropometric characteristics were tested. The investigation followed by data analyses (repeated measures ANOVA model consisting of Subject factor, between-subject factors Gender and Intervention and between-factor interactions). As expected, when evaluated the intact population data with the groups of children with disabilities, we have found significant differences. Based on the analysis of the results is guided discussion whether lack of physical stimulation has a negative impact on weight and height of children with disability. Further, it is discussed the question of kinesio-protection, the level of burden in children with disability due to optimal physical development, as well as the question of sedatives and medicaments applied for children with disabilities due to symptoms of anxiety and maladaptive behaviour. Based on the Trans theoretical Model of Behaviour Change, a better understanding of the determinants of exercise behaviour is beginning to emerge.*

Keywords: *Anthropometrics characteristics, Adapted Physical Activity, Kinesio – protection, Mental Disability, Psychosomatic development, Motor Learning.*

INTRODUCTION

Wellness and kinesis-protection of quality of life

According to the accepted definition of "wellness (WHO, 2000): "Wellness is the optimal state of health of individuals and groups. There are two focal concerns: the realisation of the fullest potential of an individual physically, psychologically, socially, spiritually and economically, and the fulfilment of one´s role in the family, community, place of worship, workplace and other settings". The "heart" of the academic and professional preparation of the Wellness Specialist is a behavioural change, signalizing the fundamental philosophical shift from traditional intervention practices focused on acquisition of knowledge and skills to practices structured around the behavioural change principles with the learning outcome being a change in the way we live (Rehor, Krejčí, 2015).

Exercises and Wellness educators have more to offer to our society in this regard than most other professionals. Our concern is quality of life. We must provide an opportunity to generate and maintain the quality of life for all people, not just the sick, or elite, but all people. We have the opportunity to institute comprehensive programs that emphasize a holistic approach to a quality of life. The most dramatic implication for the future of Exercises and Wellness Education is that there will be a need for professionals who are knowledgeable regarding holistic health/wellness. Neither the traditional health educators nor the traditional physical educators meet the needs of the future. We cannot any longer afford the luxury of arguing why our specific specialization is more relevant than some other. We must cooperate to redefine our goals and establish our contribution to the future. The public is aware of the wellness/fitness movement. Parents demand a more complete education for their children, but incorporating wellness principles into the public school arena will require a change in the manner in we approach health and physical education (Rehor, 2015). Quality of life is a comprehensive, multi-level concept, acquiring special meanings in different populations. Fairly uniform definition has the concept of quality of life for people with disabilities, the elderly and impaired, where it means maintaining independence and relative rich variety of life. Physical activity is a prerequisite on the one hand, but on the other hand it presents a symptom of the quality of human life. In health population it can be considered found out, that physical activity

positively affects the important determinants of the quality of human live. Physical activity protects condition and gives a chance to the important emotional experiences. This psycho-social function we call kinesis-protection of quality of life (Hošek, 2013). The term "controlled physical activities" is the designation of recreational physical activities carried out to achieve health benefits through professionally guided motor learning process by teachers or coaches, carried out to avoid of confrontation and distress tension and to be applied in daily life.

In persons with mental disability the quality of life lies in improving of health and controlled physical activity is seen as an important part of supportive therapy. The psychosocial functions of control physical activity are presented in 3 domains:

1. ***Domain of human affiliation***. It plays a great role in the integration of person into society. Physical activity in this context can be assessed in general as a basic tool of human socialization. Without motor learning through an imitation it is impossible to imagine integrating of child into the family, in peer groups at school and in leisure time. Affiliation moments in control physical activity have many forms. Above all, there is the social response, so important for humans. In the power society, sport presents a model for social benchmarking of human performance and with that related processes of social response. Sport presents a model of competitive environment. But the action is with polarizing effect. In intact population can serve as a medium to better quality of life achieving through positive social response; conversely in people with mental disabilities may reduce the quality of life through repeated frustrations.
2. ***Domain of natural and cultural unity of man and environment***. Man in its origin is a natural species, so from the view of its development movement and outdoor activities play very important role in psychosomatic development of organism. Artificial cultural environment, in relation to the natural essence, act as a domestication factor, with all the negative (biodegradation) and subjectively positive (civilization) context.
3. ***Domain of fun***. Emotional experience is a main drive of actions. Psychosomatic medicine shows that emotional implosion may cause dysfunction and related health problems.

There is talk about alexithymia (the inability to express emotion), usually associated with anxiety, increased muscle tension and neurotic tendencies of psycho-asthenic type. Compared to emotional closing is standing "self-opening" in exciting emotional experience, which belongs into the domain of fun. In relation with physical activity in forms of play, game and sports, the man can achieve extraordinary experiences as a counterpoise to the permanent emotional implosion in daily serious life. Especially hard positive function the cases of euphoria during physical activities, states of excitement, enthusiasm, passion, modern described as the "flow".

Benefits of physical activity on physical growth and weight of children aged 8-15 years

The age 8-15 in terms of anthropometrics is characterized by skeletal development and bone mineralization with good adaptation to an optimal physical load (Bláha, 2015). World Health Organization (WHO) recommends to children aged 8-15 an opportunity of moderate physical activity at least one hour per day, such as prevention of the hypokinetic syndrome. This is very important for health development of children and their quality of life (WHO, 2010). Growth in children aged 8-15 years is not uniform. An acceleration of growth is reported particularly for girls in early puberty. Growth rate is not same in all individuals, as well as the moment of its termination. Slowdown has various causes. The critical threshold that separates a "normal" stature is the 3rd percentile. So called normal short stature is monitored in 50% of cases, mostly a combination of familiarity short stature and constitutional retardation. As the most frequent causes of growth retardation are presented endocrine disorders, chronic diseases (e.g. heart disease, chronic anaemia, anorexia, etc.) and finally genetic disorders (Gába, Přidalová, 2014; Riegerová, et al. 2006; Schoumans, 2005; Zeman (2005).

Experts agree that physical activity is a key determinant of health development. Poor/hypo or excessive/hyper physical activity is harmful to the growth and development of children in school age (Chakravarthi, Booth, 2004; Rehor, 2015; Rehor, Krejčí 2015; Rehor, Kornatovská 2013). Another important determinant which acts on the growth and development of bone, muscle and body fat, is child nutrition (Kirk, et al, 2005). Similarly Dollman, Norton (2005) recommend adequate

nutrition, ideally combined with regular physical activity, as the foundation for optimal growth development, and achievement of genetic potential. Hills, King, Armstrong reported that a lack of physical activity at any stage of growth and development, especially during the important period between childhood and adolescence, has a decisive negative influence on the rise of overweight and obesity. Physical activity presents a mechanical load factor for bones, especially in combination with the growth of bones and determination of the appearance of the bones and maintaining functional appearance of the bones (Hills, et al, 2007). Bolach et al. state, that children with mental disabilities have lack of incentives to adequate daily amount of physical activity compared their intact peers, and therefore are often characterized by poor physical fitness and poor posture (Bolach, et al, 2008).

The problematics of overweight and obesity among children with mental disabilities

Overweight and obesity in adults usually begin in childhood. Parents usually have an idea that obesity will "disappear" during the adolescent period. Máček and Máčková argue that if a child increased body weight before puberty, and continues in such a tendency during puberty, there is height probable, that the child becomes an obese adult. The authors also indicate possible risks for obesity: birth weight heighter than 4000 g, low level of education of parents, as well as overweight and obesity of the parents, hypokinetic lifestyle in the family (Máček, Máčková, 2013). Overweight and obesity are not uniformly defined. As the child overweight is usually referend Body mass index above the 90^{th} percentile, in some countries over the 85^{th} percentile. Values measured above the 97th percentile show obesity (Lebl, 2013). Obesity presents one of the biggest problems in nowadays, to which health professionals are faced as well as healthcare systems worldwide (Janssen et al., 2005; WHO, 2009). There are studies that demonstrate that a sedentary lifestyle correlates with overweight and obesity in children (Strong et al., 2005). For example, watching television is associated with low levels of physical activity and low fitness (Hills et al., 2007) or obese (Kimm, et al., 2005).

Czech authors report 5-10% of obese children in population (Vignerová, et al. 2006). Sigmund and Sigmundová (2012) in its two-year research at 84 girls and 92 boys aged 10 - 11 years, divided

children into two groups (control and intervention) and at the beginning of the research found that the incidence of obesity was at x intervention control group, respectively girls 6.9% x 7.3%, boys 11.1% x 6.4%. At the end of the two-year interventional motion program was not in the intervention group reported the prevalence of obesity even for one child, while in the control group was 21.9% of girls and 23.4% of boys obese. Lloyd, Temple and Foley (2012) in their research, which lasted from 2004 until 2008, representing an overview and prevalence of overweight and obesity among 9678 children and adolescents (ages 8-18 years) included in Special Olympics competition. In overall 30% of the participants of both sexes were overweight or obese. For participants from Europe, obesity and overweight occurred in 30.9% of girls and 21.9% for boys, implying that the probability of the occurrence of overweight and obesity in children with mental disabilities is heighter among girls than boys. As a possible reason the authors presented genetic disorders (e.g. Down syndrome), drug using, low levels of physical activity and unhealthy eating habits etc. (Lloyd et al., 2012).

WHO defines mental retardation as "a state of blocked or incomplete development, which is particularly characterized by disruption of skills, manifested during the developmental period in the level of intelligence, i.e. cognitive, speech, movement and social skills" (WHO 1996). More recently, it is recommended to use the designation of a person (child, adolescent) with mental disabilities. This reflects the fact that retardation is not an integral part of man, but only one of his many personal attributes (Švarcová, 2006). Also, the majority of Czech authors (Ješina, Janečka, et al., 2008; Ješina, et al., 2013; Válková, 2012, 2000) prefer to use such term.

Ješina et al. (2013) use following classification degrees of mental disability:

- Easy Mental Disability (code F70, IQ 50-69) is characterized by delayed of speech development, limited capacity for logical and mechanical thinking, weaker memory and slightly delayed fine and gross motor;
- Moderate Mental Disability (F71, IQ 35-49) is characterized by significantly reduced thought and speech, dyspraxia of fine and gross motor skills is presented too, which is related to problems with coordinating of movement;

- Severe Mental Disability (F72, 20-34) is characterized by significant neurodevelopmental delay. Speech development remains on before speech level. Motor disorder with symptoms of total damage of the CNS is described;
- Deep Mental Disability (F73, IQ less than 20) is often characterized by severe sensory and motor impairments like neurological disorder. Communication skills are maximally on level of understanding some of the words.

Sherrill (2004) reports, that 90% of people with intellectual disabilities are diagnosed with mild mental disabilities. The author states that in persons with mental disabilities found obesity from 29.5% to 50.5%. Overweight and obesity in children with mental disabilities have a negative effect on motor performance and physical conditions for learning. Obesity depends on the following factors: (1) gender, (2) the degree of mental disability and (3) the environment. On average, girls with mental disabilities have problems with overweight and obesity at 59% for men with mental disabilities with overweight and obesity occurs in 28% of cases (Sherrill, 2004). Children with mild mental disabilities have a heighter percentage of overweight and obesity than children with moderate to severe mental disabilities (Hove, 2004; Sherrill, 2004).

Monitoring of the anthropometrics characteristics in Czech children has a long tradition. Anthropometric characteristics of height and weight in Czech children population were completed 6 times every ten years after the 2nd war in Czech Republic. On this base norms of weight and height were developed for Czech children population. Currently it is very difficult in Czech Republic to continue this tradition, because the willingness of parents to cooperate continuously is falling down (Vignerová, Bláha, 2007). Children with mental disability in general are going through same stages of development as children of the reference population, but in some development stages are more limited in psychomotor competencies. A general problem in contemporary postmodern society is hypo kinesis, artificially inducing in children through sitting - at school, at home, watching TV, cell phones, computers, etc., followed in transport middles (Harada, et al., 2013; Krejčí, 2013; Marcus, Forsyth, 2010).

As part of motoric learning in children with mental disability is applied effort to prevention of physical weakness and management of hypokinetic style through intensity and volume of physical activity while

respecting the contraindications of the disability. Dancing, walking, yoga, game activities in nature and in water were professionally analysed in the international research project with conclusion that available controlled guided physical activities for children with mental disability have rapid and effective integration effect and positive behavioural changes (Kornatovská, 2014).

For children with mental disability are the controlled physical activities generally less available in so called "former socialist countries" than for children of the reference population. It gives them health problems and complications related to physical development, overweight, poor posture (Bolach, Bulinski, 2012; Kornatovská, 2014). If it is not given an attention to this problematic in mental disabled children 8-15 years, in later life is very difficult to provide effective behavioural changes to wellness and health education and thus preventive care for their overall health (Davis, 2011).

In the presented investigation we used the last modification of the norms for the Czech children population provided after the 6th National Anthropometric Survey (Vignerová, Bláha, 2007). That time, and it should be emphasized, the norms were developed on data analyses of intact children population only.

OBJECTIVES

1. To monitor changes in the basic physical parameters (body height, body weight) in children with disability (mental, hearing, visual) participating in intervention programs.
2. To compare the basic physical parameters of disabled children to the reference population - 6.CAP 2001.

METHODOLOGIES

Material

Data analysis was performed in 3 groups of children aged 8-15 years. Experimental sample - children with mental disability in which intervention program was applied and (N = 50, 25 boys, 25 girls, average age 12 years). Control group - children with mental disability, for which the intervention program was not applied (N = 50, 25 boys, 25 girls, average age 12 years). Reference sample represents the healthy children population, in which anthropometric indicators of body

weight and body height were examined in the framework of the 6th the National Anthropological Research on Children and Youth, 2001 in Czech Republic, published of Vignerová, et al in 2006 (N = 24787, 11931 boys and 12856 girls, average age 12years), see Table 1. The experimental study was therefore attended by 100 subjects (50 boys, 50 girls) with mental disability (light, medium), divided into two equally numerous samples - experimental and control (see Table 2). The experimental sample consisted of 26 subjects with mild mental disability and 24 subjects with moderate mental disability. The control sample consisted of 25 subjects with mild mental disability and 25 subjects with moderate mental disability.

Table 1 *Sums of the experimental and control samples of children aged 8-15*

SAMPLES	Mental disability		Sum
Sex	Female	Male	
Experimental	25	25	50
Control	25	25	50
Sum	50	50	**100**

Table 2 *Sums of the reference sample of the 6th National Anthropometric Survey in Czech adolescents aged 8-15 (Vignerová et al., 2006)*

Reference sample		Total sum
Female	Male	
12856	11931	**24787**

Three times in one year period of the intervention program anthropometric characteristics (body height, body weight) were tested. The research continued by data analyses with comparison of reference sample data. The research was conducted in the years 2011 – 2013. Probands were selected in experimental and control groups using the stratified random sampling. Investigation of the monitored parameters, e.g. body weight and body height, was performed in the experimental and control groups always in the same period, 3 times in 1 year - before the start of the intervention program, then after 5 months, and then after 10 months (after completion of the intervention program). Investigations were realized at the same hour of the day, in the same room, in the same terms. The resulting data were

edited and statistically processed with comparison to the data of the reference sample – Czech child intact population in same age range, gained in the 6th the National Anthropological Research on Children and Youth, 2001 in Czech Republic (Vignerová, et al, 2006)

METHODS

Anthropometric indicators (Vignerová, et al, 2011)

Methodology of the measure of the anthropometrics indicators was keeping according the Czech Program „Růst CZ, version 2.3" – "The program for the indicating of child´s growth" (Vignerová, et al, 2011).

- Body weight: Weighing was provided on the weighing-machine TANITA BC 531.
- Body height: Proband stood with his back to the vertical wall (without trims on the floor) with heels and toes together, touched the wall by buttocks, heels and shoulder blades, exceptionally by head. The head was oriented in „Frankfurt horizontal plane", securing the desired position of point vertex (the highest point on top of the head).

Statistical processing of acquired data was performed by Ing. Martin Hill, DSc., using software Statgraphics Centurion XVI version from Statpoint Inc. Relations of dependent variables to the proband´s gender, to experiment and its exact phases were evaluated using analysis of variance (repeated measures ANOVA model consisting of Subject factor, between-subject factors Gender and Intervention (with and without intervention), within-subject factor Stage of the experiment and between-factor interactions. Dependent variables with asymmetrical distribution of a non-constant variance were before testing ANOVA model transformed towards symmetry and homoscedasticity by using Box-Cox transformation (Meloun, et al, 2000). The optimal transformation parameter was found using linear regression on the maximum theoretical quintile compliance with Gaussian distribution percentiles actual distribution of the transformed data. Distribution and homogeneity of data, and the residue was controlled according to literature procedures - Meloun, et al (2002); Melon, Hill, et al. (2004).

Intervention method "System of the controlled physical activities" (Kornatovská 2014)

There were realized 3 times "three-month training cycles" of controlled physical activities. There were used specific didactic models according to the type of disability. Remaining months were used for data collecting and analysing - divided into blocks for testing - before, in the middle, after the intervention program. The content of the applied intervention program in Czech Republic emerged from the experience gained in the British region "West Midlands" - Walking - dance activities - yogic exercises - exercises in warm water "floating".

Description of controlled physical activities used in intervention

- **Walking - 3 coherent training units in each cycle of the intervention program**

Motor learning in this controlled physical activity was mainly focused on the gradual development of endurance and aerobic fitness adequately to current potential of monitored children. They were alternated and developed different combinations of simply walk (forward, backward, sideways, with turnovers), dance walk, accompanied by music, combined with imagination, creative elements according to possibilities of children (e.g. „walking through the forest" and on "moss"), in combination with hops and running (imitation train, galloping horse, "Indian" run). The second and the third cycle rehearsed with walking with poles (Nordic walking) and the normal tourist walking without poles. In both cases, the training was geared towards walking outdoors (street, park, forest way) in combination with games using natural environment. It was the practice of walking on a plane, walking down the sidewalk, walking in pairs, walking in a group, walk uphill or downhill.

- **Dance - 3 coherent training units in each cycle of the intervention program**

Motion learning in this controlled physical activity was mainly focused on the gradual development of coordination and posture. Dance is an important part of self-expression and social contact. It is valued for the possibility of spontaneous locomotor release and

catharsis (Dinold, Zanin, 1996; Gorny, 2013). During the dance training is strongly supported by the ability to concentrate and remember. They were chosen such elements and skills corresponding to current possibilities of monitored children. Initially the movement was developed through learning games using dance tunes and nursery rhymes (e.g. the “Golden Gate”, etc.), and other simple clapping rhythm. Further, when awakened fancy dance improvisations (e.g. the so-called Dance "in a ball" - the idea that I have in hand a brush with paint and I paint the space of an imaginary sphere where I stand - over you, around you). An important part of physical education was a demonstration of the trainer and kinaesthetic method, i.e. to stop movement in a certain position and to help to child, followed by endurance, which assist fixation physical structure. The second and the third cycle were rehearsed simple dancing in a circle and couple dancing by individual imagination (disco”, “mirror”, etc. (dancing in pairs and dance in a group (e.g. “circle”, „snake ").

- **Yoga exercises - 4 coherent training units in each cycle of the intervention program**

Motor learning in this controlled physical activity was mainly focused on the gradual development of flexibility, strength, agility and posture. The training program was based on the acquisition of simple yoga exercises in a slow rhythm, in synchronise with breathing, with an emphasis on developing balance and relaxation techniques, which have a height impact on the development and improvement of mental stability. Similarly as the dance block in yoga training presented also the important part of imagination and play. The imaginations of "tree", "animals", "Sun”, “Moon" were motivation for practicing and remember of exercises. Yoga exercises are typical with closing eyes during exercise, and it is supported by individual rhythm and development of concentration. During training, emphasis was placed on the individual and actual possibilities. In the second and third cycle were trained yoga sets “Sun salutation” and “Greeting to Moon”. Yoga sets complete a harmonious set of complementary positions, improving mobility of the body and having positive effects on glands activity. It was so improving muscular sensation and spatial orientation. Regular daily exercise of several rounds of yoga set corrects poor posture and reduces back pain, stress and digestive problems (Maheshwarananda, 2001). Efforts were made to train yoga sets smoothly in accordance

with breathing. During the imagination of “Sun rising” in yoga set children were motivated to imagine, which part of the body is pleasantly warming in every position.

- **Exercise in water “floating” - 2 coherent training units in each cycle of the intervention program**

Motion learning in this controlled physical activity was mainly focused on the development and release capabilities "floating in the water." It was used a small pool with warmer water. The intervention training units were used walking in water, water game with spraying and immersion into water to relieve the feeling of fear of water. The basic principle of access of teacher to child was the approach of Halliwick method: "I'm here to help you", emphasized gesture towards lifting the arms to practitioners. There were used various tools to develop aqua pleasant sensation of "floating", "passage", "drift" and developed in various combinations with help of instructor, without spotting. It was used effect of "flow", well-known from sports psychology, awakening feelings of joy, contentment, peace and happiness during physical activities and motivated to returning to such motion experience. These intervention training units were part of the second and the third cycle, and there were only four, due to the limited availability of the pool.

- **The structure of intervention units, including motivating tasks for a week**

Each intervention training unit consisted of 4 parts - introductory, preparatory, main and final. In the first part was main to welcome children, most often in a circle (standing or in a sitting position) and familiarization with the content of the training unit. After that motivation followed and through a game form "warming up" effect. Total time of the introductory part was 15-20 minutes. In the preparatory part has been applied stretching and warm-up as a preparation for loading in main part. Total time of the preparatory part was 15-20 minutes. In main part children repeated most important movements from previous training sessions and then were learned new skills as part of the controlled activities. Total time of the main part was 40-45 minutes. In the final part was main to calm and relax, "calming down" effect and forwarded motivational tasks, assessment of the whole exercise in a

circle (sitting up, standing), farewell and motivation for further intervention training unit. Total time of the final was 15-20 minutes. Motivational task was elected, either individually or for the whole group of children. Motivational task was made for everyday implementation for the remaining six days a week under the supervision of parents or carers and also along with them. Role reversal where the child is taught adults, "how-to" for participating children was very motivating. The application of motivational task was to achieve a regular exercise in their free time playful and joyful form of mental and physical relaxation, improve self-control.

RESULTS

Body weight

At the beginning of the experimental study, there were no significant differences between the experimental set and control group in the average weight of probands with mental disability (Table 3), Modification in body weight during the experiment is presented in Figure 1. Identified input of the average weight of probands with mental disability highly exceeded the average weight of the reference sample, in females and even in males. Results of females of the experimental and the control samples showed significantly higher weight of 5.1 kg ($p = 0.0001$) than in females of the reference sample. In males, in the experimental and in the control samples was also found significantly higher weight by 4.9 kg compared to the value of the reference sample ($p = 0.0001$).

During the experimental study the average of weight was gradually decreasing in females of the experimental group in comparison to the control sample. The average value of 50.2 kg, representing a significant difference between the first and the third phases of examination ($F = 28.8$; $p = 0.0001$). The increase of the average weight of 1.3 kg represents a significant difference between the experimental and the control female samples in the third phase of examination ($F = 154.5$, $p = 0.0001$).

In males from the experimental group remained weight value without significant changes - total weight loss was 0.4 kg (see Table 2). Statistical analysis of weight values were recorded (as was the case female control sample). The average of weight increased in

males control group by 2.1 kg for the third phase of examination (F = 52.9; p = 0.0001).

Table 3 *Changes in body height and weight before and after intervention program (IP) in comparison to control and reference samples*

B O D Y W E I G H T [kg]						
TYPE OF SAMPLE	BEFORE IP		AFTER IP		DIFFERENCE	
	Females M SD	Males M SD	Females M SD	Males M SD	Females M SD	Males M SD
EXPERIMENTAL	51,6±0,23	51,6± 0,31	50,2± 0,26	51,2± 0,31	-1,4	-0,4
CONTROL	51,9±0,26	51,6± 0,31	53,2± 0,26	53,7± 0,31	1,3	2,1
REFERENCE	46,6±0,09	46,7± 0,01				
B O D Y H E I G H T [cm]						
TYPE OF SAMPLE	BEFORE IP		AFTER IP		DIFFERENCE	
	Females M SD	Males M SD	Females M SD	Males M SD	Females M SD	Males M SD
EXPERIMENTAL	152,6± 0,18	154,0± 0,16	154,4± 0,18	156,9± 0,18	1,8	2,9
CONTROL	151,5± 0,18	152,5± 0,16	153,8± 0,18	155,5± 0,16	2,3	3,0
REFERENCE	162,0± 0,08	161,8± 0,09				

It can be said, that in the third phase of examinations in both sexes of control samples was found out negative trend in the rise of mass values, and this is a significant difference between the first and third tests. In the average weight of probands with mental disability in the second and third phases of examinations was analysed a positive trend in weight loss in the experimental sample. But still the average weight of the experimental group was significantly higher than the average weight of the reference group. In the control group in comparison to the results of the reference group (p = 0.0001) even higher average weight than the first examination was analysed (Table 3, Figure 1, Figure 2).

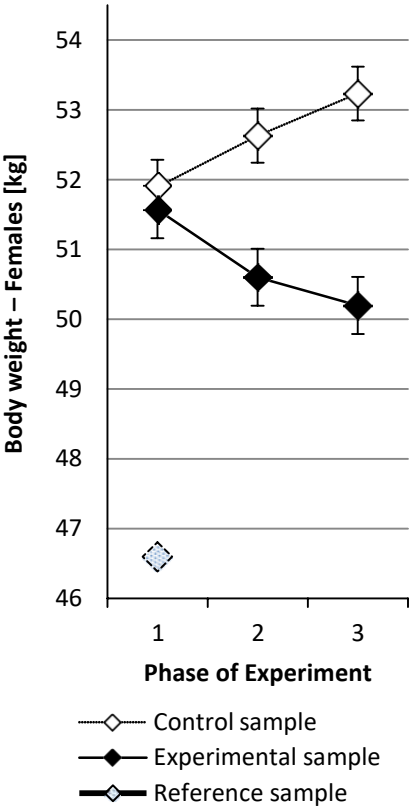


Figure 1 *Changes in body weight of females from experimental sample during the intervention program (IP) according the phases of experiment, in comparison to control and reference samples*

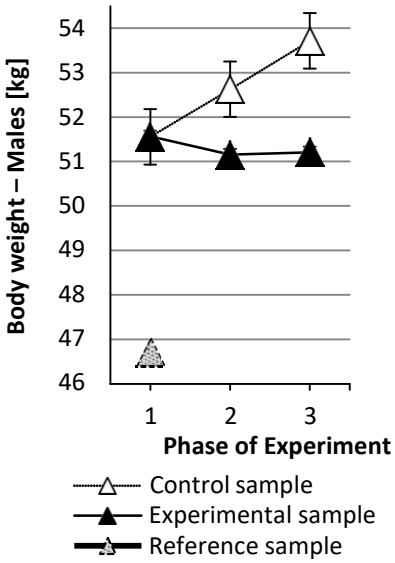


Figure 2 *Changes in body weight of males from experimental sample during the intervention program (IP) according the phases of experiment, in comparison to control and reference samples*

Body height

At the beginning of the experimental survey the average of body height was similar in the experimental and in the control samples. In female experimental sample was the average of body height 152.6 cm and in female control sample 151.5 cm; in males from the experimental sample 154.0 cm and in male control group 152.5 cm, i.e. without significant differences in heights between experimental and control samples. As it is apparent from Table 2 and Figure 2, the input average data of height of probands with mental disability were identified significantly lower ($p = 0.0001$) than the average value of height in the reference population, in females and in males. In the experimental sample of females was identified a lower body height of 9.4 cm in girls of control group 10.5 cm compared with an average body height in females of the reference population. In the experimental group of males the analyse showed significantly lower

body height by an average of 7.8 cm in males of the control group of 9.3 cm compared with the average of height in the male reference sample.

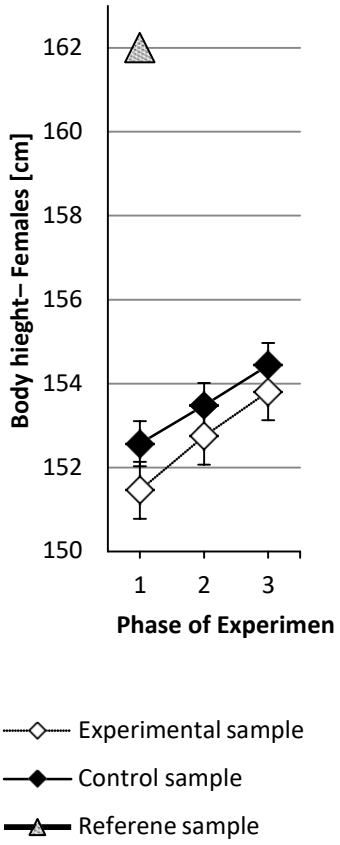


Figure 3 *Changes in body height of females from experimental sample during the intervention program (IP) according the phases of experiment, in comparison to control and reference samples*

In the end of the experimental investigation, in the third phase, it was found analogous increase of the average values of body height in the experimental group compared to the control group of girls to the average of 154.4 cm, with a control group of girls to the average of 153.8 cm, in the male experimental sample to the average value

of 156.9 cm in comparison to the average value of 155.5 cm in the control group. Despite this positive increase of the average values of body height in subjects of both sexes in the experimental investigation, these values were significantly lower ($p = 0.0001$) than the mean values of body height set the reference population of the same age range and gender (Table 3, Figure 3, Figure 4).

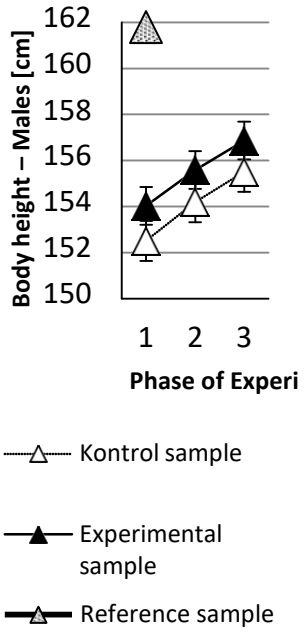


Figure 4 *Changes in body height of males from experimental sample during the intervention program (IP) according the phases of experiment, in comparison to control and reference samples*

DISCUSSIONS

Evaluation of the reference sample data with the groups of children with disabilities founds significant differences. The findings can be discussed, that one of the tasks of education for children with mental disabilities aged 8-15 years is to develop a positive relationship with the controlled physical activities, thus promoting physical spontaneity, adequate exercise regimen and quality of life.

Lack of physical stimulation has a negative impact on body weight and body height of children with disability. The results are consistent with the findings of international research, for example. Sherill, et al. (2003) states, children with Down syndrome have a lower average height, but greater weight and BMI, than the children with different degrees of mental disability. Sherill discussed that sedentary lifestyle, unhealthy nutritional habits and lack of nutritional status in the family leads to problems with overweight and obesity. It states that Down syndrome correlates with obesity and height blood cholesterol (Sherrill, 2004). It can be also argued that children with Down syndrome have a lower basal metabolism (Chad, Jobling, & Frail, 1990).

Further, it is discussed the question of kinesis-protection in children with disability due to physical activity. It was found out, that a healthy diet and regular physical activity are a key factor in preventing and treating risk profile (Elmahgoub, et al 2012). Internal harmonization between man and nature is a matter of a balanced energy balance, by analogy when the population proportion of intake and output of the energy is higher distorted in "overeating" compared to the "hypo kinesis". Motoric competence is not more an intergenerational evolutionary impulse, as it used to be in the phylogeny of man, and therefore it must be artificially maintained an additional physical exertion – no drill, but the positive feeling during the controlled physical activities, e.g. physical recreation in leisure time. Condemnation, often related to people with mental disabilities, is from the view of quality of life, a noxious stimulus. Organisationally and pedagogically it is very difficult to ensure, that social self-realization in physical activity have found all the people as a way to quality of life. To the affiliation context belongs in sport experiences of friendship, partnership, good atmosphere in the team, which can continuously improve quality of live, similarly as in the opposite direction can cause conflicting and deformed relationships. Integrative and cohesive processes in sport are actual as important attributes of quality of life, where physical activities, games and sports can play an important bio-psycho-social role (Hošek, 2013).

Question to the discussion is, how sedatives and medicaments can have influence on the found results. Parents and teachers often complain on increased psychosomatic restlessness and aggression of children. Negative role in this issue is certainly reflected through hypo kinesis, its effect is known. "Hypokinetic syndrome," which

manifests of the impulsiveness, irritability, decreased ability to concentrate and self-control, and in particular increased psychosomatic restlessness and aggression. Hypokinetic syndrome in children aged 8-15 presents a non-physiological phenomenon due to age specifics and increased need for motion and movement relaxation in this age period. Hypo kinesis in the current lifestyle is inducing artificially through daily long-term sitting - at school, at home, in vehicles, in spending time on computer, watching TV, cell phones and tablets screens, etc. Experience of adventure, previously implemented for children in a variety of motion games and physical activities, in postmodern society is replaced by a virtual experience on the computer, together with minimizing of physical movement. The goal of controlled physical activities in children with mental disability is harmonious development of the organism, optimizing of bio- psycho-social well-being (Harada, et al., 2013; Marcus, Forsyth, 2010).

A child with a disability has on the legal basis right to participate in all aspects of social life, including participation in the controlled physical activities organized by various associations, whether they are formal or informal. Controlled physical activity having the character of recreation and leisure activities should be accessible to all children. They allow them to participate in play, recreation or spontaneous sport activities. The goal is an optimum of physical fitness, relaxation, fun and playing. Children with mental disability are of course also entitled to a performance sport activities, i.e. to participate in the races, competitions and informally or formally organized games and sports activities, operating individually or in a group, as: bowling, gymnastics or soccer (WHO, 2013).

CONCLUSIONS

The role of the Wellness Specialist is to positively influence the self-care practices, reinforce healthy habits and prepare responsible citizens for the future. It is hoped that this resource combined with the implementation of the nation-wide government interventions will foster healthy behaviours for daily living and prepare individuals for their roles in our culture. Clients, their families and others will learn by a sequence of activities carefully designed to promote healthy lifestyles and social responsibility. All stakeholders within the community, including schools, must

guarantee that efforts are made to emphasize health as a value in life and reaffirm that social responsibility is an essential element in our culture.

On the base of statistics analyses we found significant differences in monitored indicators. Children with mental disability can achieve positive effects of weight reduction under the influence of controlled physical activities programs. Outputs can be beneficial for the rehabilitation of children with disability. It is advisable to seek opportunities to integrate children with disability into clubs and recreation centres focused on controlled physical activity.

Controlled physical activities, determined a system of recreational physical activities aimed to achieve health-social benefits through professionally guided motor learning, presents an intentional process achieving health objectives with the significant socialization effect. For controlled physical activities in children with disability aged 8-15 is an important determinant that conditionings in somatic occur simultaneously influences mental and social health.

To coaches, guided physical activities for children with mental disability aged 8-15, we recommend keeping of the following principles: reasonable sequence of didactic steps; be illustrative; to use context; to keep motivation; to implement various tools to keep concentration between children and coach. We recommend an individual approach, which consists in regarding on learner child as a subject, who has right due to its unique on a specific approach of teacher. We recommend in children with mental disabilities to present information in such way, which requires involvement of most of senses. Like a notice we can conclude that too much verbalization can be for a child with a mental disability confusing.

From the view of motor learning indicators we can recommend, in children with mental disability, focusing on regularly realised controlled physical activities and to create in such way proper fundamental movement stereotypes:

- Keeping of right posture, walking, manipulating with things, etc.;
- Strengthening of key postural muscle groups;
- Stretching of shortened muscles;

- Improving the motion control - learning to control the body in various situations; to teach orientation in space; improve balance;
- Fitness promoting.

As Rehor (2015) presents, the most dramatic implication for the future of Exercises and Wellness Education is that there will be a need for professionals who are knowledgeable regarding holistic health/wellness. Neither the traditional health educators nor the traditional physical educators meet the needs of the future. We cannot any longer afford the luxury of arguing why our specific specialization is more relevant than some other. We must cooperate to redefine our goals and establish our contribution to the future. The public is aware of the wellness/fitness movement. Parents demand a more complete education for their children, but incorporating wellness principles into the public school arena will require a change in the manner in we approach health and physical education. The Exercise and Wellness Curriculum is an integration of four basic domains: Lifetime Sports and Fitness, Exercise and Environmental Epidemiology, Scientific Principles with Emphasis on Behavioural Health and Wellness and Management/Programming. These knowledge areas serve as foundations for the selection of secondary content area identified in the Figure 1 by the overlapping segments of the Venn diagram symbolizing their integrated nature and the need for integrated teaching strategies. The “heart” of the Exercise and Wellness framework is a behavioural change, signalising the fundamental philosophical shift from traditional teaching practices focused on acquisition of knowledge and skills to practices structured around the behavioural change principals with the learning outcome being a change of behaviours (Rehor, 2015).

Suitable motivation in the controlled physical activity (which is due to the individuality and the current state of child with mental disability adequately and properly dosage) can cultivate a positive attitude towards motor learning. Inducing of appropriate situations, to which a child with mental disability during practicing react – motoric, emotionally and socially, it enriches the overall development of personality.

CHAPTER 3.2

ATTITUDES OF HIGH-SCHOOL STUDENTS WITH DISABILITIES TO SPORT ACTIVITIES

PETRONELA LADECKÁ

Abstract: *The aim of the research was to determine attitudes to physical education, movement and sport activities in high school with physical disabilities. We used standardized questionnaires. The result of our research is the high popularity of physical education, adapted physical education and all sport activities. Research has found that, due to physical disability of our students, is a sport, physical activity and lifestyle very important.*

Keywords: *attitudes, physical education and sport, students with physical disabilities.*

INTRODUCTION

Objective of special schools is carried out by applying various special educational and teaching methods and means which correspond to the type of disability and students of special schools. Educational goals of Physical Education (compulsory subject) in special schools follow optimal physical and movement development of students. It comes to reaching desired degree of fitness, endurance and motor skills. Physical Education and sports affects the personalities of disabled, has positive effect on biological, psychological and social area (Čepčiansky, 2000).

Labudová (2009) states that the disabled pupils can be included in everyday life is a professional duty of physical education teachers, coaches and trainers. Their role is coaching and advice in physical activities at school, in the workplace and their use in the context of free time, during training the sport for all, or the professional sport.

Sport activity is extremely important for these people. There is not only increase of physical fitness, but also strengthen disease repressed confidence.

The lesson of physical education for students with disabilities is one of the means of social, psychological, biological human adaptation to

various stressors, stimuli and irritations. It is important to know which sporting activities are for children with disabilities the most interesting and the most concerned.

METHODS

The aim of the research was to determine attitudes to physical education, movement and sport activities in high school with physical disabilities.

Hypothesis and tasks

We assume the high popularity of body resp. remedial gymnastics by students with disabilities

Work tasks

To test hypotheses and reach the goal, we have created the following tasks:

1. The preparation of the questionnaire
2. The questionnaire administered to students.
3. Evaluation and comparison of the results of research.
4. Formulation of conclusions and recommendations for practice.

Research group

Research underwent secondary students with disabilities in Bratislava, Slovakia. The sample consisted of students of four grades of selected classes. The total number of respondents was 104 of which 54 boys (51.92%) and 50 girls (48.08%) with age 18.4 ± 2.0 boys and 18.4 ± 2.3 girls. All students of secondary specialized school were physically disabled. Students of this school come from various regions of Slovakia.

Research methods

The primary source of information was the questionnaire. Through the questionnaire, we investigated the opinions, attitudes

and relationships of the respondents to the activities, sports, sports events and physical activity.

The total number of questions was 11. Questions were mainly closed with multiple choice answers. There also appeared open questions which we used for valuable individual attitudes of our students. The results obtained through empirical research methods were processed and evaluated through qualitative and quantitative research methods. To evaluate the data we used the basic methods of descriptive statistics (graphical representation, percentages by descriptive statistics).

RESULTS

We investigated the popularity of physical education, respectively remedial gymnastics. According to the survey it is clear that more than 60% of all respondents said that physical education (PE) , respectively therapeutic PE as a favourite subject (70.59% boys and 63.33% girls). Similar results in relation mentions several authors (Antal, 2014; Bendíková, 2012; Vašíčková 2015).

The respondents were also those who did not prefer this subject (5.88% of boys and 6.67% girls). In terms of our results and the results of research by other authors (Orlíková, 2005, Anta, 2014) we can state that this subject is still on the top position of the popularity among other school subjects.

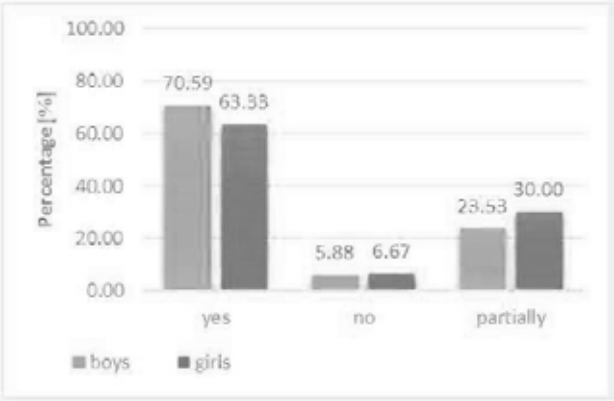


Figure 1 *Popularity of Physical Education respectively Remedial PE*

Following on from the previous question we wonder what activities are popular during the hours of PE (Physical Education). The most popular activity during the hours of PE was indicated Games (girls and boys 76.67% 79.41%), the second most popular activity was marked swimming (33.33% girls and 23.53% boys). Less popular were labelled athletics and gymnastics.

The results show that during of PE lessons is increase interest in the sport in general and during the PE is important to include sports games.

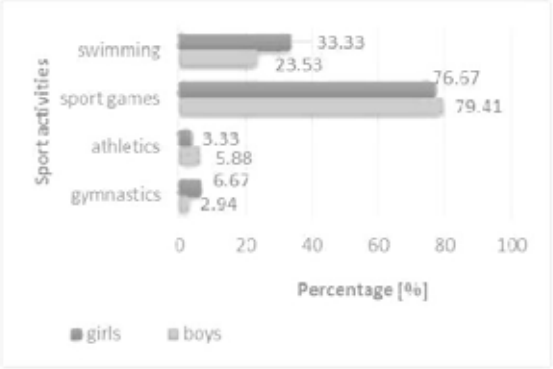


Figure 2 *Popularity of activities during PE*

As we investigated whether the students engaged physical activities outside physical education classes, we wonder about which physical sporting activities have the greatest interest. Boys reached different results to girls one (Picture 3 and 4).

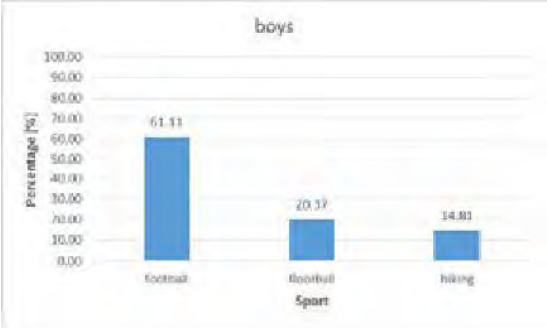


Figure 3 *Sport in leisure time*

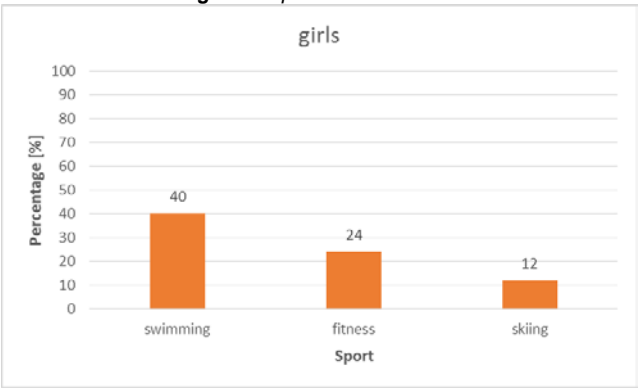


Figure 4 *Sport in leisure time*

CONCLUSION

Our findings clearly confirm that movement, physical activity and Physical exercise is for students with disabilities necessary and very popular.

It is therefore necessary to support students with disabilities in physical education and physical exercise and provide them with satisfactory temporal and spatial conditions for its implementation during school or during leisure time.

CHAPTER 3.3

EFFECT OF TAI CHI EXERCISE ON QUALITY OF MOVEMENT IN AESTHETICS CONTEXT

MIROSŁAW P. GÓRNY, INGA GÓRNA, RADOSŁAW MUSZKIETA, LUDMILA MIKLANKOVA, BARTOSZ BOLACH

Abstract: *The study below describes the method and the results of the assessment of aesthetic movement performed by participants with impaired vision. For nine months blind primary school students mastered tai chi techniques. At equal time intervals the students performed two selected movement patterns characterised by various aesthetic variables, fluidity and harmony. The movement patterns were video recorded and assessed by competent judges in order to demonstrate the level of changes in aesthetic variables. The AMSA (Aesthetic Movement Scale Assessment) (Górny 2013), an original procedure of movement assessment was used in the study. The participants achieved an improvement in the studied aesthetic variables. The introduction of tai chi exercises, which complement a typical physical education lesson, showed a clear increase in motor abilities in aesthetic form of movement and an increase in proprioceptive sensitivity.*

Keywords: *aesthetic, blind, evaluation, fluidity, harmony, tai-chi.*

INTRODUCTION

The way in which we control and perform our movements depends on a set of receptors. Depending on the degree of vision impairment each of the receptors, hearing, touch or proprioception, has a specific place and significance in terms of the amount of delivered information (Soto-Faraco 2004; Bertelson and Gelder 2004; James 1985). A lack of vision, which is a leading receptor in the perception of space, causes significant limitation of a person's ability to copy movement, and extends the time of movement learning. Although the priority of vision in perception and control of movement is not debatable, this cannot be said about other senses. This results mainly from the ability

to perceive movement, that is its beginning and end, as well as its path. No doubt touch plays a leading role in this since the birth (Lynch 2011). It is decisive for all aspects of movement, from its purposefulness, to its course and precision, taking into consideration its emotional character, which is aesthetics of movement. Even a small outside help has a beneficial effect on the correctness of movement. However, it will always involve copying of the movement demonstrated by an instructor and this link is broken when there is no integrity between a blind person and an instructor. What is left is proprioception in which the structure of passing the information is not as exact as in other senses, but which is the only one to form an independently created substitute of a movement made or performed. The question is how much proprioception can contribute to the development of aesthetic movement in the blind. Watching the blind leads to the conclusion that their capabilities in this respect are small (Brambring 2001; Chang et al. 2010). Similar situation can be noted in all physical activities of the blind. This leaves alternative or adapted systems of learning movement. An appropriate training would aim to meet two objectives. Firstly, a blind person could learn a new movement by repeating it continuously. By gaining information about the correctness of the movement the person gains experience in performing it. Secondly, a blind person learning the movement follows its various variants in striving to perfection. Information about the mistakes made leaves traces which, like in the first objective, allow for increasing of kinesthetic awareness. Is there a possibility of correcting the movement, improving the technique or performing completely new movements?

One of the possible and relatively easily available forms supporting aesthetics of movement is tai chi. It is an ancient form of health exercises and self-defence (Liang 1977; Wang et al. 2000; Kumar 2006) which is a set of physical exercises called forms. They are made of slow and strictly controlled body movements. Moving in space involves rotation of the body, appropriate placing of feet, balancing the body and arm movements. There are multiple benefits of tai chi.

Many authors describe positive effect of tai chi on many motor aspects related to motor skills, health, maintaining the posture, balance or movement co-ordination in elderly people (Lan et al. 1998; Wu 2002; Ding-Hai and Hui-Xin 2012; Vallabhajosula et al. 2014) and in people with impaired vision (Jacobson et al. 1997; Lan et al. 2000, 2002; Li et al. 2001; Horvat et al. 2003; Górny 2013; Miszko et al.

2004). Also psychological benefits have been noted, including improved well-being or reduced stress (Jin 1992; Wolf et al. 1996; Li 2001, 2002). There is no doubt that tai chi exercises are universal and have multiple, beneficial effects on people, irrespective of their health. Blind people, due to their lack of visual control, experience much greater limitations and disorders than other groups. They include disturbed kinesthesia, which is reflected in low aesthetics of the performed movements. As tai chi exercises comprise movements of aesthetic character, our study undertakes to analyse selected aesthetic variables and changes in them taking place in the period of intensive tai chi exercises.

AIM

In the present state of research there are no documented findings about the level of movement aesthetics in the blind and how it should be assessed. In order to obtain answers to the above questions the aim of this study was to establish changes in selected aesthetic variables under the influence of tai chi exercises in blind people.

MATERIALS AND METHODS

The study protocol was approved by the Bioethical Committee of the Poznań University of Medical Sciences (no. 713/10) and was in accordance with the Declaration of Helsinki for Human Research. A group of blind people (n=8), aged 8-16 years, of both sexes was randomly selected for the study. The analysis of differences in performing motor activities in various age ranges was statistically insignificant (a lack of vision brings the abilities to a comparable level), thus it was decided that the subjects should not be divided in terms of this criterion. Making such a division would have been significant in a study of able-bodied people, since in the studied period very dynamic developmental changes take place which should be considered in observations and interpretation of the results (Malina 2004). The participants were students of two primary schools for children with visual dysfunction in the Czech Republic. Permissions to take part in fitness tests were obtained from the children's guardians and ophthalmologists. Selected elements of aesthetics of movement were assessed: fluidity and harmony. In order to specify the studied area each of the properties referred to above was defined:

- *Fluidity* – the ability to maintain appropriate continuity in the movement, that is a certain acceleration and deceleration of action, the ability to maintain the course of movement on certain rounded tracks, to act without unnecessary muscular tension during transition from one motor composition to another. Sometimes it is described as time, spatial and dynamic fluidity (Osiński 1991).
- *Harmony* – is a consistence and mutual complementation of motor combinations and compositions and combining them into one cohesive whole. Harmony assumes some order of elements subordinated to one aim (Osiński 1991).

The study procedure consisted of a few stages. Before the start of the study it was explained to the participants what aesthetic movement is and what it involves. At the beginning of the study four selected motor patterns were demonstrated, two of which characterised fluidity of movement and two harmony of movements. In the next stage the participants tried to perform individual movement patterns of the given aesthetic properties with the help of an instructor which involved demonstration and verbal communication (Ponchilla et al. 1992). The stage of teaching the movement lasted until the participant learned to perform the whole movement pattern correctly and then he or she practised and mastered it against the set aesthetic model. The participant himself/herself decided when the satisfactory level of movement performance was reached. Using two different movement patterns for each of the selected properties aims for the greatest possible differentiation in movement patterns in terms of its course. The mean values were then calculated on the basis of the results of the same aesthetic patterns assessed separately, in order to obtain a global value of the property (in the study the Aesthetic Movement Scale Assessment AMSA procedure was used; Project Manual – MC IEF – 2007 -041326 – AESTH-PRO at author's M.G.). At this stage of the study the performed movement patterns were filmed and the videos were then given to competent judges for assessment ((Pomeroy et al. 2003; McKenzie 2002; Deirdre 1986). Before the assessment of the filmed movement patterns, the competent judges had undergone an appropriate training aiming to arm them with the skills necessary to give as objective marks as possible and to obtain knowledge on the method of assessment of movement patterns. The

movement pattern was assessed in 6 selected so called key points (in the patterns presented above they are highlighted with bold font), corresponding to movement description, in line with the adopted definition of the measured aesthetic property. Each of the individually assigned key points could have the value of 0.0 pts. (bad performance), 0.5 pts. (medium performance) or 1.0 pt. (very good performance). The final score of the movement pattern given by a competent judge was in the range from 0 to 6 points and corresponded to the level of the performed movement. Due to the differences in the assessment of patterns, during the training the competent judges familiarised themselves many times in detail with the motor description of the patterns and its scoring/assessment. The aim was to provide an appropriately high level of indices in terms of accuracy and cohesion of assessment.

The above procedure was subject to an assessment and was performed three times in the study period. The competent judges made the assessment at the beginning of the study (T1), that is before the participants started the exercises, mid-way through the period of tai chi exercises (T2), and at the end, in the ninth month of the study (T3). In order to observe the changes in aesthetics of movement in the blind eight forms were used in the nine months of tai chi exercises.

In order to check the level of cohesion and accuracy of assessment of the competent judges Kendall's W (coefficient of concordance) (Table 1) was used. In order to characterise the participants the basic statistical tools were used. Descriptive characteristics were calculated: mean ($\overline{x}$), mediana (Me), ranges of minimum and maximum (min, max). The database was prepared in MS Excel and the calculations were carried out in STATISTICA ver. 10.0 (StatSoft, Inc.). The results were presented in tables and charts.

Table 1 *Kendall's W coefficient of concordance*

Term	Fluidity I	Harmony I	Fluidity II	Harmony II
1 Test	0.927	0.860	0.653	0.888
2 Test	0.590	0.877	0.724	0.557
3 Test	0.937	0.980	0.980	0.974

RESULTS

The group of the blind was analysed on successive dates separately and changes in each variable taking place between the dates were compared (figure 1, table 2). A significant difference of p<.01 was noted in harmony between the dates (T2 ÷ T1). However fluidity does not present significant differences between these two dates. Between the dates (T3 ÷ T1) there is a significant difference at the level of p<.01 in both variables. On the last of analysed dates (T3 ÷ T2) significant differences were noted only for fluidity (p<0.01).

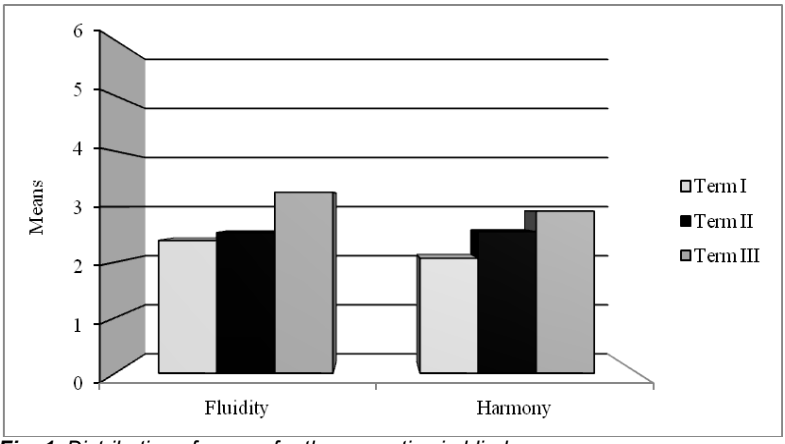


***Fig. 1**. Distribution of means for the properties in blind group.*

***Table 2** Comparison for blind group in terms*

Group	Elements	$\bar{x}$			T2 ÷ T1		T3 ÷ T2		T3 ÷ T1		(T3 ÷ T1)
		T1	T2	T3	t-W	*p*	t-W	*p*	t-W	*p*	%
Blind	Fluidity	2,39	2,53	3,26	0,420	0,674	2,521	0,012**	2,521	0,012**	36,4
(n=8)	Harmony	2,07	2,55	2,92	2,030	0,042*	1,363	0,173	2,521	0,012**	41,1

t-W - Wilcoxon test; T1 – first term; T2 – second term; T3 – third term; ** - p<.01; * - p<.05; $\bar{x}$ - mean

The increase in values in the studied variables was different depending on the period. It was higher between the dates (T2 ÷ T1) for harmony, however in the second period of comparison it did not

show such a great increase, although some increase in the value of the variable was noted. An increase in mean values for fluidity was noted between the dates (T2 ÷ T1), however it was not significant. A clear increase in the value of this variable took place in the second period (T3 ÷ T2). In the last studied interval (T3 ÷ T1), that is in the period of nine months of exercises, the effectiveness of tai chi exercises was noted. The values of the variables in the whole period of exercises showed a clear increase, which was significant at the level of $p<0.01$. The largest increase was in harmony (41.1%), followed by fluidity (36.4%).

DISCUSSION

Visual impairment leads to a lack of motor experience, which is destructive for the quality of movement, in particular aesthetics of movement. This may be caused by the impossibility of visual recognition and definition what aesthetic movement is and its verification and by the replacement of beautiful movement with a movement which is of greater significance for motoricity and safety of a person, for example for maintaining balance (Horvat el al. 2003; Ray et al. 2007, 2008; Chen et al. 2012; Davarpanah et al. 2012) mobility (Sleeuwenhoek et al. 1995) or touch (Pasqualotto and Newell 2004; Röder et al. 2004). The presented results of the study indicate that the introduction of tai chi exercises may improve selected aesthetic elements of movement in blind people. A documented record of changes which took place on successive dates of movement assessment leads to a conclusion that in spite of the lack of vision the participants have the ability to remember and improve the performance of movement and the ability to image aesthetic variables. Improved results noted on successive dates of the study result probably from a good activation of proprioceptors, which can correct the mistakes without the assistance of the vision and at the same time they support the creation of new database of movement memory. Undoubtedly, tai chi had a great effect on the result, as it activated previously passive muscle apparatus through its motor comprehensiveness. An increase in the two most characteristic aesthetic variables had a varied course. Fluidity had better results only in the second study period and they were spread over time, and harmony showed higher increases in the first study period with smaller and relatively stable increase in the

second study period. This may suggest that the process of learning movement fluidity is more extended in time than the process of learning harmony. This could be caused by the fact that movement fluidity is more difficult to achieve or such movements are less often performed by the blind and require more time to perform or improve. This leads to extension of the time of learning of this type of movement, which may be related to the learning of movement properties. In both cases in the whole period of tai chi exercises the increase in values of these variables is high and in the whole intervention programme reached a similar percentage increase. At this stage however it is difficult to decide whether the end effect reached by the blind may be considered final. It is not known whether after the second period the results will stabilise and the memory of the learned variables will be maintained. It is not known whether proprioceptive memory without the visual support is able to develop on the basis of the learned movement techniques. The current knowledge in this field is insufficient and requires further research to answer the above questions.

The results of the study indicate that control of aesthetic motor exercises can lead to much better movements in terms of quality. The intervention system of tai chi exercises which was applied increased the awareness of movement and spatial capabilities of the blind participants. An additional result could be increased satisfaction of the blind with their better efficiency and use of newly learned movements, which in their expression can be better perceived by sighted persons. A higher level of movement effectiveness and their qualitative presentation can satisfy potential employers with mastering basic movement (aesthetic) package, increasing a disabled person's chances of finding a job (Leonard and D'Allura 1997). The proposed system of movement assessment which in its assumptions was focused on aesthetic form of movement, may also be used as a rehabilitation tool or an alternative tool for checking and assessing physical fitness. The applied system of movement assessment is comprehensive enough to be used in most able-bodied and disabled social groups.

Part 4

Wellness and seniors

CHAPTER 4.1

ANALYSIS OF WELLNESS ACTIVITIES OF SENIORS (65+)

PAVEL TILINGER

Abstract: *The aim of our study was to analyse the physical activity, wellness activities and other activities of seniors or persons older than 65 years in their daily lives. Our concern was the type and frequency of these activities during the day, week, month or year.*
To achieve the purpose we compiled specially for this occasion: "Questionnaire to determine physical activities and wellness activities of seniors 65+."

Questioning was attended by 243 seniors 65+ (124 women and 119 men), average age was 71.1 years; the average age of women was 71.8 years. Probands mostly live in Prague and Central Bohemia.

93% of men and 89% of women say they have in their time their own unorganized physical activity program. The vast majority of seniors reported walking as no.1 physical activity. Other frequently mentioned activities included swimming, hiking and biking trips.

Another part of our questioning was intended to obtain information on leisure time activities of seniors; questions about hobbies, entertainment and leisure activities. 40% of surveyed men and 35% of women present their own hobby, actively from 2 to 20 hours a week, usually about 12 hours a week.

Keywords*: wellness of seniors, physical activity, seniors, leisure time, activity of seniors*

INTRODUCTION

The importance of active movement is emphasized in every age of humans. Physical activities help slowing down the involution process, bring joy to people, rest, enjoyment but only in situations when activity and its content corresponds with fitness capabilities of a single individual. In our report we have focused on the study of physical activity of older people, aged over 65 years. This age period is associated with a number of incoming biological, psychological and

social changes. These developmental processes in detail describe e.g. Vágnerová (2007), Kalvach (2004), Křivohlavý (2011), Hayflick (1997), Šauerová, Vadíková et al. (2013) and others. A great number of authors deals with substantive issues of physical activities of older people and their influence on senior's body; for example Štilec (2003) introduced and approved in practice the physical and relaxing programs for seniors; Bunc,Hráský and Skalská (2013) report about benefits and challenges of physical activities of seniors; Hráský a Bunc (2013) introduce the physical programs affecting body composition, physical fitness and independence of seniors. Physical activity and its influence on senior's personality presents Hátlová et al. (2013). Model of determinants of leisure time behaviour of seniors compiled Janiš (2012); Mudrák, Slepička and Elavský (2012) studied the physical activity and its socio-cognitive determinants questioning Czech and American seniors. Nejedlá and Kopřivová (2012) devoted their work to balance capabilities of elderly people and the possibilities to influence them through the intervention programs. Novotná, Šimůnková and Vorálková (2012) researched how gymnastics for seniors affect the quality of physical activity realization .

OBJECTIVE

The aim of our study was to analyse physical activities, wellness activities and other activities of seniors - people older than 65 years, and how they implement them in their daily lives. Our concern was the type and frequency of these activities during the day, week, month or year.

METHODS

To achieve the purpose we compiled specially for this occasion: "Questionnaire to determine physical activities and wellness activities of seniors 65+." The questionnaire contained the identification questions and a special section devoted to the topic: "What activities of the following were done actively in last 12 months - at least 30 minutes" in a way asking how seniors take care of their physical condition: "What are you favourite physical activities ? "What is your free time activity, what are your hobbies and entertainment?" followed by list of leisure activities.

Questioning was attended by 243 seniors 65+ (124 women and 119 men), average age was 71.1 years, the average age of women was 71.8 years. Probands mostly live in Prague and Central Bohemia, all are among grandparents or friends of students of VŠTVS Palestra, Ltd., who interviewed all seniors after detailed briefing.

RESULTS AND DISCUSSION

93% of men and 89% of women have in their time **their own unorganized physical activity program (Table 1)**. Obviously, if the health conditions allow them, more or less of all seniors are engaged in nonworking spontaneous locomotor activities. The number of these activities is in average of 14 events per month, mainly walking, cycling, swimming, seasonal skiing etc.

The vast majority of seniors reported walking as no.1 physical activity (an activity that lasts at least 30 minutes, usually about1 hour) - 90% of surveyed men and 92% women. Walking frequency is an average 3 per week, in a range from 1 to 60 (60 is for seniors that 2 times a day walk a dog).

Other mentioned activity is **swimming** (bathing, visiting outdoor or indoor swimming pool). 30% of men and 36% of women reported this activity, with a frequency of 1-8 times per month, swimming is mostly realized 4 times per month.

Walking tours (duration for about 1-4 h) as an activity that seniors have in their program, confirmed 43% of men and 45% women. The active ones have trips usually once a month (frequency 1-52 trips per year). 8% of surveyed men and women have those 52 trips.

Biking trips are also popular activity for seniors. Positive answer came from 42% of men and 24% women. The frequency of cycling is once a month from 1 to 2 times a week with an average of about 3 times a month (those who present biking as an activity).

Seniors also refer to other activities, they do regularly or seasonally, but this is only a small percentage of those who reported this activity as an activity with a frequency of 2 times a week – once a month. Is it possible to appoint skating (5% of men and 7% of women), fitness (6% of men), yoga (3% of men and 5% of women), curling, volleyball, tennis, squash (3% of men), sauna (5% of men and 3% women), organized (guided) exercises in Sokol or other form of exercise in a group, for example; exercise with music, aerobics, Pilates, etc. (3% of men and 7% ofwomen).

Table 1 *Activities frequent in the last 12 months*

Activity	Men - %	Men - frequency no/month	Women - %	Women – frequency no/month
Walks	90	12	92	12
Swimming	30	4	36	4
Hiking trips	43	1	45	1
Cycling	42	3	24	3
Skating	5		7	
Fitness	6	8	0	
Yoga	3	4	5	4
Sauna	5	2	3	1
Group exercise	3	4	7	4

Another part of our questioning was intended to obtain information about leisure time activities of seniors **questions about hobbies, entertainment and free time activities**.

Hobbies of seniors can be divided into two groups. The first includes physical activities such as walking, cycling, swimming, exercising individual or in a group, with a frequency of once or several times a week. The second group is possibly called "non-sport" activities such as care of the house, garden, philately, modelling, mushroom picking, doing crossword puzzles, Sudoku, reading, watching TV, care of grandchildren, photography, video art and craft activities, playing musical instrument, fishing, fish farming, beekeeping, horticulture, club activities, etc..

40% of surveyed men and 35% of women present their own hobby. These activities take from 2 to 20 hours a week, usually about 12 hours a week.

Men's focus is partly to "sports" - 40%, partly to "non-sport activities" - 60%. These non-sport activities include often crafting, gardening and taking care of the house. Women have similar situation - 35% reported "sport" and 65%"non-sport" activities. There are very often activities such as caring of grandchildren, cooking, baking, caring of the house, garden, reading, crossword puzzles, sewing, etc.

We have tried to get more detailed information about **free time activities (Table 2).** Seniors most often watch television, practically 98% of all respondents. For men is three hours, for women one hour more. 75% of men devote more than an hour a day (70 minutes) to reading newspapers and magazines, for 60% of women it is less than an hour (55 minutes). 66% of men devote 75 minutes to reading books every day, 72% of women read daily 80 minutes.

37% of men devote 35 minutes each day to crossword puzzles, Sudoku and similar activities, women (52%) solve crosswords, Sudoku, etc. 80 minutes a day. 80% of men do fresh air activity every day and women for about 1.5 hours. 10% of men and 5% of women say that they like to play card games. For couples living together is common to take care of a partner. 50% of men and 70% of women report that activity in the range from 1 to 24 hours, usually 2 hours per day. 25% of men and 62% women present care of grandchildren in the range of usually 1 - 2 times a week, from 1 to 3 hours.

Table 2 *Free time activities of seniors ("non-sport activities")*

Activity	Men - %	Men – frequency min/day	Women - %	Women – frequency min/day
Watching TV	98	180	98	240
Reading news	75	70	60	55
Reading books	66	75	72	80
Crosswords, Sudoku	37	35	52	80
Outdoors	80	90	80	90
Card games	10		5	
Care of a partner	50	120	70	120
Care of a pet	15	60	15	60
Breeding	7	60	7	60
Garden, house, flat	85	120	85	120
Care of grandchildren	25	2 h/week	62	4 h/week

Significant 15% of senior's time is for the care of a pet in the range of 1 hour. 7% of seniors is dedicated to breeding (rabbits, chickens, etc.). 85% of seniors give to house care, garden or apartment care 2 hours a day.

CONCLUSIONS

93% of men and 89% of women say that in their daily program they have their own unorganized physical activity. Obviously, if the health conditions allow them, more or less of all seniors are engaged in nonworking spontaneous locomotor activities.

Seniors say that the very substantial and the most frequent and popular physical activity is walking. Other frequently mentioned activities included swimming, hiking and biking.

40% of men's hobbies represent "sports", 60% "non-sport activities". These non-sport activities include often crafting, gardening

and taking care of the house. Women have similar situation, 35% represent "sport" and 65% ”non-sport“ activities. There are very often activities such as caring of grandchildren, cooking, baking, caring of the house, garden, reading, crossword puzzles, sewing, etc.

Our investigation revealed that wellness is a very important part of life for the Czech seniors; remarkable is the diversity of activities that seniors do. It is very gratifying that all interviewed seniors have found and implemented appropriate activities that have an irreplaceable place in their daily existence.

CHAPTER 4.2

EVALUATION OF FITNESS OF ELDERLY PEOPLE BY MEANS OF FULLERTON TEST

BARTOSZ BOLACH, MIROSŁAW GÓRNY, KATARZYNA BUKOWSKA, EUGENIUSZ BOLACH

Abstract: *The aging process of the body in a natural way affects the limitation of physical fitness. Movement deficiency can cause the acceleration of involution and infirmity, and lead o disability. To determine the level of physical fitness, the choice of a physical activity program, which will improve the health and quality of the life of seniors, multi-dimensional evaluation is needed. The aim of the study was to evaluate physical fitness of residents of the Social Care Home in Ząbkowice Śląskie. The study was conducted on a group of sixty – thirty women and thirty men at the age of 64 to 84. Somatic features such as height and weight and BMI level were studied. What is more, the information about the level of education was obtained. Physical fitness assessment was based on the comparison of the results obtained by the residents in a slightly modified to Polish conditions Fullerton Functional Fitness Test with standards developed by its creators - Jones and Rikli for the American population. A comparison of the residents' results of both sexes was conducted. It was found that older men were significantly taller than the men at a younger age. Manifestation of a secular trend was visible here. In both groups prevailed people whose level of BMI indicated being overweight and a level of education was elementary. Women gained better results in tests evaluating flexibility, while men showed better endurance. Unfortunately, all the average scores obtained by the residents of both sexes in the Fullerton fitness test were worse compared to the population in the United States. Only in a study evaluating the flexibility of the lower body more than 60 % of people were in the norm. Physical fitness evaluation of the residents of the Social Care Home in Ząbkowice Śląskie is thus unfavourable. This could be due to obesity occurring in half of the residents and the low level of education, by which these individuals have lower awareness of the beneficial effects of movement on their health and successful aging. Due to the development of standards of Fullerton Test only among the American society, there is a strong need to create them also for the Polish*

population because probably due to different lifestyles and living conditions of Poles, the American standards were too high for the residents of Social Care Home in Ząbkowice Śląskie.

Keywords: *aging, Fullerton Functional Fitness Test, adapted physical fitness, physical fitness*

INTRODUCTION

Old age is an inevitable stage of human life, a natural and unavoidable process. With the passage of years progressing the changes in the functioning of the body can be observed. The changes involve for example lowering of physical fitness, which together with mental and social fitness is an important indicator of health. Ageing of the body is an individualised process which is determined by many factors. Old age is not looked forward to. In this period a person has to face many changes in physical (biological), social and mental spheres of functioning. All these spheres mutually determine each other and merge with each other, and changes in one of them affect the functioning of others. Some occur suddenly, others are spread over time (Chabior et al., 2014; Król 2012).

Changes taking place during the ageing process are noticeable also in the psychological (change in behaviour, feelings, different than earlier perception of the world), social (interpersonal contacts, relations, relationships) and civic spheres (change in availability for services, meeting own needs, financial status) (Król, 2012).

The dynamics of ageing depend on the lifestyle. Therefore, prevention is very important and if any complaints, worrying changes or diseases occur it is important not to ignore them, but to undertake quickly an appropriate treatment and procedure in order for an elderly person to be able to enjoy good health and self-reliance as long as possible. Physically active people, following a good diet, with no addictions and stimulating their memory, reduce their risk of many diseases, e.g. degenerative, proliferative, metabolic, cardiovascular, neural diseases and dementia. At the same time, healthy lifestyle contributes to a better immunity. Most elderly people are affected by multiple morbidities, dominated by chronic diseases, often untreatable. Therefore, apart from treatment of diseases it is important to improve the quality of life (Chabior et al., 2014).

A detailed analysis of ageing, including all of its facets on the basis of interdisciplinary scientific research in medicine, biology, psychology, pedagogy and sociology gives hope to maintain the body is a good condition for a long time. Everyone should be aware of inevitability of ageing, and of the fact that physical fitness and mental alertness affect to a large extent life expectancy and the condition in which the late years in life are lived. Adopting an active attitude at an old age may not only contribute to a longer life expectancy of an individual, but also significantly improve the quality of life (Grzanka-Tykwińska and Kędziora-Kornatowska, 2010). Popularisation of knowledge about this issue is very important, in particular now – when an increase in the world's population of elderly people is noted.

Physical activity is a significant element of pro-health behaviour in human life. At every age it is essential that it should be regular. At an older age it is important for the so called successful ageing, it pays off with better well-being, has a positive impact on mental agility, allows people to enjoy everyday life and leads to a reduction in disabilities (Mac Audley, 1995; Grzanka-Tykwińska and Kędziora-Kornatowska, 2010).

In the last 25 years the fastest increase in population of elderly people in Poland related to people aged over 80, as their percentage in the total population doubled – from less than 2% in 1989 to almost 4% in 2013, i.e. from 753,000 to 1,483,000 (GUS, 2014).

THE OBJECTIVE OF THE STUDY

The objective of the study was the evaluation of the level of basic somatic charateristics and physical fitness of men and women aged 65 to 84, the residents of a Nursing Home in Ząbkowice Śląskie.

RESEARCH QUESTIONS:

1. What are the differences in height, weight and the BMI between the studied men and women?
2. Do age, sex, education and the BMI affect physical fitness?
3. Is the level of fitness of the residents of the Nursing Home in Ząbkowice Śląskie within the normal range of scores as developed by the authors of the Fullerton Fitness Test in the USA?

MATERIAL AND METHODS

1. Material

The study included a group of 60 residents of the Nursing Home in Ząbkowice Śląskie, 30 men and 30 women. The age of the participants ranged from 65 to 84 years, with the mean age of 74 years and a standard deviation of 6 years. The distribution of age of the men and women in the study did not differ significantly (Ferguson and Takane, 1997) (Table 1).

Table 1 *Comparison of parameters of distribution of age of the studied men and women*

Sex	Age [years]				Student test	
	$\bar{x}$	SD	Minimum	Maximum	t	p
Women	74.2	6.3	65	84	0.065	0.949
Men	74.1	5.7	65	84		

The majority of the participants had primary (46%) or vocational (27%) education (Fig. 1).

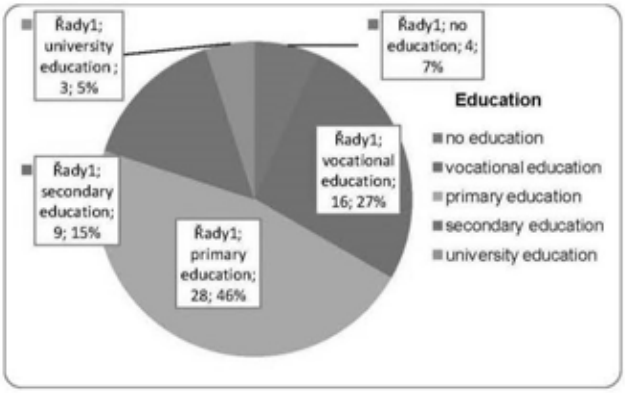


Figure 1 *Distribution of education level in the studied group*

The level of education of men and women was similar (fig. 2). Slight differences in the distribution of education levels of men and women were not statistically significant (chi square test $\chi^2 = 1.84$; $p = 0.766 > 0.05$).

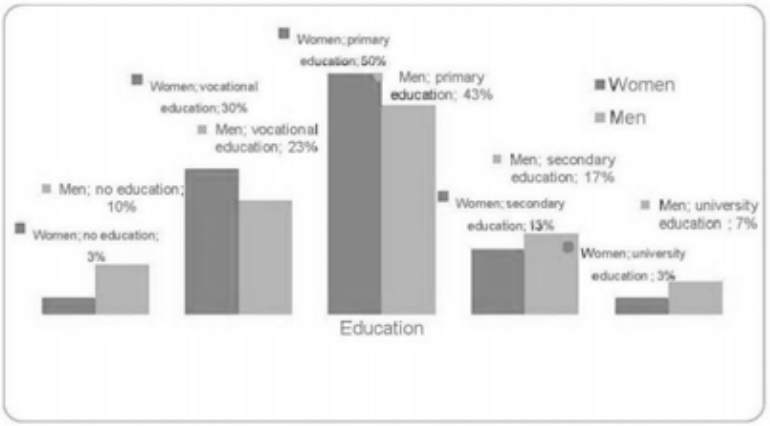


Figure 2 *Distribution of education levels in the studied group*

2. Method

The study of basic somatic characteristics and physical fitness of the residents of the Nursing Home in Ząbkowice Śląskie was carried out in January 2015. Height and weight of the participants were measured. The Body Mass Index was calculated according to the guidelines of the WHO. Physical fitness was evaluated using the Fullerton Functional Fitness Test (FFFT), developed by Jones and Rikli (2001). The objective of the test is the assessment of physiologic capacity to perform normal everyday activities safely and independently.

The test involved performing six Senior Fitness tests, which assess the lower and upper body strength, aerobic fitness, upper and lower body flexibility test, agility and dynamic balance. Five tests involved the use of equipment. None of the persons taking part in the tests had any contraindications for performing the FFFT. The test was carried out in the morning. Before each test all participants were instructed in detail about the correct performance of each test.

Functional fitness tests (Jones and Rikli, 2001):

1. Chair Stand test
2. Arm Curl test

3. Step in Place test (2 minutes)
4. Chair Sit and Reach (touching the toes in a sitting position)
5. Back Scratch test
6. Up and Go test.

RESULTS

The analysis of somatic characteristics

The measurements of somatic characteristics included measurements of height and weight and the calculation of the BMI. The men in the studied group were characterised by a significantly greater height and weight then women. The groups did not differ statistically significantly in terms of the Body Mass Index (Table 2).

Table 2 *Comparison of basic somatic characteristics of the studied men and women*

Somatic characteristics	Sex	$\bar{x}$	SD	Minimum	Maximum	Student test	
						t	P
Height [cm]	Women	159.1	6.9	146	171	5.22	<0.001
	Men	168.5	7.0	154	190		
Weight [kg]	Women	70.2	11.7	53	100	2.36	0.022
	Men	77.7	12.9	56	110		
BMI [kg/m^2]	Women	27.6	3.3	22.9	35.9	0.40	0.691
	Men	27.3	3.5	20.4	37.2		

The mean value of the BMI, both in the group of men and women, exceeded 25 kg/m^2, that is it fell within the overweight range, according to the WHO guidelines for the classification of weight using the BMI. It was noted that half of the studied group were overweight, and only 33% had normal weight (Fig. 3).

Men and women were characterised by a very similar distribution of weight assessment on the basis of the BMI (Table 3). The Chi square test indicates that the differences in assessment of weight of men and women did not differ significantly ($p = 0.344 > 0.05$).

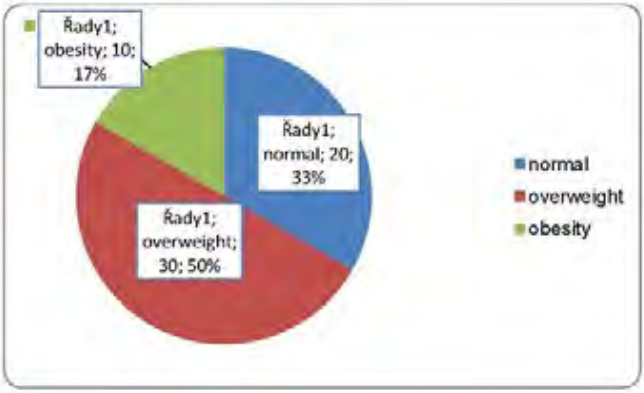


Figure 3 *Assessment of weight in the studied group on the basis of the BMI value*

Table 3 *Comparison of assessment of weight of men and women*

BMI	Women		Men		Chi square test	
	N	%	N	%	χ^2	p
Normal	10	33%	10	33%	2.13	0.344
Overweight	13	43%	17	57%		
Obesity	7	24%	3	10%		

Correlations were found between somatic characteristics and the age of the participants. Height and weight were negatively correlated with age, which means that the older participants were usually shorter than the younger ones. This correlation was more evident in the group of men and it was statistically significant only in this group ($p < 0.05$). Age was also negatively correlated with the BMI in the group of men. This correlation, however, was not statistically significant ($p= 0.163 > 0.05$). No correlation between the BMI and age was noted in the group of women (Table 4).

The analysis of physical activity of the participants

In the Fullerton Functional Fitness test battery women had better mean results in tests evaluating flexibility, namely in the Chair Sit and Reach test and the Back Scratch test. The difference between

the mean results of men and women was statistically significant only in the Chair Sit and Teach test. In the Back Scratch test the difference between the means was not statistically significant, mainly due to a significant scattering of results (high values of standard deviation). In other Fullerton tests men had better mean results. However, they were statistically significantly better only in the Arm Curl test and the Two Minute Step in Place test (Table 5).

Table 4 *Pearson's linear correlation between somatic characteristics and age*

Somatic characteristics	Correlation with age			
	Women		Men	
	R	p	R	p
Height	-0.284	0.129	-0.582	0.001
Weight	-0.146	0.441	-0.492	0.006
BMI	-0.002	0.991	-0.261	0.163

Table 5 *Comparison of the results of Fullerton tests by sex*

Fullerton tests	Measure	Women		Men		Student test	
		$\bar{x}$	SD	$\bar{x}$	SD	t	p
Chair Stand test	number of repetitions	7.9	2.7	8.1	3.3	0.17	0.866
Arm Curl test	number of repetitions	10.7	2.9	12.8	3.9	2.37	0.021
Two Minute Step in Place test	number of steps	44.2	23.0	71.8	18.4	5.13	<0.001
Chair Sit and Reach test	cm	-4.7	9.0	-9.7	9.5	2.13	0.038
Back Scratch test	cm	-21.0	15.4	-23.0	16.9	0.48	0.634
Up and Go test	s	14.77	6.63	14.14	6.82	0.37	0.715

Overall, the higher the BMI of a person, the lower the results in the Fullerton tests. The results of all tests were statistically correlated with the BMI (Table 6). Higher values of the BMI were a factor lowering physical activity of the participants.

Table 6 *Pearson's linear correlation coefficient for Fullerton test results and the BMI*

Fullerton tests	Correlation with BMI	
	R	p
Chair stand test	-0.289	0.025
Arm Curl test	-0.320	0.013
Two Minute Step in Place test	-0.367	0.004
Chair Sit and Reach test	-0.402	0.001
Back Scratch test	-0.499	<0.001
Up and Go test	0.439	<0.001

Also older age of the subjects lowered their physical fitness. This was indicated by the values (and plus and minus signs) of correlation coefficients of age and test results. However, these correlations were clearly weaker than correlations with the BMI and were not statistically significant (Table 7).

Table 7 *Pearson's line correlations coefficients for Fullerton test results and age of subjects*

Fullerton tests	Correlation with age	
	r	P
Chair Stand test	-0.105	0.425
Arm Curl test	-0.144	0.273
Two Minute Step in Place test	-0.162	0.217
Chair Sit and Reach test	-0.029	0.827
Back Scratch test	-0.104	0.430
Up and Go test	0.115	0.383

Physical activity of the participants showed correlation with their level of education. The results indicated that the higher the level of education, the better the mean physical activity. Table 8 presents mean results of the Fullerton Fitness tests by level of education. Clear, statistically significant increase in mean results can be seen as the level of education increases in most tests, except for the Two Minute Step in Place test.

Table 8 *Mean results of the Fullerton tests by level of education*

Fullerton tests	Measure	Level of education					ANOVA	
		no education	primary	vocational	secondary	university	F	p
Chair Stand test	n	3.8	7.1	7.7	11.6	13.0	6.07	0.001
Arm Curl test	n	7.0	10.3	12.3	16.0	16.3	6.80	0.001
Two Minute Step in Place test	n	52.3	52.4	52.1	81.1	80.7	0.82	0.523
Chair Sit and Reach test	cm	-26.0	-8.2	-6.6	0.6	0.7	5.02	0.004
Back Scratch test	cm	-44.0	-28.3	-20.1	-2.9	-2.0	6.95	0.001
Up and Go test	s	22.15	15.74	15.58	7.56	6.93	2.76	0.050

The analysis of the level of functional fitness of the participants and the American range of scores

The authors of the Fullerton test have set up ranges of scores for individual tests in which the middle 50% of scores of people aged 60-95 in American population fell. These ranges of scores were set separately for men and for women in 5-year age groups. The range of age of the studied residents of the Nursing Homes included four age groups of those in the American scale. The number of participants in these age groups is presented in figure 4.

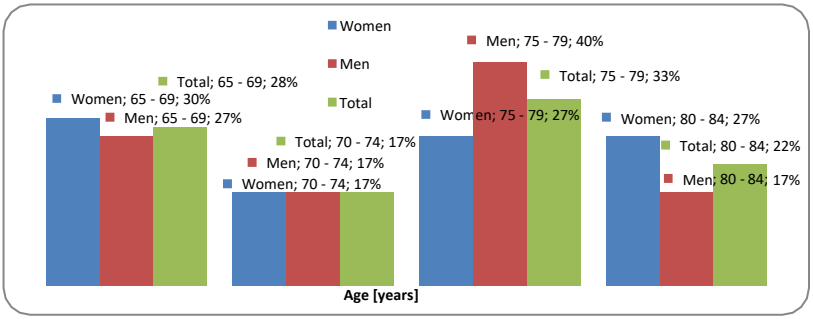


Figure 4 *The numbers of the Nursing Home residents by age groups specified in the American scale*

Table 9 presents the number of cases where the results of the Fullerton Fitness tests fell within the American normal range of scores. It can be noted that only in the Chair Sit and Reach test more than 60% of the participants (irrespective of the sex) fell within the normal

range of scores. Relatively the fewest number of participants fell within the normal range of scores in the Chair Stand test and Up and Go test.

Table 9 *The number of participants whose results in the Fullerton Fitness tests fell into the normal range of scores for American subjects*

Fullerton tests	Women		Men		Total	
	n	%	N	%	n	%
Chair Stand test	7	23%	5	17%	12	20%
Arm Curl test	10	33%	13	43%	23	38%
Two Minute Step in Place test	6	20%	10	33%	16	27%
Chair Sit and Reach test	20	67%	18	60%	38	63%
Back Scratch test	11	37%	10	33%	21	35%
Up and Go test	7	23%	6	20%	13	22%

DISCUSSION

One of the consequences of ageing is a significant lowering of physical fitness. The process occurs at a different rate in each person. In order to delay undesirable symptoms the level of physical activity, physical and functional fitness and physical efficiency should be maintained at the highest possible level. The Fullerton Functional Fitness Test (FFFT) (Jones and Rikli, 2001) comprehensively assesses physical fitness of elderly people. Using the test it is possible to assess parameters which are key for the physical fitness of elderly people.

In a multi-faceted assessment of physiological characteristics the BMI should also be considered, as it is significant in the evaluation of risk of diseases and dysfunctions related to overweight and obesity.

Ignasiak et al. (2009a) assessed physical fitness of men, residents of Nursing Homes in a number of Polish towns, aged from 60 to 79 years, who were divided into two age groups: 60-69 years and 70-79 years. The study involved measurement of basic somatic characteristics and the assessment of physical fitness using the Fullerton Fitness test. In this study younger men were statistically taller. Older men has slightly greater mean weight. The BMI of the older men was also slightly higher compared to the younger men. The difference was not statistically significant. The younger men were

characterised by statistically significantly greater strength of upper extremity. In other tests they also had better results, however the difference was not statistically significant. The comparison of the results of both groups with American results showed that the population of Polish men does not compare favourably. In all tests except for one (testing upper extremity strength), the results of the Poles were much below the lower limit of the normal range of scores.

The study carried out by Ignasiak et al. (2009b) concerned physical fitness of elderly women assessed with the Fullerton Fitness test. The study was carried out in two groups of women aged 65 to 74 years, where the first group consisted of residents of four Nursing Homes, and the second group consisted of women staying in "Zameczek" and "Polonia" sanatoria in Kudowa Zdrój. The mean value of the BMI in both groups was high, as it fell within the range indicating overweight. The residents of the Nursing Homes weighed less than the women in sanatoria. The mean BMI was similar for both groups. For residents of the Nursing Homes it was 28.06 and for women staying in sanatoria it was 29.17. Among women in the Nursing Homes 70% had primary education and few had university education (3.3%). In the second group, the education profile was different, as only 6.7% of participants had primary education, 60% had secondary and vocational education and more than 30% had university education. In the test of physical fitness using the Fullerton tests, the residents of the Nursing Homes has lower results compared to American standards, as their results fell below the normal range of scores. Women in sanatoria had better results, but in two tests their scores were not high enough.

Poor performance in the assessment of the level of physical fitness of Polish population over 65 was reported by Zieliński (2005), in his study of residents of a Nursing Home in Wrocław using the Fullerton test. Compared to American standards these results were unsatisfactory. The greatest differences were noted in agility and endurance test.

In the study of Prystupa et al. (2012) forty women with a higher mean value of BMI, had better results. They were students of the Third Age University (Uniwersytet Trzeciego Wieku, UTW) at the University School of Physical Education (Akademia Wychowania Fizycznego, AWF) aged from 60 to 70 years and their mean BMI was normal (BMI 18.5 to 24.9) and accounted for 68%. In the second group of participants there were forty women who participated in the activities of the Third Age Academy of Arts (Akademia Sztuki Trzeciego Wieku,

ASTW) in Wrocław and in this group overweight women were a majority (56%). Lower mean results were noted for the group of women who undertook activities related to animating cultural activity, i.e. in the areas of recreation, tourism, health and sport. Education and high awareness of the effect of weight on health contributed to the fact that elderly women from the Third Age University at the AWF mostly maintained normal weight. Frequent physical activity resulted in greater energy consumption.

In our study the mean BMI was 27.6 kg/m^2 for women and 27.3 kg/m^2 for men. Half of the participants were overweight. Height is to a large extent determined genetically. It also undergoes intergenerational changes which are described as a secular trend. In our study this correlation was noted in females, however it was not distinct. Younger men were statistically significantly taller than those in an older group. Physical activity and fitness, as demonstrated by the results of the study, is determined by many factors, including the level of education. People with higher education have better awareness of their health, take care of their fitness more and often live in better conditions. A clear and statistically significant improvement in mean results is visible with an increase in the level of education in all tests except for the Two Minute Step in Place test. Participants with primary education prevailed both among men and women and accounted for 43% and 50%, respectively. Among the residents of the Nursing Homes the smallest group consisted of people with university education. To compare, in the study of Ignasiak et al. (2009b) in a sanatorium group the majority of participants had secondary and vocational education and this group was fitter then the residents of the Nursing Homes studied in the second group, who like in the current study had mostly primary education.

In the current study the Fullerton test was used to assess physical fitness, which allowed for the assessment of endurance, flexibility, agility and dynamic balance. The studied women had better results in tests related to flexibility. The difference in mean results in favour of women was statistically significant only in the Chair Sit and Reach test. Men had a statistically significant advantage in tests evaluating strength and endurance.

The comparison of the results with the American standards indicated that only in the Chair Sit and Reach test more than half of all participants fell within the normal range of scores. In the Chair

Stand test and the Up and Go test the lowest number of people with scores within the normal range were noted.

In the test assessing the strength of lower extremities only 20% of the tested residents of the Nursing Home (23% of women and 17% of men) had results within the normal range. On average men and women made 8 repetitions. To compare, among older women from the UTW of the AWF and the ASTW groups (Prystupa et al., 2012) the mean result was 21 repetitions and was higher than the mean American score, which was 12 repetitions. As can be seen, there was a significant difference in results in this test as women from the UTW of the AWF and the ASTW are very active physically, taking part in recreation and sport activities (Prystupa et al., 2012).

In the Arm Curl test only 38% (38% of women and 43% of men) of the residents of the Nursing Home in Ząbkowice Śląskie fell within American normal range of scores. To compare, in the UTW of the AWF group all participants had a result within the normal range and in the ASTW group 97.5% of participants and had on average more repetitions than the residents of the Nursing Homes in the USA. In the current study the residents of the Nursing Home had an average of 11 (women) and 13 repetitions (men). The female participants had the mean result lower than the residents of the Nursing Homes in the USA, where the mean was 14 repetitions.

The next test was the Two Minute Step in Place in which the mean was 44 steps for women and 72 for men. To compare, in the study carried out by Ignasiak et al. (2009b) the mean for women, residents of Nursing Homes, was 48 steps. Thist was comparable or even lower taking into consideration the mean age. In the study of Ignasiak et al. (2009b) men divided into two age groups, 60-69 years and 70-79 years, had mean results of 77 and 70, respectively, and the total mean was higher than the mean of the men from Ząbkowice Śląskie.

During the test assessing the flexibility of the lower body the mean result was -4.7 cm for women and -9.7 cm for men. These results were low compared to the results noted in studies of other authors. The best results in this test were achieved by women from the UTW of the AWF and residents of Nursing Homes in the USA, which fell within the normal range. The arithmetic mean for women in the ASTW group was -1.28 cm. The results of residents of Nursing Homes in Wrocław, studied by Zieliński (2005), were also outside the normal range.

In the test which assessed the flexibility of upper extremities, the mean result of residents of Nursing Homes, both men and women, in

the current study did not fall within the American normal range. Older women from the UTW of the AWF and the ASTW had a better mean result, however it did not fall within the normal range either, but was better than the results of residents of the Nursing Homes in Ząbkowice Śląskie.

In the Up and Go test the participants of the current study had mean results of 15 s (women) and 14 s (men), which were not within the normal range. The groups from the UTW of the AWF and the ASTW performed this test in a shorter time, which was on average 5.5 s and fell within the normal range. This test assesses the risk of falls in elderly people. Participants who performed the test in less than 9.3 s were not in a risk group, whereas the participants with results from 9.3 to 21.7 s qualified to a risk group. Covering the specified distance in the time exceeding 21.7 s indicates a higher risk of falls (Grześkowiak and Wieliński, 2008, 2009). Therefore, the residents of the Nursing Homes in Ząbkowice Śląskie had a high probability of falls as only 22% of the participants had results within the normal range.

It can be concluded that American standards were too high for the residents of the Nursing Homes in Ząbkowice Śląskie. Different environments and living conditions of Polish and American populations suggest that it would be advisable to develop a Polish scale of scores for the Fullerton Fitness test. The application of the Fullerton test makes it possible to assess the degree of physical fitness, defined as a set of characteristics of elderly people, which is very important in order to work on the improvement of the quality of certain activities and to help elderly people use them is everyday life and enjoy the autumn of life. It would be advisable to introduce the test in rehabilitation centres, nursing homes and other care centres for the elderly as well as in planned and organised rehabilitation of groups of elderly people, as it provides a possibility of planning, carrying out and monitoring the effects of the applied physical activity. It also allows for a fast, clear and simple presentation of results to the tested person, which is an important element of rehabilitation. Co-operation and awareness of positive changes are two of the basic factors which motivate to further work and give hope for a better and more dignified old age.

CONCLUSIONS

Men in the studied group were characterised by a significantly greater height and weight than women. Half of the studied men and

women were overweight. The sex groups did not differ statistically significantly in terms of the Body Mass Index.

Older participants were usually shorter than younger ones. This correlation was statistically significant for men only. Secular trend can be noted here, which involves changes in biological development occurring under the influence of the development of civilization.

Older age of the participants lowered their fitness, however not enough to consider this relation significant. Women had greater flexibility, whereas men had better endurance and muscle strength. Lower level of education and higher values of the BMI were factors which lowered physical fitness.

Low physical fitness of the tested men and women compared to American standards is a cause for concern. Only in the Chair Sit and Reach test did more than half of the participants fall within the normal range of scores. The lowest number of participants fell within the norm during the Chair Stand test and Up and Go test. The lack of Polish scale of scores should be an incentive to create separate normative ranges of physical fitness assessed in the Fullerton Fitness test.

Due to a growing percentage of elderly people in the Polish population it would be advisable to introduce the Fullerton test to everyday functioning of nursing homes, rehabilitation centres and care homes. It would be a tool for accurate planning and monitoring of physical activity of the elderly.

The residents of the Nursing Homes in the current study showed lower mean results of the Fullerton tests compared to the American population. This is caused by a number of factors, including low awareness of health benefits of exercise, overweight, staff carrying out everyday activities for the elderly. Residents should be educated and activated and best conditions should be created to encourage them to exercise, which will increase their physical fitness.

CHAPTER 4.3

RELATIONSHIP WITH LAUGHTER YOGA AND QUALITY OF LIFE FOR STUDENTS UNIVERZITY OF THIRD AGE

LUCIE LAUERMANOVÁ, DANA ŠTĚRBOVÁ

Abstract: *Laughter yoga is physical activity, still little expert solutions. It is combining simulated unconditional laughter and yogic breathing. The aim of this chapter is to familiarize professionals with the process of laughter yoga among the target group of students of the University of the Third Age (individuals 50+), including access to a given age group. It also presents selected issues of quality of life, which according to the students of the University of the Third Age affects yoga laughter.*

Key words: *laughter yoga, students from the University of the Third Age, age, wellness*

INTRODUCTION

"An old age is not sad because all pleasures cease, but because hope disappears." Jean Paul

Czech population is aging, similarly to populations in other developed countries. "The main and visible characteristic of Czech population is progressive aging, which is going to raise in upcoming decades" (ČSO, 2013, p. 6), the age index grows significantly. At present, 113 elderly people per 100 children. ... "The whole second half of the century should move above the threshold of 250 elderly people per 100 children with a peak of 277 elderly people per 100 children at 1. 1. 2063" (ČSO, 2013, p. 6).

"An Old Age is a stage not disease. An old Meaningfulness is determined by each individual. Survival to old age is a complex process, which is reflected both in the life of each individual seniors and the whole society. It covers all areas of life. Senior age with lengthening life expectancy becomes a major phase of human life"

(Ministerstvo práce a sociálních věcí, 2013, p. 5). Aging is a natural process associated with disruption of some organs function and declining in physical performance. Its effects occur in various areas. Venglářová (2007) divides changes in the body into three basic levels: mental, physical and social.

The above-mentioned degenerative changes in old age affect the quality of life of each individual. The quality of life is a very broad complicated and term because of its complexity and multidimensionality. It touches on areas as follow - understanding of human existence, the meaning of life and existence itself (Svobodová et al., 2012). It examines the physical, psychological, social, spiritual and other conditions ensuring the conditions for a healthy and happy human life, it involves self-understanding and finding the key factors of being (Payne, 2005; Svobodová et al., 2012).

Comprehensiveness and complexity of the quality of life captures the definition of the World Health Organization - WHO (in Vaďurová & Mühlpachr, 2005, p. 11), that quality of life is defined as the perception of the individual "(...) its position in life in the context of their culture and value system and related goals, expectations, standards and worries. This is a very broad concept multifactorially influenced by one's physical health, psychological status, personal confession, social relations and relations to key areas of the environment". Basic qualities (pages, dimensions) of human life are considered: a sense - spiritual side, happiness - mental side and health - physical side (Balcar in Payne, 2005; Svobodová et al., 2012). The spiritual side of life has been associated with optimism and a positive outlook.

In relation to quality of life within old age World Health Organization (2002) points to an active aging, which considers as an approach to help individuals achieve successful aging. As an active approach to aging can be considered studying the University of the Third Age (below U3A), which is adapted to the needs of seniors. The basic aim is to improve the adaptation of seniors (Mühlpachr, 2004; Šemberová, 2004). The study is focused on personal development, self-knowledge, familiarity with the scientific findings, etc.

Palacky University in Olomouc is one of the universities in the Czech Republic, that mediates the University of the Third Age. Faculty of Physical Culture, Palacky University in Olomouc (below FTK UP) responds to the aforementioned need for raising awareness about active aging. In their lectures U3A the listeners are offered new activities that can help active aging. Most of the activities offered to

students are free time and musculoskeletal in nature. One of the subjects on offer is yoga laughter.

LAUGHTER YOGA

Laughter yoga (Hasja yoga) is a leisure activity built on the idea that everyone can laugh for no reason. Laughter yoga combines yogic breathing and unconditional simulated laughter, according to Mora-Ripoll (2011) it is triggered unnecessarily. Within laughter yoga are used special laughter exercises based on group dynamics, eye contact and childlike playfulness (Kataria, 2011). The founder of Laughter Yoga is an Indian physician Madan Kataria Kataria. March 13, 1995 founded the first laughter club in Mumbai (Shahidi, Mojtahed, Modabbernia, Mojtahed, Shafiabady, Delavar, & Honar, 2011). Since then, the idea of laughter yoga has extended through the education system worldwide (Kataria, 2011).

In the Czech Republic, laughter yoga is popularized by Dr. Karel Nešpor. His book "Healing Power of Laugh" is the theoretical material for activities working with a laugh. Obviously the first steps of laughter yoga in the Czech Republic date back to 1999. Since 2008 Ejvind Jacobsen has helped to popularize laughter yoga. He is Danish laughologist (author's note: laughologist is an expert on laughter, derived from the term smíchologie, English Laughology - science dealing with a laugh) and co-founder of the project Laughter at Work. In July 2009 he organized the first session of laughter yoga for instructors in the Czech Republic. The teachers Petr Fridrich and Lucie Lauermanová continue in organizing the training seminars of laughter yoga. Petr Fridrich is a member of the International Association of Laughter Yoga International brings together instructors and teachers of laughter yoga, in 2011 he organized the championship in laughter in the Czech Republic in Olomouc, which was the first of its kind in Europe.

The principle of laughter yoga is based on the proven effects of human laughter, the physical, psychological and social area. A detailed breakdown of positive effects on laughter you can find in Lauermanová (2012), Lauermanová, Štěrbová and Kudláček (2014), Mora-Ripoll (2011) or Nešpor (2010). According to Mora-Ripoll (2011) a laugh has both preventive and therapeutic influence.

At present are more reachable more studies on the effects of laughter. Similarly, studies devoted to yoga. This begs the question of

influence of classical yoga exercises where specific parameters are selected due to the target group of seniors. E.g. by Krejci (2011) seniors with arthritis and osteoporosis psychological analysis shows that after the intervention of a yoga program seniors shifts from anxiety to certainty, from depressive moods to vitality, from fatigue to energy, from confusion and uncertainty to self-esteem and self-confidence. The influence of yoga on stress and anxiety is also confirmed by Alexander Innes, Selfie and Brown (2013), together with the overall improvement in physical function and capacity expansion of peace, enriching a sleep quality and support efforts towards improving eating habits.

The number of studies focusing directly on laughter yoga is very limited. This claiming is confirmed by Proyer, Ruch and Rodden (2012), who report, the scientific basis of laughter yoga hasn´t been documented yet, despite the fact further research has been done since 2012. In Czech literature the topic of laughter yoga hasn´t been completely processed yet. Basic information can be found at Lauermanové (2012); Lauermanové, Štěrbová and Kudláček (2014) and Nešpor (2010), respectively in "improper sources" (eg. Fridrich, 2011).

In foreign literature only a limited number of studies investigating laughter yoga for elderly ones is available (Dolgoff-Kaspar, Baldwin, Johnson, Edling, & Sethi, 2012; Krebs, Herodež, & Pajnkihar, 2014; Shahidi et al., 2011). This is a quantitative researches deal with specific varieties (e.g. heart rate, life satisfaction levels, hormone levels, etc.). However, none of these studies, has´t solved the overall view addressed to the phenomenon of laughter yoga in human life. The relation of laughter yoga and quality of life, has been solved in the study (Shahidi et al., 2011) comparing the effectiveness of laughter yoga to group exercises therapy led by Madan Kataria (in the frame of group therapy) on how to reduce depression and increase life satisfaction among seventy elderly women adults in cultural community in Tehran in Iran. Another study (Herzog, Cairo & Kdushei, 2015) focused on the impact of laughter yoga and quality of life and immune cells at cancer patients.

The need to expand scientific basis laughter yoga grows, even the number of active participants in laughter yoga grows, which is confirmed by personal communication with the founder, Madan Kataria (July 2013).

YOGA LAUGHTER AMONG STUDENTS OF THE UNIVERSITY OF THE THIRD AGE

The following chapter introduces the study, which has been part of a larger qualitative survey solved within the dissertation - Laughter Yoga in students of University of the Third Age. It was a non-experimental qualitative study based on the principles of grounded theory (according to Strauss & Corbin, 1999). In the chapter we are focusing on the partial results of the above qualitative investigation in connection with selected elements. The research sample consists of 14 students (2 males and 12 females) of the University of the Third Age at the Faculty of Physical Culture Palacky University in Olomouc (below FTK UP). Conditions included in the research: age over 50 years; student of FTK UP; the participant has no previous experience with laughter yoga; the participant has no contraindications of laughter yoga. The research was approved by the Ethics Committee FTK UP.

The research was conducted in several steps. The first was laughter yoga program - 7 hours of laughter yoga with a frequency of once a week; Participation: 14 participants. Implementation period: spring 2015. The second step was a free individual interviews with participants of laughter yoga program; Participation: 12 participants. Implementation period: spring 2015. The third step was a focused group with participants of laughter yoga program; Participation: 10 participants. Implementation period: summer 2015.

Given the qualitative nature of the research occurred throughout the course of the blending phase of data collection and analysis. Between phases of individual interviews and focus group held a primary ongoing analysis of data. The results were presented to the participants after the focused group and then participants re-verified the results. The notes were subsequently processed and together with the outputs of focused group were further analyzed and incorporated into the overall results (Lauermanová & Štěrbová, 2015).

Within the open coding semantic units were identified, these were subsequently assigned to categories. For clarification the categories, they were then divided into three basic areas of quality of life: psychological, physical and social.

RELATIONSHIP LAUGHTER YOGA AND THE QUALITY OF LIFE FOR STUDENTS OF THE UNIVERSITY OF THE THIRD AGE

Students of the University of the Third Age, agreed on several major categories according to data analysis, which is the result of selective coding. This is the central issue of categories for relationship of laughter yoga and quality of life, these were at the feedback ratings of all participants assessed as significant. First, in whole, we introdukce all categories which are the result of selective coding, further we give detailed description about the categories which were mentioned by majority of subscribers.

For clarity, we lined all categories into sub-categories of quality of life: psychological, physical, social. In Sub psychic students reported: insight; carelessness and playfulness; positive attitude and optimistic outlook; release; reduce stress; not take things seriously and personally; "Live now"; acquisition of energy; elan. In Sub Physical students reported: total body relaxation - relaxation; release the diaphragm; "Vibrate" the body; strengthening the abdomen; vitality. In Sub social: new friendships; the presence of positive people.

The most important category, participants were calling: perspective, positive attitude and "stress reduction", which in turn affect the overall quality of human life. Overall, the students agreed on the appropriateness of laughter yoga just for a group of seniors.

At this stage we introduce the most frequently reported categories of majority of participants. They will be given verbatim quotations taken from verbatim transcripts of interviews. One of the key categories of the effects of laughter yoga is **detachment**. This category was shown by all the participants. "*The perspective totally, absolutely taste to smile, not to handle things so seriously, as I tended to take (.) Optimistic view ... lighter look at any obstacles ..."; "... I had the feeling that I have a particular perspective, and that the most ordinary things look somewhat from the ceiling (laughs) ...."; "... Just when you smile, man can not be mad can not be angry, cursing and so ... it helps. That the vitality and wellbeing - no doubt "; "... From which I draw all the time, if I ever need someone ... like mad, so what, after all, what I'm here I can laugh about it (laughs), I will not spoil the day. So it gave me too much, it gave me a lot "; "Whenever someone got mad, so I took it, like (wave hands in the air)(.*)."

Other reported categories were **optimistic and positive view**: *"Man is better tuned, sees everything in a better light as well, I think*

really, that laughter yoga is a wonderful thing so I said I would sum it up in a Global ..."; "... Everything in life is so beautiful, but when a person laughs, and suddenly see everything nicely, I'd say no. I have a feeling as if I had walked into some highs'; "... It adds to the life of optimism, especially optimism actually the ardor of life, such prudence, able to deal with various such and sometimes sad story must be the life and person of yoga laughter is completely looks at the life differently, to see him, as I say, with pink eyes, yeah, shining, yeah, that's just something beautiful in this world that is not only sad, but it's really beautiful "; "Priority is to release the stress that is the optimistic view then as that which arises out of this world."

All participants agreed on the category "**anti-stress effect**": "... *So I think, laughter yoga has mainly anti-stress effect affects, this means that even the health ..."; "... I guess I've learned to live peacefully ..."; "... that everything can be resolved ... such a fact that has a positive effect ..."; "... When is practicing laughter yoga of yourself - the stress is going out ..."*

Another category is the category of **relaxation**: *"Laughter Yoga is a maximum relaxation with aim or with feeling so different from other forms of exercise, because I think there is one really frees up"; "... A person is released, just forget everything and just man laughing (laughs)"*; In laughter yoga, *"... you have to shut down more than anywhere else, you have to switch off and just working only with yourself. You do not have time to think about whether your home removed the meat from the freezer and things like that. You do not think there"; "And after that lesson ... I was free as a bird ... the head is clean, no such stress or worries ... (laughs) ... it was gone (laughs) ... "; "... As we were giggling and completely here (Pointing to his belly) all me as completely vibrated, and I say it's cool, like I went to some simulator as me everything vibrates as it completely, it just There was something wonderful."*

Laughter yoga is *"... exercise, certainly good breathing exercises, such as the abdomen, diaphragm, and just here these matters when a person is released ..."; "... It brings relaxation, (...) it completely erases the sort of negative thoughts, forget everything that's been bothering you before, and you're just like in the moon."*

Followed by the category of **new friendships**. Senior age brings loneliness. *"In that elderly person it considers more friendship ... after all we are in an age where we have different friends and*

colleagues leave and try again to establish more friendships, we will not be such a lonely, as older people, when they are closed need to carapace like that, so it is very bad .... "; "... We have established friendships ..."; ".... And in that elderly person it considers more friendship ..."; "... All there, all those people, it seemed to me that even prettier those people."

"... Much old, they are very skeptical that little laugh, yeah, but that's all that they are alone and that it is sealed and the elderly should not be closed, on the contrary, they should go and enjoy yet that the life experience and the last moments of life, joyfully and should not be closed ... and I think that laughter yoga for seniors is something completely ideal, it is something of an ideal." Participants commented favorably on the homogeneity of the group, which was reflected eg. similar interests and topics, for example: grandchildren, etc. *"... those feelings can better understand the man."*

Categories **overlap into everyday life**: *"Everything was very nice ... that I began to be applied every morning." "... Just brings something positive to the present time ... that brings everything to the controlled electronic those contacts. That's not it. How we can sit together and talk together ... "; "... or when I'm bitter it (laughs), I say, just a smile and now it will be better. It really helps, from the health point of view. And thus forgets some of those problems that sometimes occur and (.) Really gave me a lot. " "... Because the time between nutty pessimists as I have there is any such well-known ones are eternally angry, still swear on everything at home ... I had it, too tired, I'm told I have one of those people where there is laughter."*

Category **acquisition of energy**: *"... laughter yoga a lot, and quickly charging, fast charging.... a lot of charges, yeah, terribly charging me energy." "... I came ... so acquired energy that I can not imagine it at all."*

CONCLUSION

Laughter Yoga is still little explored area, which is in accordance with Proyerem et al. (2012). The aim is to address this issue, which is confirmed by the founder of Laughter Yoga Madan Kataria (personal communication with Madan Katarion, July 2013).

The results of this study in the first place detail pose laughter yoga. Further show that by the testimony of students U3A there is a relationship between laughter yoga and individual sub-areas of quality

of life (physical, psychological and social), which is consistent with research that in their surveillance studies indicate such. Lauermanová et al. (2014) and Mora-Ripoll (2011).

The results of the study show that laughter yoga affects the quality of life of students of the University of the Third Age. Allegations point to the fact that laughter yoga is a very appropriate activity for older individuals affected by natural degenerative changes associated with aging. Likewise loneliness coming of age.

Account should be taken of the fact that our results presented are part of a larger qualitative survey solved within the dissertation. The results therefore represent the primary data of a larger complex research project. It is therefore not possible to generalize the results. It can be taken as a starting point for future research, both quantitative and qualitative. There are many variables affecting the quality of life of individuals that need to be taken into account.

We sincerely believe that our present results provide findings and starting points for future studies focused mainly on the factors affecting the course of laughter yoga in students of U3A.

SUMMARY

MILADA KREJČÍ

In nowadays the term wellness is used as a broader term across different contexts. Current understanding of the phenomena "wellness" is usually in two kinds of meaning: in the "hedonistic meaning" oriented on wellness in understanding of pleasure attainment and pain elimination; and in the "eudemonistic meaning" focused on relating to happiness and well-being on the base of holistic transformation to harmony and balance.

The monograph is focused on clear scientific description and demarcation on background of health support and education to be well, to be active in own health development and in health support of others. This approach is fully consistent with the WHO definition of "Wellness" in the wording: "Wellness is the optimal state of health of individuals and groups. There are two focal concerns: the realisation of the fullest potential of an individual physically, psychologically, socially, spiritually and economically, and the fulfilment of one´s role in the family, community, place of worship, workplace and other settings" (WHO 2000).

On the base of authors interpretations we can conclude, that "Education to wellness – Education through wellness" stresses positive orientation in individual, development in beliefs about the sense of human life. Wellness becomes a part of the protection and promotion of health with a tendency to initiate self-education. It contributes to the cultivation of actions and behaviour. The monograph presents findings of long term scientific cooperation of authors regard to the topic "education to wellness" using designs and methods to empower inner motivation and responsibility across all dimensions of health and wellness in historical basic context.

The monograph is divided into three parts. Each part is further divided into 3-5 chapters.

The first part "Historical and basic context of Wellness" in the first chapter presents findings of a literature review that sought to answer how terms "wellness" and "healthy lifestyle" are used in current scientific literature and what are possible implications of their use for wellness education. A review of scientific literature published in 2015 was conducted, involving online database keyword searches,

additional searches of other studies and resources, screening abstracts, assessing their relevance to the review, and integrating the findings with regard to the topic of wellness education. It was found that the term“Healthy lifestyle” is defined as behaviour that leads to better health; as such it is used in current scientific literature. The term “Wellness” is used as a synonym or accompanying term to health as defined by WHO encompassing similar dimensions – physical, mental, social and spiritual (and many more). Authors suggest that wellness education should promote wellness with regard to an individual’s actual state and needs, using designs and methods that not only spread and support practices and knowledge about healthy living, but that empower inner motivation and responsibility across all dimensions of health and wellness.

In the second chapter is defined wellness as an important of healthy life, generally respected not only by populations of all ages and nationalities but also by governments, health insurance companies and regulatory institutions. It is presented that in last ten years, the wellness developed itself to today’s format, despite of non-regulatory environment and rocky times. The understanding of wellness as an important part of heath and disease prevention will provide tool for saving costs for an expensive medical treatments of important chronic diseases resulting from poor lifestyle choices, because wellness delivers on personal satisfaction and more productive life.

The third chapter present results of the international research project on the Public awareness about the importance of wellness for human life, realised in Czech Republic and in Slovakia in 1400 respondents (2 age groups: 20 – 39; 40 - 60, intact persons, persons with disability). In the chapter authors discuss perspectives concerning the nature of wellness and public awareness about the wellness in the Czech and Slovak milieu.

The second part of the monograph “Education at school and sport environment” includes the new methods of scientific work accept multilevel composition and allow to formulate new challenging questions for the education to wellness in school, university and sport milieu. The purpose of the second part is to present the opinion of intentional health promotion and implementation of health education in Poland, Slovakia, Czech Republic, and in Japan. The research was based on specially designed questionnaires, interventions and methods of evaluation. Basic research strategies to promote health in

education institutions develop human responsibility for the health state. Knowledge and skills leading to the reduction or elimination of excessive stress in daily life (not only in sport life) bring to sportsmen the knowledge of "Self „and a development of the potentials in sense of appropriate and real-life perspectives implementation.

There are presented observations of selected health determinants relating to the body weight of students, in particular the physical activities of their exercise regime. The results demonstrate that already in young age students have health problems occurring of various combinations, as well as increased body weight and obesity, which probably resulted from their sedentary lifestyle combined with other risk factors. The intervention studies for promoting sleep and mental health of young athletes consisted of evaluation of sport performance.

The distributors of dietary supplements tend to heavily overestimate the effects of their products. Therefore aim of this chapter is also to evaluate objectively the effect of ß-alanine supplementation on the sports performance, based on the latest knowledge of the world scientific literature. We used the databases of scientific articles Google Scholar, PubMed, Scopus and Sport Discus. Based on the key words we looked up works from the year 2000 to the present. There were chose only the double-blind studies with a control group and a placebo. It was found that Carnosine in the muscle cells increases muscular buffering capacity reduces muscle fatigue and leads to easier regeneration of repeated bouts of high-intensity exercise. Recent data indicate that β-alanine supplementation may not only improve the sports performance. Beta-alanine operates also as a training aid to augment bouts of high-intensity training. We can regard the effect of carnosine on the increase of training volume a wellness effect because the sportsmen are able to perform the same training volume with less effort.

In the last chapter of the second part of the monograph is presented a pilot research study of the influence of Nordic Walking on the musculoskeletal system using Expert Information System Computer Kinesiology B-plus to confirm the hypothesis that gait NW is as a whole more effective than walking without poles on the movement system, improves the function of the thoracic spine section Th3- Th 6 and more muscles are turned into activity with NW than with walking without poles. The authors recommend the Expert Information System CK-B plus as a valid method for objectification of changes in functions of the locomotor system.

The third part of the monograph "Wellness and handicapped people" is aimed on kinesis protection of young persons with disability. The objectives of the first research study are presented in 2 points: first to compare anthropometric characteristics of a group of mental disability children with the norms of intact population of children in Czech Republic, in second to analyse an intervention influence of physical activity on the monitored anthropometric parameters of height, weight and BMI in the experimental groups. Based on the analysis of the results is guided discussion whether lack of physical stimulation has a negative impact on weight and height of children with disability. Further, it is discussed the question of kinesis-protection, the level of burden in children with disability due to optimal physical development, as well as the question of sedatives and medicaments applied for children with disabilities due to symptoms of anxiety and maladaptive behaviour. Based on the Trans theoretical Model of Behaviour Change, a better understanding of the determinants of exercise behaviour is beginning to emerge.

The aim of the second chapter was to determine attitudes to physical education, movement and sport activities in high school with physical disabilities. Standardized questionnaires were used. The main result of the research is the high popularity of physical education, adapted physical education and all sport activities. Research has found that, due to adequate physical disability, is a sport, physical activity and lifestyle very important for the students with physical disabilities.

The last third chapter describes an original procedure of movement assessment, the research method and the results of the assessment of aesthetic movement performed by participants in school age with impaired vision. For nine months they performed two selected movement patterns characterised by various aesthetic variables, fluidity and harmony. The movement patterns were video recorded and assessed by competent judges in order to demonstrate the level of changes in aesthetic variables. The participants achieved an improvement in the studied aesthetic variables. It was analyse significant increase in motor abilities in aesthetic form of movement and an increase in proprioceptive sensitivity.

The fourth part of the monograph "Wellness and seniors" is focused on physical activity, wellness activities and other activities of seniors or persons older than 65 years in their daily lives were

analysed. The aging process of the body in a natural way affects the limitation of physical fitness. Movement deficiency can cause the acceleration of involution and infirmity, and lead of disability. To determine the level of physical fitness, the choice of a physical activity program, which will improve the health and quality of the life of seniors, multi-dimensional evaluation is needed.

The first chapter is concerned on the type and frequency of these activities during the day, week, month or year. To achieve the purpose there were compiled specially for this occasion: "Questionnaire to determine physical activities and wellness activities of seniors 65+." Questioning was attended by 243 seniors 65+ (124 women and 119 men) from Czech Republic. Results present that 93% of men and 89% of women have their own unorganized physical activity program. The vast majority of seniors reported walking as no.1 physical activity. Other frequently mentioned activities included swimming, hiking and biking trips. Another part of our questioning was intended to obtain information on leisure time activities of seniors; questions about hobbies, entertainment and leisure activities. 40% of surveyed men and 35% of women present their own hobby, actively from 2 to 20 hours a week, usually about 12 hours a week.

The aim of the second chapter is to evaluate physical fitness of residents of the Social Care Home in Poland. The presented research study was conducted on a group of sixty – thirty women and thirty men at the age of 64 to 84. Somatic features such as height and weight and BMI level were studied, and information about the level of education was obtained. Physical fitness assessment was based on the comparison of the results obtained by the residents in a slightly modified to Polish conditions Fullerton Functional Fitness Test. It was found that older men were significantly taller than the men at a younger age. Manifestation of a secular trend was visible here. In both groups prevailed people whose level of BMI indicated being overweight and a level of education was elementary. Women gained better results in tests evaluating flexibility, while men showed better endurance. Physical fitness evaluation of the participants is unfavourable. This could be due to obesity occurring in half of the residents and the low level of education, by which these individuals have lower awareness of the beneficial effects of movement on their health and successful aging.

The third chapter in the fourth part of the monograph familiarize professionals with the process of laughter yoga among the target

group of students of the University of the Third Age (individuals 50+), including access to a given age group. There are presented issues of quality of life, which according to the students of the University of the Third Age.

In January 2013 in USA started program “Health in Mind: Improving Education through Wellness” offering a strong framework for addressing the nation’s most urgent health and education challenges by outlining strategies within the current regulatory and budget framework of the Department of Education and Department of Health and Human Services that the administration can utilize to better the conditions for health and learning in schools. The report also examines the research connecting health disparities with educational outcomes and presents case studies of innovative on-the-ground practices across the nation. (www.healthinmind.org.)

In accordance with that the monograph “Education to Wellness – Education through Wellness” addresses to research promoting especially in areas “Preparing educators and managers to promote health and wellness” and “Incorporating health and wellness into education programs”. In a modern wellness research it is relevant to analyse how human health associates with physiological changes generated through the action of autonomous nervous system. Mental activity in the form of our perceptions (including proprioception), emotions, cognitive ability (predictions, anticipation, imaginations and needs), cognitive transcriptions in dreams, and mental activity during communication (inner – out), etc., can causing in imbalance in organism. Stress state in fact is also a state of autonomic imbalance, does not matter, if sympathetic or parasympathetic activity is increased because resulting is the same reality - in many different kinds of disorders. Diseases as arthritis, a back pain, cardiovascular disease, type 2 diabetes mellitus, digestive disorders, hypertension, hypotension, spondylitis, etc. are originated in harmless of human organism. Postmodern living period is so called “Period of Stress” and therefore education to wellness and education strategies to resilience building for good health keeping are crucial. The ultimate aim of education is a positive behavioural modification, defined as the Self - Transformation.

The paradox situation in the medical care service, which is nonstop increasing in advanced countries, has bad economic impacts in these countries. The origin of an unfit life style (which depends on “unfit”

mental activities) can be searched for example in ignorance, in indolence, in a lack of interest, in negligence about personal health. Quality of life develops in depending of individual wants or needs. Individual wants or needs are unique and correspond much with social and spiritual level. In the program “Health 21” is declared that only right education can guide to individual health and to the health community. From this point is a very important question “How to complement all attributes of wellness for a continual building of resilience?” The answer is symbolized in the Fig. 1. Only intentional education linked hand in hand can support wellness in human life, can support health and quality of life in society.

Figure 1 *Coherent cooperation of 3 phenomena of education to wellness (Krejčí 2013)*

REFERENCES

A

Aartioli, G.G., Gualano, B., Smith. A, Stout, J., and Lancha, A.H.J. (2010). Role of β-alanine Supplementation on Muscle Carnosine and Exercise Performance. *Med Sci Sports Exerc, 42*: 1162-1173.

Abe, H. (2000). Role of histidine-related compounds as intracellular proton buffering constituents in vertebrate muscle. *Biochem. (Mosc). 65*, 757-765.

Abreu, T. & Bragança, M. (2015). The bipolarity of light and dark: A review on Bipolar Disorder and circadian cycles *Journal of Affective Disorders* 2015;185: 219–29.

Active wellness (2015) www.activewellness.cz

Adamčák, Š., Bartík, P., Kozňáková, A. (2011). *Úroveň posturálnych a fázických svalov žiakov na 2.stupni základných škô*l. Banská Bystrica : UMB FHV KTVŠ, 173p.

Alexander, G. K., Innes, K. E., Selfie, T. K., & Brown, C. J. (2013). „More than I expected": Perceived benefits of yoga practice among older adults at risk for cardiovascular disease. *Complementary Therapies in Medicine, 4,* 14-28.

Andrzejewska, M., Szark-Eckardt, M., Żukowska, H., Zukow, W. (2013). Wpływ aktywności fizycznej na zdrowie młodzieży w I Liceum Ogólnokształcącym w Nakle nad Notecią. In *Journal of Health Sciences*. Vol. 3 No 12 s. 181-202. ISSN 1429-9623 / 2300-665X.

Antala, B. & Dorošová, S. (1996). Postoje žiakov pohybovo podpriemerných a pohybovo nadpriemerných ku školskej telesnej výchove. *Telesná výchova a šport*, 6(4), 8 - 10.

Antala, B., et al. (2014). Telesná a športová výchova a súčasná škola. Bratislava: NŠC a FTVŠ UK. ISBN: 978-80-97 1466-1-0.

Antonovski, A. (1985) *Health, Stress and Coping.* San Francisco: Jossey-Bass.

Arena, R., Lavie, C. J., Cahalin, L. P., Briggs, P. D., Guizilini, S., Daugherty, J., … Borghi-Silva, A. (2015). Transforming cardiac rehabilitation into broad-based healthy lifestyle programs to combat

noncommunicable disease. *Expert Review of Cardiovascular Therapy*, 1–14. http://doi.org/10.1586/14779072.2016.1107475

Arena, R., Lavie, C. J., Hivert, M.-F., Williams, M. A., Briggs, P. D., & Guazzi, M. (2015). Who will deliver comprehensive healthy lifestyle interventions to combat non-communicable disease? Introducing the healthy lifestyle practitioner discipline. *Expert Review of Cardiovascular Therapy*, 1–8. http://doi.org/10.1586/14779072.2016.1107477

Arloski, M. (2007). *Wellness coaching for lasting lifestyle change*. Duluth, Minn.: Whole Person Associates.

Astrup, A., et al. (2002). Low fat diets and energy balance: how does the evidence stand in 2002, In *Proceedings of the Nutrition Society*, 2002. 61(2): p. 299-309.

B

Baguet, A., Bourgois, J., Vanhee L., Achten, E., and Derave, W. (2010). Important role of muscle carnosine in rowing performance. *J Appl Physiol, 109,* 1096-1101.

Baguet, A., Koppo, K., Pottier, A., et al. (2010). Beta-alanine supplementation reduces acidosis but not oxygen uptake response during high-intensity cycling exercise. *Eur J Appl Physiol, 108,* 495-503.

Bangsbo, J., Iaia, F.M., and Krustrup, P. (2008). The Yo-Yo intermittent recovery test: A useful tool for evaluation of physical performance in intermittent sports. *Sports Med, 38,* 37-51.

Bartík, P. (2005). *Zdravotná telesná výchova I.* Banská Bystrica: Univerzita Mateja Bela.

Bashir, Z., & May, K. (2015). Future Trends in Health and Wellness. *Parks & Recreation*, *50*(8), 32–35.

Batrukova, M.A., Rubtsov, A.M. (1997). Histidine-containing dipeptides as endogenous regulators of the activity of sarcoplasmic reticulum Ca-release channels. *Biochimica et Biophysica Acta, 1324*, 142–150.

Becker, C. M., Chaney, B. H., Shores, K., & Glascoff, M. (2015). The Salutogenic Wellness Promotion Scale for Older Adults. *American Journal of Health Education*, *46*(5), 293–300.

Béderová, A. (2003). Príloha o racionálnej výžive v škole a rodine. Prevencia a učitelia. In *Rodina a škola,* 2003, č. 7, p. 29.

Bell, E.A., et al. (1998). Energy density of foods affects energy intake in normal weight women. In *American Journal of Clinical Nutrition*, 1998. 67: p. 412-420.

Begum, G., Cunliffe, A., and Leveritt, M. (2005). Physiological role of Carnosine in contracting muscle. *Int J Sport Nutr Exerc Metab, 15,* 493–514.

Bellinger, P.M., Howe, S., Shing, C., and Fell, J.W. (2012). The effect of combined β-alanine and $NaHCO_3$ supplementation on cycling performance. *Med Sci Sports Exerc, 44,* 1545-1551.

Bellinger, P.M. (2015). β-alanine supplementation for athletic performance: An update. *Journal of Strength and Conditioning Research Publish,* Ahead of Print. *DOI: 10.1519/JSC. 0000000000000327*

Bendíková, E. Jančoková, Ľ. (2013). *Biorytmy, oslabenia a poruchy zdravia : kapitoly zo zdravotnej telesnej výchovy.* 1. vyd. Banská Bystrica : Vydavateľstvo Univerzity Mateja Bela - Belianum, 2013, 121p.

Bendíková, E., Kostelecká, A. (2013). *Exercise routine as a conditions of early school age pupils´ health.* 1. vyd. Bydgoszcz : Oficyna Wydawnicza Mirosław Wrocławski, 2013. 149p.

Bendíková, E. (2014). Lifestyle, physical and sports education and health benefits of physical activity. In *European researcher : international multidisciplinary journal*. Sochi : Academic publishing house Researcher, 2014; 69(2-2):343-348.

Bendíková, E. (2012). Kapitoly z didaktiky školskej telesnej a športovej výchovy. Žilina: Edis. ISBN 978-80-554-0487-5.

Bertelson P, de Gelder B. (2004). The psychology of multimodal perception. In C. Spence & J. Driver (Eds.). Oxford: Oxford University Press. *Crossmodal space and crossmodal attention*, 141-177.

Bezner, J. R. (2015). Promoting Health and Wellness: Implications for Physical Therapist Practice. *Physical Therapy*, *95*(10), 1433–1444.

Bian, L., Liu, Z., & Li, G. (2015). Promoting health wellness—The essentials of Chinese medicine. *Chinese Journal of Integrative*

Medicine, *21*(8), 563–568. http://doi.org/10.1007/s11655-015-2100-y

Bill Hettler. (1976). Six Dimensions of Wellness Model. National Wellness Institute. Retrieved from http://c.ymcdn.com/sites/www.nationalwellness.org/resource/resmgr/docs/sixdimensionsfactsheet.pdf

Bláha, P. (2015). Clinical Anthropology in Medicine. *Acta Salus Vitae*. *3(1),* 36-46.

Boksa, P., Joober, R., & Kirmayer, L. J. (2015). Mental wellness in Canada's Aboriginal communities: striving toward reconciliation. *Journal of Psychiatry & Neuroscience: JPN*, *40*(6), 363–365.

Bolach, B., Bolach, E., Kielan (2008). Comparison of overall physical fitness in mental deficient and normal developing children. In: Migasiewicz, J., Bolach, E. Disabled Physical Activity. Wroclaw: Polish Disability Association. T 3:293-305

Bolach, E., Bulinski, P. E. (2012). Ocena sprawności motorycznej dzieci w wieku przedszkolnym, *Rozprawy Naukowe, 39(1),* 120-125.

Boldyrev, A.S., et al. (1999). Carnosine, the protective, anti-aging peptide. *Biosci. Rep., 19,* 581-587.

Brambring, M. (2001). Motor activity in children who are blind or partially sighted. *Visual Impairment Research*, 3:41-51. DOI: 10.1076/vimr.3.1.41.4415

Brezinova, V., & Oswald, I. (1972). Sleep after a bedtime beverage. *British Medical Journal,* 2:431-433. http://dx.doi.org/10.1136/bmj.2.5811.431

Bruce, K. F. (2006). *Tai Chi: Health for Life*. Blue Snake Books.

Buer, R. (2015). Wellness and Safety Programs Expand to Embrace Employee Well-being. *Occupational Health & Safety (Waco, Tex.)*, *84*(9), 70–71.

Buchovceva, D., Buchovcev, J., Kurilov,V. (1998). Periostal technology and individual correction. Ukrajina, Ukrajinská státní agentura autorských práv č. 38, 1998.

Buchovceva, D., Buchovcev, J., Kurilov,V., Šeptalin, N. (1998). PAK-Program atlas komplex. Ukrajina, Ukrajinská státní agentura autorských práv č. 37.

Bunc, V., Hráský, P., Skalská, M. (2013). *Pohybové aktivity seniorů – benefity a problémy.* In. Štěpánková, H. (Editor) Sborník příspěvků z mezioborové konference o stárnutí. Praha: Psychiatrické centrum Praha.

Burnhams, N. H., London, L., Laubscher, R., Nel, E., & Parry, C. (2015). Results of a cluster randomised controlled trial to reduce risky use of alcohol, alcohol-related HIV risks and improve help-seeking behaviour among safety and security employees in the Western Cape, South Africa. *Substance Abuse Treatment, Prevention & Policy*, *10*(1), 1–14. http://doi.org/10.1186/s13011-015-0014-5

Butler, C. E., Clark, B. R., Burlis, T. L., Castillo, J. C., & Racette, S. B. (2015). Physical Activity for Campus Employees: A University Worksite Wellness Program. *Journal of Physical Activity & Health*, *12*(4), 470–476.

Byron, G., Ziedonis, D. M., McGrath, C., Frazier, J. A., deTorrijos, F., & Fulwiler, C. (2015). Implementation of Mindfulness Training for Mental Health Staff: Organizational Context and Stakeholder Perspectives. *Mindfulness*, *6*(4), 861–872. http://doi.org/10.1007/s12671-014-0330-2

C

Cadavid, E., & Sáenz, L. M. (2015). Physical Activity as a Strategy for Prevention and Health Promotion in the Occupational Context: An Example of Corporate Engagement. *Procedia Manufacturing*, *3*, 1140–1147. http://doi.org/10.1016/j.promfg.2015.07.191

Campbell, B.I., Wilborn, C.D., La Bounty, P.M. (2010). Supplements for Strength-Power Athletes. *Strength and Conditioning Journal, 32,* 93-100.

Centers for Disease Control and Prevention. (n.d.). Healthy Living. Retrieved from http://www.cdc.gov/healthyliving/

Čepčiansky, J., et al. (2000). Teória a didaktika telesnej a športovej výchovy mentálne postihnutých. Bratislava: Univerzita Komenského v Bratislave. ISBN 80-223-1477-3.

Český statistický úřad. (2013). Projekce obyvatelstva České republiky (Projekce 2013). Retrieved from http://www.czso.cz/csu/2013edicniplan.nsf/t/A6003061EE/$File/402013u.pdf

Chabior A, Fabiś A, Wawrzyniak J. *Starzenie się i starość w perspektywie pracy socjalnej*. Centrum Rozwoju Zasobów Ludzkich, Warszawa 2014, 20-26, 80-84.

Chad, K., Jobling, A., Frail, H. (1990). Metabolic rate: A factor in developing obesity in children with Down syndrome. *American Journal of Mental Retardation, 95(2),* 228-235.

Chakravarthi, M. V., & Booth, F. W. (2004). Eating, exercise, and "thrifty" genotypes: Connecting the dots toward an evolutionary understanding of modern chronic diseases. *Journal of Applied Physiology, 96,* 3-10.

Chang, Y.K., Nien, Y.H., Tsai, C.L., Etnier, J.L. (2010). Physical activity and cognition in older adults: the potential of Tai Chi Chuan. *J Aging Phys Act*, 18:451-472

Chasovnikova, L.V., Formaziuk, V.E., Sergienko, V.I., et al. (1991). Modeling the interaction of anti-cataract drugs with membranes of normal human crystalline lenses and those with cataracts. *Biofizika, 36(4),* 648-651.

Chen, E.W., Fu, A.S.N., Chan, K.M., Tsang, W.W.N. (2012). The effects of Tai Chi on the balance control of elderly persons with visual impairment: a randomised clinical trial. *Age & Ageing,* 41:254.

Chung, W., Shaw, G., Anderson, M.E., et al. (2012). Effect of 10 Week Beta-Alanine Supplementation on Competition and Training Performance in Elite Swimmers. *Nutrients 4(10),* 1441-1453.

Colantonio, S., Coppini, G., Germanese, D., Giorgi, D., Magrini, M., Marraccini, P., … Salvetti, O. (2015). A smart mirror to promote a healthy lifestyle. *Biosystems Engineering*, *138*, 33–43. http:// doi.org/10.1016/j.biosystemseng.2015.06.008

Corbin, C. B., & Pangrazi, R. P. (2001). Toward a uniform definition of wellness : a commentary. *Research Digest - President's Council on Physical Fitness and Sports (U. S.)*. Retrieved from http:// purl.access.gpo.gov/GPO/LPS20624.

Cubero, J., Valero, V., Sanchez, J., Rivero, M., Parvez, H., Rodriguez, A. B. & Barriga, C. (2005). The circadian rhythm of tryptophan in breast milk affects the rhythms of 6-sulfatoxymelatonin and sleep in newborn. *Neuroendocrinology Letters,* 26:657-661.

Cuisinier, C., De Welle, M.J., Verbeeck, R.K., et al. (2002). Role of taurine in osmoregulation during endurance exercise. *Eur J Appl Physiol., 87(6),* 489-495.

Currell, K. and Jeukendrup, A.E. (2008). Validity, Reliability and Sensitivity of Measures of Sporting Performance. *Sports Med, 38,* 297-316.

D

Dattilo, A.M., Kris-Etherton, P.M. (1992). Effects of weight reduction on blood lipids and lipoproteins: a meta analysis. In *American Journal of Clinical Nutrition*, 1992; 56: p. 320-328.

Davarpanah, J. S., Purrajabi, F., Movahedi, A., Jalali, S. (2012). Effect of Selected Balance Exercises on the Dynamic Balance of Children with Visual Impairments *Journal of Visual Impairment & Blindness,* 106:466-474.

Davis, R. W. (2011). *Teaching Disability Sport: A Guide for Physical Educators.* Ed. 2. Champaign: Human Kinetics.

Deirdre, M. Scully. (1986). Visual perception of technical execution and aesthetic quality in biological motion. *Human Movement Science,* 5:185-206. DOI: 10.1016/0167-9457(86)90024-2

Derave, W., et al. (2007). Beta-alanine supplementation augments muscle Carnosine content and atenuates fatigue during repeated isokinetic contraction bouts in trained sprinters. *J Appl Phys, 103,* 1736-1743.

Derave, W., Everaert, I., Beeckman, S., et al. (2010). Muscle Carnosine metabolism and beta-alanine supplementation in relation to exercise and training. *Sports Med, 40,* 247-263.

Dimitrovski, D., & Todorović, A. (2015). Clustering wellness tourists in spa environment. *Tourism Management Perspectives*, *16*, 259–265. http://doi.org/10.1016/j.tmp.2015.09.004.

Ding-Hai,Yu., Hui-Xin, Yang. (2012). The effect of Tai Chi intervention on balance in older males. *Journal of Sport and Health Science*, 1:57–60.

Dinold, M., Zanin, K. (1996). *Miteinanders: Kreative Arbeitsweise für behinderte und nichtbehinderte Menschen mit den Mitteln Körpererfahrung, spontanem Spiel, Tanz und Theater. Wien: Hpt-Breitschopf.*

Dolgoff-Kaspar, R., Baldwin, A., Johnson, M. S., Edling, N., & Sethi, G. K. (2012). Effect of laughter yoga on mood and heart rate variability in patients awaiting organ transplantation: a pilot study. *Altern Ther Health Med, 18*(5), 61-66.

Dollman, J., Norton, L. (2005). Evidence for secular trends in children's physical activity behaviour. *British Journal of Sports Medicine, 39,* 892-897.

Donovan, T., Ballam, T., Morton, J.P., and Close, G.L. (2012). β-alanine Improves Punch Force and Frequency in Amateur Boxers During a Simulated Contest. *Int J Sport Nutr Exerc Metab*, published ahead of print.

Ducker, K.J., Dawson, B., and Wallman, K.E. (2013). Effect of β-alanine Supplementation on 800 m Running Performance. *Int J Sport Nutr Exerc Metab,* published ahead of print.

Ducker, K.J., Dawson, B., and Wallman, K.E. (2013). Effect of β-Alanine Supplementation on 2000 m Rowing Ergometer Performance. *Int J Sport Nutr Exerc Metab, 23,* 336-343.

Dukát, A., Lietava, J., Luluiak, M., Krahulec, B., Čaprnda, M., Vacula, I. (2007). Epidemiológia nadváhy a obezity na Slovensku. In *Via practica*, 2007, roč. 5 (3)

Dunn, H. L. (1959). High-Level Wellness for Man and Society. *American Journal of Public Health and the Nations Health*, *49*(6), 786–792.

E

Elmahgoub, S. S., Van de Velde, A., Peersman, W., Cambier, D., & Calders, P. (2012). Reproducibility, validity and predictors of six-minute walk test in overweight and obese adolescents with intellectual disability. *Disability & Rehabilitation, 34(10),* 846-851.

Engler, A. C., Hadash, A., Shehadeh, N., & Pillar, G. (2012). Breast feeding may improve nocturnal sleep and reduce infantile colic: Potential role of breast milk melatonin. *European Journal of Pediatrics,*171:729-732.http://dx.doi.org/10.1007/s00431-011-1659-3

Erdrich, J., Zhang, X., Giovannucci, E., & Willett, W. (2015). Proportion of colon cancer attributable to lifestyle in a cohort of US women.

Cancer Causes & Control, *26*(9), 1271–1279. http://doi.org/10.1007/s10552-015-0619-z.

EURO WHO, (2006). *Obesity home*. Dostupné na: http://www.euro.who.int/obesity.

F

Flaschberger, E. et al. (2013). Learning in networks: individual teacher learning versus organizational learning in a regional health – promoting schools network. *Health Education Research*, vol.28 (6), pp. 993-1003.

Fobi, M.A. (2004). Surgical treatment of obesity. In *J. Natl. Med. Assoc*., 96, 2004; 1: p. 61-75.

Fogelholm, M., Kukkonen, N., Harjula, K. (2000). Does physical activity prevent weight gain: a systematic review. In *Obesity Reviews*, 2000. 1: p. 95-111.

Fridrich, P. (2011). *Certifikovaný kurz pro instruktory jógy smíchu* (Rev. Ed.). Praha: Dr. Kataria School of Laughter Yoga.

G

Gába, A., Přidalová, M. (2014). Age-related changes in body composition in a sample of Czech women aged 18 – 89 years: a cross sectional study. European *Journal of Nutrition*. *53(1),* 315-321.

Ginter, E., Havelková, B. (2004). Demografické údaje o prevalencii nadváhy a obezity v detstve: Slovensko a svet. In *Medicínsky monitor*, 2004; 6: p.12–13.

Główny Urząd Statystyczny. Sytuacja demograficzna osób starszych i konsekwencje starzenia się ludności Polski w świetle prognozy na lata 2014-2050. Narodowy Spis Powszechny Ludności i Mieszkań, Warszawa 2014, 2-6.

Golombek, D.A., Casiraghi, L.P., Agostino, P.V., Paladino, N., Duhart, J.M., Plano, S.A., Chiesa, J.J. (2013). The times they're a-changing: Effects of circadian desynchronization on physiology and disease. *Journal of Physiology-Paris* 107;310–322.

Gooding, H. C., Shay, C. M., Ning, H., Gillman, M. W., Chiuve, S. E., Reis, J. P., … Lloyd-Jones, D. M. (2015). Optimal Lifestyle Components in Young Adulthood Are Associated With Maintaining

the Ideal Cardiovascular Health Profile Into Middle Age. *Journal of the American Heart Association*, *4*(11). http://doi.org/10.1161/JAHA.115.002048

Gorner, K. (2001). Postoje, vedomosti a názory žiakov 2.stupňa ZŠ na telesnú výchovu. Banská Bystrica: Univerzita Mateja Bela. ISBN 80-8055-565-6.

Gorny, M. (2013). *Estetika pohybu dětí se zrakovým postižením.* Olomouc: Univerzita Palackého v Olomouci.

Gooley JJ, Chamberlain K, Smith KA, et al. (2011). Exposure to room light before bedtime suppresses melatonin onset and shortens melatonin duration in humans. *Journal of Clinical Endocrinology and Metabolism*. 2011; 96: E463–E472.

Górny, M. (2013). *Aesthetics movement of visually impaired children* [in Czech]. Olomouc, Univerzita Palackého v Olomouci.

Green, J., Tones, K. (2013). Health promotion. Planning and strategies. London: SAGE Publications.

Grzanka-Tykwińska A, Kędziora-Kornatowska K. *Znaczenie wybranych form aktywności w życiu osób w podeszłym wieku.* Gerontologia Polska, 2010, 18 (1), 28-32.

Grześkowiak J, Wieliński D. *Wykorzystanie Testu Fullerton Functional Fitness do badania ryzyka upadków u osób w podeszłym wieku*. Antropomotoryka, 2008:44, 86.

Grześkowiak J, Wieliński D. *Porównanie wybranych parametrów sprawności fizycznej kobiet po 65roku życia badanych metodą FullertonFunctional Fitness Test z badaniami populacyjnymi prowadzonymi w USA przez Rikli i Jones*. Antropomotoryka, 2009, 45, 77-82.

Guan, J., Khambhati, J., Jones, L. W., Morgans, A., Allaf, M., Penson, D. F., & Moslehi, J. (2015). ABCDE Steps for Heart and Vascular Wellness Following a Prostate Cancer Diagnosis. *Circulation*, *132*(18), e218–e220. http://doi.org/10.1161/CIRCULATIONAHA.115.012521.

Guesdon, B., Messaoudi, M., Lefranc-Millot, C., Fromentin, G., Tome, D. & Even, P. C. (2006). A tryptic hydrolysate from bovine milk *a*S1-casein improves sleep in rats subjected to chronic mild stress. *Peptides,* 27:1476-1482.

Gulewitsch, Wl. (1902). Ueber das Carnosin, eine neue organische Base des Fleisch-extractes. *Berichte der deutschen chemischen Gesellschaft, 33, (2).*

H

Hagensen, K. P. (2015). Using a Dance/Movement Therapy-Based Wellness Curriculum: An Adolescent Case Study. *American Journal of Dance Therapy*. http://doi.org/10.1007/s10465-015-9199-4

Hainer, V. a kol. (2004). *Základy klinické obezitologie*, Grada : Publishing, Praha, 2004, 356p.

Halson, S. L. (2014) Sleep in Elite Athletes and Nutritional Interventions to Enhance Sleep.*Sports Medicine,* Volume 44(1):13-23.

Harada, T. (2004). Effects of evening light conditions on salivary melatonin of Japanese junior high school students *Journal of Circadian Rhythms.* 2: 1-5. doi: 10.1186/1740-3391-2-4

Harada, T., Hirotani, M., Maeda, M., Nomura, H., & Takeuchi, H. (2007). Correlation between breakfast tryptophan content and morn-ingness-eveningness in Japanese infants and students aged 0 - 15 years. *Journal of Physiological Anthropology.* 2007;26:201-7. doi:10.2114/jpa2.26.201

Harada, T., Nakade, M, Wada, K., Kondo, A., Maeda, M., Noji, T. & Takeuchi, H. (2012) Mental health of children from a chronobiological and epidemiological point of view.(Chapter 22). In V. Olisah (Ed.), *Essential Notes in Psychiatry* (pp. 439-458), Rijeka, Croatia: Tech. http://dx.doi.org/10.5772/38801

Harada, T., Wada, K., Tsuji, F., Krejci, M., Kawada, T., Noji, T., Nakade, M., Takeuchi, H. (2016) Intervention study using a leaflet entitled 'Three benefits of go to bed early! Get up early! and Intake nutritionally rich breakfast!" a message for athletes' to improve the soccer performance of university soccer team. *Sleep and Biological Rhythms* 14 (Suppl 1): S65- S74.

Harada, T., Wada, K., Akimitsu, O., Krejčí, M., Noji, T., Nakade, M., Takeuchi, H. (2013). Education to health, life style with the accent to sleep habits – intervention program. *Acta Salus Vitae. 1(1),* 13-26.

Hargreaves, M., McKenna, M.J., Jenkins, D.G., Warmington, S.A., Li, J. L., Snow, R. J., and Febbraio MA. (1998). Muscle metabolites and performance during high-intensity, intermittent exercise. *J Appl Physiol, 84:* 1687-1691.

Harris, R.C., Hill, C.A., Kim, H.J., Bobbis, L., Sale, C., Harris, D.B., and Wise, J.A. Beta-alanine supplementation for 10 weeks significantly increased muscle Carnosine levels. *FASEB J, 19,* A1125, 2005.

Hátlová, B. a kol. (2013*). Pohybové aktivity a jejich vliv na osobnost seniorů*. In. Štěpánková, H. (Editor) Sborník příspěvků z mezioborové konference o stárnutí. Praha: Psychiatrické centrum Praha.

Hayflick, L. (1997). *Jak a proč stárneme*. Praha: Columbus. ISBN 80-85928-97-3.

Health Promoting Schools. (2015, November 6). Retrieved from http://www.schools-for-health.eu/she-network/health-promoting-schools.

Herzog, D., & Kahir, K. (2015). The impact of laughter yoga on quality of life and immune cells in oncologic patients. *Cancer Nursing*, *4*(38), 4-5.

Higuchi, S., Nagai, Y., Lee, S. & Harada, T. (2014) Influence of light at night on melatonin suppression in children.*Journal of Clinical Endocrinology and Metabolism* 2014; 99: 3298–303.

Hill, C. C., et al. (2007). Influence of beta-alanine supplementation on skeletal muscle at high intensity cycling intensity. *Amino Acids, 32;* 225-233.

Hills, A. P., King, N. A., & Armstrong, T. P. (2007). The Contribution of Physical Activity and Sedentary Behaviours to the Growth and Development of Children and Adolescents. Implications for Overweight and Obesity. *Sports Medicine, 37(6),* 533-545.

Hipkiss, A.R., Brownson, C., and Carrier, M.J. (2001). Carnosine, the anti-ageing, anti-oxidant dipeptide, may react with protein carbonyl groups. *Mech Ageing Dev 122,* 1431-1445.

Hobson, R.M., Saunders, B., Sale, C., et al. (2012). Effects of β-alanine supplementation on exercise performance: a meta-analysis. *Amino Acids, 43,* 25-37.

Hoffman, J.R., Ratamess, N.S., Faigenbaum, A.D., Ross, R., Kang, J., Stout, J.R., and Wise, J.A. (2008). Short-duration beta-alanine

supplementation increases training volume and reduces subjective feelings of fatigue in college football players. *Nutr Res, 28,* 31–35.

Hoffman, J.R., Emerson, N.A., Stout, J.R. (2012). Beta-alanine supplementation. *Nutrition and Ergogenic Aids, 11(4),* 189–195.

Holland, S. K., Greenberg, J., Tidwell, L., & Newcomer, R. (2003). Preventing disability through community-based health coaching. *Journal of the American Geriatrics Society*, *51*(2), 265–269. http://doi.org/10.1046/j.1532-5415.2003.51068.x

Hornung, O.P., Regen, F., Danker-Hopfe, H., Schredl, M.& Heuser, I. (2007). The Relationship between REM sleep and memory consolidation in old Age and effects of cholinergic medication. *Biological Psychiatry* 2007;61:750-57. doi:10.1016/j.biopsych.2006.08.034

Horvat, M., Ray, C., Ramsey, V., Miszko, T., Keeney, R., Blasch, B. (2003). Compensatory analysis and strategies for balance in individuals with visual impairments. *Journal of Visual Impairment & Blindness*, 97:695–703.

Hošek, V. (2013). Wellness, well-being a pohybová aktivita. *Acta Salus Vitae*, *1(1),*27-34.

Hošková, B., Matoušová, M. (2005). *Kapitoly z didaktiky zdravotní tělesné výchovy pro studující FTVS UK*. Praha, 2005, 135p.

Hove, O. (2004). Weight survey on adult persons with mental retardation living in the community. *Research in Developmental Disabilities, 25(1),* 9-17.

Howe, S.T., Bellinger, P.M., Driller, M.W., Shing, C.M., and Fell, J.W. (2013). The effect of β-Alanine supplementation on isokinetic force and cycling performance in highly-trained cyclists. *Int J Sport Nutr Exerc Metab,* published ahead of print.

Hráský, P., Bunc, V. (2013). *Pohybové programy pro ovlivnění tělesného složení, tělesné zdatnosti a nezávislosti seniorů.* In. Štěpánková, H. (Editor) Sborník příspěvků z mezioborové konference o stárnutí. Praha: Psychiatrické centrum Praha.

Hu, J., Jensen, G. A., Nerenz, D., & Tarraf, W. (2015). Medicare's Annual Wellness Visit in a Large Health Care Organization: Who Is Using It? *Annals Of Internal Medicine*, *163*(7), 567–568. http://doi.org/10.7326/L15-5145.

Huijgen, J. & Samson, S. (2015).The hippocampus: A central node in a large-scale brain network for memory. *Revue Neurologique*171: 204-16.

I

Ignasiak, Z., Domaradzki, J., Kaczorowska, A., Katan, A. *Poziom sprawności ruchowej mężczyzn w wieku 60-79 lat.* Antropomotoryka, 2009a, 48, vol. 19, 17-24.

Ignasiak, Z., Kaczorowska, A., Katan, A., Domaradzki, J.*Mobility in olderwomenassesed by Fullerton test (Sprawność ruchowa kobiet w starszym wieku oceniana testem Fullertona).* Fizjoterapia, 2009b,17(2), 48-52.

J

Jacobson, B.H., Chen, H.C., Cashel, C., Guerrero, L. (1997). The effect of Tai Chi Chuan training on balance, kinesthetic sense, and strength. *Perceptual and Motor Skills*, 84:27–33.

Jahangiry, L., Shojaeizadeh, D., Abbasalizad Farhangi, M., Yaseri, M., Mohammad, K., Najafi, M., & Montazeri, A. (2015). Interactive web-based lifestyle intervention and metabolic syndrome: findings from the Red Ruby (a randomized controlled trial). *Trials*, *16*(1). http://doi.org/10.1186/s13063-015-0950-4

James, R., Lackner, Shenker, B. (1985). Proprioceptive influences on auditory and visual spatial localization. *The Journal of Neuroscience,* 5:579-583.

Jandová, D., Morávek, O. (2009). Využití expertních informačních systémů v oboru RFM. Sborník MKF ČR - Mezinárodní fyzioterapeutické konference ČR - UNIFY ČR, v Brně 4. 9. 2009, ISSN 1801-4062.

Jandová, D. (2009). Existence expertních informačních systémů ve fyzioterapii. Rehabil. fyz.. lék., č.4/16.

Jandová, D. (2010). Wellness zpohledu lázeňské medicíny. In Hošek, V., Tilinger, P. (Eds.) Východiska pro odborné vzdělávání wellness specialistů. VŠTVS Palestra, s.r.o., 2010, ISBN 978-80-904435-0-1.

Jandová, D., Morávek, O. (2011). Změny v pohybovém systému po Nordic Walking . Čas. Rehabil. fyz.lék. č. 2/18.

Janiš, K. (2013). *Vybraný model determinantů volnočasového chování seniorů*. In. Štěpánková, H. (Editor) Sborník příspěvků z mezioborové konference o stárnutí. Praha: Psychiatrické centrum Praha.

Jansa, P., & Kovář, K. (2010). Vybrané Determinanty Životního Stylu Učitelů Základních Škol. / Selected Determinants of the Primary Shools Teachers Lifestyle. *Physical Culture / Telesna Kultura*, *33*(1), 57–68.

Janssen, I., Katzmarzyk, P. T., Boyce, W. F., Vereecken, C., Mulvihill, C., Roberts, C., et al. (2005). Comparison of overweight and obesity prevalence in school-aged youth from 34 countries and their relationships with physical activity and dietary patterns. *Obesity Reviews, 6(2),* 123-132.

Ješina, O., Bartoňová, R., Kepštová, L, & Hovorková, L. (2013). *Úvod do didaktiky aplikovaných pohybových aktivit žáku s mentálním postižením.* Olomouc: Univerzita Palackého v Olomouci.

Ješina, O., Janečka, Z., et al. (2008). *Aplikované pohybové aktivity v zimní přírodě II.* Olomouc: Univerzita Palackého v Olomouci.

Jin, P. (1992). Efficacy of Tai Chi, brisk walking, meditation, and reading in reducing mental and emotional stress. *Journal of Psychosomatic Research*, 36:361-370.

Jones, J.C., Rikli, R.E. *Assesing physical performance of older adults in community setting.* W: Bailey S. (red.) Physical Activity and Aging. Meyer and Meyer Sport (UK), 2001, 127-147.

Jordan, T, Lukaszuk, J., Misic, M., and Umoren, J. (2010). Effect of β-alanine supplementation on the onset of blood lactate accumulation (OBLA) during treadmill running: Pre/post 2 treatment experimental design. *J Int Soc Sports Nutr, 7,* 20.

Jourdan, D. et al.(2010). Factors influencing the contribution of staff to health education in schools. *Health Education Research*, vol.25 (4), pp. 519-530.

K

Kalvach, Z., a kol. (2004). *Geriatrie a gerontologie*. 1. vyd. Praha: Grada. ISBN 80-247-0548-6.

Karni, A., Tanne, D., Rubenstein, B.S., Askenasy, J.J. &Sagi, D. (1994).Dependence on REM sleep of overnight improvement of a perceptual skill. *Science* 265: 679-82. doi:10.1126/science. 8036518

Kasa, J. (2005). Šport, zdravie, výchova. In *Pohyb a zdravie, II*. roč. Trenčín : KTVŠ, 2005, p. 7 –19.

Kataria, M. (2011). *Laufh For No Reason* (4th ed.). India: Madhuri International.

Kemm, J. (2015). Health promotion. Ideology, discipline, and specialism. Oxford: Oxford University Press, p.96.

Kendrick, I., Harris, R., Kim, H., Kim, C., Dang, V, Lam, T., Bui, T., Smith, M.., and Wise J. (2008). The effects of 10 weeks of resistance training combined with β-alanine supplementation on whole body strength, force production, muscular endurance and body composition. *Amino Acids 34,* 547-554.

Kharofa, R. Y., Copeland, K. A., Sucharew, H., & Meurer, J. R. (n.d.). Randomized controlled trial of a wellness action plan to promote healthy diet and activity in pediatric primary care. *Preventive Medicine Reports*. http://doi.org/10.1016/j.pmedr.2015.10.008.

Kimm, S. Y. S., Glynn, N. W., Obarzanek, E., et al. (2005). Relationship between the changes in physical activity and body-mass index during adolescence: a multicentre longitudinal study. *Lancet, 36(6),* 301-307.

Kornatovská, Z. (2014). Availability and offer of controlled physical activities for children with disability in selected regions of the EU. In: Hošek, V., Tilinger, P. (Eds.) Wellness, zdraví a kvalita života. Praha: VŠTVS PALESTRA, 59-70.

Kostencka, A., Śmiglewska, M. & Szark-Eckard, M. (2012). *Edukacja zdrowotna w wychowaniu fizycznym - realizacja podstawy programowej: opracowanie kierowane do studentów i nauczycieli wychowania fizycznego.* Oficyna Wydawnicza Mirosław Wrocławski, Bydgoszcz, 2012, 201p.

Kováč, D. (2001). Kvalita života - naliehavá výzva pre vedu nového storočia. Československá psychologie, 45(1),34-44.

Kozica, S. L., Harrison, C. L., Teede, H. J., Ng, S., Moran, L. J., & Lombard, C. B. (2015). Engaging rural women in healthy lifestyle programs: insights from a randomized controlled trial. *Trials*, *16*(1). http://doi.org/10.1186/s13063-015-0860-5

Kožuchová, M., Bašková, M. (2013). Výskyt nadhmotnosti a obezity u detí v školskom veku a adolescencii v oblasti stredného Slovenska. In *Hygiena,* 2013;58(1):11–15

Kračmar, B., Vystrčilová, M., Psotová, D (2007). Sledování aktivity vybraných svalů u NW a chůze pomocí povrchové EMG. Rehabil. fyz. Lék., č.1/14.

Krebs, S., Herodež, Š. S., & Pajnkihar, M. (2014). Communicational method of impact of „exercise of laughter yoga“ on the elderly behaviour. *Informatologia, 47*(2-3), 135-144.

Krejčí, M. (2011). Yoga training application in overweight control of seniors with arthritis/osteoarthritis. *Fizjoterapia, 19*(2),3-8.

Krejčí, M. (2013). Self-transformation process in wellness and health education. *Procedia Social and Behavioural Sciences, 3(2),*706–718.

Krahulec, B. (2004). Odporúčania pre liečbu obezity u dospelých. In *Via practica*, 2004, (4):236-238.

Krejčí, M., Tuli, K., Krásová, B. (2014). Stress management in young female sportsmen through breath and movement synchronizing. *Acta Salus Vitae*, *2(1),*40-51.

Krejčí, M., Wada, K., Nakade, M., Takeuchi, H., Noji, T., Harada, T. (2011) Effects of Video Game Playing on the Circadian Typology and Mental Health of Young Czech and Japanese Children.*Psychology (Scientific Research).*Vol.2(7):674-680.

Krejčí, M. (2013) Strategies of mental health promotion in young athletes - Education to wellness. *Acta Salus Vitae*. 1 (2):4-64.

Król, K. *Aktywność ruchowa osób starszych.* W: Fizjoterapia w psychologii. PZWL, Warszawa 2012, 179- 192.

Krustrup, P., Bangsbo, J. (2001). Physiological demands of top-class soccer refereeing in relation to physical capacity: effect of intense intermittent exercise training. *J Sports Sci, 19,* 881-891.

Krustrup, P., Mohr, M., Nybo, L., Jensen, J.M, Nielsen, J.J., and Bangsbo, J. (2006). The Yo-Yo IR2 test: physiological response, reliability, and application to elite soccer. *Med Sci Sports Exerc 38*, 1666-1673.

Křivohlavý, J. (2011). *Stárnutí z pohledu pozitivní psychologie.* Praha: Grada. ISBN 978-80-247-3604-4.

L

Labudová, J., Vajcziková, S.(2009). Športová činnosť pri poruchách orgánov opory a pohybu. Bratislava: Slovenský zväz rekreačnej telesnej výchovy a športu. ISBN 978-80-8113-020-5.

Lahti-Koski, M., Pietinen, P., Heliovaara, M., Vartiainen, E. (2002). Associations of body mass index and obesity with physical activity, food choices, alcohol intake, and smoking in the 1982–1997. In *Am J Clin Nutr* May 2002; 75(5): 809-817.

Laird, D. A., & Drexel, H. (1934). Experimenting with food and sleep. I. Effects of varying types of foods in offsetting sleep disturbances caused by hunger pangs and gastric distress children and adults. *Journal of American Dietetic Association,* 10:89-94.

Lan, C., Lai, J.S., Chen, S.Y., Wong, M.K. (1998). 12-Month Tai Chi training in theelderly: its effects on health fitness. *Med Sci Sports Exerc*, 30:344-351.

Lan, C., Lai, J.S., Chen, S.Y., Wong, M.K. (2000). Tai chi chuan to improve muscular strength and endurance in elderly individuals: a pilot study. *Archives of Physical Medicine & Rehabilitation*, 81:604–607.

Lan, C., Lai, J.S., Chen, S.Y. (2002). Tai chi chuan: an ancient wisdom on exercise and health promotion. *Sports Medicine*, 32:217–224.

Landmann N, Kuhn M, Maier J-G, Spiegelhalder K, Baglioni C, Frase L, Riemann D, Sterr A, Nissen C. (2015). REM sleep and memory reorganization: Potential relevance for psychiatry and psychotherapy. *Neurobiology of Learning and Memory*122: 28–40.

Larkin, M. (2015b). From wellness to transformation: next steps for active-aging leaders. *Journal on Active Aging*, *14*(4), 34–41.

Larkin, M. (2015a). A wellness approach to posture: feeling the impact. *Journal on Active Aging*, *14*(4), 48–53.

Lauermanová, L. (2012). Smích jako specifický prostředek tělocvičné rekreace. Diplomová práce, Univerzita Palackého, Fakulta tělesné kultury, Olomouc.

Lauermanová, L., Štěrbová, D., & Kudláček, M. (2014). Smích jako specifický prostředek pohybové rekreace. *Tělesná kultura, 37*(1), 39-65.

Lauermanová, L., & Štěrbová, D. (2015). Vliv jógy smíchu na kvalitu života u studentů Univerzity třetího věku. In J. Broďáni (Ed.), *Pohyb*

a kvalita života 2015 (pp. 277-285). Nitra: Univerzita Konštantína Filozofa v Nitre, Pedagogická fakulta, Katedra telesnej výchovy a športu.

Lean, M.E.J., Han, T.S., Morrison, C.E. (1995). Waist circumference as a measure for indicating the need for weight management. In *British Medical Journal*, 1995. 311: p. 158-161.

Lebl, J., Provazník, K., & Hejcmanová, L. (2003). *Preklinická pediatrie,* Praha: Galén.

Lebl, J. (2013). Obezita. *Česko-slovenská pediatrie, 68(5),*342-349.

Leonard, R.M., D'Allura, T. (1997). Preparing youth with visual impairments for work: Evaluation of a pilot program. *Journal of Visual Impairment & Blindness*, 91:271–279.

Lewy AJ, Wehr TA, Goodwin FK, Newsome DA, Markey SP. Light suppresses melatonin secretion in humans. Science 1980; 210:1267-1269.

Li, F., Duncan, T.E., Duncan, S.C., McAuley, E., Chaumeton, N.R., Harmer, P. (2001). Enhancing the psychological well-being of elderly individuals through Tai Chi exercise: A latent growth curve analysis. Structural Equation Modeling: A Multidisciplinary Journal, 8:53-83.

Li, F., Harmer, P., Duncan, T.E., Duncan, S.C., Chaumeton, N.R. (2002). Tai Chi as a means to enhance self-esteem: A randomized controlled trial. *Journal of Applied Gerontology*, 21:70-89.

Li, J.X., Hong, Y., Chan, K.M. (2001). Tai Chi: Physiological characteristics and beneficial effects on health. *British Journal of Sports Medicine,* 35:148–156.

Liang, T. T. (1977). *T'ai Chi Ch'uan* for *Health* and *Self-Defense***:** *Philosophy* and *Practice***.** New York: Vintage Books.

Liba, J. (2000). *Výchova k zdraviu a pohyb*. Prešov : FHPV PU, 2000, 120p.

Liba, J. (2007). *Zdravie v kontexte edukácie*. Prešov: Pedagogická fakulta.

Lloyd, M.,Temple, V. A., Foley, J. T. (2012). International BMI comparison of children and youth with intellectual disabilities participating in Special Olympics. *Research in Developmental Disabilities, 33(6),*1708-1714.

Loef, M., & Walach, H. (2012). Review: The combined effects of healthy lifestyle behaviors on all cause mortality: A systematic review and meta-analysis. *Preventive Medicine*, *55*, 163–170. http://doi.org/10.1016/j.ypmed.2012.06.017

Lucey, J., & Mathis-Gleason, L. (2015). Wellness Incentives for Tobacco-Cessation Efforts. *Benefits Magazine*, *52*(8), 8–9.

Lynch, H. (2011). Exploring the role of touch in the first year of life: mothers' perspectives of tactile interactions with their infants. *The British Journal of Occupational Therapy*, 74:129-136. DOI: 10.4276/030802211X12996065859247

M

MacAuley, D*. Potencjalne korzyści płynące z aktywności fizycznej wśród osób starszych.* Medicina Sportiva, 1995, 5 (4), 229-236.

MacRae, N., & Strout, K. (2015). Self-care project for faculty and staff of future health care professionals: Case report. *Work (Reading, Mass.)*. http://doi.org/http://www.ncbi.nlm.nih.gov/pubmed/26528847

Máček, M., Máčková, J. (2013). Pohybová aktivita a obezita. *Medicina Sportiva Bohemica et Slovaca, 22(2),*96-102.

Maheshwarananda, P.S. (2001) The System – Yoga in Daily Life. Vienna: Universität Verlag.

Machalová, J., Kubátová, D. a kol. (2009). Výchova ke zdraví. 1. vyd. Praha: Grada Publishing, a.s., 2009. 296p. ISBN 978-80-247-2715-8.

Malátová, R., Kanasová, J., Novák, V. (2014). Výskyt obezity u 10-11letých dětí v Českých Budějovicích. In *Studia Kinanthropologica.* Vol. 5, XV, č. 2, s. 75 -80.

Malina, R.M., Bourchard, C., Bar-Or, O. (2004). *Growth, maturation and physical activity*. Human Kinetics, Champaign, Il.

Marcus, B. H., Forsyth, L. H. (2010). *Psychologie aktivního způsobu života.* Praha: Portál.

Martens, R. (2012). Successful Coaching. Portland: Human Kinetics.

Maslow, A. H. (1987). Motivation and Personality. Glenview: Harper Collins College Div.

McKenzie, T.L. (2002). The use of direct observation to assess physical activity. In G. Welk (Ed.), *Physical activity assessments*

for health-related research. Champaign, IL: Human Kinetics, 179-195.

McMahon, A. T., O'Shea, J., Tapsell, L., & Williams, P. (2014). What do the terms wellness and wellbeing mean in dietary practice: an exploratory qualitative study examining women's perceptions. *Journal of Human Nutrition & Dietetics*, *27*(4), 401–410.

Melnyk, B. M. (2015). The Short-Term Effects of a Wellness On-Boarding Program with Health Sciences Students on Depression, Anxiety, Healthy Lifestyle Beliefs and Healthy Lifestyle Behaviors. Presented at the 43rd Biennial Convention (07 November - 11 November 2015), STTI. Retrieved from https://stti.confex.com/stti/bc43/webprogram/Paper76866.html

Meloun, M., J. Militky, M. Hill, Brereton, R. G. (2002). Crucial problems in regression modelling and their solutions. *Analyst.* 127,433-450.

Meloun, M., M. Hill, J. Militky a K. Kupka. (2000). Transformation in the PC-aided biochemical data analysis. *Clin Chem Lab Med.* 2000, 38,553-559.

Meloun, M., M. Hill, J. Militky, J. Vrbikova, S. Stanicka a J. Skrha. (2004). New methodology of influential point detection in regression model building for the prediction of metabolic clearance rate of glucose. *Clin Chem Lab*, 42,311-322.

Menear, K. S., Preskitt, J. K., Goldfarb, S. S., & Menachemi, N. (2015). Correlates of wellness among youth with functional disabilities. *Disability and Health Journal*, *8*(2), 223–230. http://doi.org/10.1016/j.dhjo.2014.10.001

Merriam Webster Dictionary. (n.d.). Definition of lifestyle. Retrieved November 7, 2015, from http://www.merriam-webster.com/dictionary/lifestyle

Miller, G., & Foster, L. T. (2010). Critical synthesis of wellness literature. Retrieved from http://www.geog.uvic.ca/wellness/

Miller, J. W. (2005). Wellness: The History and Development of a Concept. *Spektrum Freizeit*, *2005*(1), 84–106. http://doi.org/http://www.fh-joanneum.at/global/show_document.asp?id=aaaaaaaaaabdjus&

Ministerstvo práce a sociálních věcí. (2013). Národní akční plán podporující pozitivní stárnutí pro období let 2013 až 2017. Retrieved from http://www.mpsv.cz/files/clanky/14540/NAP_2013-2017_070114.pdf

Miszko, T., Ramsey, V., Blasch, B. (2004). Tai Chi for People with Visual Impairments: A Pilot Study. *Journal of Visual Impairment & Blindness*, 98:5-13.

Modise, L., & Johannes, M. L. (2015). Well-Being and Wellness in the Twenty-First Century: A Theanthropocosmic Approach. *Journal of Religion and Health*. http://doi.org/10.1007/s10943-015-0140-4.

Mora-Ripoll, R. (2011). Potential health benefits of simulated laughter: A narrative review of the literature and recommendations for future research. *Complementary Therapies in Medicine***,** 19(3), 170-177.

Morávek, O. (2009). Využití informačních technologií v rehabilitaci. Sborník přednášek V. mezinárodní konference informačních technologií ve zdravotnictví. Telemedicína, Brno, ISBN 978-80-7392-092-0.

Morávek, O. (2008). Verifikace efektu chůze s hůlkami Nordic Walkingpomocí expertního informačního systému. Computer Kinesiology,Pardubice: JONA ©2008.

Mudrák, J., Slepička, P., Elavský, S. (2012) Pohybová aktivita a její sociálně-kognitivní determinanty u českých a amerických seniorů. *Česká kinantropologie*, Vol. 16, č. 3, s. 49-63.

Mühlpachr, P. (2004). Gerontopedagogika. Brno: Masarykova univerzita.

Mýtnik, M. a kol. (2005). Chirurgická liečba obezity. In *Molisa č. 2.* Recenzovaný zborník, Fakulta zdravotníckych odborov Prešovskej univerzity v Prešove v spolupráci s Fakultnou nemocnicou J. A. Reimana v Prešove.

N

Naci, H., & Ioannidis, J. A. (2015). Evaluation of wellness determinants and interventions by citizen scientists. *JAMA*, *314*(2), 121–122. http://doi.org/10.1001/jama.2015.6160.

Nakade, M., Takeuchi, H., Taniwaki, N., .Noji, T., Harada, T. (2009). An integrated effect of protein intake at breakfast and morning exposure to sunlight on the circadian typology in Japanese infants aged 2 - 6 years. *Journal of Physiological Anthropology* 28:239-45. doi:10.2114/jpa2.28.239

Nakade, M., Akimitsu, O., Wada, K., Krejci, M., Noji, T., Taniwaki, N., Takeuchi, H. & Harada T. (2012). Can breakfast Tryptophan and Vitamin B6 intake and morning exposure to sunlight promote morning-typology in young children aged 2 – 6 years? *Journal of Physiological Anthropology* 31: MS No.11. http://www.jphysiolanthropol.com/content/31/1/11

Nejedlá, L., Kopřivová, J. (2013) *Vliv intervenčního programu Senior-fitness na rovnovážné schopnosti u starších osob: Předběžné výsledky*. In. Štěpánková, H. (Editor) Sborník příspěvků z mezioborové konference o stárnutí. Praha: Psychiatrické centrum Praha.

Nešpor, K. (2010). *Léčivá moc smíchu* (4th ed.). Praha: Vyšehrad.

Noble, C., Toft, M. (2012). How effective are schools as a setting for health promotion? W: Scriven, A., Hodgins, M. (eds.), Health Promotion Settings. Principles and practice. Los Angeles-London-New Delhi-Singapore-Washington DC: SAGE, pp.140-152.

Novotná, V., Šimůnková, I., Vorálková, J. (2013) *Gymnastické aktivity Golden Age*. In. Štěpánková, H. (Editor) Sborník příspěvků z mezioborové konference o stárnutí. Praha: Psychiatrické centrum Praha.

Nowak, M. (1997). Chosen aspects of healthrelated behaviour of women who retained physical fitness in the past. In *Women and Sport*. Proceedings of XIII. IAPESGW Congress, Gdansk, 1997. p. 131 – 138.

O

Onyenwenyi, C., & Ricardo, A. C. (2015). Impact of Lifestyle Modification on Diabetic Kidney Disease. *Current Diabetes Reports*, *15*(9). http://doi.org/10.1007/s11892-015-0632-3

Orlíková, M. (2005). Monitorovanie úrovne telesnej výchovy na stredných školách. In Telesná výchova a šport na univerzitách v ponímaní študentov ako objektu edukácie. Nitra : SPU Nitra. ISBN 80-8069-602-0.

Osiński, W. (1991). *The problems of human motoricity*. AWF Poznań, [in Polish], 66:32.

Ottevaere, C., Huybrechts, I., Béghin, L., Cuenca-Garcia, M., De Bourdeaudhuij, I., Gottrand, F., … De Henauw, S. (2011). Relationship between self-reported dietary intake and physical activity levels among adolescents: The HELENA study. *International Journal of Behavioral Nutrition & Physical Activity*, *8*(1), 8–16. http://doi.org/10.1186/1479-5868-8-8

Özkan, A. (2015). The Relationship between Physical Activity Level and Healthy Life-Style Behaviors of Distance Education Students. *Educational Research and Reviews*, *10*(4), 416–422.

P

Painelli, S.V., Roschel, H, Artioli, G.G., et al. (2013). The ergogenic effect of beta-alanine combined with sodium bicarbonate on high-intensity swimming performance. *Applied Physiology, Nutrition, and Metabolism 38(5),* 525–532.

Parkhouse, W.S., McKenzie, D.C. (1984). Possible contribution of skeletal muscle buffers (Carnosine) to enhanced anaerobic performance: a brief review. *Med Sci Sports Exerc 16,* 328-338.

Pasqualotto, A., Newell, Fiona N. (2007). The role of visual experience on the representation and updating of novel haptic scenes. *Brain and Cognition*, 65:184–194.

Pate, R.R. & O'Neill, J.R. (2008). Summary of the American Heart Association Scientific statement : Promoting physical activity in children and youth : A leadership role for schools. In *J. Cardiovascular Nursing*, 2008, 23/1, p. 44 - 49.

Payne, J. (2005). *Kvalita života a zdraví.* Praha:Triton.

Polak, R., Sforzo, G. A., Dill, D., Phillips, E. M., & Moore, M. (2015). Credentialed Chefs as Certified Wellness Coaches: Call for Action. *Eating Behaviors*, *19*, 65–67. http://doi.org/10.1016/j.eatbeh.2015.06.016

Pomeroy, V.M., Pramanik, A., Sykes, L., Richards, J., Hill, E. (2003). Agreement between physiotherapists on quality of movement rated via videotape. *Clinical Rehabilitation*, 1:264–272. **DOI:** 10.1191/0269215503cr607oa

Ponchillia, S.V., Powell, L.L., Felski, K.A., Nicklawski, M.T. (1992). The effectiveness of aerobic exercise instruction for totally blind women. *Journal of Visual Impairment & Blindness,* 86:174-177.

Portaluppi, F., Smolensky, M.H., Touitou, Y. (2010). Effects and methods for biologicalrhythm research on animals and human beings. *Chronobiol Internation* 2010; 27: 1911-1929.

Provencio, I., Warthen, D.M. (2012). "Melanopsin, the photopigment of intrinsically photosensitive retinal ganglion cells". *Wiley Interdisciplinary Reviews: Membrane Transport and Signaling* 1: 228–237.doi:10.1002/wmts.29

Proyer, R. T., Ruch, W., & Rodden, F. (2012). Letter on Shahidi et al. (2011): "Laughter Yoga versus group exercise program in elderly depressed women: A randomized controlled trial" I — First things first! Caveats in research on "Laughter Yoga". *International Journal of Geriatric Psychiatry, 27*(8), 873–874.

Prystupa, T., Bolach, B., Bolach, E., Migasiewicz, J., Paliga, Z. *Ocena sprawności fizycznej kobiet po 60 roku życia.* AWF, 2012 (5), 137-148.

Puett, R., Teas, J., España-Romero, V., Garcia Artero, E., Lee, D., Baruth, M., … Blair. (2014). Physical Activity: Does Environment Make a Difference for Tension, Stress, Emotional Outlook, and Perceptions of Health Status? *Journal of Physical Activity & Health*, *11*(8), 1503–1511.

R

Ramsland, L. T. (2015). With Nature and the Outdoors as a Resource:A Case of a One-Footed Elderly Man in a Wheelchair. *Physical Culture & Sport. Studies & Research*, *65*(1), 24–30.

Ray, C., Horvat, M., Keen, K., Blasch, B.B. (2007). Using Tai Chi as an exercise intervention for improving balance in adults with visual impairments: two case studies. *Re:View*, 37:17-24.

Ray, C., Horvat, M., Croce, R., Mason, R.C., Wolf, S.L. (2008). The impact of vision loss on postural stability and balance strategies in individuals with profound vision loss. *Gait & Posture*, 28:58-61.

Reger-Nash, B., Smith, M. and Juckett, G. (2015) *Foundations of Wellness*. Human Kinetics.

Rehor, P. R., Krejčí, M. (2015). Wellness, Self-Efficacy and Behavioural Changes. *Acta Salus Vitae*, *3(1),*40-51.

Rehor, P. R. (2015). Exercise and wellness curriculum. *Acta Salus Vitae*. *3(1),*1-6.

Rehor, P. R., Kornatovska, Z. (2013). Measuring of health – related benefits of physical activity in height school students. *Acta Salus Vitae*. *1(2),*148-157.

Riegerová,J., Přidalová, M., Ulbrichová, M. (2006). Aplikace fyzické antropologie v tělesné výchově a sportu. Olomouc: Hanex.

Röder, B., Rösler, F., Spence, C. (2004). Early vision impairs tactile perception in the blind. *Current Biology,*14:121-124.

Rodríguez Huerta, M. D., Trujillo-Martín, M. M., Rúa-Figueroa, Í., Cuellar-Pompa, L., Quirós-López, R., Serrano-Aguilar, P., & Spanish SLE CPG Development Group. (2015). Healthy lifestyle habits for patients with systemic lupus erythematosus: A systemic review. *Seminars in Arthritis and Rheumatism*. http:// doi.org/10.1016/j.semarthrit.2015.09.003

Ryan, P. (2015). Making the connection between wellness and quality of life. *Journal on Active Aging*, *14*(6), 64–68.

S

Sale, C., Hill, C., Ponte, J., and Harris, R. (2012). β-alanine supplementation improves isometric endurance of the knee extensor muscles. *J Int Soc Sports Nutr 9,* 1-7.

Sale, C., Saunders, B., Hudson, S., Sunderland, C. Wise J, and Harris R. (2011). Effect of β-alanine plus sodium bicarbonate on high-intensity cycling capacity. *Med Sci Sport Exer, 43(10):* 1972-1978.

Sale, C., Saunders, B., Harris, R.C. (2010). Effect of beta-alanine supplementation on muscle carnosine concentrations and exercise performance. *Amino Acids 39,* 321–333. DOI 10.1007/s00726-009-0443-4

Šauerová, M., Vadíková, K. M. a kol. (2013). *Specifika edukace seniorů*. Praha: Vysoká škola tělesné výchovy a sportu Palestra. ISBN 978-80-87723-09-8.

Saunders, B., Sunderland, C., Haris, R.C., et al. (2012). β-alanine supplementation improves YoYo intermittent recovery test performance. *J Int Soc Sports Nutr, 9(39),* 1-5.

Schoumans, J. (2005). *Gene dose impalances in children with mental retardation*. Stockholm: Karolinska Institutet.

Segar, M. (2015). *No Sweat: How the Simple Science of Motivation Can Bring You a Lifetime of Fitness*. AMACOM.

Segar, M., Eccles, J. S., & Richardson, C. R. (2011). Rebranding exercise: closing the gap between values and behavior. *International Journal of Behavioral Nutrition & Physical Activity*, *8*(1), 94–107. http://doi.org/10.1186/1479-5868-8-94

Sellers, J., Baghurst, T., Volberding, J., & Brown, T. (2014). Overview of a Student-Focused Wellness Initiative. *Recreational Sports Journal*, *38*(1), 33–39.

Šemberová, J. (2004). Univerzita třetího věku jako součást celoživotního vzdělávání v České republice 2004. In J. Šemberová, & J. Bláha (Eds.), *Vzdělávání seniorů na vysokých školách v České republice 2004: Sborník příspěvků z konference dne 19. - 20. 5*. (pp. 21-23). České Budějovice: Jihočeská univerzita v Českých Budějovicích, Zdravotně sociální fakulta.

Severin, S.E., Kirzon, M.V., Kaftanova, T.M. (1953). *Doklady Akademii Nauk SSSR, 91(3),* 691-694.

Shahidi, M., Mojtahed, A., Modabbernia, A., Mojtahed, M., Shafiabady, A., Delavar, A., & Honari, H. (2011). Laughter Yoga versus group exercise program in elderly depressed women: a randomized controlled trial. *International Journal of Geriatric Psychiatry, 26*(3), 322-327.

Sherrill, C., (2004). Adapted physical aktivity, recreation and sport: crossdisciplinary and lifespan. Sixth Edition, 6th ed. New York: McGraw-Hill.

Sherill, C., Block, M. Kelly. L. (2003). Adapted Physical Activity, rekreacion, and Sport - Croosdisciplinary and Lifespan. Ed. 6. New York: McGraw-Hill Humanities.

Shipway, R., & Holloway, I. (2010). Running free: Embracing a healthy lifestyle through distance running. *Perspectives in Public Health*, *130*(6), 270–276. Uhttp://doi.org/10.1177/1757913910379191

Sigmundová, D., Sigmund, E. (2012). Efekt pohybového programu ve školním prostředí na zmírnění výskytu dětské obezity: Výsledky 4leté longitudinální studie. *Medicina Sportiva Bohemica et Slovaca, 21(3),*129-141.

Sitzer, D. L., & Stockwell, A. B. (2015). The art of wellness: A 14-week art therapy program for at-risk youth. *The Arts in Psychotherapy*, *45*, 69–81. http://doi.org/10.1016/j.aip.2015.05.007

Sleeuwenhoek, H.C., Borer, R.D., Vermeer, A. (1995). Perceptual-motor performance and the social development of visually impaired children. *Journal of Visual Impairment & Blindness*, 89:359–367.

Šmída, L. (2015). Úroveň držania tela u žiakov druhého stupňa základnej školy (Posture level of pupils at primary school). In *Aktuálne problémy telesnej výchovy a športu IV*. Zborník vedeckých prác. Ružomberok : VERBUM, 2015. p. 215 – 223.

Smith-Ryan, A.E., Fukuda, D.H., Stout, J.R., et al. (2012). High-velocity intermittent running: effects of β-alanine supplementation. *J Strength Cond Res, 26(10),* 2798-2805.

Soto-Faraco, S., Spence, Ch., Lloyd, D., Kingstone, A. (2004). Moving Multisensory Research Along: Motion Perception Across Sensory Modalities. *Current Directions in Psychological Science,* 13:29-32. DOI: 10.1111/j.0963-7214.2004.01301008.x

Stackeová, D. (2003). Fitness – trendy a perspektivy. FTVS UK Retrieved from http://www.ftvs.cuni.cz/eknihy/sborniky/2003-11-20/rtf/03-002%20-%20stackeova-e.rtf

Stănciulescu, G. C., Diaconescu, G. N., & Diaconescu, D. M. (2015). Health, Spa, Wellness Tourism. What Is the Difference? *Knowledge Horizons / Orizonturi Ale Cunoasterii*, *7*(3), 158–161.

Stanford Research Institute SRI. (2010). Spas and the Global Wellness Market: Synergies and Opportunities. Global Spa Summit. Retrieved from http://www.globalspaandwellnesssummit. org/images/stories/pdf/gss_sri_spasandwellnessreport_rev_82010. pdf.

Stellingwerff, T. (2011). β-Alanine and Carnosine: The science and its application. *Lausanne: Nestlé Research Center*.

Stellingwerff, T., Decombaz, J., Harris, R., et al. (2012). Optimizing human in vivo dosing and delivery of β-alanine supplements for muscle carnosine synthesis. *Amino Acids, 43,* 57-65.

Štilec, M. (2003). *Pohybově relaxační programy pro starší občany*. Praha: Karolinum. ISBN 80-246-0788-3.

Stout, J.R., Zoeller, R.F., et al. (2007). Effects of beta-alanine supplementation on the onset of neuromuscular fatigue and ventilatory threshold in women. *Amino Acids (Vienna), 32,* 381-386.

Strauss, A. L., & Corbin, J. (1999). Základy kvalitativního výzkumu. Boskovice: Albert.

Strong, W. B., Malina, R. M., Blimkie, C. J., et al. (2005). Evidence based physical activity for school-age youth. *Journal of Pediatrics,* 146, 732-737.

Svobodová, L. et al. (2012). *Svět práce a kvalita života: vliv změn světa práce na kvalitu života*. Praha: Výzkumný ústav a bezpečnostní práce.

Suzuki, Y., Takahashi, H., Takamatsu, K, et al. (2002). High level of skeletal muscle carnosine contributes to the latter half of exercise performance during 30-s maximal cycle ergometer sprinting. *Jpn J Physiol. 52(2),* 199-205.

Švarcová, I. (2006). *Mentální retardace*. Praha: Portál.

Sweeney, K.M., Wright, G.A., Glenn Brice, A., and Doberstein, S.T. (2010). The Effect of β-Alanine Supplementation on Power Performance During Repeated Sprint Activity. *J Strength Cond Res, 24(1),* 79-87.

Szark-Eckardt M., Żukowska H. (2015). Physical activity after compulsory physical education classes in the opinion of the students from selected secondary schools in Bydgoszcz. In *Aktuálne problémy telesnej výchovy a športu IV.* Peter Krška, Katolicka Univerzita v Ružomberku, Ružomberk, s. 195 - 206, ISBN 978-80-561-0209-1.

Szkoły z Krajowym Certyfikatem Szkoła Promująca Zdrowie. (2011, March 15). Retrieved from http://www.ore.edu.pl/programy-i-projekty-19445/szkoa-promujca-zdrowie/krajowy-certyfikat-szpz/szkoy-z-certyfikatem-szpz.

T

Tallon, M.J., Harris, R.C., Boobis, L.H. etal. (2005). The Carnosine content of vastus lateralis is elevated in rezistance-trained body builders. *Journal of Strength & Conditioning Research, 19,* 725-729.

Takeuchi H, Oishi T, Harada T. (2005). Association between morningness – eveningness preference and mental/physical premenstrual symptoms in Japanese females 12 to 31 years of age. Chronobiology International 22: 1055-1068.

Takeuchi, H., Nakade, M., Wada, K., Akimitsu, O., Krejčí, M., Noji, T., Harada, T. (2012) Can an integrated intervention on breakfast and

following sunlight exposure promote morning-type diurnal rhythms of Japanese University sports club students? *Sleep and Biological Rhythm*. 10(4):255-263.

Takeuchi, H., Wada, K., Kawasaki, K., Krejci, M., Noji, T., Kawada, T., Nakade, M. & Harada, T. (2014). Effects of cow milk intake at breakfast on the circadian typology and mental health of Japanese infants aged 1 - 6 years. 5: 172-176.

Teuscher, D., Bukman, A. J., van Baak, M. A., Feskens, E. J. M., Renes, R. J., & Meershoek, A. (2015). Challenges of a healthy lifestyle for socially disadvantaged people of Dutch, Moroccan and Turkish origin in the Netherlands: a focus group study. *Critical Public Health*, *25*(5), 615–626. http://doi.org/10.1080/09581596.2014.962013

The American Heart Association. (n.d.). The American Heart Association's Diet and Lifestyle Recommendations. Retrieved November 7, 2015, from http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/The-American-Heart-Associations-Diet-and-Lifestyle-Recommendations_UCM_305855_Article.jsp#.Vj28prfhDIU

Thompson, S. J., & Rew, L. (2015). The Healthy Workplace Project: Results of a Hygiene-Based Approach to Employee Wellness. *American Journal of Health Promotion*, *29*(5), 339–341.

Tobias, G., Benatti, F., Roschel, H., et al. (2013). Additive effects of β-alanine and sodium bicarbonate on upper-body intermittent performance. *Amino Acids, 39,* 1-9.

Torsvall, L. & Åkerstedt T. (1980). A diurnal type scale: Construction, consistency and validation in shift work. *Scand J Work Environ Health* 6: 283-290.

Travis, J. W., & Ryan, R. S. (2004). *Wellness workbook: How to achieve enduring health and vitality*. Berkeley: Celestial Arts.

Trexler, E T., Smith-Ryan, A.E., Stout, J.R., et al. (2015). International society of sports nutrition position stand: Beta-Alanine. Journal of the International Society of Sports Nutrition. DOI 10.1186/s12970-015-0090-y.

U

Urbaník, T. (2011). *Láska je fuška.* Čadca: Tour.

Üstün, & Jakob. (2005). Re-defining “Health.” *Bulletin of the World Health Organization*, *2005*(83:802). Retrieved from http:// www.who.int/bulletin/bulletin_board/83/ustun11051/en/

V

Vacková, L. (2014). Economy and Wellnes. *Acta Salus Vitae*, *2(1),*93-98.

Vaďurová, H., & Mühlpachr, P. (2005). *Kvalita života.* Brno: Masarykova univerzita.

Vágnerová, M. (2007). *Vývojová psychologie II: Dospělost a stáří.* Praha: Karolinum. ISBN 978-80-246-1318-5.

Válková, H. (2000). *Skutečnost nebo fikce?* Olomouc: Univerzita Palackého v Olomouci.

Válková, H. (2012). *Teorie aplikovaných pohybových aktivit pro užití v praxi I*. Olomouc: Univerzita Palackého v Olomouci.

Vallabhajosula, S., Roberts, B.L., Hass, C.J. (2014). Tai Chi Intervention Improves Dynamic Postural Control During Gait Initiation in Older Adults: A Pilot Study. *Journal of Applied Biomechanics,* 30:697

Van Norman, K. (2010). *Exercise and Wellness for Older Adults - 2nd Edition:* Practical *Programming Strategies* (2 edition). Champaign, IL: Human Kinetics.

Van Thienen, R., Van Proeyen, K., Vanden Eynde, B., Puype, J., Lefere, T, and Hespel, P. (2009). β-alanine improves sprint performance in endurance cycling. *Med Sci Sports Exerc, 41*, 898-903.

Vasickova, J. & Neuls, F. (2015). Popularity of School Physical Education and Its Effect on Performed Number of Steps. *Journal of Physical Education and Sport*, 15(1), 40 – 46. doi:10.7752/jpes.2015.01007.

Venglářová M. (2007). *Problematické situace v péči o seniory*. Praha: Grada.

Vignerová, J., Bláha, P. (Eds.) (2001). *Sledování růstu českých dětí a dospívajících – norma, vyhublost, obezita*. Praha: SZÚ, PřF UK.

Vignerová, J., Bláha, P. Anthropology and health. In: Bláha, P., Susanne, CH., Rebato, E. (2007). *Essentials of biological anthropology.* Praha: Karolinum, s. 301-315.

Vignerová, J., Riedlová, J., Bláha, P., Kobzová, J., Krejčovský, L., Brabec, M., & Hrušková, M. (2006). *6. celostátní antropologický výzkum dětí a mládeže 2001 Česká republika.* Praha: PřF UK a SZÚ. Available on: http://www.szu.cz/publikace/6-celostatni-antropologicky-vyzkum-deti-a-mladeze-2001 .

Vignerová, J., Riedlová, J., Bláha, P., Paulová, M. (2011). *Program "Růst CZ, Verze 2.3." - Metodika měření.* Praha: SZÚ, 2011.

W

Wada, K., Yata, S., Akimitsu, O., Krejci, M., Noji, T., Nakade, M., Takeuchi, H. & Harada, T. (2013) A tryptophan-rich breakfast and exposure to light with low color temperature at night improve sleep and salivary melatonin level in Japanese students. *Journal of Circadian Rhythms* 2013; 11: MS No. 4.http://www.jcircadianrhythms.com/content/11/1/4

Wilson, E. O. (1999). *Consilience: The Unity of Knowledge* (Reprint edition). New York: Vintage.

Wilson, J.M., Wilson, G.J., Zourdos, M.C. (2010). Beta-Alanine Supplementation Improves Aerobic and Anaerobic Indices of Performance. *Strength and Conditioning Journal, 32(1),* 71-78.

Wang, Y.T., Chen, S., Liu, J., Pearl, M.J. (2000). Tai Chi: an ideal body-mind harmony exercise for everyone. J Int Counc Health Phys Educ Recreation Sport Dance, 36:38-43.

Wolf, S.L,, Barnhart, H.X., Kutner, N.G., McNeely, E., Coogler, C., Xu, T. (1996). Reducing frailty and falls in older persons: an investigation of Tai Chi and computerized balance training. Atlanta FICSIT Group. Frailty and injuries: Cooperative studies of intervention techniques. *J Am Geriatr Soc*, 44:489–497.

World Health Organization. (1948). Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19–22 June 1946 and entered into force on 7 April 1948. World Health Organization. Retrieved from http://www.who.int/governance/eb/who_constitution_en.pdf

World Health Organization. (2015, November 7). A healthy lifestyle. Retrieved November 7, 2015, from http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle

World Health Organization, R. O. for the E. M. (1998). Draft Regional Health-for-all Policy and Strategy for the Twenty-First Century. World Health Organization. Retrieved from http://apps.who.int/iris/bitstream/10665/121699/1/em_rc45_14_en.pdf.

Woynarowska-Soldan, M., Skoczek, G. (2014). Health promotion for schools staff as part of whole school approach to health in Poland. W: Buijs G., Dadaczynski K., Schulz A., Vilaca T. (eds.), Equity, education and health: learning from practice. Utrecht: CBO, pp.77-82.

World Health Organisation. (1996). *ICD-10 guide for mental retardation.* Geneva: Available on: http://apps.who.int/iris/bitstream/10665/63000/1/WHO_MNH_96.3.pdf?ua=1.

World Health Organization. (2000). *The world health report 2000. Health Systems: Improving Performance.* WHO: Geneva. Available on: http://www.who.int/healthpromotion/about/HPRGlossary_NewTerms.pdf

World Health Organization. (2009). *Global health risks: Mortality and burden of disease attributable to selected major risks*. Geneva: WHO. Available on: http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_Front.pdf

World Health Organization. (2010). *Global recommendations on physical activity for health.* Geneva: Available on: http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf?ua=1.

World Health Organization. (2013). *Childhood obesity prevention.* Geneva: WHO. Available on: http://apps.who.int/iris/bitstream/10665/80149/1/9789241504782_eng.pdf

Wu, G. (2002). Evaluation of the effectiveness of tai chi for improving balance and preventing falls in the older population - a review. *J Am Geriatr Soc,* 50:746–754.

Y

Yach, D. (2013, November 21). Health and illness: the definition of the World Health Organization. Retrieved from http://www.medizin-ethik.ch/publik/health_illness.htm

Young, H.-J., Erickson, M. L., Johnson, K. B., Johnson, M. A., & McCully, K. K. (2015). A wellness program for individuals with

disabilities: Using a student wellness coach approach. *Disability and Health Journal*, *8*(3), 345–352. http://doi.org/10.1016/ j.dhjo.2014.12.003,

Young, I., Williams, T. (1989), The healthy school. Edinburgh: Schttish Health Education Group

Z

Zeitzer, J. M., Dijk, D. J., Kronauer, R., Brown, E. & Czeisler, C. (2000). Sensitivity of the human circadian pacemaker to nocturnal light: melatonin phase resetting and suppression. *Journal of Physiology* 526: 695–702.

Zeman, D. (2005). Obezita a metabolický syndrom. *Vnitřní lékařství. 51(1),*72-75.

Zieliński W. *Physical fitness of the American Polish population over 60 (Sprawność fizyczna populacji polskiej i amerykańskiej po 60 roku życia)*. AWF, Poznań, 2005, 240 p.

Żukowska, H. (2012). Body posture features in the sagittal plane in firsty-year pupils from rural areas. In *Determinantes of the development of rural children and youth* (ed.) Wilczewski A. Józef Piłsudski of Physical Education in Warsaw, Faculty of Physical Education and Sport in Biała Podlaska, 2012, p.176-184.

Zoeller, R.F., Stout, J.R., O'Kroy, J.A., Torok, D.J., and Mielke, M. (2007). Effects of 28 days of β-alanine and creatine monohydrate supplementation on aerobic power, ventilatory and lactate thresholds, and time to exhaustion. *Amino Acids, 33,* 505-510.

INDEX

ABOUT AUTHORS

Prof. PaedDr. Pavol Bartík, PhD.
Vice-Dean, Faculty of Arts UMB
Tajovského 40
974 01 Banská Bystrica, Slovakia
pavol.bartik@umb.sk

The author deals with teaching methods and issues related to physical and health education at schools. He is focused on the lifestyle and stabilization physical activity programs with using of martial arts. He focused on different age groups with aim to improve body posture, muscle imbalance and wellness.

Assoc. Prof. PaedDr. Elena Bendíková, PhD.
Department of Physical Education and Sport,
Faculty of Arts UMB
Tajovského 40
974 01 Banská Bystrica, Slovakia
elena.bendikova@umb,sk

The author deals with teaching methods and issues related to physical and health education at schools. She is focused on the lifestyle, musculoskeletal disorders and development of preventive and stabilization physical activity programs, which are designed for different age groups and related to disease prevention.

Dr. Bartosz Bolach, PhD.
Akademia Wychowania Fizycznego we Wrocławiu
Katedra Sportu Osób Niepełnosprawnych
51-612 Wrocław, al. I. J. Paderewskiego 35
zsiron@awf.wroc.pl

His directions of scientific activities are focused on research on medical rehabilitation in different diseases, adaptive physical activity, and didactics of sport for the disabled: visually impaired, with reduced mobility, as well as children, youth and seniors with intellectual disabilities.

Prof. Eugeniusz Bolach, PhD.
Akademia Wychowania Fizycznego we Wrocławiu
Katedra Sportu Osób Niepełnosprawnych
51-612 Wrocław, al. I. J. Paderewskiego 35
zsiron@awf.wroc.pl

His directions of scientific activities relate to rehabilitation, assessment of fitness and exercise capacity of disabled athletes, adaptive physical activity and fitness (children, youth, elderly).

Ass. Prof. Katarzyna Borzucka-Sitkieiwcz PhD.
Uniwersytet Ślaski w Katowicach,
Katedra Pedagogiki Spolecznej
Katowice, Poland
katarzyna.borzucka-sitkiewicz@us.edu.pl

The researcher in the Chair of Social Pedagogy in the University of Silesia. Her research interests focus on the issues related to social and health risks, especially in relation to psychosocial health. In her publications she concentrates on health behaviours and their socialization conditions. She is also interested in health education and health promotion.

Mgr. Katarzyna Bukowska, MSc.
Akademia Wychowania Fizycznego we Wrocławiu
Katedra Sportu Osób Niepełnosprawnych
51-612 Wrocław, al. I. J. Paderewskiego 35
zsiron@awf.wroc.pl

She specializes in adaptive physical activity, with particular emphasis on the elderly.

Prof. PhDr. Michal Charvát, PhD.
Masaryk University, Faculty of Sports Studies,
Kamenice 5, 625 00 Brno, Czech Republic
charvat@fsps.muni.cz

Michal Charvát has been publishing in the field of sports sociology, ethics and hostility in sports. In past years has focused also on promotion of healthy lifestyle and wellness.

Mgr. Pavla Formanová
Clinic rehabilitative medicine
3LF Charles University Praha
Ruská 87, 100 00 Praha
pavfor@seznam.cz

Formanova is a physiotherapist, she specializes in rehabilitation and the use of IT technology called Computer Kinesiology in rehabilitation and sports. Her main specialty is the diagnosis of disorders of the locomotion system, their treatment by Mc Kenzie method and reflexotherapy in children, youth and adults.

Dr. Miroslaw Górny, PhD.
University School of Physical Education, Poznań, Poland,
Contact Address:
61-871 Poznań,
ul. Królowej Jadwigi 27/31
Poland
gornymp@gmail.com

et

Mgr. Inga Górna
Oxford Uniwersity, United Kingdom
Prof. Radosław Muszkieta
Kazimierz Wielki University, Bydgoszcz, Poland
Ass. Prof. PhDr. Ludmila Miklánková PhD.
Palacky University, Olomouc, Czech Republic
Dr. Bartosz Bolach
University School of Physical Education, Wrocław, Poland

Górny's major is area of Adapted Physical Activities in childhood. His research is aimed especially to motoric learning of persons with vision disability management, to improve the methodology of movement aesthetics in people with disabilities - children, youth and adults. In cooperation with co-authors Górna Inga, Muszkieta Radosław, Miklankova Ludmila, Bolach Bartosz they develop and verify original procedure of movement assessment in aesthetic variables, in motor abilities in aesthetic form of movement and an increase in proprioceptive sensitivity of persons with disability.

Prof. Tetsuo Harada, PhD.
Laboratory of Environmental Physiology, Graduate School of Integrated Arts and Sciences, Kochi University, Kochi, Japan
Contact Address: 2-5-1 Akebonocho, Kochi 780-8520, Kochi Prefecture, Japan
haratets@kochi-u.ac.jp

Professor Harada´s major is Environmental Physiology. His research work is oriented on ecophysiology and human chronobiology, sleep science. National and international research activity is focused especially on human diurnal rhythms and sleep habit in the age period 2-40 years. He published more than 90 science papers in the named fields.

Prof. PhDr. Václav Hošek, DrSc.
College of Physical Education and Sport PALESTRA
Pilská 9, 198 00 Prague 9
hosek@palestra.cz

Professor Hošek´s major is sport psychology, especially the problemtic of motivation and adherence in sports. In relation to the fact, that he is the rector of the College of PE and Sport, he is professionally oriented to research in the health lifestyle of various target groups, particularly of seniors. His professional contribution is significant to the development of wellness area in the Czech Republic and abroad.

Assoc. Prof. MUDr. Dobroslava Jandová
College of Physical Education and Sport PALESTRA and
Clinic rehabilitative medicine 3 LF Charles University Praha
Pilská 9, 19800 Praha
jandova@palestra.cz, Dobroslava.Jandova@seznam.cz

Jandova is a physician. She specializes in physiotherapy, balneology and the use of expert information systems in rehabilitation and sports. Her main specialty is diagnostics of disorders of the locomotion system, their treatment and their reflexive regulatory support in children, youth and adults.

Ass. Prof. Takahiro Kawada
Center for Regional Collaboration, Kochi University
Contact address: 2-5-1 Akebonocho, Kochi 780-8520, Kochi Prefecture, Japan
Kawada@kochi-u.ac.jp

Professional profile: Coaching management for athletes especially soccer players, Relationship between soccer performance promotion and diurnal rhythms & sleep health.

Mgr. Zuzana Kornatovská, DiS., PhD.
University of South Bohemia, Faculty of Education,
Department of Health Education
Dukelská 9, 371 15 České Budějovice
zkornatovska@pf.jcu.cz

Kornatovska´s major is Health Education and Adapted Physical Activities. Her directions of scientific activities are focused on research of sport for the disabled: sensually impaired, with reduced mobility, as well as children, youth and seniors with intellectual disabilities. She is focusing on the issues related to social risks and health. In the chapter she controlled the part of wellness in disabled persons as the guarantee for Czech Republic and Slovak Republic. She was also responsible person for data editing and evaluating for pre-statistical data analysing.

Dr. Katarzyna Kowalczewska-Grabowska PhD.
Faculty Pedagogy and Psychology
Chair of Social Pedagogy University
of Silesia
ul. Grażyńskiego 53
40-126 Katowice
katarzyna.kowalczewska-grabowska@us.edu.pl

The researcher in the Chair of Social Pedagogy in the University of Silesia. Her research interests focus on the issues related to social risks and health in local communities. She also tackles the subject of health promotion in the local environment.

Prof. PaedDr. Milada Krejčí, PhD.
College of Physical Education and Sport PALESTRA
Pilská 9, 19800 Praha 9
krejci@palestra.cz

Krejci´s major is Sport Humanistic and Wellness. Her research activities are focused on health promotion, on advancement of new intervention and compensation programs based on holistic concept of health. She cooperates with psychologists, physicians, school principals, teachers, educators and trainers in the Czech Republic and abroad (e.g. Austria, Belgium, Bulgaria, Canada, Germany, Netherlands, Poland, Portugal, Slovenia, Slovakia, Switzerland, India, Japan, Great Britain, USA, etc.).

She publishes scientific articles and monographs from the fields of healthy lifestyle and wellness, sport psychology, lifestyle optimizing, stress reduction, social rehabilitation of juvenile delinquents, etc. She is helping to disseminate new scientific knowledge in the field of general wellness and wellness for seniors and people with disabilities. She is initiator and co-founder of the scientific journal "Acta Salus Vitae" and the "Society of Research in Wellness".

Mgr. Petronela Ladecká
Comenius University in Bratislava
Faculty of physical education and sport
Nábr. arm. gen. L. Svobodu 9
81469 Bratislava, Slovakia
pladecka@gmail.com

Completed her Mater degree at the Faculty of Physical Education and Sports, Comenius University (FTVSUK) in Bratislava in academic branch of teaching education in specialization Physical Education and Management. Nowadays, she continues her academic degree as a postgraduate student in the Dept. of Gymnastics FTVSUK in Bratislava (Supervisor: Ass. Prof. Oľga Kyselovičová, Ph.D.). Her PhD thesis is focused on evaluation of the effect of strength and plyometric training on neuromuscular performance of middle-distance runners. She was awarded with Young Scientist Award on International Scientific Conference 2014 - Sports, Physical Activity and Health. Project work: research, project activities, dealing with managerial and economical issues.

Mgr. Lucie Lauermanová
Faculty of Physical Culture Palacky
University, Trida Miru 117 711 11
Olomouc, Czech Republic
lucie.lauermanova@seznam.cz

Lauermanova's major is Laughter and Laughter yoga. Her research is aimed to Laughter yoga with Seniors. The current theme of the study research is Laughter yoga with Students of University of Third age.

Mgr. Jitka Masopustová
College of Physical Education and Sport PALESTRA
Pilská 9, 198 00 Prague 9
masopustova@palestra.cz

Masopustova´s a pedagogue in College of Physical Education and Sport, Palestra. She is a lecturer of Developmental Psychology and Psychology of Personality, Communication and Rhetoric and Leisure Time Pedagogy.

Ing. Otakar Morávek
Centrum zdraví JONA, Pardubice a Praha/ Center of Health JONA,
Na Bučance 7, 120 00, Praha
jona@jona.cz

Since his young age he has been dealing with a physical therapy and traditional disciplines, i.e. yoga and reflexology. He has worked as a masseur and gym instructor. Since 1998 he has utilised his knowledge in the filed of IT technologies and cooperation with medical doctors in the development of a diagnostic and information system called Computer Kinesiology.

Mgr. Jana Stará
Masaryk University, Faculty of Sports Studies,
Kamenice 5, 625 00 Brno, Czech Republic
jana.stara@mail.muni.cz

Jana Stará dedicates her doctoral research to topics of wellness interventions, effectiveness of teaching methods and differences in understanding of the wellness concept in the Czech Republic and the United States. Her main argument is that wellness reaches far beyond the walls of wellness centers.

Assoc. Prof. PhDr. Dana Štěrbová, PhD.
Faculty of Physical Culture
Palacky University, Trida Miru 117
711 11 Olomouc, Czech Republic
dana.sterbova@upol.cz

Štěrbova's major is Clinical Psychology and Sexual Education (especially of people with disabilities). Her research is aimed to sport and leisure time of families with child with disability. The current theme of the study research are the characteristics of sexuality in sport and physical activites.

Hitomi Takeuchi, PhD.
Laboratory of Environmental Physiology, Graduate School of Integrated Arts and Sciences, Kochi University, Kochi, Japan

Contact Address : 2-5-1 Akebonocho, Kochi 780-8520, Kochi Prefecture, Japan
rhythmsyn@hotmail.co.jp

Professional profile: PhD in 2004 from Nara Women University, Researcher, National University Cooperation Kochi University, from April 2004, more than 45 science papers in the fields of human chronobiology & sleep science especially on diurnal rhythms and sleep habit in Japanese children and students aged 2-40 years.

Assoc. Prof. PhDr. Pavel Tilinger, PhD.
College of Physical Education and Sport PALESTRA
Pilská 9, 19800 Praha 9

Faculty of Physical Education and Sport, Charles University in Prague
Martího 31, 162 52 Praha 6
tilinger@palestra.cz; tilinger@ftvs.cuni.cz

Tilinger's major is Didactics of Physical Education and Sport. His research is aimed to sport training management, sport performance prognosis, sport for intellectually disabled individuals and the assessment of fitness proficiency of children, youth and adults. The current theme of the study research are the Physical activities - Wellness of Seniors.

Mgr. Tomáš Urbaník
Urbanik´s major is Sport Education and Mathematic. In the chapter he was the guarantee for Slovak Republic, for data collection and statistical data analysing results. His scientific work is devoted to the general public knowledge about wellness. He wants to pay people a positive inspiration for a wellness sector and its effects on the human organism.

RNDr. Ludmila Vacek, PhD.
College of Physical Education and Sport PALESTRA
Pilská 9, 198 00 Praha 9, Czech Republic
dr.lidavacek@gmail.com

Studied at Charles University, Prague. For last over 30 years she studied and worked in Canada and USA. She worked at University of British Columbia. Over the last twenty years she took number credited post-graduate courses in preventative medicine, sports medicine and spa and wellness procedures. She has been active in several professional associations (ISPA, BANA, ACAI – sports medicine committee, and

others). In cooperation with several colleges and university colleges in Canada and Czech Republic she developed and delivered curriculum for spa and wellness accredited programs. Her company, Global Spa Concepts, Inc. provides consulting and education services for spas and wellness centres.

Assoc. Prof., M.D., Zdeněk Vilikus, PhD.
Charles University – 1st Medical Faculty, Institute of Sports Medicine
Salmovská 5, 120 00 Prague 2
zvili@lf1.cuni.cz

Is a sports medicine physician in the Institute of Sports Medicine, 1st Medical Faculty, Charles University, Prague. He is a lecturer of Sports Medicine and Functional Diagnostics and Complex Nutrition in Sportsmen and Sports Performance at College of Physical Education and Sport PALESTRA, Prague.

Prof. Tomoko Wakamura, PhD.
Department of Nursing Science, Human Health Sciences, Graduate School of Medicine,Kyoto University, Japan, (Professor)

Wakamura´s major is Food Intake Behavior and Chronotype investigation in Japanese people. Her professional profile is consisted from Basic Nursing Science (Philosophy, Nursing Skill), Biological Rhythm, Chronobiology, Sleep Sciences, Thermal Physiology, Clothing Science. She participated as chief coordinator and investigator in number of international and national projects. She is author of 2 Scientific Books, 42 Original Manuscripts and 6 Textbooks and teaching materials. She is member of scientific boards in 3Journals - “Journal of Japan Society of Nursing Research”, “Japanese Journal of Nursing Art and Science”, “Japanese Journal of Clinical Research on Death and Dying.