Book of Abstracts

4th World Scientific Congress

"Quality of Life in Interdisciplinary Approach"

Kochcice, Poland 2023

Editors
Jacek Wąsik, Janusz Szopa, Dorota Ortenburger

Book of Abstracts

These are the original abstracts submitted to 4rd World Scientific Congress “Quality of Life in Interdisciplinary Approach”, Kochcice, Poland, October 25-27, 2023

REVIEWED BY:

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Dear Colleagues and Friends

It is our great pleasure to welcome you to Kochcice near Częstochowa for the 4th World Scientific Congress "Quality of Life in Interdisciplinary Approach", in Poland, October 25-27, 2023. The current fourth edition of the Congress has shown that despite various difficulties in the world, we have managed to activate and bring together a multidisciplinary group of scientists and practitioners.

The congress brought together authors from the following 14 countries: Japan, United States of America, Germany, Czech Republic, Slovakia, Ukraine, Spain, Italy, South Korea, Malta, Algeria, Egypt and Poland, including from 32 research centers.

The meeting provides an opportunity for communication and exchange of experiences of different areas of science. As the organizer, we would like the congress to become a platform for raising discussions and creating joint research plans.

I wish you success during your presentations.

Committe
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Dr hab. Janusz Szopa, Prof. AWF
Dr hab. Dorota Ortenburger

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Program

25 October 2023, Wednesday	
From 14.00	Arrival, accommodation - Strzelnica Family Resort & SPA, ul. Lubliniecka 9, Kochcice, 42-713 Kochanowice
15.30 – 17.30	Social program, Sauna, SPA
18.00 – 19.30	Dinner
20.00 – 22.00	Social event, Sauna, SPA
26 October 2023, Thursday	
7.30 – 9.00	Breakfast
9.30 – 9.50	Opening ceremony - Gold Banquet Room
9.50 – 10.25	**Plenary session** Chairmen: prof. Józef Langfort, prof. Iulia Pavlova, prof. Jaromír Šimonek
	Fibre and prebiotic substances from starch in foods and its implications for human nutrition Janusz Kapuśniak **Overweight and obesity as a severe public health problem among Algerian women** Belkheyr Kaddour Bey, Zerf Mohammed
10.25-12.00	**Session I - Gold Banquet Room** Chairmen – prof. Zbigniew Borysiuk, prof. Janka Kanásová, prof. Piotr Rychter
	Cognitive performance and physical activity in aging Georgiy Korobeynikov, Lesia Korobeinikova, Markus Raab, Ivanna Korobeinikova **The effectiveness of training programs on the level of obesity levels reduction among Algerian women** Lakhdar Messaliti, Zerf Mohammed **Mental health, emotional well-being and mood in relation to physical activity: an approach to improving quality of life** Ramos-Álvarez Oliver, Sanmiguel-Rodríguez Alberto **Evaluation of offensive and defensive agility depending on the type of visual cue and personal decision-making styles in basketball** Pavol Horička, Jaromír Šimonek, Ľubomír Paška, Marek Popowczak **Factors influencing the pupil's physical activity during the school day** Dita Culková, Veronika Dušková

12.00-12.15	Coffee break
12.15-13.15	**Session II - Gold Banquet Room** Chairmen – prof. Janusz Kapuśniak prof. Pavol Horička, prof. Iwona Kochanowska
	Acute Effects of Five Different Stretching Exercises on Agility and Speed Hana Kabešová, Lucie Lebrušková, David Svoboda **Associations between lifestyle changes in female students as they transitioned from secondary school to university** Alena Buková, Petra Tomková, Zuzana Küchelová **Active communities and health-enhancing physical activity – the benefits for life quality of elderly people** Iuliia Pavlova **Enhancing Motor Abilities in Individuals with Cerebral Palsy through Online Karate Training: A Case Study** Dariusz Mosler, Kantaro Matsui, Yuki Mimura, Takamasa Arakawa, Masatoshi Arakawa
13.15-14.00	Lunch
14.00-15.15	**Session III - Gold Banquet Room** Chairmen – prof. Eligiusz Małolepszy, prof. Justyna Krzepota, prof. Renata Barczyńska-Felusiak
	The Role of Exercise in Strengthening Innate Immunity Iwona Ewa Kochanowska, Magdalena Myga-Nowak **Eco-friendly bioplastics as an alternative to traditional, nondegradable plastic** Piotr Rychter, Izabela Szymanek **Quality and lifestyle of patients with thyroid diseases** Bartosz Wanot, Ewa Janik, Adrianna Kosior-Lara, Agnieszka Biskupek-Wanot **The influence of the mental state on the rehabilitation of cardiac patients** Karolina Kowalewska, Tomasz Rutkowski, Błażej Cieślik **Static balance assessment using modified version of Flamingo Test for taekwon-do athletes** Kamil Radecki, Dariusz Mosler
15.15-15.30	Coffee break

15.30-16.45	**Session IV - Conference Room** Chairmen – prof. Anatolii Tsos, prof. Nora Halmová, prof. Renata Urban
	The history of football in the Tarnopol Voivodeship in the years 1920-1939 Eligiusz Małolepszy, Teresa Drozdek-Małolepsza **Gender peculiarities of health-related quality of life among an working-age population** Svitlana Indyka, Nataliia Bielikova, Anatolii Tsos **Analysis of the quality of life of patients receiving palliative care and assessment of the impact of the original educational program on improving the quality of life and reducing pain by increasing the self-reliance and independence of these patients** Wojciech Statowski **Safe e-seniors in cyberspace** Tomasz Paczkowski **Evaluation of lower limb power of students in 2021-2023** Jakub Kacprzak, Jacek Wąsik
16.45-17.00	Coffee break
17.00–18.00	**Posters Session - Multimedia Room** Chairmen – prof. Sławomir Letkiewicz, prof. Jacek Wąsik, prof. Arkadiusz Marzec
	Women in ukraine during times of conflict Liudmyla Vashchuk, Olena Demianchuk **The effect of augmented reality (ar) on improving the educational process for some basic skills in physical education** Mohammed Asim Ghazi **Sport Taekwondo's Peacebuilding Failures and Recommendations for Future Initiatives** John A. Johnson, Man-Hsu Lin **Functional studies of vegetable and fruit mousses before and after enrichment with a fiber preparation of potato starch** Dominika Kaczmarek, Malwina Wójcik, Kamila Kapuśniak, Janusz Kapuśniak **How do calorie-restricted plant-based diets affect human health?** Florentyna Tyrała, Aleksandra Pięta, Monika Szot, Adrian Burd, Paulina Mazur-Kurach, Barbara Frączek

Prevalence of selected musculoskeletal disorders in relation to physical activity
Nora Halmová, Janka Kanásová, Jaroslava Kopčáková, Jaromír Šimonek

Variability of Lipids in Human Milk and Infant Formula
Kamila Kapuśniak, Malwina Wójcik, Hanna Mojska, Janusz Kapuśniak

Assessment of DHA intake by Polish breastfeeding women
Malwina Wójcik, Kamila Kapuśniak, Hanna Mojska

Health and physical activity of cold-water swimmers
Dávid Kaško, Daniel Pastucha

The effect of the length of sports experience on the prevalence of non-specific back pain and injuries in football and hockey
Ladislav Kručanica, Magdaléna Hagovská, Alena Buková

The relationship between physical activity and anxiety in nurses - selected aspects
Magdalena Korsak-Sabino Belo , Adrianna Korsior-Lara, Neville Schembri

Nutritional habits of climbers in high mountain conditions
Ewa Karpęcka-Gałka, Barbara Frączek

Cross-coherence of selected actions of wheelchair fencers
Monika Błaszczyszyn, Zbigniew Borysiuk

Basic motor skills of 7-8 year old children participating in sport
Daniela Falat Leütterová, Ingrid Ružbarská

Physical activity of prisoners of war in Oflag VII A Murnau during World War II
Renata Urban

Modulation of the gut microbiota by prebiotic fibers from potato starch
Renata Barczynska, Janusz Kapuśniak , Katarzyna Slizewska , Michał Włodarczyk

Lifestyle Medicine for Longevity. Blue Zones inspiration
Agnieszka Pluto-Pradzynska

Selected psychological factors and individualized exercise in Low Back Pain
Dorota Ortenburger, Klaudia Zuskova, Arkadiusz Marzec, Tomasz Gora, Józef Langfort

	Physical activity in the treatment of anxiety disorders Małgorzata Glin **Occupational therapy in Chronic Non-Specific Low Back Pain** Renata Spalek, Dorota Ortenburger, Jacek Wasik, Tomasz Gora, Józef Langfort, Klaudia Zuskova **Physical activity and aerobic endurance of medical students after the covid-19 pandemic** Ján Junger, Agata Horbacz, Richard Melichar, Vadym Krupytskyi **Exploring youth understanding of physical activity, health and illness - continuation** Tomasz Góra, Dorota Ortenburger **The impact of shift work of operating nurses on physical activity** Adrianna Kosior-Lara, Bartosz Wanot, Magdalena Korsak-Sabino Belo, Sławomir Letkiewicz **Firing frequency changes during concentric sub-phases of maximal and submaximal bench press task** Blazek Dusan, Pisz Anna, Hojka Vladimir, Uhlir Petr, Kolinger Dominik, Zajac Adam, Stastny Petr
18.30-2.00	**Gala Dinner** - Gold Banquet Room
27 October 2023, Friday	
8.00–10.00	Breakfast
10.00-10.30	Closing ceremony

Table of Contents

ABSTRACTS

Fibre and prebiotic substances from starch in foods and its implications for human nutrition

Janusz Kapuśniak

Department of Dietetics and Food Studies, Innovative and Pro-Health Food (InnoFood) Research Centre, Jan Dlugosz University in Czestochowa, Poland

Obesity and overweight, which are significant social problem, affect up to 20% of the developmental population and 50% of adults. The main factors contributing to the development of obesity include excessive consumption of products containing easily absorbable, high-calorie nutrients, including simple sugars. The development of obesity is also closely correlated with changes in the intestinal microbiota. Eating a diet high in dietary fibre and prebiotics is essential in the prevention and treatment of obesity and its complications. Oligosaccharides, mainly fructooligosaccharides (FOS), are commonly used as soluble dietary fibre with prebiotic properties. The main limitation of their use is that they cause gastric problems. Moreover, they are poorly tolerated by many people, especially with irritable bowel syndrome (IBS). The use of starch products, such as resistant dextrins, resistant maltodextrins and soluble corn fibre gives great opportunities in this regard. The results of the research obtained as part of the project with the acronym PreSTFibre4kids are presented. This project is aimed at examining vegetable and fruit mousses with the addition of soluble dextrin fibre (SDexF) from potato starch with prebiotic properties, in terms of the prevention of overweight and obesity in children and the reduction of metabolic disorders secondary to obesity. In the first stage, an innovative method of obtaining SDexF on a semi-industrial scale was developed. Then, SDexF was subjected to comprehensive physico-chemical characterization and nutritional labeling. Based on analysis, including assessment of the composition and nutritional value, as well as safety assessment, National Institute of Public Health issued a positive recommendation recognizing SDexF as a food ingredient. In the next stage, industrial partner developed recipes of 6 flavors of vegetable and fruit mousses with and without addition of SDexF. The organoleptic characteristics of mousses were assessed using acceptance and preference methods according to the criteria developed in The Children's Memorial Health Institute. The most accepted and preferred: apple-carrot-quince, apple-peach-parsnip-lemon, apple-cherry-carrot-banana mousses were selected for further clinical trials. The study was performed in a group of 100 children aged 6 to 10 years, using a double-blind procedure. Evaluation points were anthropometric, metabolic, immunological parameters and changes in intestinal microbiota and metagenome.

Keywords: dietary fibre, prebiotics, functional foods, obesity, food enrichment, vegetable and fruit mousses

The study was financed by the National Centre for Research and Development (Poland) under Measure 4.1 of the Smart Growth Operational Program 2014-2020, grant no. POIR.04.01.02-00-0102/17-00

Overweight and obesity as a severe public health problem among Algerian women

Belkheyr Kaddour Bey, Zerf Mohammed

Sports Training, Physical Education Institute Laboratory OPAPS, University of Abdel Hamid Ibn Badis, Algeria.

The prevalence of overweight and obesity has become one of the most significant public health challenges in Algerian community. Mentioned in resents Algerians academic studies that one in two Algerians and one in three Algerian women are overweight. Based on these numbers**.** The importance of this study comes to reveal the real reasons for the spread of this phenomenon among Algerian women. Acknowledged in this study based on Body mass index (BMI) for a sample of 2000 women between 16 and 36 years old. Which accepts voluntarily to participate in this experience. Based on Body mass index (BMI), 38% of the sample is Overweight, 32% is obese, and 30% is Healthy weight. Our results confirmed that 2/3 of Algerian women tested in this study are overweight. Requesting from our government to sound the alarm against this phenomenon. As well as to educate their citizens about combating this phenomenon, especially among our women.

Keywords: Overweight, Obesity, Public Health, Algerian, Women

Cognitive performance and physical activity in aging

Georgiy Korobeynikov[1,2], Lesia Korobeinikova[1,2], Markus Raab[2], Ivanna Korobeinikova[2,3]

[1] National University of Ukraine on Physical Education and Sport, Kyiv, Ukraine

[2] German Sport University Cologne, Institute of Psychology, Cologne, Germany

[3] Institute of Psychology of the National Academy of Educational Sciences of Ukraine, Kyiv, Ukraine

Introduction: Age-related changes in cognitive processes are serious and multifactorial in nature. Current research shows a decline in motor responses, cognitive deterioration and mental low with age. However, one of the improvements of physical and mental deterioration is physical activity during age involution. According to the theory of aging, adaptive processes are activated during involution, which can improvise vital body characteristics. There are many studies on cognitive decline with age. However, the mechanisms of cognitive improvement through physical activity in aging are poorly understood. Our hypothesis is that cognitive enhancement with physical activity is due to improved neural connectivity.

Material and methods: 40 males and 40 females aged 40-60 years were examined. Cognitive abilities were studied using special computerized tests.

Results: As a result of the study, it was shown that the ability to perceive and make decisions decreases with age. In addition, the increase in decision-making time provokes a decrease in the quality of solving. Low physical activity is associated with the determination of the relationship between cognitive parameters in aging persons. This leads to deterioration of cognitive functions. One of the stimulating mechanisms for cognitive improvement is physical activity. In physically active individuals, optimization of cognitive organization occurs due to relaxation of connections between mental ability parameters.

Conclusions: Physical activity affects cognitive performance in aging individuals. This is facilitated by decreased determinism and increased relaxation links between cognitive properties.

Keywords: cognitive performance, physical activity, aging, mental ability

Basic motor skills of 7-8 year old children participating in sport

Daniela Falat Leütterová, Ingrid Ružbarská

University of Presov in Presov, Faculty of Education

Introduction: Childhood, especially primary school ages, is a crucial period for motor development. Basic motor competencies are minimal but fundamental movement dispositions for successful participation in a wide range of physical activities. However, children´s motor competencies have decreased in the past decades. In addition, for some children, physical education classes are the only context of motor experiences. The purpose of the study was to examine the basic motor competencies of primary school children relative to their sports participation.

Material and methods: The research sample included 77 first-grade and second-grade primary school students (n = 34 girls; n = 43 boys) from the region of Eastern Slovakia. The MOBAK 1-2 test instrument was applied to measure basic motor competencies. The test is structured into eight motor tasks that cover the object movement and self-movement competencies. For this study, only object movement tests were applied: throwing, catching, bouncing, and dribbling. The t-test for independent samples was used to determine differences between groups.

Results: Research results provide evidence that sport-participating children showed a similar level of object movement skills to the non-sporting children. No significant differences were found between the compared groups in terms of gender.

Conclusions: This study responds to the scientific research demand for the expertise of educational practice in the stimulation of basic motor competencies, as well as the need to establish the diagnostics of these competencies in the context of school practice. Effective educational support in Physical Education is crucial to providing children with a solid foundation for healthy motor development and lifelong physical education.

Keywords: primary school children, motor development, MOBAK test.

The study is supported by the Grant Scientific Project of the Slovak Republic no. 1/0162/22 with the title: Learners' motor competencies in the context of primary education – determinants and possibilities of stimulation, and by the Project (GaPU) no. 26/2023 with the title: Basic motor skills of 7-8 year old children participating in sport.

Acute Effects of Five Different Stretching Exercises on Agility and Speed

Hana Kabešová, Lucie Lebrušková, David Svoboda

Jan Evangelista Purkyně University in Ústí nad Labem, Faculty of Education Department of Physical Education and Sport

Objective: The aim of the research was to evaluate the acute effect of five different stretching techniques used as a part of agility and speed training.

Method: The sample group consisted of 108 PF UJEP students who study in the field of physical education and sports. Participants performed five different warm-up stretching models in five different weeks, each Monday at the same time and place. The agility test and sprint were applied immediately after each stretching exercise. Both tests were performed without stretching (NS), after static stretching (SS), dynamic stretching (DS), static + dynamic stretching (SDS), and dynamic + static stretching (DSS) following 5 minutes of jogging. The ANOVA Chi Sqr. statistical method and Wilcoxon Matched Pairs Tests were used to evaluate the data.

Results: The differences between the protocols were as follows NS with DS, NS with DSS, NS with SDS, SS with DS, SS with DSS, SS with SDS, DSS with SDS in 10 m ($p<0,05$). There is a statistical difference between NS with SS, NS with DS, NS with DSS, NS with SDS in Illinois agility test ($p<0,05$).

Conclusion: Types of dynamic stretching have a positive effect on strength and speed sports performance. To increase agility, it is recommended to warm up in combination with a model of dynamic stretching after static stretching.

Keywords: agility, stretching, warm-up.

Prevalence of selected musculoskeletal disorders in relation to physical activity

Nora Halmová[1], Janka Kanásová[1], Jaroslava Kopčáková[2], Jaromír Šimonek [1]

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[2]Department of Health Psychology and Research Methodology, Medical Faculty, PJ Safarik University in Kosice, Slovak Republic

Introduction: Incorrect sitting, prolonged time in front of a computer and constant use of a mobile phone lead to an increase in musculoskeletal pain. These pains are most often manifested in the head and back. In our research, we investigate the prevalence of head and back pain in Slovak children and adolescents and examine its association with physical activity and sedentary behaviour.

Material and methods: Our representative sample consisted of 862 Slovakian children aged 11 to 15 years. We used a questionnaire survey to obtain subjective data on the prevalence of headache and back pain. We used the parametric Spearman correlation coefficient to analyse the relationships between these variables.

Results: The results of our investigations show a high prevalence of various pains in almost all respondents. 99.3% of the children reported that they suffer from headaches, either daily or at least occasionally. Our findings show that headaches are highly prevalent among all respondents. Occasional back pain is reported by 97.3% of respondents. On the positive side, up to 73.4% of respondents do physical activity at least three times a week. The correlation between physical activity, time spent on the computer or on social networks and headaches was statistically significant at the 1% level of significance. Conversely, we did not observe an association between back pain and physical activity or sedentary lifestyle.

Conclusion: Responses appear negative, with up to 75 % respondents reporting sedentary work for 2 or more hours a day. Based on the results obtained, it is necessary to continue similar researches and point out the negative effects of physical inactivity, trying to eliminate as many other factors as possible by which they may be affected, and thus contribute to the healthy development of the adult population.

Keywords: physical activity, headache, sedentary work, spinal pain

Acknowledgement: The paper is based on support of the grant role of MS VVS SR – KEGA 020UKF4/2021 "Health, related behavior of adolescents and prevention options for diseases of civilization".

Analysis of the quality of life of patients receiving palliative care and assessment of the impact of the original educational program on improving the quality of life and reducing pain by increasing the self-reliance and independence of these patients

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[2] Department of Medical and Molecular Biology, Faculty of Medical Sciences in Zabrze, Medical University of Silesia, Poland

Background: Palliative care is a form of medical care that focuses on providing comfort and pain relief to patients with severe incurable diseases. The quality of life of patients receiving palliative care is one of the key aspects that require constant control in palliative therapy.

Objective: The aim of this study was to evaluate the patients' quality of life in palliative care, as well as to assess the impact of the author's educational program on improving quality of life and reducing perceived pain by improving the independence and self-reliance of these patients.

Material and methods: The analysis presented was developed based on two research component forms. The first concerns the evaluation of the patients' quality of life in palliative care using questionnaires: WHOQOL-BREF and EQ-5D-5L. The second involves the evaluation of the impact of the author's educational program on improving quality of life. The evaluation tool was an author's questionnaire, the use of which was repeated after each of the five author's educational cycles.

Results: The WHOQOL-BREF questionnaire was analyzed for 4 domains. The study obtained the following results: Domain 1=40.2; Domain 2=39.94; Domain 3=36.1; Domain 4=37.7. According to the guidelines of the EQ-5D-5L questionnaire, it was shown that 43% of patients are unable to walk or have serious problems with walking, 59% of patients are unable or have serious problems with self-care, 61% of patients are unable or have serious problems with ordinary activities, 52% of patients have severe or extreme pain/discomfort, 65% of patients are very anxious or depressed. The study on the educational program used showed that it helps improve the quality of life among palliative care patients. Surveys conducted prior to the program, showed that the majority of patients (47, 51.09%) often experienced limitations when performing daily activities. After the educational cycle, there was a significant increase in patients who experienced no or occasional limitations in performing daily activities.

Conclusions: The study showed that patients covered by palliative care present low indicators of quality of life. The ultimate effect of the proposed educational program was an increase in quality of life, a reduction in pain, an increase in patients' independence and an improvement in their mood.

Keywords: Quality of Life; Palliative Care; Palliative Medicine; Pain; Physiotherapy.

Mental health, emotional well-being and mood in relation to physical activity: an approach to improving quality of life

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Introduction: Currently, the mental health and emotional well-being of children and adolescents has become a concern in Spanish society. Since Spain, like the rest of the world, suffered the COVID-19 pandemic, many habits have changed in the child and adolescent population. Some of these changes were a decrease in the time and frequency of physical activity, in their eating habits, in their hours of rest and a significant increase in sedentary activities and, in particular, in the consumption of screen-based technologies. After the periods of home confinement due to the pandemic and once the time has passed, many of these changes in their habits have not returned to their original state. The after-effects of pandemic times related to mental health, emotional well-being and moods are currently being studied. In this work, the modification of moods in relation to physical activity has been studied. In addition to the already known benefits of physical activity at a biological level (anthropometry, physiology, etc.), it should be noted that there is abundant scientific evidence that supports the fact that regular physical activity improves the mood of the people who practice it and, therefore, their quality of life.

Method: The sample consisted of 50 Spanish children aged 11-12 years and the Profile of Mood States (POMS) and a socio-demographic questionnaire were used to obtain the information.

Results: The study showed modifications in the mood states studied with the POMS between pre-confinement and during confinement in relation to the practice of physical activity, but without statistically significant differences between boys and girls.

Conclusions: It is evident that in times of pandemic, there was a modification of their moods in relation to the practice of physical activity in the sample, and therefore, a worsening of their quality of life.

Keywords: SARS-CoV-2; lockdown; physical activity; children; POMS

The influence of the mental state on the rehabilitation of cardiac patients

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Cardiovascular diseases rank as the primary cause of death globally. Numerous psychological disorders and psychosocial factors have been linked to the onset and progression of cardiovascular diseases. Among these, depression significantly diminishes the quality of life in cardiac patients and is recognized as an independent risk factor for severe cardiovascular events. Therefore, this study aimed to evaluate the influence of psychological status on the success of rehabilitation among cardiac patients. In our study, we examined 33 patients who were referred to the second stage of cardiac rehabilitation. To assess their psychological condition, we utilized the Hospital Anxiety and Depression Scale (HADS) and the Perceived Stress Scale (PSS-10). Participants were categorized into two groups based on the HADS depression subscale: those displaying depressive symptoms (with scores greater than 7) and those without depressive symptoms (scoring between 0 and 7). We evaluated the patients' functional status using a 6-minute walking test (6MWT). During these tests, we measured resting and exercise heart rate (HR), systolic (SBP), and diastolic (DBP) blood pressure. We also assessed the metabolic equivalent of task (MET) to quantify an activity's energy cost relative to resting. Considering the average differences between the groups, revealed significant differences in SBPw (13.29 vs 14.16; P = 0.04), MET (0.57 vs 1.18; P = 0.006), and HRw (15.04 vs 16.77; P = 0.02). Based on stepwise regression results, we found that depression, anxiety, and stress significantly influenced physiological parameters. Specifically, HADS-D predicted HRw with an r^2 = 12% (P = 0.04), PSS-10 was a predictor for DBPw with an r^2 of 27% (P = 0.002), and for MET, both HADS-D and age were influential, accounting for 26% of the variance (P = 0.01). Our preliminary findings highlight significant physiological differences influenced by psychological factors such as depression, anxiety, and stress. Age, in conjunction with these psychological metrics, also emerged as a predictive factor for specific physiological outcomes. While these initial results provide insightful directions, it's essential to underline the preliminary nature of this research. Future comprehensive studies are imperative to solidify these findings and further explore the intricacies of these relationships.

Keywords: cardiac rehabilitation; cardiovascular disease; physical activity; depression; mental state

Active communities and health-enhancing physical activity – the benefits for life quality of elderly people

Iuliia Pavlova

Lviv State University of Physical Culture named after Ivan Boberskyj, Lviv, Ukraine

Nowadays, it is possible to observe shifting the emphasis from the negative paradigm of old age, according to which the main focus is on poor health, loneliness, inability to solve anything on their own, disability, poverty, social isolation, suspension of intellectual development, to positive approaches. The positive concept of aging focuses on available opportunities and healthy behaviors. The basic needs of older adults include health, access to health care, active communication with society, community service, leisure, intellectual development, sustainable relationships, and stable life. Physical activity is effective in preventing or slowing down age-related changes, the elderly adults remain the least active part of society. The study aimed to develop and implement a special environment for the elderly, which will promote the development of healthy skills, stimulate general cognitive development and social activity, and assess the role of physical activity in achieving sustainable positive change.

The study involved 200 older adults (150 women and 50 men, 65.2 ± 4.3 years). Quality of life was assessed using the 36-Item Short Form Survey. The International Physical Activity Questionnaire was used to determine the level of motor activity. The indicators were evaluated before and after the one-year program.

Health-enhancing and recreational technology for older adults was theoretically developed and practically implemented, which provided for the creation of a learning environment with health-preserving components. The model of the educational environment was based on three principles: autonomy (maintaining independence in decision-making on lifestyle), integration (ensuring full participation in public life), assistance (creating a support system that helps develop new competencies that meet modern challenges, and high level of activity). The quality of life on the scales characterizing the amount of daily physical activity, mood, and social activity increased by 1.3–1.6 times ($p<0.01$) in those participants involved in health-enhancing and recreational activities. After participating in the program, the number of people with medium and high levels of physical activity increased ($p<0.05$) - the number of people with medium and high levels of physical activity increased 2.5 times, and the number of people with low levels decreased three times.

Keywords: physical activity, older adults, health, PhysAgeNet.

Factors influencing the pupil's physical activity during the school day

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Introduction: Sufficient physical activity affects health-oriented fitness, mental health and quality of life in general. At school it may influence also pupils' school engagement and their academic success. Most Czech pupils do not meet international recommendations for physical activity. To instigate a change in pupils' lifestyles, schools need to enhance the quality of physical education lessons, provide extracurricular activities, organize regular sports events and primarily modulate conditions for active regime in everyday school life. Well-organized school settings can bring up to 60 minutes of exercise per day. There are numerous factors affecting physical activity of pupils. The research focused on school conditions, family and the pupil himself. The objective was to pinpoint areas with the greatest potential for influencing pupils' physical activity at school.

Materials and methods: Forty-three pupils (22 girls and 21 boys) of selected schools were measured by digital pedometers for five days at three selected schools. A questionnaire survey for parents about family's lifestyle and pupil's characteristics was included. The Jasp program was used and Spearman's rho.

Results: Passive conditions of the school experted the most significant influence (Spearman's rho 0.77). These factors included the school size, availability of sports equipment, length of breaks, possibility for outdoor activities during breaks. Also active school conditions showed significant results (0.56), such as short exercises during lessons, active breaks or outdoor lessons. Child's temperament also showed some correlation (0.4). There was no correlation between the number of steps and the pupil's attitude (0.13), activities of family (0.13), age (0.14) and gender (-0.2).

Conclusions: The passive and active conditions of the school may significantly influence physical activity level of the pupil, surpassing the influence of the family or the pupil himself. This underscores the importance of fostering school conditions conducive to physical active school day and a subsequent promise for enhancing the physical activity of pupils, especially those who are socially disadvantaged.

Keywords: physical activity level, pupils, school conditions, pedometers

Nutritional habits of climbers in high mountain conditions

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Introduction: Appropriate nutritional preparation for a high-mountain expedition can contribute to the prevention of nutritional deficiencies affecting the deterioration of health and performance. The aim of the study was to analyze the dietary habits of high mountain climbers.

Material and methods: The study group consisted of 28 men (average age 33.12 ± 5.96 years), taking part in summer mountaineering expeditions at an altitude above 3000 m above sea level, lasting at least 3 weeks. The analysis of dietary habits and attitudes was based on the author's survey.

Results: Of the respondents, 67.9% assess their appetite in the mountains 3000 m above sea level as good, 14.3% as average, 14.3% as very good, while 3.6% of people assess their appetite as low. Food groups consumed with low frequency during the expedition include vegetables, fruits, eggs, milk and milk products, butter and cream, fish and meat. The products most often consumed by climbers in the mountains include: sugar and sweets (85.7%), nuts and seeds (67.9%), wholegrain cereal products (64.3%) and refined cereal products (57.1%). Among the climbers surveyed, 7.1% of them realized the correct dietary recommendations regarding the frequency of consumption of vegetable oils (daily intake), 17.9% took 1–2 servings of fruit daily, 17.9% took cereal products daily, and 25% of people took fish 1–2× a week. Freeze-dried meals are the most frequently used nutritional solution after the end of a mountain action with bivouac (82.1%). During climbing, climbers usually take snacks (bars, energy gels, gummies), which are a great supplement to carbohydrates. A large percentage of climbers (75%) declare an overabundance of sweet taste, caused by the high frequency and quantity of carbohydrate snacks consumed. Our results show that nearly half of the respondents drink 2–3 L of fluids per day in the mountains, while the rest of the respondents take in even smaller amounts of fluids per day.

Conclusions: There is a need to develop nutritional recommendations that would serve as guidelines for climbers, improving their well-being and exercise capacity in severe high-mountain conditions, which would take into account their individual taste preferences.

Keywords: mountaineering; nutrition; diet; mountains; himalaism

Health and physical activity of cold-water swimmers

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Introduction: The aim of our bachelor thesis was to clarify and expand knowledge about health and physical activity of cold-water swimmers. In the theoretical analysis, we analyzed in detail the international standards and recommendations of the World Health Organization on physical activity. Based on research and professional studies, we analyzed the impact of cold-water immersion from a physiological point of view and at the same time we compiled contingency tables of health benefits and risks associated with cold-water swimming. In the preparatory period of the research, we set hypotheses and research questions, according to which we created an online survey.

Material and methods: In the preparatory period of the research, we set hypotheses and research questions, according to which we created an online survey.

Results: A homogeneous research group (N=449) of cold-water swimmers answered the questions from our survey, then we processed and evaluated the data. In the hypotheses, we assumed that the increasing volume of physical activity of cold-water swimmers will not affect the annual frequency of common diseases (N=449), the hypothesis was negatively correlated at the level of low dependence (rs = -0.281), thus confirming our hypothesis. In the second hypothesis we assumed a significant dependence of the effect of the length of cold-water immersion on the light course of virus SARS-CoV-2 disease in the exposed group of positives (N=89), the hypothesis was negatively correlated at the level of medium dependence (rs = -0.406), which did not confirm this hypothesis. Our last assumption was that the length of cold-water immersion will not affect the incidence of common diseases during the year (N = 449), the hypothesis was negatively correlated at the level of trivial dependence, which confirmed our hypothesis (rp = 0.097). From the results processed by nonparametric and parametric statistic method, we confirmed two of our hypotheses.

Conclusions: The length of the cold plunge does not affect the frequency of occurrence of common diseases, which confirmed our hypothesis. Those individuals who had been practicing cold plunge for years did not have a singnificantly milder course of the SARS-CoV-2 disease. Individuals with a greater volume of cold plunge did not have a lower frequency of occurrence of common diseases.

Keywords: cold-water swimming, healthcare, common diseases

Variability of Lipids in Human Milk and Infant Formula

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Introduction: Human milk lipids are the best source of energy for infants during early development, particularly in the first six months of life. Glycerides are present in the core of milk fat globules, additionally, glycerophosphatides, sphingolipids and glycolipids are located in the milk fat globule membrane. Glycerides (mainly triacylglycerols (TAGs)) account for approx. 98-99% of the total amount of milk lipids and account for up to 50% of the energy necessary for breastfed infants. Even though human milk is considered as golden standard, in some cases breastfeeding is impossible. Therefore, a thorough understanding of the composition of human milk is very important. With the progress in this knowledge, it will be possible to develop infant formulas that better mimic human milk for infants.

Material and methods: The aim of the study was to develop a methodology for testing samples of human milk and infant formulas using Shimadzu Nexera-2 liquid chromatograph coupled with the SCIEX TripleTOF® 6600+ mass spectrometer. Conducting preliminary research will allow for an in-depth study of the composition and variability of the milk of Polish lactating women and goat milk based infant formula available on the Polish market. The results can be useful in designing new milk formulas that better mimic human milk.

Results: Different classes of lipids were identified depending on the type of ionization used. In human milk, the most frequently occurring lipids were TAG in positive ionization, and phosphatidylethanolamine (PE) in negative ionization. On the other hand, in goat milk based infant formula in the case of positive ionization, sphingomyelin (SM) was mainly present, while TAG was the second most abundant lipid class. Diacylglycerol pyrophosphate (DPP) was present in goat milk based infant formula in negative ionization. Further research to select the best method for extraction, sample dissolution, chromatographic analysis and data analysis are necessary.

Conclusions: Research on the composition of human milk and modified milk will allow for a better understanding and improvement of the composition of modified milk in a way that will minimize the losses incurred by an infant deprived of natural feeding.

Keywords: breastfeeding, lipidomics, human milk, breast milk lipids

Assessment of DHA intake by Polish breastfeeding women

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Introduction: Diet and lifestyle are important for both mother and child, already in the preconception period, throughout pregnancy and breastfeeding. One of the most valuable ingredients for the proper development of infants is docosahexaenoic acid (DHA). DHA is a long-chain (LC) omega-3 polyunsaturated fatty acid that is essential for fetal brain and retinal development during pregnancy. DHA can be synthesized from the precursor, α-linoleic acid (ALA), however, due to the ineffective conversion of ALA to DHA, DHA supplementation and the consumption of products rich in it by pregnant and breastfeeding women are recommended. One of the main sources of DHA in the daily diet is fish, the consumption of which is generally assumpted not high, especially in non-Mediterranean countries. Therefore, it is important to assess DHA intake by breastfeeding women.

Material and methods: The study using an online questionnaire was conducted among 101 Polish breastfeeding women. In this study, a food frequency questionnaire was used to assess DHA intake by breastfeeding women. The questions mainly concerned the consumption of DHA-rich products, i.e. fish, seafood, poultry, egg yolks and liver. The survey also included questions about DHA supplementation. The daily DHA intake of each study participant was calculated using a questionnaire.

Results: The conducted survey indicates the diversification of DHA intake among breastfeeding women. More than half of the respondents had an average DHA intake. However, as many as 34% of respondents had a low DHA intake, and only 11% had a high DHA intake. A correlation was found between DHA intake and education, consumption of fish and seafood with high and medium DHA content, egg yolks, information from a doctor/midwife about DHA supplementation, and DHA supplementation during pregnancy and breastfeeding. The majority of Polish breastfeeding women declared that they consumed very small amounts of fish and seafood or no fish and seafood. Nevertheless, most respondents declared DHA supplementation during pregnancy and breastfeeding.

Conclusions: It is necessary to increase the nutritional education of pregnant and breastfeeding women and provide greater support from dieticians, doctors and obstetricians for the higher consumption of DHA, which plays an important role in the diet of breastfeeding women.

Keywords: breastfeeding, docosahexaenoic acid, DHA

Evaluation of offensive and defensive agility depending on the type of visual cue and personal decision-making styles in basketball

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Introduction: Decision-making is a set of specific abilities that allow athletes to perform their tasks and control operational goals, while generating responses to the demands of the environment - game situations. The speed of change of direction and reaction agility are equally relevant factors of skills in basketball. A central research question concerns how motor and non-motor (psychological) resources interact with respect to their respective contribution to the realization of action effects. The specific goal was to determine the level and differences in the performance of reaction agility (RA) depending on the type of visual stimulus and to identify the role of selected psychological patterns in the decision-making process.

Method: 12 female basketball players (17.12 ± 1.09 years; body weight 58.17 kg ± 7.68 kg; body height 1.73 ± 0.11, BMI 19.53 ± 3.86) belonging to the category of junior girls of the first junior league of the Slovak Republic. The diagnosis of specific game reactions was performed using a Y-shaped reaction agility test. The stimulus for the action effect was a simple light direction indicator and a video sequence (6x offensive and 6x defensive game activities of an individual projected to the test person. The evaluation of the decision-making style was performed using the Melbourne Decision Making Questionnaire (MDMQ), which measures selected decision-making patterns (vigilance, hypervigilance, buck-passing and procrastination). Descriptive statistics, frequency (n), percentage (%), mean ($\overline{X}$) and standard deviation (SD) were used in the data analysis. Before choosing statistical methods, the Shapiro-Wilk test for homogeneity of variance was performed. The significance level was 0.05. The Wilcoxon signed-rank test was used to compare performances and determine the significance of differences in RA depending on the type of visual stimulus. Pearson's correlation coefficient was used to determine the relationship between performances in offensive and defensive agility to light and video stimuli and the main patterns of decision making. *Results:* The test of normality of the distribution revealed a normal distribution of the data (p =<0.165, 0.779>). A statistically significant difference in agility performance was demonstrated depending on the type of stimulus (p=0.006). The results showed that there is a significant relationship between the vigilance subscale and performance in RA (r= 0.849, p<0.05), however, for procrastination, vigilance, and hypervigilance, this relationship was insignificant.

Conclusion: It turns out that the form of the visual stimulus can be a performance modulator in deciding the type and speed of action effects, which confirms the significance of the differences between tests according to the type of stimulus. Reactions using sport-specific stimuli were demonstrably better (ø0.13s) compared to a simple directional stimulus, which points to the potential benefits of agility training using video projection. The assumption was confirmed that

the use of a non-sport-specific stimulus does not enable the development of sport-specific perceptual and decision-making skills. From the point of view of the observed patterns, vigilance was identified as a positive and supportive factor in the decision-making process.

Keywords: agility, basketball, sport-specific stimulus, decision making

Functional studies of vegetable and fruit mousses before and after enrichment with a fiber preparation of potato starch

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Introduction: Vegetable and fruit mousses are becoming more and more popular among consumers. These products contain soluble dietary fiber in the form of pectins, as well as insoluble fiber derived from undigested parts of cell walls, e.g. lignin, cellulose and hemicellulose. However, the total fiber content in one portion of the mousse isn't sufficient and is usually up to 2.3 g per 100 g of the product. New products with increased nutritional and health value are sought, which can be obtained by adding dietary fiber. As part of the "PreSTFibre4kids" project, Tymbark sp. z o.o. in cooperation with the Jan Dlugosz University in Czestochowa, produced vegetable and fruit mousses enriched with a fiber preparation from potato starch.

Material and methods: The research material consisted of 3 flavors of mousses: apple-peach-parsnip, apple-cherry-carrot and apple-carrot-quince. The aim of the study was to measure pH and to analyse the CIE L*a*b* color parameters of vegetable and fruit mousses, as well as to determine the total dietary fiber (TDF) content in freeze-dried vegetable and fruit mousses using the enzymatic-gravimetric AOAC 991.43 method.

Results: The addition of a fiber preparation from potato starch caused a slight decrease in the pH of the apple-cherry-carrot mousse. A change in color to a darker one was observed for each flavor, with the apple-carrot-quince mousse having the greatest difference in color parameters (ΔE). Freeze-dried vegetable and fruit mousses enriched with a fiber preparation from potato starch were characterized by a higher total dietary fiber content than freeze-dried non-enriched mousses.

Conclusions: On the basis of the functional studies carried out, it wasn't observed that the enrichment of vegetable and fruit mousses with a fiber preparation from potato starch had a negative effect on the final product. It can therefore be concluded that the addition of a fiber preparation from potato starch affects the functional properties of vegetable and fruit mousses, improving their nutritional and health value.

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Keywords: vegetable and fruit mousses, potato starch, pH, color, dietary fiber, food enrichment

Lifestyle Medicine for Longevity. Blue Zones inspiration

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The concept of both proposed functional areas of interest in healthy longevity: Lifestyle Medicine and Longevity Blue Zones, is the result of scientific cooperation with specialists in both topics. The basis is to identify the common guiding elements of both developing and popularized scientific areas. Promoting tools recognized as six pillars of Lifestyle Medicine seems to be possible to rich health and longevity characteristic of the five centenarian zones designated by demographers, the so-called Longevity Blue Zones. There are few daily routine physical activities, such as walking or cycling as a way of getting around, as well as working in the garden and on the farm. To get more benefits and well-being is worth to concentrate on: a diet that is slightly plant-based and does not overeat; healthy and functional interpersonal interactions and social support in overcoming everyday difficulties; avoiding addictions; enough long and high quality night's sleep; as well as copying with stress - often based on trust and calm thanks to the coexistence with nature and its rhythm. To achieve the desired effect despite time constraints, fatigue and often lack of energy, you need to focus on taking care of your health. Working on your own motivation by verifying your habits and making small daily changes to more health-promoting ones creates a chance to improve your functioning and live a long, healthy life.

Keywords: Lifestyle Medicine, Blue Zones, Quality of Life

Modulation of the gut microbiota by prebiotic fibers from potato starch

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In developed countries people began to pay more attention to maintaining healthy dietary habits of society as the increased rate of childhood obesity was observed. There are many types of foods dedicated to children, but there is still a lack of functional foods that boost their overall health by i.e., enhancing the gut microbiota and maintaining a healthy weight. Several types of fiber have an unfavorable influence on the sensory properties of meals or the digestive system, which is why the production of modified dietary fibers, which have little or no effect on the taste of the meals, and have all the advantages of prebiotics, such as modulating gut microbiota composition, promoting satiety, and enhancing human metabolic parameters is of high importance. In the presented research, a resistant dextrin from potato starch with prebiotic properties was tested as a possible additive to new vegetable-fruit preparations that fall under the functional food category and are primarily intended to help overweight children lose weight and improve their health markers due to changes in the gut microbiota. It was hypothesized that the resistant dextrin will be a viable source of carbon for the intestinal bacteria and will cause a positive change in the metabolic profiles of overweight children. The results of in vitro study showed that intestinal bacteria isolated from the fecal samples showed better growth dynamics on the medium enriched with resistant dextrin with a clear dominance of strains lactobacilli, Bifidobacterium, which was reflected in a positive value of prebiotic index. Furthermore, addition of resistant dextrin caused a decrease in pH of the co-culture over time. The results of in vivo study showed that the addition of resistant dextrin to vegetable-fruit preparations caused an increase in the concentrations of the studied acids (SCFA) after 6 months of their intake. It is likely that the regular consumption of vegetable-fruit preparation alone contributed to the increases in SCFA concentrations (and decreases in BCFA) during the 2nd stage of the study. There was also a positive effect of the addition of resistant dextrin to preparations on the maintenance of the positive effects 3 months after discontinuation of intake.

Keyword: resistant dextrin, dietary fibers, prebiotics, microbiota, obesity

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Associations between lifestyle changes in female students as they transitioned from secondary school to university

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Background: The study examined the associations between lifestyle changes in female students as they transitioned from secondary school to university. In addition, we investigated the associations between individual lifestyle factors and the frequency of physical activity (PA) per week. We assessed the quality and quantity of sleep, dietary habits, including fruit and vegetable intake, alcohol and tobacco consumption, and the weekly frequency of PA.

Methods: This cross-sectional study was conducted among first-year female bachelor's degree students studying at public colleges and universities in Slovakia. A total of 1,177 students with a mean age of 20.64 years (±1.36) participated in the study. A questionnaire survey was used to conduct the research. Within the survey, we used two standardized questionnaires: the Healthy Lifestyle Questionnaire (EVS-II) and the Pittsburgh Sleep Quality Index (PSQI). Data collection started in December 2022 and was completed in February 2023.

Results: We found a significant difference in most of the examined lifestyle variables prior to entering university compared to the first semester of study after starting university, to the detriment of university study. We found a significant relationship with PA for all lifestyle variables during university study, whereas the results were inconlusive before entering university.

Conclusion: Understanding how PA interacts with individual lifestyle factors could provide a basis for health behavior interventions during the critical period of transition from secondary school to university.

Keywords: secondary school to university, women, lifestyle, Pittsburgh Sleep Quality Index, Healthy Lifestyle Questionnaire.

The history of football in the Tarnopol Voivodeship in the years 1920-1939

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The aim of the work is to present football in the Tarnopol Voivodeship in the years 1920-1939. The area of the Tarnopol Voivodeship was located in the south-eastern part of the Second Polish Republic. The Tarnopol Voivodeship was created on December 23, 1920 and covered an area of 16,533 km^2 and had a population of 1,600,400. The Tarnopol Voivodeship was inhabited mainly by Polish people, Ukrainian people and Jewish people.

Sports clubs and societies from the Tarnopol Voivodeship, running the football section in organizational terms, were part of the Lviv OZPN. In the Tarnopol Voivodeship, since 1935, the Tarnopol subdistrict has been operating in the structures of the Lviv District Football Association (Lviv OZPN). The establishment of the Tarnopol subdistrict had a positive impact on the development of the discipline in the discussed area. Football developed among the Polish, Ukrainian and Jewish people living in the Tarnopol Voivodeship. In the 1920s and 1930s, there was an increase in the number of clubs and societies running a football section.

In the league games of the Lviv OZPN from the Tarnopol Voivodeship - in the years 1921-1939 - including: football sections of the following sports clubs and societies took part: Military-Civilian Sports Club (WCKS) Kresy Tarnopol, Janina Złoczów (formed under the name Złoczovia Złoczów), Gwiazda Brody, Jehuda Tarnopol, Police Sports Club (PKS) Kresowiacy Zbaraż, Legion Tarnopol, Lubicz Brody, Meta Tarnopol, Sports Club (KS) Strzelec Czortków, Rusałka Złoczów, Gymnastic Society (TG) "Sokół" Czortków, TG "Sokół" Brody, Sparta Trembowla, UST Podilla Tarnopol, WKS 54 pp. Tarnopol, WCKS Brody, Jewish Workers' Sports Club (ŻRKS) Tarnopol, Jewish Sports Club (ŻKS) Złoczów, ŻTGS Złoczów. The Ukrainian sports clubs and associations running football sections in the Tarnopol Voivodeship include: UST Podilla Tarnopol, Meta Tarnopol and Rusałka Złoczów.

The best football teams in the Tarnopol Voivodeship include: WCKS Kresy Tarnopol, Janina Złoczów - among the Polish population; Jehuda Tarnopol, ŻKS Złoczów – among the Jewish population and UST Podilla Tarnopol among the Ukrainian population.

Keywords: Poland, Tarnopol Voivodeship, sport, football

Gender peculiarities of health-related quality of life among an working-age population

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Introduction: Health-related quality of life (HRQoL) is a multidimensional concept that refers to the health aspects of quality of life and encompasses physical and occupational functions, psychological status, social interaction, and somatic sensations. Notably, an accurate determination of HRQoL can yield comprehensive data on overall health status, which can alert public health officials to the burden of physical and emotional health as well as preventable diseases. The assessment is not only seen as a relevant outcome measure for patient population but is also an accepted metric for healthy groups of people, including employees working in various fields and environments.

Methods: Theoretical analysis and generalization of information from electronic databases using HRQoL measures, as well as methods of induction, deduction and comparative analysis have been used.

Results: A human working capacity is one of the mental and physical well-being aspects. Research results have evidenced that workload, the lack of social support, stressful situations have been associated with lower HRQoL indicators and depended on age group, status and education, individual lifestyle, race, ethnicity, occupation, family status. etc. HRQoL analysis results and self-assessment of health status have proved that the gender gap is largely explained by socio-demographic and socio-economic differences between males and females. Although men may have lower level of health than women, shorter life expectancy at any age, and a higher prevalence of life-threatening diseases, some studies have evidenced that women have lower HRQoL indicators than men. Nowadays, however, the evidence is ambiguous, thus population-based HRQoL analysis more often controls the potentional confusion by gender, than gender research as the independent variable.

Conclusions: Therefore, the research results emphasize the importance of the HRQoL indicator, which is an informative marker for the prevention and treatment of diseases affecting the physical and mental health of working age population.

Keywords: Health-Related Quality of Life (HRQoL), working capacity, females, males.

Physical activity and aerobic endurance of medical students after the covid-19 pandemic

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Introduction: Based on an analysis of the problem and personal research, the paper sought to learn about the aerobic endurance of students at the Faculty of Medicine of the University of Pavel Jozef Šafárik in Košice following the COVID-19 pandemic.

Material and methods: The contribution is part of the research task VEGA N. 1/0234/22 "Influence of pandemic Covid 19 on readiness and organism reaction of university students on physical load" completed at the UPJŠ Institute of Physical Education and Sports in Košice. The research sample included 116 students (80 women and 36 men) who chose to participate in some of the various sports as part of their studies. The study was conducted in November 2022. We also collected data on physical activity using a shortened version of the International Physical Activity Questionnaire (IPAQ), and aerobic endurance was measured by running for 20 metres in a row using Polar TEAM Coach Basic.

Results: The empirical findings underscore a gender gap in leisure-time physical activities: specifically, 55.5% of male participants engaged in physical activities three times per week, in contrast to 39.2% of their female counterparts. Further, in the fitness tests, male participants notably outperformed females, with mean times of 2 minutes and 20 seconds in the aerobic threshold compared to 1 minute and 23 seconds for women.

Conclusions: Despite these manifest differences, the low correlation coefficients indicate that there exists no statistically significant relationship between time spent in the aerobic threshold and the frequency of physical activity for either gender. These findings consequently raise critical questions concerning the underlying factors that contribute to gender disparities in physical activity and overall fitness, thus necessitating additional focused research.

Keywords: medical, university students, fitness, IPAQ, aerobic threshold.

Sport Taekwondo's Peacebuilding Failures and Recommendations for Future Initiatives

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Introduction: World Taekwondo (WT) is the governing body of Olympic Taekwondo, and it has aligned itself with the International Olympic Committee's (IOC) peacebuilding goals. As WT has increasingly dedicated itself to IOC philosophies and interests, peacebuilding has likewise become a part of WT's brand. Yet, the Taekwondo organization's peacebuilding activities have not been examined within a Peace Studies nor a sports marketing lens. The present interdisciplinary study aims to examine the history of WT's peacebuilding efforts through these two lenses to ascertain the efficacy of these endeavours and, by doing so, provide recommendations for such activities in the future.

Material and methods: A qualitative literature review was performed on WT's known peacebuilding activities and then a SWOT (strengths, weaknesses, opportunities, and threats) analysis was performed to determine if the organization has been effective.

Results: This study found that WT does not conduct its peacebuilding activities entirely within a Peace Studies paradigm, mostly likely due to it being a sport, as opposed to a peacebuilding, organization. Consequently, many opportunities for bettering the world–arguably Taekwondo's primary goal–are being missed.

Conclusions: This study suggests WT adopt just such a lens in order to maximize its benefits around the globe. Doing this would broaden not only its grassroots endeavours but also its international peacebuilding potential.

Keywords: Olympics, Peace Studies, martial arts, SWOT, World Taekwondo, sport diplomacy

The Role of Exercise in Strengthening Innate Immunity

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The immune system is a complex network of cells, tissues, and organs that collaboratively defend the body against foreign pathogens in two response manners - innate and adaptive.

Innate immunity is a defense mechanism that provides general, non-specific protection dependent on physical and bio-chemical barriers and white blood cell activity. Unlike adaptive immunity, innate immunity does not rely on prior exposure to specific pathogens.

Cellular components, such as natural killer (NK) cells, phagocytes, neutrophils, and macrophages, play crucial roles in eliminating threats even in the absence of specific antibodies.

Numerous studies have explored the effects of exercise on immune cells, focusing on leukocytes and NK cells. Two main avenues of research have emerged. First, comparing well-trained athletes and sedentary individuals consistently shows superior immune function in athletes. Second, investigation of changes in immune cell functions in subjects who engage in various durations and intensities of training under specific conditions. The findings reveal that increasing leukocyte levels, including leukocytes, neutrophils, lymphocytes, and NK cells depends on exercise intensity. As exercise intensity gradually increases, reaching a maximum, the numbers of these immune cells rise, while the T4/T8 cell ratio decreases. Notably, NK and T8 cells possess a higher density of β2-adrenergic receptors than T4 cells. This boost in NK levels and their functional efficiency can compensate for transient immune vulnerability due to T4/T8 ratio changes. NK cells are unique immune components, displaying spontaneous cytolytic activity against tumors, and therefore are essential in the early defense against the spread of malignant diseases.

In the current danger of the COVID-19 pandemic, understanding the role of exercise in strengthening innate immunity is particularly relevant.

Physical exercises act as a modulator of the immune system, releasing pro- and anti-inflammatory cytokines, increasing lymphocyte circulation, and recruiting immune cells.

Keywords: innate immune response; immune cells levels; physical exercises

The relationship between physical activity and anxiety in nurses - selected aspects

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Introductions: Research shows that an appropriate level of physical activity in the form of cardio activity (such as aerobic exercise) has a positive effect on health however, its deficiency can cause many disorders in various systems and organs of the body. In addition, performing appropriate physical exercises helps restore emotional balance and reduce the negative consequences of stress inherent in the work of nurses. Increasing knowledge about the level of physical activity and anxiety level of nurses.

Material & Method: The research was conducted in the Silesian Voivodeship. They included nurses working in various systems, including 12-hour shifts and a single-shift system. An original survey questionnaire and a questionnaire were used to diagnose the intensity of experienced anxiety.

Results: It was found that there is a certain relationship between the level of physical activity of nurses and the intensity of anxiety. A positive attitude towards exercise correlates significantly with lower levels of anxiety.

Conclusions: For nurses with a low threshold of experiencing anxiety, physical activity may be a specific preventive factor contributing to improved well-being. It helps protect against the negative effects of experiencing numerous difficult situations in professional and private life.

Keywords: nurses, positive attitude, subjective quality of life, exercises, anxiety, physical activity.

Enhancing Motor Abilities in Individuals with Cerebral Palsy through Online Karate Training: A Case Study

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Introduction: This research focuses on exploring the impact of online karate trainings on individuals with cerebral palsy, a condition characterized by impaired muscle coordination. The study aims to assess the potential of martial arts, specifically Budo, as a rehabilitative intervention to enhance motor abilities and overall functionality.

Materials and Methods: A case study approach was utilized, involving a participant with cerebral palsy. The participant engaged in online karate training, lasted for 4 months. Online sessions were held once a week and participant practiced with video material twice a week. Regular qualitative assessments and interviews were conducted to monitor the progress and evaluate the improvements in motor abilities and daily activities. The interview served as a qualitative method to understand the participant's perceptions and feelings regarding Budo and its impact on his condition.

Results: Preliminary observations indicate a notable improvement in the participant's abilities and his positive feelings towards Budo. Initially, the participant demonstrated poor motor abilities, being unable to walk or stand alone, and experienced difficulties in performing everyday activities, such as managing zips and buttons. The participant expressed a sense of empowerment and enhanced self-efficacy through the practice of Budo, reflecting an improvement in both physical and psychological aspects. Motor assessment shows improvement in strength, coordination and balance while performing karate-specific motor tasks.

Conclusion: This study provides insightful preliminary observations on the potential benefits of online karate trainings in the form of Budo for individuals with cerebral palsy. The enhanced physical abilities and positive psychological impact underscore the holistic value of martial arts as a therapeutic intervention. Further research with a larger sample size is warranted to validate the findings and explore the extensive scope of martial arts as a rehabilitative strategy for improving motor functionalities and psychological well-being in individuals with cerebral palsy.

Keywords: neurology, qualitative research, quality of life, interview analysis

Static balance assessment using modified version of Flamingo Test for taekwon-do athletes.

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Introduction: Achieving maximum strength is intricately linked to optimal static balance, especially in disciplines like taekwondo. This study is designed to investigate the variations in static balance assessments among taekwondo athletes by contrasting standard Flamingo test with its modified versions tailored to the distinct nature of the sport. The aim is to determine whether this tailored assessment offers a more accurate reflection of the athletes' static balance capabilities, considering the unique demands and movements of taekwondo.

Material and methods: A total of 20 taekwondo athletes, consisting of 8 females and 12 males (average age: 30.61 years), participated in this study. All participants were adult with at least 2 years of experience. The athletes underwent standard and modified versions of the Flamingo Balance Test, the latter being tailored to meet the specific demands of taekwondo. The measurement criteria in both tests are identical, which allows for the verification of the correlation between the two versions of the test. The modification involves changing the starting position to the final phase of a side kick (kor. *Yop Chagi*). Each athlete performed both versions of the test twice before and twice after a standard training session, for both lower limbs, to validate its repeatability and reliability.

Results: The examined Taekwon-do athletes made, on average, 2.35 errors in the Flamingo test for the right limb and 2.5 errors for the left limb. In turn, in the modification of this test, the subjects made an average of 17.15 errors for the right and 17.63 for the left. The results of the examined athletes in the Flamingo test between the first and the second attempt did not show a significant difference for both the right limb ($p=0.07$) and the left limb ($p=0.27$). No significant difference was also demonstrated in the author's modification for the right limb ($p=0.09$) and the left limb ($p=0.35$). There were moderate correlations between those test results for right lower limb ($r=0.489$) and left lower limb ($r=0.478$).

Conclusions: The higher number of errors made in the modified test indicates its higher sensitivity. The modified Flamingo test is better suited for assessing the static balance of martial arts practitioners, provided it meets the criteria for repeatability and measurement reliability.

Keywords: Postural balance, Martial Arts, Test Validity

The effect of the length of sports experience on the prevalence of non-specific back pain and injuries in football and hockey

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Introduction: Back pain is one of the most common health problems not only among the general population but also among athletes. However, there is a lack of evidence-based findings on the dose-response effect of athletic training on back pain and injuries. The study aimed to find out whether the training experience affects the intensity of back pain and the number of injuries in moderate-to-high performance level team sports athletes.

Methods: A total of 147 male football players (age 27.8 ± 5.9 y; training experience 17.2 ± 5.6 y) and 179 male ice hockey players (age 29.2 ± 5.9 y; training experience 20.5 ± 6.1 y) were asked to fill out questionnaires focused on back pain and injuries: Oswestry disability index (ODI) and McGill Pain Questionnaire (MPQ). In addition, we investigated the number of back injuries that occurred during the sports career of athletes.

Results: A nonparametric Spearman correlation was performed to determine if a relationship existed between the training experience of athletes and the occurrence of back pain and back injuries. Spearman correlation analysis revealed significant positive associations between the length of training experience and the occurrence of thoracic pain ($p=0.005$), low back pain ($p=0.016$), thoracic injuries ($p=0.006$), and ODI ($p=0.007$) in football players. In hockey players, training duration was significantly correlated with the occurrence of low back pain ($p<0.001$) and injuries (=0.006), ODI ($p<0.001$), affective dimension ($p<0.001$), evaluative dimension ($p=0.002$), miscellaneous dimension ($p=0.027$) and total MPQ ($p=0.029$).

Conclusion: The results of this study suggest that length of training experience is another important factor influencing back injury pain. Therefore, it is necessary to focus increased attention on more experienced players and include considerably more compensatory exercises and time to recover in their training process.

Keywords: football, ice hockey, back pain, McGill questionnaire, Oswestry Disability Index

Eco-friendly bioplastics as an alternative to traditional, nondegradable plastic.

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Environmental pollution with plastics is currently very serious and global problem not only in Europe, but also all over the world. The world production and consumption of plastics has increased many times over the last few decades. Due to improper disposal of plastic products after their use (including insufficient level of recycling), pollution with these waste materials, especially in fragmented form, is already observed everywhere, in water (especially in the seas and oceans), air and land (beaches mostly). Microplastics are nowadays very important problems related to the negative impact on living organisms in the environment. Shredded plastics pose a threat to both the aquatic and terrestrial environment. Especially large water reservoirs like seas and oceans are exposed to microplastic wastes, because they are the final recipients of the pollutants entered them through surface waters. Dependently on the density of microplastics, they are able to flow on the surface (when density of MPs is lower than water density) or fall on the seabed (density of MPs is higher than water density). In both cases these plastic microparticles are very dangerous for organism, because imitate plankton and benthic invertebrates. Terrestrial environment is also significantly exposed on microplastics contamination. They go to seawage treatment plant where the sludge is finally formed and used as soil fertilizer. With this respect, application of biodegradable and compostable polymers wherever it is possible seems to be alternative to nondegradable and environmentally persistent plastic. Biodegradable and biocompatible polymers are more and more popular in human health and environment protection. Advantages and disadvantages of biodegradable/biocompatible polymers, their mechanism of biodegradation as well as examples of application especially in our daily life will be presented.

Keywords: eco-friendly polymers, bioplastics, compostable polymers, biodegradation, microplastics

Quality and lifestyle of patients with thyroid diseases

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Introduction: It is estimated that thyroid diseases affect about 20% of Poles, but many of them are not aware of the disease. The most common thyroid diseases include hyperthyroidism and hypothyroidism, as well as Hashimoto's disease and Graves' disease. Treatment usually involves pharmacological therapy and diet, and removal of the thyroid gland is the most radical form of treatment for diseases of this gland. The aim of the study was to investigate the impact of thyroid diseases on the patient's quality and lifestyle.

Material and methods: The research was conducted using a survey consisting of 28 questions that concerned, among others: the duration of the disease, age and circumstances of its diagnosis, as well as the impact of the disease on individual areas of the patient's life. Questions were also asked about the assessment of health and well-being, the presence of comorbidities, and the type of complications occurring. Respondents were also asked about practicing sports and whether thyroid diseases forced them to limit physical activity. The survey was anonymous and completed with the consent of the respondent. A group of 100 people with thyroid diseases took part in the study.

Results: In the examined group of patients, the majority suffered from Hashimoto's disease (41%) and hypothyroidism (40%). The rarest disease turned out to be thyroid cancer (5%). Weight gain due to thyroid disease led to cessation of physical activity in 37.5% of respondents. Moreover, of those who indicated limited physical activity, 27% declared excessive sweating, which was bothersome and could be a factor that increased discomfort during any physical activity. The occurring weight gain and inability to regain normal weight had a negative impact on self-esteem, which may be additionally lowered as a result of mental disorders and mood swings. Moreover, complications of thyroid diseases such as chronic fatigue or drowsiness significantly affect the professional life of patients. Despite the popularity of diets among respondents, in 2/3 of cases the diet did not bring the expected results and it was not possible to restore normal body weight.

Conclusion: It has been shown that thyroid diseases have a significant impact on the quality and lifestyle of patients, primarily through weight gain and physical activity. Thyroid diseases also resulted in lower self-esteem and chronic fatigue. Relationships with family and friends also suffered.

Keywords: quality of life, thyroid, Hashimoto

Cross-coherence of selected actions of wheelchair fencers

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Aim of the study: We assumed the existence of differences in the activation of selected upper limb muscles in wheelchair athletes at specific frequency levels. For this purpose, the following frequency levels were selected: alpha 2-16 Hz, beta 17-30 Hz, gamma 31-60 Hz. For muscle pairs: 1) biceps/triceps, 2) flexor carpi radialis/extensor carpi radialis.

Participants: The study included 16 athletes of the Polish Paralympic wheelchair fencing team: mean age 31 (7.96) years, mean body height 1.7 (0.1) m, mean weight 64 (9.6) kg), including 7 representatives of category A and 9 of category B. The EMG signal was recorded using a 16-channel EMG system (Noraxon, DTS, Desktop Direct Transmission System, Scottsdale, Arizona, USA) with a 16-bit sampling rate of 1500 Hz. Dedicated software was used for the analysis of system data (MyoResearch XP Master Edition for DTS Noraxon).

Material and Methods: Coherence analysis of recorded upper limb EMG signals in wheelchair fencers was carried out. The recorded EMG signals were subjected to time-frequency transformation. Scalogram waveforms were determined using the continuous wavelet transform (CWT). Time-frequency coherence maps were obtained from the analysis to determine validation in frequency bands.

Results: The analysis included three frequency bands, for which the following parameters were calculated: Gband—share of high 0.9–1 coherence in a given frequency range, Mband—mean coherence in a given frequency range. The analysis revealed significant differences in the gamma 31-60 Hz and alpha 2-16 Hz frequency bands. Significantly higher coherence values were observed in category A fencers.

Conclusions: Frequency domain coherence analysis is able to functionally determine the strength of neuronal synchronization between muscles, enabling a comprehensive study of the neuronal mechanism underlying motor function recovery and motor control. Low gamma level frequency can be explained by the need to quickly integrate information under dynamic conditions and generate appropriate motor control, reflects corticomedullary coupling. Alpha frequency reflects the reticulospinal pathway responsible for stimulation of the distal muscles of the wrist and hand.

Keywords: Intermuscular synchronization, wheelchair fencers, wavelet analysis

How do calorie-restricted plant-based diets affect human health?

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Introduction: A large number of interventions have recognized the benefits of caloric restriction and plant-based diets in terms of anthropometric or health indicators.

Objective: This meta-analysis aimed to evaluate the influence of Caloric Restriction Plant-Based Diet (CRP-BD) that is Dąbrowska Diet (DD) and Daniel Fast (DF) on health status in both healthy and unhealthy adults and assess the short- and long-term effects of dietary intervention.

Materials and methods: We conducted a meta-analysis using articles available in 6 databases including MEDLINE, Sport Discuss with Full Text, Science Direct, Scopus, also Web of Science and Google Scholar from inception to June 2021. We investigated selected health indicators (body composition, hematological parameters, lipid profile, carbohydrate metabolism, renal function and hepatic function, total serum protein and serum protein fraction, inflammation indicator, electrolytes, blood oxidative stress and antioxidant status, blood pressure). The study included 318 obese and largely healthy adults with increased body mass index (BMI) (mean age 47.4-62.5 in the Dąbrowska diet and 35.0-45.2). Twelve full-text types of dietary intervention outcomes were evaluated and analyzed in terms of qualification for the meta-analysis. For all variables, for the calculation of average effect size, we applied a random-effects model.

Results: We observed statistically significant changes after CRP-BD interventions in the health indicators selected. These included decreased body mass (BM, average -4.3 kg), body mass index (BMI, average -1.4 kg/m^2), total cholesterol (TC, average by 39.3 mg•dL^{-1}), triglycerides (TG, average by 46.3 mg•dL^{-1}), high-density lipoprotein cholesterol (HDL-C, average by 4.7 mg•dL^{-1}), low-density lipoprotein cholesterol (LDL-C, average by 24.1 mg•dL^{-1}), insulin level (average 1.2 µU•mL^{-1}), homeostasis model assessment of insulin resistance (HOMA-IR, average 0.24), malondialdehyde (MDA, average -0.12 µmol·L^{-1}), urea (average by 7.2 mg•dL^{-1}), systolic blood pressure (SBP, average by 5.9 mmHg), heart rate (HR, average by 2.7 bpm) and increased level of potassium (average 0.3 mmol•L^{-1}).

Conclusions: CRP-BD with no intake of refined foods and animal products can effectively improve health in terms of changes in selected health indicators. The lack of sufficient scientific research necessitates an attempt to investigate the health effects of very-low-calorie plant-based diets, especially in the context of a long-term assessment.

Keywords: caloric restriction plant-based diet, Daniel fast, vegetable-fruit diet

Physical activity in the treatment of anxiety disorders

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Anxiety disorders significantly reduce the quality of life, leading to difficulties in interpersonal relationships, limitations in the workplace and disruptions in everyday activities. There are no clearly defined guidelines for the prevention of anxiety disorders. However, promoting mental health awareness, healthy lifestyles, effective stress management strategies, and access to psychological support can help reduce the risk of developing these disorders and improve society's overall quality of life. By including physical activity in prevention, it is possible to actually improve the quality of life. Regular physical exercise has a positive impact on mental health, helping to reduce anxiety levels and improve mood, which effectively prevents the occurrence of anxiety disorders.

This article focuses on the role of physical activity as a complementary therapeutic tool in the treatment of anxiety disorders. The benefits of regular physical activity were discussed and various forms of physical activity which influence the reduction of anxiety symptoms were analysed. Scientific evidence was presented confirming the effectiveness of physical activity in the treatment of anxiety disorders and the biological mechanisms that influence the beneficial effects of physical activity in the treatment of anxiety disorders, including the effect on the nervous system, stress hormones and brain neuroplasticity. The article aims to emphasize the importance of physical activity as a component of a comprehensive approach to the treatment of anxiety disorders.

Introducing physical activity into therapeutic plans for patients with anxiety disorders increases the effectiveness of therapy and contributes to improving the quality of life of these people.

Keywords: physical activity, anxiety disorders, quality of life

The effectiveness of training programs on the level of obesity levels reduction among Algerian women

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This study aimed to know the effectiveness of a proposed training program to reduce the level of obesity among Algerian women. The research sample consisted of 300 Algerian women who accepted voluntary participation in this experience. All of them suffer from the problem of overweight. That was calculated based on BMI (body mass index). The program proposed consisted of a cardio program with and without diet program. For three months, with 90 minutes for every day. After three months. We agreed that a cardio with diet program is more effective than without diet. Conclude in this study as best program lifestyle factors promoting physical activity and improving nutritional education among Algerian women.

Keywords: obesity - sports - training program

The effect of augmented reality (AR) on improving the educational process for some basic skills in physical education

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The paper explores the potential use of augmented reality (AR) in improving the teaching process of basic skills in physical education. AR can provide an interactive and immersive learning experience for students, using animation, films, 3D models, and virtual assistants that help students better understand concepts and improve their skills in a virtual environment. Challenges with AR include sign detection and usability issues, as well as focusing vision and ignoring motor feedback. However, studies have shown that the use of augmented reality in physical education can be effective in teaching spatial content and improving performance and mastery of content for different learning experiences. The document reviews the ways in which augmented reality can be used to enhance physical education, such as interactive educational programs, virtual training, transforming games into group games, visualization of anatomy and physiology, virtual field trips, cooperative learning, and performance analysis. The study compared modern methods in augmented reality with traditional methods for basic skills in physical education and showed that modern methods offer slight improvements in some aspects, but other factors must be considered before making a final decision on their use. The paper notes that the potential for augmented reality to enhance the learning process in physical education is great, and can provide personalized feedback and opportunities for exploration and collaboration.

Keywords: augmented reality(AR)- catch the ball – kick the ball

The impact of fitness activities on the psychoemotional well-being of elderly women in Ukraine during times of conflict

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Ukraine has faced complex challenges in the context of an ongoing military conflict, whichcan significantly impact the psychological and emotional well-being of its population. Elderlywomen, as a vulnerable social group, may experience particular difficulties in times of war. Thisresearch aims to investigate the influence of fitness activities on the psychoemotional well-being of elderly women in Ukraine during the conflict. Methods. Collection and analysis of statistical data on the psychoemotional well-being of elderly women in conflict-affected regions of Ukraine.Results. In order to assess the impact of fitness activities on the psychoemotional well-being ofelderly women in Ukraine during the ongoing military conflict, we conducted a thorough analysisof the collected data. The following key findings and conclusions emerged from our research: Prior to participating in fitness activities, elderly women in conflict-affected regions of Ukraine exhibited a range of psychoemotional challenges. These included elevated levels of stress, anxiety, and depressive symptoms, which were attributed in part to the ongoing conflict and its associated stressors. Following the implementation of fitness programs tailored to the needs and preferences of the participants, we observed a significant improvement in their psychoemotional well-being. Participants reported reduced stress levels, increased feelings of empowerment, and a greater sense of emotional resilience. Our data analysis revealed that certain types of fitness activities were more effective in improving psychoemotional well-being among elderly women. Yoga and low-impact aerobic exercises, in particular, were well-received and demonstrated notable positive effects on participants; mental health. While regular participation in fitness activities was associated with more pronounced improvements in psychoemotional well-being, even short-duration sessions had a positive impact. An important consideration in the success of fitness programs was the motivation and engagement of the elderly women. Programs that incorporated elements of socialization, peer support, and encouragement were particularly effective in retaining participants and sustaining their interest. These findings emphasize the importance of implementing and supporting fitness programs as part of holistic strategies to address the psychoemotional challenges faced by elderly women in times of conflict.

Keywords: elderly women, fitness activities, psychoemotional well-being.

Physical activity of prisoners of war in Oflag VII A Murnau during World War II

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Introduction: The outbreak of World War II interrupted the sports activities of athletes, the activities of sports clubs and prevented the organization of sports competitions. Many athletes were drafted into the army and participated in military operations on all fronts of World War II. Some of them died in combat, others were sent to prisoner of war camps. Within the Third Reich and occupied countries the Germans established a system of prisoner-of-war camps for officers (Oflags) and rank-and-file soldiers (Stalags). One of the largest was Oflag VII A Murnau in Bavaria.

Material and methods: Sources were queried at the Archive of New Records, the Military Historical Bureau – Central Military Archives (Warsaw), the Wielkopolska Museum of Independence Struggles (Poznań), the Central Museum of Prisoners of War (Łambinowice), the National Library and the Library of the Museum of Sport and Tourism (Warsaw). Historical research methods were used, mainly analysis and criticism of sources.

Results: Oflag VII A Murnau was established by Germans on September 25, 1939, and liberated by Allied forces on April 29, 1945. During this period, more than 5,000 Polish officers were held there. In order to prevent the „barbed wire disease"; resulting from prolonged inactivity and lack of hope for liberation, a Physical Culture Department was established in the Oflag, whose task was to take care of the constant maintenance of the physical fitness of the POWs. Eight sports clubs were active. Instructor courses, lectures, fitness demonstrations and sports competitions were organized. The most popular disciplines were soccer, volleyball, athletics, gymnastics and tennis.

Conclusions: Despite the very harsh conditions of captivity, the POWs in Oflag VII A Murnau took effective measures to maintain physical fitness. A favorable circumstance for undertaking organized physical activity was the satisfactory state of sports facilities and the high level of consciousness of the POWs, among whom were many athletes, including Olympic athletes.

Keywords: sports, prisoner of war camps, Olympic Games, Olympian

Selected psychological factors and individualized exercise in Low Back Pain

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Background: Chronic back pain generates a substantial burden as the very important cause of disability. More than 85% of back pain cases are classed as non-specific, meaning that there is no clear pathoanatomical cause for the experienced pain. Chronic pain complaints are modulated by many psychological and psychosocial factors and is a complex multidimensional phenomenon.

Aim The aim of the investigation was to determine if the personality features and attitude towards physical activity participate in the variance of symptoms and automatic negative thoughts at chronic musculoskeletal pain patients.

Method: The study included 43 patients, people involved in practicing sports, with Low Back Pain. Duration since initial onset of pain more than 3 months. The following method were applied: semi structural interview, NEO-FFI, The Pain Strategies Questionnaire. Having estimated the parameters of regression, the goodness of fit was tested.

Results Hierarchical regression analyses revealed that extraversion, neuroticism, and the feeling of pain management ($p<0,001$)were significant predictors of negative emotions. The first model explained more than 56% total variance of automatics thoughts. In the above model, the intensity of pain revealed to be a less prominent predictor than the few psychological predictors. Extraversion was the single strongest predictor (negative) of cognitive symptoms. Neuroticism was a positive predictor

Conclusions:

Using measures of the psychosocial and physical health together, probably may allow for more appropriate subgrouping of back pain individuals. . In case of persons with different personalities, one selected approach to the pain therapy will not be efficient in all the cases and in respect to each patient. The results obtained, though so far presented on the basis of the examination of a small number of patients, give some basis to improve the process of identification of patients with the risk of worsening emotional state due to some specified qualities of personality.

Keywords: personality features, attitude towards physical activity, predictors

Grant No. 1/0163/21Prevalence of pain and disability of the spine and joints in selected types of sport

Occupational therapy in Chronic Non-Specific Low Back Pain

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Background: Chronic nonspecific low back pain restricts activity and is a major problem associated with important consequences for patients and families. Occupational therapy has a long history of practice with individuals with stress-related disorders. Therefore, there is a strong rationale for occupational therapy that also addresses menatal factors that may exacerbate chronic pain. The effectiveness of occupational therapy interventions to improve functioning and mental health is still under investigation.

Aims and Methods: Occupational therapy aims to promote health and improve quality of life. The aim of the present work is to present the problems related to occupational therapy that make up the major part of the programs for the treatment of mobility limitations related to different dysfunctions in patients with chronic nonspecific low back pain. Semi-structured interview method/46 patients with chronic nonspecific low back pain.

Results: Selected chronic back pain emotional and cognitive aggravators: selected factors of personality and psychosocial factors, inadequate self-assessment, negative emotions (such as anxiety).A number of factors related to daily activity have been identified: manual handling heavy lifting - twisting while lifting (over size loads); use of hand tools; pulling, inadequate lifting with pushing, over size loads, sustained heavy, handling postures; vibration repetition and duration and others.

Conclusions: Results showed that few standardized occupational therapy interventions exist for individuals. We showed that individuals with chronic non-specific low back pain could be sub-grouped and this pain is heterogeneous. Results also pushed that few standardized occupational therapy interventions exist for individuals with chronic non-specific low back painrestricts and stress-related disorders. Occupational therapy work to help patients improve recovery, and while maintaining the skills that they need to live their lives.

Keywords: occupational therapy, quality of life, back pain aggravators, emotional load

Grant No. 1/0163/21 „Prevalence of pain and disability of the spine and joints in selected types of sport"

Exploring youth understanding of physical activity, health and illness - continuation

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The aim of this study was to present a few techniques that allows you to examine current views on youth perceptions of extra-curricular physical activity. Exploring children's and youth understanding of health and illness still is a special challenge for researchers. The drawings of young children have attracted and interested many psychologists and others professionals in the field of health education. Writing and drawing is popular in child health research and in children's perceptions of physical activity, health and illness. Physical activity promotion is essential within childhood with physical activity levels in childhood influencing lifestyle choices in adulthood and active children tend to be active adults. Regular physical activity is associated with wide-ranging health benefits for children and averts many diseases. Research to increase physical activity in children has, to date, largely underrepresented youth's voices. This assumption needs further study. The participative method, such as writing and drawing is the important point of efficient research methods in health psychology. Art as a form of communication and self-expression takes on a whole new level of importance when we consider the way that children use drawing. Active listening is valued like key point to a youth-centred methodology to explore perceptions Selected findings that describes the analysis of the expressive language of drawings and written comments, suggest that the draw-and-write technique has the potential to provide valuable insights into children's health perceptions. It is through their drawings children express the views for many situations, and interpretations of their physical connections related to the body and social experiences. The draw-and-write technique is interactive and youth's methodology that facilitates the exploration of a wide range of topics and increases the reliability of data. Children's health perception through creative drawing language demand future research - to a large degree it is through their performance and drawings that youth express the interpretations of experiences.

Keywords: active listening, youth**,** out-of-school physical activity, health behaviours, performance

Safe e-seniors in cyberspace

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Digitalization, drastically accelerated by the global pandemic, has resulted in Poles starting to use online services en masse. There is a growing interest in e-administration, telemedicine and online shopping, the use of which has become an integral element of life for many people who previously used the Internet sporadically or only used social media or access to e-mail. Unfortunately, with the information development of society, security threats have become more and more common, and cybercriminals have learned to take advantage of the gullibility of Internet users, especially seniors. People who do not use the solutions provided by the Internet have limited opportunities to fully participate in social, professional and cultural life, which leads to their gradual exclusion, both social and economic, and to deepening existing social divisions. The main benefits for older people resulting from the use of modern technologies are: Socialization - through the ability to communicate and socialize with minimal effort. Tablets and smartphones offer seniors an easy-to-use device that can be programmed to meet their personal needs. They enable seniors to easily stay in touch with friends and loved ones, even if they are unable to leave home regularly Security - Personal monitoring devices can do everything from monitoring a user movement, sleep, location and care patterns so that if a change is noticed, an alert can be sent to family members. Seniors can call for help with the simple press of a button. Entertainment - With the introduction of smart TVs, you can now buy a TV for seniors where seniors can easily access all their favorite shows and movies with one easy-to-use remote control. Convenience - Thanks to modern technology, shopping for necessary items online or via the application is very easy and can be delivered to your home. There are several apps that allow retirees to simply press a button if they need a refill of anything from paper towels to groceries, and it will be promptly delivered to their senior home. To sum up, it should be noted that although new technologies are often a problem for seniors, we must help them master them for two main reasons: Unfortunately, the process of population aging will continue, creating greater requirements for providing care for the elderly, but at the same time, the development of new technologies expands the potential of using them for care activities and even for the care of disabled and sick people. In Japan, we have already seen the first attempts to use anthropoid robots for this purpose. As time passes, subsequent generations entering senior age will have earlier contact with new technologies and will therefore be able to use them more easily.

Firing frequency changes during concentric sub-phases of maximal and submaximal bench press task

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Introduction: The bench press (BP) is a widely used exercise in strength training. Despite numerous studies on muscle activation during BP, little is known about individual muscle frequency changes during the sticking region (SR). This study aimed to evaluate muscle activation during 1 repetition maximum (RM) and 4RM BP in 24 male participants experienced with BP exercise. Electromyography was used to measure muscle activity in various muscles during pre-sticking, sticking, and post-sticking phases, with kinematic data aiding in phase differentiation.

Results: Our findings revealed a significant decrease in muscle activation frequency as participants moved from the pre-sticking to the sticking and then to the post-sticking phases ($p < 0.01$). This decline was evident in both 1RM and 4RM conditions, indicating muscle exhaustion that persisted even after the SR. The SR of the BP is the most challenging part of the exercise, resulting in a decrease in muscle frequency during this phase in both 1RM and 4RM repetitions.

Conclusions: It indicates exhaustion of the muscles which persisted even in the post-sticking phase, highlighting the challenging nature of the exercise. This study presents insights into muscle activity during the BP, which can help understanding the impact of each exercise phase on muscle frequency.

Keywords: bench press EMG; sticking region muscle activation; firing frequency bench press

Computer educational technologies in physical culture and sports

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Introduction: The solution to the problem of organizing classes in a distance or mixed format is the use of computer training programs. The research of scientists is highlighted and made public on scientific platforms that have an impact on the formation of modern informational education. The research consists in the systematization of computer educational resources for physical education and sports.

Material and methods: The research methodology consisted in the study of the scientific works of modern researchers in the direction of the application of computer training programs in physical culture and sports. For this, the method of scientific and methodological analysis of literary sources presented on the Scopus, Web of Science, and Google Scholar platforms was used. 468 scientific journals were analyzed, among which 103 were selected as the most influential in terms of the selected research topic. This article presents references to 14 literary sources.

Results: An analysis of the literature confirms the relationship between computer training and educational performance indicators in various countries around the world. Researchers indicate that there is a need to use artificial intelligence in the educational process. The researchers concluded that the use of information technology in distance learning in physical culture shows a high level of influence on students' interest and motivation in classes, improvement of indicators of cardiovascular functioning of the body. A reliable increase in the improvement of vital performance indicators was established among students aged 16-18 who used computer-based educational systems when learning the elements of sports games. The use of educational information technology in physical culture and sports stimulates improved intellectual and physical activity outcomes in children with congenital psychosomatic health defects. A relationship between the cognitive and affective states of students during the use of computer-based training programs was noted. The data obtained showed that mobile educational games with augmented reality can increase interest in learning and help students acquire teamwork skills. The factors that motivate students in learning through video games were identified. This requires that the video game be socially engaging, fun, challenging but relaxing, and induce positive affect and learning.

Conclusions: During the research, it was found in the works of authors from different countries of the world the consistency of opinions regarding the positive impact of computer training programs on the level of assimilation of educational content and the cognitive, creative, and emotional characteristics of students. The presented developments and research results of various scientists have identical features of the structure and methods of using educational technologies in the field of physical culture and sports.

Keywords: education, information technologies, physical culture and sports.

Evaluation of lower limb power of students in 2021-2023

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Introduction: Physical fitness is an important part of a person's health and high quality of life. Therefore, it was decided to check the lower limb power of a selected group of students over 3 years. The question was posed: what were the changes in the students' average jump height in 2021-2023?

Material and methods: The research material consisted of groups of a total of 59 students from 2021-2023 (2021yrs n=26; 2022yrs n=11; 2023yrs n=22). The students had their height and body weight measured and then took the CMJ (countermovement jump) test, which checked the ability of their lower limbs to generate maximum speed and force during a vertical jump upwards. The BTS G-SENSOR accelerometer was used for the measurements.

Results: The average lower limb power in the study group was 3.30-4.15 kW. No statistically significant differences were observed between measurements in 2021-23 ($p>0.05$) for all recorded indicators of the CMJ test. A correlation was observed between the values of maximum power generated and jump height ($r=0.67$; $p<0.05$) and rebound force and maximum power ($r=0.75$; $p>0.05$)

Conclusions: The study conducted showed no differences in the CMJ test among the 2021-23 students surveyed, and it can be assumed that this group did not experience the impact of the pandemic period on lower limb strength. The correlation between maximum power and jump height was confirmed, which is consistent with the results of other researchers.

Keywords: maximum power of lower limbs, CMJ test, impact of the pandemic period on students' physical fitness

The impact of shift work of operating nurses on physical activity

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Introduction: The aim of the study was to obtain knowledge about the impact of shift work of operating nurses on their physical activity.

Material and methods: The research was conducted on a sample of operating nurses working in hospitals in Czestochowa. The measurement was carried out using a diagnostic survey method, using the author's questionnaire and the standardized Minnesota Leisure Time Physical Activity (MLTPAQ) questionnaire.

Results: Only a dozen or so percent of surveyed nurses working in shifts undertake health-beneficial physical activity. The preferred forms of physical activity in the surveyed population are walking, cycling and exercising at home. The biggest barriers to physical activity are: lack of time, fatigue and insufficient number of 24-hour sports facilities. In turn, the strongest motivation to take up physical activity is to improve your overall well-being and then improve your figure.

Conclusions: The conducted research shows that, according to respondents, shift work has a significant impact on physical activity undertaken by surgical nurses. The obtained results may constitute an introduction to a deeper analysis in developing recommendations regarding the operating nurse's work system.

Keywords: shift work, operating room nurse, physical activity,