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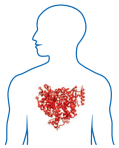
MRTBS 2024
1st International Conference
Modern research trends in biomedical sciences: a holistic approach to health care
Opole, Poland, 17-19.04.2024



Ministry of Education and Science
Republic of Poland

The project is co-financed by the state budget, allocated by the Minister of Education and Science under the Excellent Science II Program (Polska)

1st International Conference MRTBS 2024
Modern research trends in biomedical sciences: a holistic approach to health care

Under the patronage of the rector of the University of Opole, Poland, Prof. Marek Masnyk
and the president of Tzu Chi University of Science and Technology, Taiwan, Prof. Wen-Jui Lo

BOOK OF ABSTRACTS

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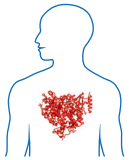
TABLE OF CONTENTS



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FOREWORD

Human health is a complex web of interactions between physical, mental, emotional, social, and spiritual aspects. Nowadays, a holistic, multidisciplinary approach to medicine is not only important but essential for a comprehensive understanding, diagnosis, and treatment of individual and population health problems.

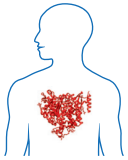
The exchange of ideas between researchers from different branches of science, from basic research to studies that affect people and whole populations, is crucial, especially today when there is so much going on in science. Researchers from different fields often approach problems with unique perspectives and methods, inspiring each other and leading to innovative solutions and breakthroughs. Collaboration enables a more comprehensive understanding of complex issues related to human health and society by incorporating findings from different disciplines. In addition, collaboration enables the translation of fundamental discoveries into practical applications, such as new treatments or strategies. Ethical considerations are also of utmost importance, especially when research is conducted on humans or entire populations, and ethical research requires collaboration between researchers from the fields of health sciences, ethics, social sciences, and biomedicine. Research findings have the greatest impact when they address real-world problems and challenges. Therefore, it is important to encourage interdisciplinary collaboration to ensure research is relevant to the needs of society. In addition, collaboration promotes the validation and replication of research results, which improves the robustness, transferability, and generalizability of results in different contexts.

The MRTBS2024 conference brings together scientists from different disciplines in health sciences and those from different countries and cultures, which is important for creating a holistic approach to health sciences. By bringing together experts from different fields, such as medicine, public health, psychology, physiotherapy, nursing, dietetics, medicinal chemistry, biology, etc., this conference offers a comprehensive understanding of health issues. The integration of these different perspectives promotes a more holistic understanding of health, taking into account cultural beliefs, practices, and social determinants that influence health outcomes, and provides an opportunity for researchers from different disciplines to collaborate on research projects and initiatives, promoting the integration of different methods, theories, and approaches. By bringing together researchers from diverse cultural backgrounds, we also wanted to promote cultural sensitivity and its relevance in health research.

We hope that this extraordinary event will not only be a breakthrough for Opole University and the city of Opole but will also leave a lasting impression on the Polish and international stage in the field of medicine and health sciences.
The project is conducted as a part of the Excellent Science II Program announced by the Minister of Education and Science 2023.

On behalf of the scientific and organizational committee
of the Institute of Health Sciences of the University of Opole

Danuta Wiśniewska



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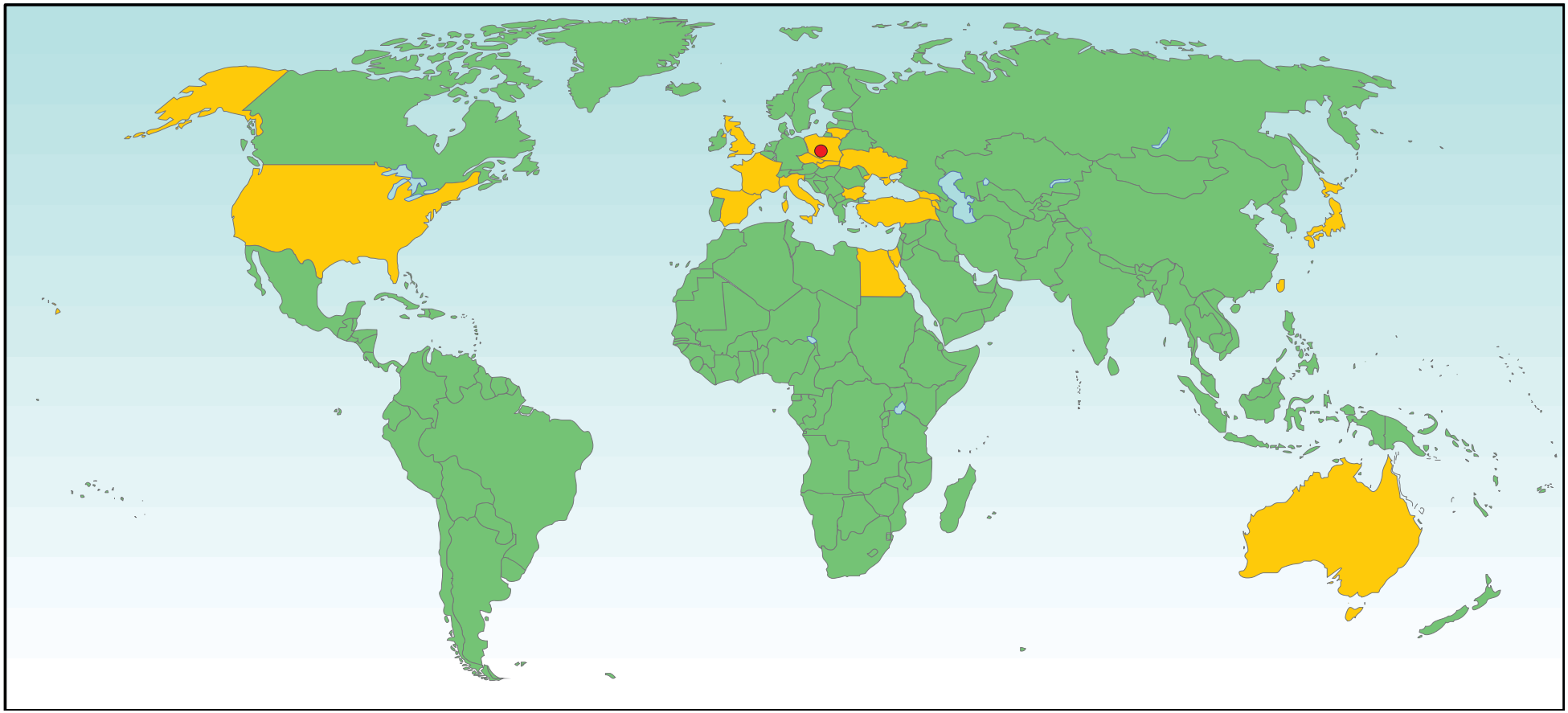
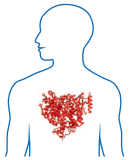


On behalf of the conference organizers, we would like to thank all participants: speakers from various corners of the world, lecturers from renowned Polish universities and scientific institutions, numerous students and health care workers for their active participation in our scientific project.
We hope for another meeting: 2nd International Conference: **M**odern **R**esearch **T**rends in **B**iomedical **S**ciences: a Holistic Approach to Health Care.

Coordinator of Ministry of Education and Science project
The Excellent Science II Program (Polska)
Bożena Ratajczak-Olszewska
Institute of Health Sciences, University of Opole



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PROGRAMME OF 1ST INTERNATIONAL CONFERENCE MRTBS 2024

Modern research trends in biomedical sciences: a holistic approach to health care

Opole, April 17-19, 2024

DAY 1 (17 April 2024)	
Time	**Bioethics session - Auditorium A** (moderators: Prof. Dariusz Krok and Assoc. prof. Danuta Witkowska)
13.00-14.00	Arrival and Check-in
14.00-14.30	Welcome and Introduction from the Chairs
14.30-15.30	**Prof. Błażej Kmieciak** The Maria Grzegorzewska University in Warsaw, Poland *Bioethics, between fear and hope*
15.30-16.00	**MSc Paweł Susłowski** IntegrumMed, Wroclaw, Poland *Shifting the evidence-based paradigm based on the working model of osteopathy and functional medicine: towards an understanding of complexity (personal experience)*
16.00-16.30	Coffee break
16.30-17.00	**Prof. Dariusz Krok** Institute of Psychology , University of Opole, Poland *Coping with chronic illness: Psychological aspects of patient-centred care*
17.00	Group photo
17.00-18.00	Poster session 1 **Hall A1/A2**

DAY 2 (18 April 2024)		
Time	**Biomedical sciences as a holistic approach to healthcare** **Auditorium A1** (moderators: PhD Giovanni Roviello, Assoc. prof. Danuta Witkowska, Assoc. prof. Magdalena Rowińska-Żyrek)	**Health sciences matters!** **Auditorium A2** (moderators: Prof Andrzej Tukiendorf, Prof. Marek Gierlotka, PhD Martyna Kasper-Jędrzejewska)
9.00-9.30	**Prof. Chad L. Leverette** Coastal Carolina University, Conway, USA *The power of partnerships: leveraging expertise, opportunities, and resources to advance biomedical science*	**Prof. William Hills** Coastal Carolina University, Conway, USA *Integration of primary care and behavioral healthcare: Evidence-based outcomes supporting communities of practice*
9.30-10.00	**Prof. Henryk Kozłowski** Institute of Health Sciences, University of Opole, University of Wrocław, Poland *Neurodegenerative diseases: why should we care?*	**Prof. Mieczysław Pokorski** Institute of Health Sciences, University of Opole, Poland *The Aging Process: An Update*
10.00-10.30	**Prof. Milena Salerno** University Sorbonne in Paris, France *Synthesis of copper complexes for potential use in the diagnosis of Alzheimer's disease*	**Assoc. prof. Chi-Ping Chang** Tzu Chi University Science &Technology, Hualien City, Taiwan *Factors associated with the voluntary cessation of clinical practice by nursing students*
10.30-11.00	Coffee break	
11.00-11.30	**PhD Giovanni Roviello** Institute of Biostructures and Bioimaging (IBB) of the Italian National Council for Research, Naples, Italy *Exploring the neuroprotective effects of synthetic compounds for new neurodrug development*	**Prof. Takizawa Shigeo** International Biophilia Rehabilitation Academy, Tokio, Japan *Motivated exercise: a paradigm change in medical rehabilitation*
11.30-12.00	**Assoc. prof. Hayarpi Simonyan** Yerevan State University, Armenia *Synthesis and biological evaluation of unnatural alpha-amino acids and peptide-based systems for biomedical strategies*	**Prof. Giovanni Barassi** University of Chieti-Pescara, Italy *Biophysicsmetric approach in musculoskeletal dysfunctions*
12.00-12.30	**Assoc. prof. Magdalena Rowińska-Żyrek** University of Wrocław, Poland *Metal ions - the eminence grise of antimicrobial peptides?*	**Assoc. prof. Alejandro Mercant** Cadiz University, Spain *Advance Physical Exercise Programs in older people implementable in Primary Care Service, a perspective from the experience and evidences*

12.30-13.30	Lunch	
13.30-14.00	**Assoc. prof. Chiara Gamberi** Coastal Carolina University, Conway, USA *Combating orphan diseases by fly-empowered drug discovery and Drosophila – omics*	**Assoc. prof. Gergana Avramova** Assen Zlatarov University in Burgas, Bulgaria *A holistic way to promoting health by the means of emotional intelligence and art therapeutic approach*
14.00-14.30	**Prof. Milen Todorov** Arsen Zlatarov University in Burgas, Bulgaria *Information technologies as a tool for identification of endocrine disrupting chemicals*	**Assis. Prof. Hsia-Tzu Kao** Tzu Chi University Science &Technology, Hualien City, Taiwan *Advancing indigenous health in Taiwan: enhancing cultural competency in nursing students through service learning*
14.30-16.30	Workshop 1 - **A1***	Poster session 2 **Hall A1/A2/A0**
15.00-17.00	Afternoon tea	
16.30-18.30	Workshop 2 - **A1****	
20.00	Gala dinner	

* Workshop 1: *The art and science of grant writing,* **Assoc. prof. Magdalena Rowińska-Żyrek,** University of Wrocław, Poland

** Workshop 2: *Problems of correct data preparation, accuracy of calculations and correct selection and verification of statistical hypotheses in biomedical research,* **prof. Arkadiusz Liber**, Wroclaw University of Sciences and Technology, Poland

DAY 3 (19 April 2024)		
Time	**Biomedical sciences as a holistic approach to healthcare** **Auditorium A1** (moderators: PhD Agnieszka Szebesczyk, PhD Magdalena Golachowska)	**Health sciences matters!** **Auditorium A2** (moderators: Assoc. prof. Alejandro Mercant, PhD Lucyna Ptaszkowska)
9.00-9.30	**Prof. Monika Bronkowska** Institute of Health Sciences, University of Opole, Poland *Influence of selected immunomodators for nutritional health of human health*	**Prof. Marek Gierlotka** Institute of Medical Sciences, University of Opole, Poland *Multimorbidity in patients with atherosclerosis*
9.30-10.00	**PhD Ilaria Piccialli** Federico II University of Naples, Division of Pharmacology, Department of Neuroscience, reproductive and dentistry sciences, Naples, Italy *Biological aspects of new molecular therapies for neuropathologies*	**Prof. Jacek Jóźwiak** Institute of Medical Sciences, University of Opole, Poland *The prevalence of cardiovascular risk factors and cardiometabolic disease among primary care patients in Poland*
10.00-10.30	**PhD Jessica Holien** RMIT University, Melbourne, Australia *Protein-protein Interactions – untapped drug targets*	**Assoc. prof. Aelita Bredelyte** Klajpeda University, Lituania *Digital competencies of healthcare professionals as a challenge of the contemporary health system*
10.30-11.00	Coffee break	
11.00-12.00	Short communication session	
	PhD Agnieszka Szebesczyk Institute of Health Sciences, University of Opole, Poland *Can a molecule change the way we see the world? – the interaction of metal ions with fragments of heat shock proteins*	**PhD Przemysław Domaszewski** Institute of Health Sciences, University of Opole, Poland *The role of obesity in the manifestation of caffeine-induced effects in women*
	PhD Radosław Balwierz Department of Pharmacy and Organic Chemistry at the Faculty of Chemistry, University of Opole, Poland *Noninvasive transdermal administration of insulin at a therapeutic level – preliminary studies*	**PhD Martyna Kasper-Jędrzejewska** Institute of Health Sciences, University of Opole, Poland *Raising awareness of pelvic floor health to prevent dysfunction – let's start with the local community. Ongoing project highlights based on NICE recommendations*
	Assoc. prof. Mark Hunt Nencki Institute of Experimental Biology PAN, Warsaw, Poland *Exploring the actions of ketamine: abnormal fast brain rhythms in freely moving rodents*	**MSc Marcin Kapczyński** Clarivate Strategic Customer SuccessConsultant, Warsaw, Poland *Most impactful emerging specialty areas and Research Fronts in Clinical Medicine and Biological Sciences*

12.00-13.00	Scientific debate	
	PhD Magdalena Golachowska Institute of Health Sciences, University of Opole, Poland Scientific debate: *Human beings as complex biological systems - multidisciplinary research trends*	**PhD Lucyna Ptaszkowska** Institute of Health Sciences, University of Opole, Poland Scientific debate: *Healthcare systems: a holistic, inter-proffesional paradigm for the future*
13.00-14.00	Lunch	
14.00-14.30	Master Class Session (moderator: PhD Katarzyna Szwamel)	
14.30	Closing ceremony **Auditorium A**	

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ABSTRACTS

Keynote Speakers

BIOETHICS, BETWEEN FEAR AND HOPE

Błażej Kmieciak[a]

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KEYWORDS: bioethics, medical law, medical ethics, patient's rights

Introduction: Today, bioethics is an ever-present element in numerous biological and medical activities. Bioethical analyses must be carried out before scientists undertake, for example, experimental activities. At the same time, bioethical discussions are a constant thread in social debates. They appear in political disputes that evoke strong emotions.

Aim: The aim of the speech is primarily to present the currently most important threads related to bioethical discussion. First, attention will be paid to the goals of bioethics: the preventive nature of bioethics, which, as part of the assessment of given activities, is able to warn scientists against mistakes. From an expensive perspective, attention will be paid to the importance of bioethical reflection when undertaking innovative activities in medicine. We are talking here about the important relationship that exists between modern medical knowledge and ethical standards.

Material and methods: The following methods will be used in the work: analysis of documents and media messages. The case study method will also be helpful.

Results and conclusions: Bioethics is currently an indispensable element of biomedical activities. It is thanks to the bioethical assessment of given clinical activities that it is possible to avoid medical activities that may violate human dignity.

SHIFTING THE EVIDENCE-BASED PARADIGM BASED ON THE WORKING MODEL OF OSTEOPATHY AND FUNCTIONAL MEDICINE: TOWARDS AN UNDERSTANDING OF COMPLEXITY – PERSONAL EXPERIENCE

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KEYWORDS: evidence-based medicine, osteopathic medicine, health care quality, Guillain-Barre syndrome

Evidence-Based Medicine (EBM) and Osteopathic Medicine offer different views on healthcare. EBM focuses on using clinical research and guidelines to make medical decisions, while osteopathy, with more than a century of practice, believes that understanding the body's complex, self-adapting systems is essential. Critics of EBM point to its challenges, such as the fact that it does not always take into account the individual needs of patients and the influence of industry on research. On the other hand, the effectiveness of osteopathy, although proven by various studies, is viewed with skepticism due to unclear mechanisms of action according to conventional research criteria. The discussion on osteopathy underlines the need for a broader approach to medicine. It suggests that the complexity of the body and the role of metabolic movements, which has been emphasized by scientists such as Erich Blechschmidt and Nobel Prize winner Peter Mischel, should be considered beyond the current narrow research framework. This is in line with the latest findings in nutrigenomics and sociogenomics, which show the importance of looking at human health in a broader context.

A practitioner's personal recovery journey from Guillain-Barre Syndrome through the Intensive Care Unit and Rehabilitation Center combined with Osteopathic and Functional Medicine understanding highlights the value of integrating different medical perspectives. It shows how personalized care and understanding the complexity of the human body can lead to better health outcomes.

To improve healthcare, it is suggested that EBM should be further developed to incorporate a greater diversity of evidence, such as patient experience and holistic practices like osteopathy. This would help to address the diverse needs of patients, particularly those with complex conditions. The medical community will be challenged to balance scientific evidence with a broader view of health to ensure that care is truly focused on the patient's needs and circumstances.

What will the results of this study achieve? All project activities should ensure that the knowledge gained becomes a tool that enables proactive care of the pelvic floor at every stage of life, helping to improve quality of life and reduce the risk of possible dysfunction. Pelvic floor education workshops are designed to improve knowledge and thus reduce risky behaviors for the pelvic floor.

COPING WITH CHRONIC ILLNESS: PSYCHOLOGICAL ASPECTS OF PATIENT-CENTRED CARE

Dariusz Krok[a]

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KEYWORDS: coping, chronic illness, patient-centred care, psychological resources

Introduction: Coping with chronic illness can be a challenging and complex process that concerns the whole person. In addition to medical and social factors, patients diagnosed with chronic illnesses frequently experience a range of psychological antecedents and consequences that determine their cognitive, emotional, and behavioural reactions. Therefore, the holistic understanding of coping with chronic illness is vital to patient-centred care which involves the practice of caring for patients (and their families) in ways that are meaningful and valuable to the individual patient.

Aim: The paper will examine some key psychological antecedents and consequences of coping with chronic illness in the context of patient-centred care.

Material and methods: Two studies including over 500 cancer patients were conducted to examine the above-mentioned relationships. Psychological questionnaires measuring coping, stress, meaning-making, illness acceptance, and well-being were used.

Results: Patients suffering from chronic illness tend to rely on both their personal evaluation illness-related risks, personal resources, and coping strategies, which helps them understand current life situations and restore cognitive and emotional balance. Coping with stress in chronic illness is crucial for both mental and physical well-being. Chronic illnesses can bring about persistent stress due to the challenges associated with managing psychological symptoms, medical appointments, lifestyle adjustments, and uncertainties about the future.

Conclusions: Patients apply various coping strategies for managing stress in chronic illness, some of which are effective and beneficial, whereas others may be maladaptive.

THE POWER OF PARTNERSHIPS: LEVERAGING EXPERTISE, OPPORTUNITIES, AND RESOURCES TO ADVANCE BIOMEDICAL SCIENCE

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KEYWORDS: public private partnership, biomedical enhancement, biomedical technology, biomedical research, government agencies

To really advance biomedical science, researchers and institutions must partner together to create, leverage, and align resources and opportunities to solve today's scientific challenges. As technology continues to advance at such a rapid pace, it is quite difficult for institutions alone to build the needed expertise and infrastructure in order to meet these challenges. To this end, Coastal Carolina University (CCU) understands its role in advancing scientific research and education and is taking a holistic approach to leverage every opportunity for maximum benefit to advance science. In this presentation, CCU's strategic partnerships with global and state university consortiums, local healthcare providers, as well as federal and state agencies will be discussed. Details on a number of distinctive internal programs and centers that have been developed will also be shared to illustrate how CCU is positioning itself to greatly expand its ability to solve complex biomedical challenges while also educating the next generation of scientists.

INTEGRATION OF PRIMARY CARE AND BEHAVIORAL HEALTHCARE: EVIDENCE-BASED OUTCOMES SUPPORTING COMMUNITIES OF PRACTICE

William E. Hills[a], Karen T. Hills[b]

• Presented by: William E. Hills

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KEYWORDS: integrated care, behavioral health, practice guidelines, tele-care, healthcare disparities, community of practice

Introduction: The transition of healthcare in the U.S. to models supporting behavioral health provision includes communities of practice, whereby healthcare professionals work as teams sharing information through all phases of patient care. Under the direction of physicians, team members, including mental and community health service professionals, work alongside traditional primary care providers and utilize a range of skillsets based in best- and evidence-based practices for the complete healthcare needs of patients.

Aim: This presentation will provide empirical support demonstrating the efficacy of integrated models for the comprehensive care of patients. In addition, evidence will be presented supporting the use of relatively new, virtual service delivery techniques being developed and implemented to augment services provided in more traditional brick-and-mortar practices.

Material and methods: Literature reviews of databases, including PsycINFO, MEDLINE with Full Text, PubMed, and SocINDEX with Full Text, were conducted through library resources of Coastal Carolina University. Additional information was gathered through article citations and publicly-available, online resources, such as nih.gov and samhsa.gov of the Substance Abuse and Mental Health Services Administration, as needed and/or deemed appropriate.

Results: Among the topics and articles accessed and reviewed for this presentation were demographics of current and future healthcare needs, in both urban and rural areas; integrated care delivery models; and synchronous and asynchronous tele-healthcare delivery.

Conclusions: This literature review, exploring new, transitional forms of integrated care, supports the thesis that new healthcare approaches are needed to bridge the widening gaps between existing healthcare approaches and the growing shortages of professionals educated and trained to meet burgeoning healthcare needs in the 21st century. Challenges facing professionals involved in developing and implementing integrated models of service delivery will be discussed.

NEURODEGENERATIVE DISEASES: WHY SHOULD WE CARE?

Henryk Kozłowski[a], Aleksandra Hecel[b]

- Presented by: Henryk Kozłowski

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KEYWORDS: neurodegeneration, amyloidogenic proteins, aggregation process, copper ions

Introduction: Undoubtedly, Neurodegenerative Diseases (ND) are one of the most serious diseases in modern society. Understanding the molecular mechanisms underlying these disorders is a challenge for global science. ND are still based on huge number of hypothesis, therefore it is important to find out the mechanism which leads to the pathogenic process. Amyloidogenic proteins are associated with severe neurodegenerative disorders afflicting millions of people worldwide.

Aim: The misfolding process leading to protein aggregates is far to be completely understood. However, it is well accepted that many factors are able to influence the morphology and kinetics of amyloids formation. The aim of the project is the understanding of the bioinorganic chemistry of biologically significant copper complexes of the amyloidogenic proteins, in the presence of micelles, which mimic the lipid bilayer, to which the proteins are anchored in vivo.

Material and methods: Understanding the coordination properties of the metal-peptide complexes will require a complex experimental approach. Mass spectrometry will be used to study the stoichiometry of metal-complex formation. Potentiometry was allow us to determine the thermodynamic parameters. In order to precisely identify the binding sites, the donor atoms and the coordination geometry of complex species formed in solution at given pH, a fruitful combination of NMR, UV-Vis, CD and EPR spectroscopic techniques have been used.

Results: The coordination ability of the amyloidogenic fragment of human Prion Protein (hPrP) is significantly different in the aqueous solution when compared to that containing micelles. Our results prove that the metal binding mode strongly depends on the protein backbone structure. The α-helix structuring of the amyloid hPrP domain influences both the metal coordination sphere and the binding affinity.

Conclusions: Essential metal ions are actively involved in several biological events associated with neurodegenerative disorders. The molecular understanding basis of the metal homeostasis and regulations in the cells are critical in identifying the underlying causes for diseases pathophysiology, providing proper diagnosis and treatments. It is also necessary for the development of new therapeutic agents able to treat and prevent their occurrence.

Acknowledgements: Financial support by the National Science Centre (no. UMO-2017/26/A/ST5/00363).

THE AGING PROCESS: AN UPDATE

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KEYWORDS: aging, longevity, phenotype, quality of life

Life expectancy increases due to population aging worldwide. A consequent rise in neurological and cardiovascular disabilities in the elderly overstretches ever-limited health care and socioeconomic resources constituting one of the greatest contemporary challenges. The effective implementation of antiaging strategies requires insights into the mechanisms of the aging process, which is now an area of rapidly expanding medical knowledge. The aim is not only longevity, which is the life expectancy or lifespan, but even more the "healthspan", which is the quality of life in old age. This is a paradigm shift in how we view the process of aging. It includes a departure from the past searching for a distinct decline in a vital body system, be it gene, atherosclerosis, or otherwise related, to viewing aging as an extremely intertwined multifactorial process. This review presents an overview of the contemporary status of knowledge on the underlying mechanisms and health consequences of population aging. The multiplicity of mechanisms interacting in shaping aging is underscored at the molecular, cellular, and systemic levels. These mechanisms form the basis of various theories of the aging process and include telomere shortening, oxidative stress, and cellular wear-and-tear leading to molecular injuries, chronic progressing hypoxia, dysregulated cellular immunity, and neurodegeneration, all accelerating cell senescence. The heterogeneity of the aging phenotype, augmented by epigenetic and environmental factors, underlines differences in individual longevity related to physiological aging. Disease and disability with unpredictably variable functional deficits integrate to act as the body systems traumas and further compromise the homeostatic harmony influencing life trajectories. There is no unified theory of aging. Nor have yet any cellular and molecular changes contributing to senescence become explicitly predominant. Nonetheless, insights into the underlying mechanisms help clarify how the aging process is shaped, thereby aiding in influencing longevity and age-associated diseases.

SYNTHESIS OF COPPER COMPLEXES FOR POTENTIAL USE IN THE DIAGNOSIS OF ALZHEIMER'S DISEASE

Fatma Dellal[a], Romain Triaud[a], Alban Moyeux[a], Olivier Gager[a], Milena Salerno[a]

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KEYWORDS: Alzheimer disease, copper, coordination complexes, positron emission tomography, diagnosis

Since there is currently no cure for Alzheimer's disease (AD), it is important to develop methods that could contribute to its diagnosis and propose new therapeutic approaches for its treatment. Positron emission tomography (PET) is a medical imaging technique that can be used to diagnose Alzheimer's disease, as some radiotracers have been developed to detect amyloid plaques, one of the hallmarks of the disease. However, the radiotracers already used for the diagnosis of AD have a low half-life, which limits their use over the time and requires the presence of a cyclotron close to the examination site. The use of copper complexes could be a good alternative for the development of new radiotracers, since they can be used in PET imaging and have a longer half-life than the other radiotracers already used for AD diagnosis. In this context, the aim of our work is to synthesize copper complexes that could be used as PET radiotracers able to cross the blood brain barrier and detecting amyloid plaques. A first complex has already been synthesized. The physicochemical studies performed indicate that this complex seem to be thermodynamically stable. In addition, cytotoxicity tests on human neuronal cells and labeling tests on brain sections from Alzheimer's patients show promising results. We are also proposing the development of a new copper complex for tau PET imaging.

FACTORS ASSOCIATED WITH SELF-INITIATED DISCONTINUATION OF CLINICAL PRACTICUM IN NURSING STUDENTS OF A FIVE-YEAR JUNIOR COLLEGE PROGRAM AT A UNIVERSITY OF SCIENCE AND TECHNOLOGY IN EASTERN TAIWAN

Chi-Ping Chang[a], Chu-Ru Lin[a], Malcolm Koo[a]

• Presented by: Chi-Ping Chang

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KEYWORDS: nursing college program, clinical practicum, nursing students, five-year junior college program

This study aimed to investigate the factors associated self-initiated discontinuation of clinical practicum among nursing students enrolled in a five-year junior college program. The study utilized the data from the institutional research database of a University of Science and Technology in eastern Taiwan, and the study participants were nursing students who enrolled in the program from 2013 to 2017. Multiple binary logistic regression and decision tree analysis were conducted. The results showed that 105 (8.9%) of the 1,186 students had self-initiated discontinuation of their clinical practicum. Four independent significant factors were found, including living in agricultural towns or remote villages (odds ratio 1.88, p=.004), belonging to the low score group in the course Fundamentals of Nursing (odds ratio 2.78, p<.001), taking sick leave during the first year of study (odds ratio 1.87, p=.003), and having a socially oriented vocational personality type (odds ratio 0.92 for every 10 percentile increment, p=.015). It is suggested that early measures should be taken to address these factors to reduce the occurrence of self-initiated discontinuation of clinical practicum among nursing students.

EXPLORING THE NEUROPROTECTIVE EFFECTS OF SYNTHETIC COMPOUNDS FOR NEW NEURODRUG DEVELOPMENT

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KEYWORDS: Alzheimer's disease, Aβ1-42, ISOAC1, spectroscopy, computational analysis, neuroprotection

Introduction: Alzheimer's disease (AD) presents significant therapeutic challenges, with amyloid β 1-42 ($A\beta_{1-42}$) protein aggregation playing a central role in its pathogenesis.

Aim: Our study investigates the potential therapeutic efficacy of the isoindolinone derivative 3-(3-oxoisoindolin-1-yl)pentane-2,4-dione (ISOAC1) against $A\beta_{1-42}$-induced toxicity.

Material and methods: We employed spectroscopic and computational approaches to explore ISOAC1's ability to mitigate $A\beta_{1-42}$ aggregation and its consequent toxicity. Other experimental analyses included Thioflavin T fluorescence assay, and Western blotting.

Results: Our findings reveal ISOAC1's capacity to disrupt $A\beta_{1-42}$ aggregation and hinder its transition towards β-sheet structures. Computational investigations elucidate ISOAC1's binding mechanisms with $A\beta_{1-42}$, highlighting its potential as a therapeutic agent.

Conclusions: ISOAC1 emerges as a promising neuroprotective compound, offering insights into novel therapeutic strategies for AD treatment. The combined spectroscopic and computational approach herein presented provides a comprehensive understanding of ISOAC1's mechanism of action against $A\beta_{1-42}$-induced toxicity.

MOTIVATED EXERCISE: A PARADIGM CHANGE IN MEDICAL REHABILITATION

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KEYWORDS: aging society, autogenic training, rehabilitation, impairment, disability, fragility

Introduction: The longevity of people leads to an aging society. Our study aims to reduce the incidence of the „disability" the WHO attentive, even if not cured. We work to overcome it by introducing new intervention methods for society to be sustainable. It will provide us with the means to build a healthy society. We report the study contents for it for welfare improvement.

Aim: In 1998, the author and the orthopedic surgeons in Fujisawa City published a reviewed article in the Journal of the Japanese Clinical Orthopaedic Association on an actual situation of rehabilitative medical care for older patients with a diagnosis of impairments due to cerebrovascular disease in a bedridden state at a nursing-type hospital. The result was regaining gait in 50% of bedridden patients transferred from other hospitals. The presentation aims to clarify the method and results of studies until today.

Material and methods: The studies were as follows: This method was clarified by obtaining a U.S. patent, and the effect of re-acquirement of the physical function by FIM score by the method was verified at three facilities. The effect of overcoming impairments was verified at the facilities by fNIRS and fMRI regarding the activation status of brain functions. The verification of the method was clarified by changing the body surface temperature using infrared cameras. The development of the devices for clarification was conducted with the cooperation of an engineer. The mass-produced device is now developing from the device for clarification with a grant, and its details will be reported.

Results and conclusions: At the research start time, it was not possible to train a disabled lower limb as a self-training, so we needed physical therapists. Then, we coined the word "motivative exercise" to describe performing self-training for moving an affected foot by an unaffected one by self-motivation and by others to motivate. The exercise is at the core of the Takizawa Method. It can be used easily by anyone, anywhere, and achieve the results. By spreading it worldwide, the elderly can overcome their disabilities and live independently in an aging society. We hope that our audience will participate in future research.

SYNTHESIS AND BIOLOGICAL EVALUATION OF UNUSUAL ALPHA-AMINO ACIDS FOR BIOMEDICAL STRATEGIES

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KEYWORDS: amino acid, stereoisomerism, albumin, drug delivery systems

Introduction: Unusual amino acids play vital roles in biology, serving as bioactive molecules, scaffolds, and building blocks for drug discovery. The asymmetric synthesis of chiral molecules, especially amino acids, is crucial in pharmaceutical research due to the distinct behaviour of individual enantiomers.

Aim: This study aims to asymmetrically synthesize a novel class of enantiomerically enriched α-amino acids with heterocyclic substituents in the side-chain radical. We seek to investigate their biological activity and potential applications in drug delivery systems.

Material and methods: Using a chiral Ni^{II} complex of Schiff's base derived from dehydroalanine and dehydroamonobutyric acid, along with the chiral auxiliary (S)-2-N-(N'-benzylprolyl)aminobenzo-phenone, we synthesized amino acids with high optical purity (ee>95%). Biological examination involved UV analysis, fluorescence studies, dynamic light scattering (DLS), molecular docking, and cell vitality assays.

Results: Our findings reveal the significant impact of synthesised amino acids on alpha-helix formation, supramolecular networks, and structural changes in serum albumin, as elucidated through CD and UV (HT(V)) spectra. Molecular docking highlighted unique subdomain interactions, showcasing diverse modulatory effects on serum albumin.

Conclusions: This study lays the foundation for further exploration into protein-drug interactions and the development of innovative drug delivery systems. The potential of artificial amino acids offers promising avenues for patient-centric therapies and advancements in pharmaceutical research.

FOCUSED MECHANO-ACOUSTIC VIBRATIONS IN CHRONIC PAIN: BIO-PHYSICO-METRIC APPROACH, KEY TRIGGER POINTS AND POSTURE

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KEYWORDS: physiotherapy, rehabilitation, low back pain, vibration, posture

Introduction: Scientific literature has repeatedly highlighted the mutual influence between the somatic and visceral systems of the human body, which finds its maximum expression in the genesis of Myofascial Key Trigger Points (MKTrPs). It has been observed that the rebalancing of somato-visceral and viscero-somatic reflexes can occur through peripheral stimulations of these MKTrPs using different techniques.

Aim: Our study wants to demonstrate the effectiveness of the treatment of MKTrPs through Focused Mechano-Acoustic Vibrations (FMAV) administered through the Vibration Sound System (Vissman Srl, Fiano Romano, Italy) in cardiac and cancer surviving patients affected by Chronic Low-Back Pain (CLBP).

Material and methods: Clinical data of 20 subjects, examined and treated at the Ce.Fi.R.R. Rehabilitation Center located in the Gemelli Molise Hospital (Campobasso, Italy) and affected by CLBP, were collected and observed from January to June 2023. The sample was composed by 12 women and 8 males, average age 48 years old. The patients underwent FMAV treatment for a total of 8 biweekly sessions. The evaluation systems considered for pain were the VAS Score and for the pain assessment and the Biometric Postural Index (BPI) (Normal value 0-10) derived from the Postural Digitalized Biometry (Diasu Health Technologies, Rome, Italy). The treatment consisted in the application of FMAV for 2 minutes on each of the 4 most dysfunctional MKTrPs previously identified through the study of dermatomal skin impedance thanks to an impedence-metric device named ENF (Fast Therapies, Carpenedolo, Italy).

Results: A statistically significant reduction was detected both for the BPI (T0=13.6, T1=11.2, p=0.004) and the VAS scale (T0=6,45, T1=4,75, p<0.001).

Conclusions: The study showed improvements in terms of pain and posture in patients suffering from CLBP, consequently reflecting on their quality of life without side effects, through a targeted treatment producing systemic neurophysiological effects, according to the principle of minimum stimulus and greater response.

METAL IONS – THE EMINENCE GRISE OF ANTIMICROBIAL PEPTIDES?

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KEYWORDS: antibiotic resistance, antimicrobial peptides, zinc and copper ions

Introduction: It is recently becoming clear that there is a significant and underestimated effect of metal coordination on the antimicrobial activity of antimicrobial peptides (AMPs) – potential treasure troves for the design of novel antibiotics. Beyond any doubt, understanding the molecular mechanisms underlying these disorders is a serious challenge for modern science.

Aim: The way in which metal ions affect the mode of action of AMPs is far from being understood. They may alter the charge/structure/morphology of a given AMP and therefore enhance the AMP antimicrobial potency. The aim of the project is to understand the relationship between metal coordination, thermodynamic stability, structure, morphology and antimicrobial activity of AMPs.

Material and methods: Achieving the overall aim requires a complex experimental approach. Mass spectrometry, potentiometry, ITC and a fruitful combination of NMR, UV-Vis, CD and EPR spectroscopic techniques are used to describe the beautiful bioinorganic chemistry of the studied systems. Antimicrobial assays and studies on regular cell lines establish the biological potency of the novel systems

Results: We have recently elucidated the relationship between Zn(II) coordination, structural, morphological change and antifungal activity of human amylin analogues (pramlintide) and for peptides from the shepherin group (from the plant Capsella bursa pastorsis). We observe a logical sequence of phenomena, each of which is the result of the previous one: (i) Zn(II) coordinates to histidyl imidazoles, (ii) causes a structural change of the peptide, which in turn (iii) results in the formation of fibrils.

Conclusions: Ultimately, this chain of structural changes has (iv) biological consequences – the Zn(II)-pramlintide and Zn(II)-shepherin complex fibrils have a strong antifungal effect. A similar effect is not observed neither in the case of free ligands, nor in the case of their complexes with Cu(II). A working hypothesis on the mode of action of such Zn(II) complexes assumes that the formed fibrils can act as needles, physically damaging the fungal cell wall or membrane.

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ADVANCE PHYSICAL EXERCISE PROGRAMS IN OLDER PEOPLE IMPLEMENTABLE IN PRIMARY CARE SERVICE: A PERSPECTIVE FROM THE EXPERIENCE AND EVIDENCES

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KEYWORDS: frailty, sarcopenia, primary health care, older adults, physical activity, exercise

Introduction: The implementation of tailored physical exercise programs for older adults become increasingly crucial, particularly within primary care settings. This conference presentation explores the multifaceted considerations involved in designing effective exercise programs for older adults, focusing on safety, accessibility, and efficacy. Moreover, it examines the benefits of integrating such programs into primary care services, facilitating personalized guidance and proactive health monitoring.

Aim: to assess the effectiveness of a lifestyle education programs, as well as the impact of a personalized physical exercise program referral algorithm and other guides, tailored to various phenotypes of older adults at risk of dependency, within primary care services.

Material and methods: Different older adults' groups have been selected from the primary care services, previously classified as dependent, frail, prefrail and robust, will be randomly assigned to participate in an educational program, supervised physical exercise sessions, a combination of both, or to a control group. The research involves a period of intervention, followed by a re-evaluation 12 months later. The supervised exercise regimen will cover cardiovascular, muscular, coordination, and balance exercises, progressively adjusting the intensity.

Results: we presented the results and the progression from the last 15 years in our research group in the University of Cádiz. From the results we have strong evidence around the identification in primary care service of different older adults' phenotype, as well as we present the results from the pass and current randomized control trial focus on physical activity programs.

Conclusions: The presented projects seek to advance our understanding of how ultra-personalized exercise programs can benefit individuals at risk of dependency. By adopting a multidimensional approach, the project aims to translate its research findings into practical solutions that can be implemented in social and healthcare settings, ultimately leading to improved well-being and healthcare practices, with the potential for significant societal and economic impact.

COMBATING ORPHAN DISEASES BY FLY-EMPOWERED DRUG DISCOVERY AND DROSOPHILA-OMICS

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KEYWORDS: Drosophila melanogaster, cysts, polycystic kidney diseases

Originally discovered in the fruit fly *Drosophila* melanogaster, Bicaudal C (BicC) is an RNA binding protein needed to set up the oocyte anterior-posterior polarity. BicC mutant flies display understudied pleiotropic defects, while embryos from BicC heterozygote females exhibit variable anterior-posterior defects, the most severe being two-tailed (bicaudal) embryos. BicC is evolutionarily conserved from flies to humans and expressed in all cells. In both vertebrates and *Drosophila*, *BicC* mutations cause renal cysts like those found in polycystic kidney disease (PKD). PKD is incurable and knowledge of its precise molecular mechanisms is incomplete, but it is frequently linked to mutations in the *PKD1* (85% cases) or *PKD2* (~10% cases) genes. We established a PKD fly model in the *BicC* mutants. We found that in mice and humans, *BicC* is genetically downstream of the major *PKD1* gene, which links BicC to PKD pathology. Besides degenerating cystic kidneys, PKD causes ill-characterized extra-renal pathologies. BicC is a negative regulator of mRNA translation and *BicC* loss-of-function affects several cellular pathways and distinct tissues. To decipher the conserved bases of renal cyst formation and extra-renal defects in PKD, we combined genetics and molecular approaches to define the cellular roles of BicC, probe its molecular interactions, and study the consequences of its mutation at the organismal level. BicC appears to be a key regulator of cell function, the mutation of which remodels cellular metabolism and functions similar to neoplasias and impacts several tissues. Our experimental approach can only be done in the fly and is poised to produce knowledge with translational value.

A HOLISTIC WAY TO PROMOTING HEALTH BY THE MEANS OF EMOTIONAL INTELLIGENCE AND AN ART THERAPEUTIC APPROACH

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KEYWORDS: health promotion, well-being, emotional intelligence, art therapy

Introduction: Nowadays, it is of great importance to explore new approaches for promoting health and well-being. Regarding this issue, the role of emotional intelligence is being often associated with physical and mental health. Thus, it appears to be an appropriate source in pursuing a healthier lifestyle.

Aim: It is a significant task to attempt new methods for improving the person's overall quality of life. This goal can be achieved by exploring the state of emotional awareness through an art therapeutic approach.

Material and methods: For the purpose of the study, a set of art therapy practices is observed. A representative group of students is recruited in order to examine the effect of the practices on their emotional state during the survey.

Results: Observing the overall experimental data from the respondents' practices, a positive influence can be reported as a result of the art therapy techniques applied. On the ground of the feedback received from the participants in the experiment we can assume that the proposed techniques are suitable for stimulating the emotional intelligence.

Conclusions: The ability to express and regulate one's emotional perceptions has shown to impact the mental and physical health, positive well-being, motivation and social relationships of the respondents. It is important to proceed with the attempts to initiate new methods for promoting health and well-being.

INFORMATION TECHNOLOGIES AS A TOOL FOR IDENTIFICATION OF ENDOCRINE DISRUPTING CHEMICALS

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KEYWORDS: estrogen binding, QSAR, in silico prediction, human health

Introduction: A multitude of chemicals possess the ability to disrupt nuclear receptors, leading to adverse effects on human health. Evidences indicated that various agricultural, industrial, and household chemicals can directly or indirectly impede the endocrine system of both wildlife species and humans. These substances, defined as endocrine disrupting chemicals (EDCs), pose a potential threat to male and female reproductive functions, prompting high scientific and regulatory attention towards their identification.

Aim: The aim of this study is to outline a logic for identification of endocrine-disrupting chemicals, applied with non-commercial software tool.

Material and methods: The analysis was conducted using the non-commercial software platform QSAR Toolbox. This platform enables the utilization of a range of pre-existing models for diverse biological/toxic effects. Moreover, it facilitates the integration of new models for various effects.

Results: The estrogenic effect of a target chemical is evaluated by making use of a non-commercial software tool. The predicted result is in agreement with literature published findings on the estrogenic effect of similar to the target chemicals.

Conclusions: In the current study a sequence of steps is presented in order to assess the estrogenic effect of a target chemical. Each step is explained and discussed in the light of logic incorporated in non-commercial software tool. It is expected that the results could be of help for researchers in the field of receptor binding or other similar studies.

ADVANCING INDIGENOUS HEALTH IN TAIWAN: ENHANCING CULTURAL COMPETENCY IN NURSING STUDENTS THROUGH SERVICE LEARNING

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KEYWORDS: cultural competency, indigenous peoples, education, service-learning, Taiwan

Taiwan is a country with diverse ethnic groups, including 16 nationally recognized indigenous subgroups, making up 2.5% of its population. These ethnic minorities each have their distinct culture, language, customs, and social structure. Cultural competency in healthcare is crucial, especially as the average life expectancy of indigenous peoples is notably lower than that of non-indigenous peoples, a disparity exacerbated by limited access to medical resources and healthcare providers' lack of cultural competence and their failure to deliver culturally appropriate care.

To address these challenges, nursing students can engage in service-learning courses that offer on-site service opportunities in indigenous communities. These courses aim to enhance students' cultural competence across various ethnic groups. They effectively facilitate students' immersion to into indigenous community for service learning. This involves students familiarizing themselves with the indigenous community through on-site and off-campus visits to understand its environment and cultural characteristics. In addition, students directly interact with indigenous people, engaging in cultural exchanges that enhance their communication skills and enable them to provide culturally appropriate care. Furthermore, they conduct health assessments and provide education, understanding individual health conditions while offering health education, sharing nursing knowledge and skills while learning from the indigenous peoples' cultures, beliefs, and worldviews.

After completion of the service, students reflect on and share their experiences through reports, with summarized outcomes such as recognizing the need for enhanced professional knowledge and skills in nursing, an increased understanding and respect for cultural differences, improved empathy and caring attitudes, and a heightened engagement in cultural nursing care. These service-learning courses show that nursing students develop improved cultural competence and understanding, contributing to reducing health disparities and improving care quality for indigenous communities.

INFLUENCE OF SELECTED IMMUNOMODULATORS FOR NUTRITIONAL HEALTH OF HUMAN HEALTH

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KEYWORDS: immunomodulators, nutrition, human health, vitamin D, probiotics

Introduction: Immunomodulation food ingredients are compounds that occur naturally in food. They have the ability to influence the functioning of the immune system through various mechanisms. Immunomodulators influence the maturation, differentiation, proliferation and activation of immunocompetent cells, the production of cytokines, the ability to present antigens and the production of antibodies. They stimulate or inhibit specific and non-specific reaction mechanisms. They have preventive and curative properties in relation to infections, cancer, autoimmune diseases, chronic inflammation and allergies. Immunomodulation food components include omega-3 fatty acids, probiotics, vitamin D3, lactoferrin, flavonoids and others.

Aim: A review of the current literature on immunomodulation food ingredients.

Conclusions: Immunomodulation food ingredients are a unique group of compounds that can influence the function of the immune system. In particular, they have a health-promoting effect by preventing and contributing to the treatment of many diseases. They support the natural abilities of the immune system, make it more efficient in dealing with pathogens and allergens and help to maintain the body's homeostasis. Unlike pharmaceuticals, they are naturally occurring compounds found in food, which makes them easier, safer and cheaper to use. It therefore seems appropriate to recommend the consumption of these nutrients instead of artificial pharmaceutical compounds. However, the reports of adverse health effects of some immunomodulators should not be downplayed. Studies need to be carried out to determine the parameters of their use (dose and time) in healthy people and in different diseases.

MULTIMORBIDITY IN PATIENTS WITH ATHEROSCLEROSIS

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KEYWORDS: multimorbidity, atherosclerosis, coronary artery disease, ischemic stroke, peripheral artery disease, long-term outcomes

The high prevalence of cardiovascular diseases worldwide is still a growing health, psychosocial and economic problem. At the beginning of the 20th century, cardiovascular diseases were responsible for approximately 10% of deaths worldwide, while at the end of the 20th century they accounted for almost 30%. It is currently estimated that in developed countries cardiovascular diseases cause nearly 50% of deaths.

Statistics indicate that at least 50 million people in the EU suffer from multimorbidity, and year by year - due to the aging of European societies - this number will only increase. Multi-morbidity is associated with the need to perform many tests and implement numerous therapies, which may lead to a vicious diagnostic and therapeutic spiral and the clinically uncontrolled phenomenon of polypharmacy.

However, no studies have been conducted so far to assess the effectiveness of a simultaneous preventive intervention aimed at cardiometabolic risk factors and a diagnostic intervention aimed at the early detection of atherosclerosis-related diseases in various vascular beds.

The study was designed to determine the actual incidence of multi-morbidities related to atherosclerosis and the risk of its development over a 5-year period in Opole voivodeship and at the same time verify the research hypothesis whether a preventive intervention aimed at cardiometabolic risk factors of cardiovascular diseases combined with a diagnostic intervention aimed at detecting undiagnosed disease related to atherosclerosis, will reduce the risk of occurrence during the 5-year follow-up: death or life-threatening diseases related to atherosclerosis: acute coronary syndrome, ischemic stroke, limb amputation, or embolism or clot of limb arteries, in patients with very high cardiovascular risk with a diagnosed disease caused by atherosclerosis in one or two of the three vascular areas (heart, limb arteries, precerebral or cerebral arteries).

Preliminary data suggest that patients with multimorbidity related to atherosclerosis have higher risk of 5-year death and developing of clinically overt diseases related to non-diagnosed so far atherosclerosis of other vascular beds.

BIOLOGICAL ASPECTS OF NEW MOLECULAR THERAPIES FOR NEUROPATHOLOGIES

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KEYWORDS: Alzheimer's, amyloid-β, ISOAC1, Thioflavin T fluorescence assay, neuroprotection, biochemistry, therapeutic potential

Introduction: Addressing the formidable therapeutic hurdles posed by Alzheimer's disease (AD), our study delves into the central role of amyloid β 1-42 (Aβ1-42) protein aggregation in its onset.

Aim: Our investigation aims to assess the therapeutic potential of the isoindolinone derivative 3-(3-oxoisoindolin-1-yl)pentane-2,4-dione (ISOAC1) against the Aβ1-42-induced toxicity.

Material and methods: Employing a combination of thioflavin T fluorescence assay and biological and cellular approaches, alongside other experimental methods, we explored ISOAC1's ability to mitigate Aβ1-42 aggregation and toxicity.

Results and conclusions: Our study unveils ISOAC1's capacity to disrupt Aβ1-42 aggregation and impede its transition towards β-sheet structures. Furthermore, our findings shed light on ISOAC1's binding mechanisms with Aβ1-42, indicating its promise as a therapeutic agent. ISOAC1 emerges as a compelling neuroprotective compound, offering novel avenues for AD treatment.

THE PREVALENCE OF CARDIOVASCULAR RISK FACTORS AND CARDIOMETABOLIC DISEASE AMONG PRIMARY CARE PATIENTS IN POLAND

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KEYWORDS: cardiovascular risk factors, hypertension, hypercholesterolaemia, diabetes mellitus, obesity, primary health care

Introduction: Cardiovascular disease (CVD) is currently one of the leading cause of mortality in the European Union (EU) and in the world. Well-known, modifiable cardiovascular (CV) risk factors include hypertension (HTN)), hypercholesterolaemia, diabetes mellitus (DM), obesity, low activity levels, poor diet and smoking.

Aim: To estimate the prevalence of CVD and CV risk factors among Polish patients.

Material and methods: 438 primary care physicians enrolled 13,724 adult patients that sought medical care in primary health care practices. For each patient recruited for the study, a 28 item questionnaire was collected that gathered data on chronic diseases and their treatment, lifestyle (diet, physical activity, smoking status), and family history of CVD (altogether 24 questions). The questionnaire also recorded demographic data: age, sex, place of residence and level of education (altogether 4 questions). In all patients, anthropometric measurements were made (height, body weight, waist circumference and hip circumference). On the same day, measurements of blood pressure (BP) and fasting glucose and lipid profile were taken. Patients were fasting for at least 12 h prior to the blood sample collection.

Results: Nearly 19% of men and approximately 12% of women had cardiovascular disease (CVD). Over 60% of the recruited patients had hypertension (HTN), >80% had dyslipidaemia and <15% of patients were diagnosed with diabetes (DM). All of these disorders were more frequent in men. In 80% of patients the waist circumference exceed norm for the European population. Less than half of the patients were current smokers or had smoked in the past. Patients with CVD had significantly higher blood pressure and glucose levels but lower low density lipoprotein-cholesterol level.

Conclusions: The prevalence of CVD and CV risk factors among patients in Poland is high. CVD is more common in men than in women. The most common CV risk factors are excess waist circumference, dyslipidaemia and HTN. Family physicians should conduct activities to prevent, diagnose early and treat CVD in the primary health care population.

PROTEIN-PROTEIN INTERACTIONS: UNTAPPED DRUG TARGETS

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KEYWORDS: drug discovery, computational biology

Introduction: Despite the vast scientific and technological advancements made since the 1950s, drug development costs had shown a seemingly paradoxical two-fold increase every nine years with drug approvals per USD$1billion global R&D dramatically decreasing. One proposed reason is the "low hanging fruit" phenomenon i.e., all the easily druggable targets have been picked. Therefore, alternative strategies in drug discovery have been the focus of scientists in recent years. One such strategy is to broaden the target space for drug discovery to include protein-protein inhibitors (PPIs).

Aim: To develop computational approaches to understand and drug PPIs.

Material and methods: To identify novel protein-protein interactions upregulated, we have created a novel bioinformatics pipeline which mapped the protein-protein interactions which differentiate in diseased vs benign cells. Importantly, we add uniquely designed "druggability" filters. Proteins are then knocked down in cell lines to identify functional proteins which alter cell growth. We validated these targets with known inhibitors. For those which didn't have known inhibitor, we conduct computational virtual screens using novel PPI compound filters.

Results: An initial disease target identified 16 proteins that are structurally tractable to therapeutic targeting by small molecules. siRNA knockdown identified functional proteins which inhibited cell growth in the disease of interest but not fibroblasts. We validated these targets with known inhibitors and have identified novel small molecules for a novel target.

Conclusions: We have established a validated pipeline for novel PPI drug discovery.

DIGITAL COMPETENCIES OF HEALTHCARE PROFESSIONALS AS A CHALLENGE OF THE CONTEMPORARY HEALTH SYSTEM

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KEYWORDS: digital competencies, cyber security, healthcare professionals

Introduction: The EU Pact for Health emphasises the need to improve the resilience of Europe's health systems in a challenging contemporary environment. Within health technology implementation there tends to be an emphasis on the technical aspects of its employment and protection with little focus on the skilling of the diverse individuals in the health workforce who use it.

Aim: The aim was to assess individual digital literacy, resilience and service delivery of the healthcare workers and allied professionals.

Material and methods: EU-wide survey was carried out under the DDS-MAP project. 1132 healthcare professionals participated and filled in the online survey questionnaire about their experience working with the technologies in healthcare settings.

Results: Healthcare professionals use technologies frequently, many of them are confident in that. However, about 20% are anxious when using electronics, are not confident in their cyber security practices, cannot manage the safety risks, cannot protect themselves (and work environment) from unwanted and malicious online encounters and material.

Conclusions: To improve the cyber and digital resilience of Europe's health systems much attention for digital competences of healthcare professionals is needed.

CAN A MOLECULE CHANGE THE WAY WE SEE THE WORLD? – THE INTERACTION OF METAL IONS WITH FRAGMENTS OF HEAT SHOCK PROTEINS

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KEYWORDS: cataract, lens opacities, heat-shock proteins, coordination complexes, copper, zinc

Introduction: Heat shock proteins (HSPs) are synthesized in cells upon an increase in temperature, but also contribute to cell protection in various ways. In addition, crystallins, which belong to the family of small HSPs, are present in the eye lens and the polymer structures they form are responsible for the transparency of the lens and its protection at high temperatures. Since the interaction of crystallin with metal ions such as zinc or copper could be crucial for the maintenance of these properties, it is worthwhile to determine the binding sites of metal ions and the stability of such complexes. Since these proteins polymerize easily, a simpler way to study them is to examine their peptide fragments and their analogs.

Aim: The aim of the studies was to identify metal ion-binding groups in the investigated peptides.

Material and methods: We investigated the coordination properties of selected peptides developed on the basis of native fragments of α-B-crystallin (a similar fragment is present in α-A-crystallin). Different methods such as potentiometric titration, isothermal calorimetric titration (ITC) and spectrophotometric methods (UV-Vis or CD titration) were used to determine the physicochemical properties of the studied peptides and to characterize the coordination properties with copper and zinc ions.

Results: We identified the main residues involved in the binding of metal ions (namely His-131 and Glu-126) and determined the stability constants and thermodynamic properties of the copper and zinc complexes of the studied systems.

Conclusions: The results show that the potential binding sites in the protein are His and Glu residues. Changes in the protein structure, including deletion or substitution of these residues, may lead to disruption or loss of the ability to bind metal ions and consequently to a loss of protection against clouding of the crystalline lens.

THE ROLE OF OBESITY IN THE MANIFESTATION OF CAFFEINE-INDUCED EFFECTS IN WOMEN

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KEYWORDS: adverse effects, caffeine, gender, free fat mass, obesity

Introduction: Individuals with higher levels of obesity may have increased serum concentrations of caffeine and its metabolites, in addition to possibly slower caffeine metabolism compared to individuals with lower levels of obesity.

Aim: The aim of this study is to compare the occurrence of both positive and negative caffeine-induced effects in non-obese and obese female subjects.

Material and methods: A group of 160 female participants (mean age: 23.4±2.8; mean BMI: 23.1±3.3) was included in this study. Body fat composition was determined using the mBCA 515 SECA analyzer. Participants were categorized into four different groups: non-obese CAF, non-obese PLA, obese CAF and obese PLA. The CAF groups were administered 6 mg/kg body weight of caffeine, while the PLA groups received identical maltodextrin-filled capsules. One hour after administration and within a twenty-four hour period, participants completed a questionnaire detailing the caffeine-induced effects.

Results: Statistical significance was found in the CAF group with respect to neutral ($p \leq 0.014$), negative ($p \leq 0.002$) and positive ($p \leq 0.015$) effects. Further analyses revealed statistically notable correlations, in particular increased urine output ($p \leq 0.014$), heightened vigor/activeness ($p \leq 0.009$) and headache ($p \leq 0.033$) one hour after ingestion. Conversely, no statistically significant placebo effects were found.

Conclusions: Sixty minutes after ingestion of 6 mg/kg body weight caffeine, there were significant differences in response to caffeine between non-obese and obese participants. Obese individuals were more likely to report adverse effects after caffeine consumption compared to non-obese individuals.

NONINVASIVE TRANSDERMAL ADMINISTRATION OF INSULIN AT A THERAPEUTIC LEVEL: PRELIMINARY STUDIES

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KEYWORDS: transdermal patch, pharmacokinetics, type 1 diabetes, drug formulation

Introduction: Transporting molecules, especially large proteins, through the skin is a challenging task due to the skin's efficient barrier function. Insulin in turn is highly susceptible to chemical and physical denaturation. Despite these challenges, it is worth noting that insulin remains a crucial component in the treatment of diabetes, and ongoing research is focused on developing more stable formulations. It should be mentioned that the effective administration of insulin in a transdermal patch is a novelty never seen before in the scientific literature.

Aim: The study aimed to assess the feasibility of transdermal insulin delivery using the Biotts MTC transdermal carrier and to determine the therapeutic concentration in an animal model..

Material and methods: In accordance with OECD guidelines, porcine skins were prepared and suitable skin samples were chosen for analysis. The insulin release study from the MTC transdermal carrier was conducted using a pharmacopoeial paddle dissolution apparatus with Enhancer cell vessels and autosampler. This method enabled a comprehensive evaluation of the formulation's performance. Additionally, in vivo studies were conducted using male Wistar rats as the animal model. The LC-MS/MS method was employed to determine insulin concentrations in the acceptor medium and rat plasma in vivo.

Results: The concentration of insulin reached nearly 60 ng/ml after 72 hours. Following subcutaneous insulin administration, the C_{max} reaches approximately 3.8 ng/ml and decreases to zero after approximately 32 hours. However, when insulin is administered transdermally using a modified MTC transdermal carrier, the C_{max} level reaches an impressive 8.5 ng/ml. Additionally, the measured concentration remaining stable after 48 hours.

Conclusions: The MTC transdermal carrier has been found to be an effective method of transporting insulin into the bloodstream via the transdermal route. Studies have shown that API concentrations achieved through this method are comparable to those achieved through subcutaneous administration.

RAISING AWARENESS OF PELVIC FLOOR HEALTH TO PREVENT DYSFUNCTION – LET'S START WITH THE LOCAL COMMUNITY: ONGOING PROJECT HIGHLIGHTS BASED ON NICE RECOMMENDATIONS

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KEYWORDS: health knowledge, urinary incontinence, pelvic organ prolapse, surveys and questionnaires

Introduction: Pelvic floor dysfunction (PFD) includes conditions such as urinary incontinence (UI), pelvic organ prolapse (POP) and pelvic pain that affect quality of life. The main causes are pregnancy, childbirth, obesity, menopause and radical prostatectomy. Despite the effectiveness of pelvic floor exercises, there is still ignorance and misconceptions about PFD. As various scientific publications have shown, knowledge of the anatomy, physiology and functions of the pelvic floor can be effective in preventing and effectively treating pelvic floor dysfunction. The UK National Institute for Health and Care Excellence (NICE) recommends raising awareness of pelvic floor health and exercises to prevent PFD and emphasizes the importance of knowing both modifiable and non-modifiable risk factors.

Aim: The main objective of the project is to disseminate knowledge about pelvic floor health among women and men through pelvic floor education group workshops.

Material and methods: Phase 1 of the study will be a cross-sectional observational study approved by the relevant ethics committee. It will validate the Prolapse and Incontinence Knowledge Questionnaire (PIKQ), which assesses patients' knowledge of UI and POP, through translation and cultural adaptation into Polish, followed by an analysis of its measurement properties. The PIKQ is a self-administered questionnaire with 24 items divided into UI and POP sections, each containing 12 items on etiology, diagnosis and treatment. Phase 2 includes group workshops on pelvic floor education, covering pelvic floor anatomy and physiology, urinary and digestive physiology, risk factors for PFD and preventive measures. Participants will complete a PIKQ questionnaire at the beginning and end of the workshops.

What will the results of this study achieve? All project activities should ensure that the knowledge gained becomes a tool that enables proactive care of the pelvic floor at every stage of life, helping to improve quality of life and reduce the risk of possible dysfunction. Pelvic floor education workshops are designed to improve knowledge and thus reduce risky behaviors for the pelvic floor.

EXPLORING THE ACTIONS OF KETAMINE: ABNORMAL FAST BRAIN RHYTHMS IN FREELY MOVING RODENTS

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KEYWORDS: ketamine, rat, brain, electrophysiology

Introduction: Ketamine is a psychoactive agent that produces a psychotic-like dissociative state used to model certain features of schizophrenia. Over the last twenty years, ketamine has emerged as an important drug in the treatment of depression, with its clinical efficacy often linked to dissociation. Despite its increasing popularity, how ketamine produces its effects in the brain remains relatively poorly understood. This talk will focus on recent findings from animal models showing that ketamine produces fast brain rhythms.

Aim: One way to investigate how ketamine affects brain activity is through electrophysiological recordings directly from experimental animals.

Material and methods: Rats were implanted with electrodes in the olfactory bulb and related brain regions and administered a subaesthetic dose of ketamine.

Results: Ketamine injection was associated with the rapid generation of fast brain rhythms that can be recorded in diverse regions. The olfactory bulb is an important generator of this activity and is dependent on nasal airflow.

Conclusions: We speculate that ketamine-induced fast brain rhythm reflects the abnormal firing of neurons which may contribute to the psychosis-like features produced by this drug.

MOST IMPACTFUL EMERGING SPECIALTY AREAS AND RESEARCH FRONTS IN CLINICAL MEDICINE AND BIOLOGICAL SCIENCES

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KEYWORDS: innovation, research fronts, areas science, specialist areas

The pace of innovation never slows, with fast-moving and emerging specialty areas of science. The ability to identify where the action is and to track emerging specialty areas, provides a distinct advantage for administrators, policy makers, and others who need to monitor, support, and advance the conduct of research in the face of finite resources.

Our study shares knowledge and foresight in understanding shifting global research trends in both broad areas of Clinical Medicine and Biological Sciences. Starting from variety of Research Fronts the objective was to discover which of them were most active or developing most rapidly. This finally led to identifying hot and emerging specialties.

In 2023 the top10 Research Fronts in Clinical Medicine focus mainly on subfields such as: immunotherapy; targeted therapy and molecular specific PET imaging of tumors; gene therapy for genetic diseases; and COVID-19-related drug treatment and vaccine evaluation. At the same time the top Research Fronts in Biological Sciences include: Prime Editing technology, new sequencing technology, protein structure prediction using artificial intelligence (AI), pan-cancer analysis of whole genomes, blood biomarkers of Alzheimer's disease, biological functions of exosomes, SARS CoV-2 infection, and other research directions.

PROBLEMS OF CORRECT DATA PREPARATION, ACCURACY OF CALCULATIONS AND CORRECT SELECTION AND VERIFICATION OF STATISTICAL HYPOTHESES IN BIOMEDICAL RESEARCH

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KEYWORDS: biomedical reseaerch, statistics, data preparation

One of the most important problems in statistical research is the correct preparation of data, the selection of correct calculation methods and the use of appropriate statistical tests to verify the research hypothesis. The workshop presents the most important problems of correct data preparation and methods to avoid errors. Attention is paid to the correct approach to calculations in the case of incomplete data, which we often encounter in the practice of medical and biological research. Selected methods of statistical hypothesis testing applicable to biochemical research are discussed. There is a practical part to learn about new approaches to scientific computing that allow easy integration of statistical computing with other computational methods, such as artificial intelligence, optimisation, etc. Special attention is given to the documentation of calculations.

ABSTRACTS

Master Class & Poster Session

DOES THE CONSUMPTION OF CARBOHYDRATES BEFORE BEDTIME HAVE A SIGNIFICATION IMPACT ON SLEEP QUALITY, AND IF SO, ARE THERE SPECIFIC TYPES OR QUANTITIES OF CARBS THAT DEMONSTRATE A MORE PRONOUNCES INFLUENCE ON SLEEP PATTERNS?

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KEYWORDS: sleep, carbohydrates, quantities of carbohydrates, impact on sleep quality

Introduction: Sleep plays a crucial role in maintaining overall health and well-being. It is a fundamental physiological process that supports various functions within the body. Here's a brief background on the importance of sleep and its impact on overall health, including: physical, cognitive, emotional, metabolic, cardiovascular, hormonal and immune functioning.

Aim: The aim of this study is to investigate the potential impact of carbohydrate consumption before bedtime on sleep quality. Additionally, we aim to identify specific types or quantities of carbohydrates that may have a more pronounced influence on sleep patterns.

Material and methods: The study will employ a questionnaire-based approach involving a participant pool of 100 individuals. The questionnaire is meticulously designed to gather comprehensive information on participants' sleeping habits and their carbohydrate intake specifically during or shortly before bedtime. By employing this questionnaire-based methodology with a focus on both sleep habits and carbohydrate intake, the study aims to find potential connections between dietary choices and sleep quality, offering valuable insights into the impact of pre-bedtime carbohydrate consumption on sleep patterns.

Results: The results suggest a nuanced relationship between carbohydrate consumption before bedtime and sleep quality. Specific types of carbohydrates, such as sugars fibers and starches demonstrated a more pronounced influence on sleep patterns in certain age groups. These findings provide valuable insights for tailoring dietary recommendations to enhance sleep quality, emphasizing the importance of considering individual characteristics and preferences. Further research is warranted to explore these connections in greater detail and to validate these initial observations.

Conclusions: In conclusion, our study investigating the relationship between carbohydrate consumption before bedtime and sleep quality among 100 participants across diverse age groups and genders revealed a nuanced connection. While statistical analysis indicated the calculated correlation is approximately 27.5%. This suggests a moderate correlation between good sleep quality and the reported sugar consumption, mostly among individuals in the 15-25 age group. Specific types of carbohydrates, such as sugars fibers and starches, exhibited a more pronounced influence on sleep patterns, particularly within certain age groups.

INTEGRATING TRADITION AND INNOVATION: NEW HORIZONS IN PHYSIOTHERAPY

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KEYWORDS: dry needling, virtual reality therapy, electroacupuncture, myofascial release therapy, holistic medicine, innovative therapies

Introduction: In today's dynamic world, research in biomedicine and healthcare is constantly evolving toward an integrated approach that takes into account the physical, mental and spiritual aspects of health. This thesis presents the latest trends in physiotherapy, focusing on innovative approaches and their associated challenges.

Aim: The purpose of this paper is to present the latest research developments in physiotherapy, such as dry needling, electroacupuncture, virtual reality and fascial therapy, highlighting their holistic approach to the patient. The challenges of implementing and proving the effectiveness of these innovations are also analyzed.

Material and methods: The literature review used databases: PubMed, Google Scholar, using the keywords: "holistic physiotherapy", "dry needling", "fascial release", "VR", "electroacupuncture", "VR rehabilitation", "DN therapy". Inclusion criteria: articles based on randomized clinical trials from the last 5 years, excluding case reports and meta-analyses. Of the 60 papers, 20 were selected by subjecting them to methodological evaluation on the PEDro scale.

Results: One of the latest research trends is the growing importance of holistic medicine, combining ancient traditions from the Middle East with modern standards. Analysis of the research papers indicates that the implementation of DN, electroacupuncture, MFR and VR in the treatment of patients has significant effects that affect different levels, covering physical, mental and motivational aspects. The papers evaluated on the PEDro scale received an average score of 8.5/11, with the lowest score of 6/11.

Conclusions: Research in biomedicine and holistic health care is moving toward the integration of modern technologies and a better understanding of the complex mechanisms of health and disease. Despite the introduction of new methods to support therapies, challenges remain in accessing innovative therapies, reducing health disparities and educating the society. While research confirms the effectiveness of the techniques discussed, there is a need for further, more solid research into their effectiveness, the extent of impact and long-term prognosis.

QUALITY OF CARE IN MAINTENANCE OF CENTRAL VENOUS CATHETER FROM THE PERSPECTIVE OF INTENSIVE CARE NURSES: A SYSTEMATIC REVIEW

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KEYWORDS: quality of care, catheter, intensive care, nurse

Introduction: Central venous catheterization is an important procedure for the treatment and care of patients in critical conditions. According to the World Health Organization, up to 30% of patients in intensive care units experience healthcare-associated infections, the majority of which are bloodstream infections due to the presence of a catheter in the vein cord. CVC care is one of the indicators of quality of care.

Aim: To find out how the quality of care in maintenance of central venous catheter was investigated from the perspective of critical care and intensive care nurses.

Material and methods: The literature search and evaluation was conducted according to the PRISMA guidelines. The PubMed and Science Direct databases were searched using keywords such as central venous catheter, quality of care, intensive care nurse and in various combinations during the period November 2014 and February 2024. Only qualitative studies involving intensive care nurses were selected for review.

Results: Only five articles met the selection criteria. The most common type of study design was an interview, and included various interview plans (Central venous catheter care, Prevention of central venous catheter infections, Central venous catheter care education). Interviews were audio-recorded, reviewed, and transcribed by the study investigator. Data analysis utilized content analysis method. Care of central venous catheters emphasizes sterility, hygiene, frequency of dressing changes, infusion systems/extension lines. Continuous education of nurses is essential to ensure that central venous catheters are cared for according to aseptic rules and infection prevention protocols.

Conclusions: A systematic review showed that the most commonly used method for determining the quality of care in maintenance of central venous catheter from the perspective of intensive care nurses was semi-structured interview. The care of central venous catheter is directly related to the frequency of bloodstream infections developing.

ANTI-TUMOR AND IMMUNOMODULATORY EFFICACY OF THE COMBINED HSP70 VACCINE IN THE MODEL OF METASTATIC TUMOR GROWTH

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KEYWORDS: heat shock proteins, HSP70-TAA vaccine, cancer, immunomodulation

Introduction: Heat-shock proteins 70 kDa (HSP70) is an intracellular chaperone protein, over-expressed in cancer cells. The extracellular HSP70, emerging in the tumor microenvironment, demonstrates immunomodulatory activity. HSP70 stabilizes tumor-associated antigens (TAA) conformation, forming stable complexes with it (HSP70-TAA), it also provides cross-presentation of these antigens, resulting in anti-tumor activation of CD8+ / CD4+ T-cells.

Aim: The aim was to investigate of anti-tumor effect of the combined heat shock protein 70 kDa vaccine developed on the basis of allogeneic tumor and xenogeneic fetal complexes of HSP70-TAA with the adjuvant of microbial origin.

Material and methods: In the Lewis lung carcinoma (LLC) model, was investigated the anti-metastatic and immunomodulatory efficacy of vaccine therapy (the parameters of anti-tumor cytotoxic activity (CTA) and antibody-dependent cytotoxic activity (ADC) of lymphocytes and macrophages), both after the tumor removal by surgery, and after treatment performed without surgery.

Results: The application of the combined HSP70 vaccine in the early period after surgery has been shown to increase the metastasis inhibition index up to 79.24%. The immunomodulatory effect results from a reduced of immunosuppressive serum activity towards anti-tumor immunity effector cells and increased cytotoxic activity of lymphocytes and macrophages in treated animals.

Conclusions: In particular, cytotoxic activity of lymphocytes and macrophages in animals with LLC that received combined HSP70 vaccine after surgical resection of the primary tumor was two-fold higher than in tumor growth control. Notably, the macrophage activity in the mice of this experimental group the values of activity exceeds in intact animals. Also, the parameters of anti-tumor antibody-dependent cytotoxic activity of lymphocytes and macrophages in non-operated and operated mice with LLC after vaccine therapy significantly exceeded the parameters of the tumor growth control.

INFLUENCE OF SUPPLEMENTS USED DURING PREGNANCY ON MATERNITY RESULTS

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KEYWORDS: pregnancy, dietary supplements, nutrients, infant

Introduction: Pregnant women are more often exposed to vitamin and mineral deficiencies. They very often use supplementation during pregnancy, taking into account the health of the developing fetus.

Aim: The aim of the study was to assess the impact of supplements used during pregnancy on obstetric outcomes. Analysis of whether there is a relationship between the use of a healthy diet in the 3 months preceding conception and whether premature delivery occurred. To assess the impact of regularly used supplementation during pregnancy on the occurrence of premature birth, as well as whether the use of drugs during pregnancy or 3 months preceding conception has an impact on the course of pregnancy.

Material and methods: The research material was obtained using a diagnostic survey method. The study included a group of 150 women who met the inclusion criteria. The inclusion and exclusion criteria for the study were: Inclusion criteria: consent to complete the survey, woman up to 3 months postpartum. The survey questionnaire contained a total of 52 questions in closed and open form.

Results: More than 94% of surveyed women who regularly took dietary supplements did not experience premature birth. However, over 38% of women who did not take dietary supplements experienced premature birth. The use of a healthy diet in the 3 months preceding conception reduces the risk of premature birth.

Conclusions: It is appropriate to expand knowledge about dietary supplements and their proper use among women during the reproductive period, which will favorably support both the health of mothers and their offspring.

THE RELATIONSHIP BETWEEN EMOTIONAL INTELLIGENCE AND WORK-RELATED STRESS AMONG NURSES WORKING IN THE OPERATING THEATER

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KEYWORDS: operating theater, nurses, emotional intelligence, stress

Introduction: Nurses are considered to be the profession with the highest level of stress at work, and the operating theater is one of the most challenging environments in the healthcare, which poses many risks to the healthcare team. Emotional intelligence has an important role in the mental health of nurses. The analysis of literature reviews is important in order to analyze the relationship between the emotional intelligence of nurses working in operating theater and the stress experienced at work and thus contribute to the development of training programs in operating theater

Aim: To determine the relationship between the emotional intelligence of nurses working in the operating theater and the stress experienced at work, by analyzing a systematic literature review.

Material and methods: In order to analyze the emotional intelligence of nurses working in the operating theater and the stress experienced at work, literature sources were searched in Research gate, PubMed, Google Scholar databases. The analyzed scientific literature was not older than 10 years, in Lithuanian and foreign languages. Search words: operating theater, nurses, emotional intelligence, stress. According to the exclusion and inclusion criteria, 5 scientific articles were included and analyzed in the systematic review.

Results: The emotional intelligence of nurses working in the operating theater is related to the stress experienced at work. Nurses who had a higher level of emotional intelligence experienced less stress at work. Younger nurses and those with the shortest working experience have higher emotional intelligence. Also, nurses with higher university education had higher emotional intelligence and experienced lower levels of stress at work than nurses with higher education.sy

Conclusions: Training on emotional intelligence development and stress management in the work environment for nurses working in the operating theater can help nurses improve their mental health and contribute to better organizational performance.

POPULARITY OF DIETARY SUPPLEMENTS AMONG THE POLISH POPULATION: PRELIMINARY REPORTS

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KEYWORDS: dietary supplements, supplemented, population, knowledge

Introduction: In the era of the hugely expanding pharmaceutical market as well as the development of mass media, the Polish population is susceptible to the suggestions conveyed in advertisements and is increasingly willing to use dietary supplements.

Aim: The aim of this research study is to assess the frequency of use of dietary supplementation among Poles, as well as to evaluate their knowledge about supplements.

Material and methods: The study material consists of a randomly selected population of 100 people. The research tool is a questionnaire consisting of 20 closed questions concerning the frequency of use of supplements, knowledge about supplements as well as the way of obtaining them.

Results: The trend among Poles to use supplements is upward. As many as 78% of respondents use dietary supplements, where the majority are women (78%) . The majority of supplements used by the surveyed population contain elements in their composition (64%).

The greater part of the population surveyed suggests the manufacturer of the product when choosing a product, which is 65%. The vast majority of the population surveyed on dietary supplements is characterized by an average theoretical knowledge, which is 68%.

Conclusions: The vast majority of the population surveyed used dietary supplements, often selecting them themselves without consulting a doctor or pharmacist. The study shows that the respondents' knowledge of supplements is at an average level. The purchase of a large number of products containing mainly micronutrients is noted, due to their low price. The vast majority pays attention to the manufacturer when choosing a supplement, which is often dictated by the influence of advertising and social media.

SLEEP QUALITY OF NIGHT SHIFT NURSES

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KEYWORDS: nurses, night shift, sleep quality

Introduction: Night shift work affects the sleep quality for nurses. Inadequate sleep for nurses due to night shifts is a major concern due to disturbed sleep and damage to health and increased sleepiness at the ending of a shift.

Aim: To analyse the recent literature and present data on the sleep quality of night shift nurses.

Material and methods: A review of the recent literature on nurses' night work and its impact on sleep quality. The literature was searched in PubMed and Google Scholar. The review used scientific articles from 2019-2024, in English, relevant to the topic. Keywords used in the search: nurses, night work, sleep quality. The overview included 6 sources on the topic under consideration.

Results: Night shift work has been linked to sleep disturbances such as shortened sleep duration, sleep disorders, poor sleep quality and sleep deprivation. Along with sleep disturbances and daytime sleepiness, in many cases days off may not be enough to restore a normal sleep pattern. Night shift nurses had significantly higher PSQI scores than day shift nurses. Night work among nurses not only increases sleepiness and reduces psychomotor performance, but also results in higher rates of depression. Nurses with poor sleep quality have poorer sustained attention after a night shift. Also, the sleep of night shift nurses is often disturbed during the day, so night-shift nurses not only face difficulties with the depth of sleep, but also face problems with a long time to fall asleep. Research shows that night shift nurses seek to improve sleep quality by changing shifts.

Conclusions: Night shift work has become an occupational health problem that contributes to chronic diseases, significant metabolic risk factors and negative impacts on sleep health. Poor sleep quality due to night shifts is a common problem for nurses.

ASSESSMENT OF THE QUALITY OF LIFE OF HEALTHCARE WORKERS AND MEDICAL STUDENTS DURING THE COVID-19 PANDEMIC

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KEYWORDS: quality of life pandemics, students, medical

Introduction: The COVID-19 pandemic exposed healthcare workers and medical students to enormous stress, fear for their own health and even the lives and health of their families, who were also particularly exposed to health damage.

Aim: The purpose of this study was to assess the quality of life among healthcare workers and medical students.

Material and methods: The study was conducted in November 2021 and May 2022. The study included 71 participants: 34 healthcare workers and 37 medical students. The Polish version of the WHOQOL-BREF questionnaire was used to assess the quality of life. The survey was created using a Google form and available online. The results of individual domains were transformed according to the 4-20 key.

Results: The average age among healthcare workers was 41 years, and among students 21.03 years. Healthcare workers most often had a master's degree (52.9%) and the dominant profession was a nurse (47.1%). Among students, the most common field of study was medicine (59.5%). The results of the assessment of general quality of life, health and somatic, psychological and social domains are similar in both groups. Students valued the environmental domain significantly higher compared to healthcare workers (p=0.024). Among healthcare workers, the quality of life was rated highest in the social domain (15.17±2.690) and lowest in the environmental domain (13.85±2.271). Among medical students, the environmental domain scored the best (15.10±2.195), and the psychological domain scored the lowest (14.24±2.762).

Conclusions: The results obtained in individual domains indicate a fairly good quality of life in all domains examined. A significantly higher assessment of the environmental domain in the group of students compared to employees may indicate a greater impact of the COVID-19 pandemic on the living environment of medical workers.

ASSESSMENT OF THE QUALITY OF LIFE OF STUDENTS DURING THE COVID-19 PANDEMIC

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KEYWORDS: quality of life, pandemics, students

Introduction: The COVID-19 pandemic has put people under tremendous stress, fear for their health and lives. Medical students taking practical classes in health care facilities may be particularly vulnerable to stress, which can significantly reduce their quality of life.

Aim: The purpose of this study was to assess quality of life among medical and non-medical students.

Material and methods: The study was conducted in April/May 2022. The study included 62 participants: 37 medical students and 25 non-medical students. The Polish version of the World Health Organization Quality of Life Instrument Short Form (WHOQOL-BREF) questionnaire was used to assess quality of life. The questionnaire was created using a Google form and available online. Individual domain scores were transformed according to the 4-20 key.

Results: Sixty-two students participated in the survey, including 51 women (82.3%) and 11 men (17.7%). The average age of medical students was 21.02 years, and that of non-medical students was 20.92 years. The predominant major of the medical students surveyed was medical (59.5%), and non-medical students were in the field of pedagogy (28.0%). The results of the assessment of overall quality of life, health, and somatic, psychological, social and environmental domains are similar in both groups. Medical students, rated the environmental domain the highest (15.10±2.195), and the psychological domain the lowest (14.24±2.762). Among non-medical students, the social domain scored best (14.92±3.695) and the psychological domain scored lowest (13.44±3.764).

Conclusions: The quality of life of the surveyed students was quite good in all domains. The lowest rated domain in both groups was the psychological domain and the highest was the environmental and social domains, which may indicate that the COVID-19 pandemic had the greatest impact on the psychological aspect of quality of life and the least on the environmental and social aspects.

WHAT DO UNIVERSITY STUDENTS KNOW ABOUT PELVIC FLOOR DISORDERS AND WHY THIS MATTERS? A CROSS-SECTIONAL PILOT STUDY

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KEYWORDS: cross-sectional studies, pelvic floor disorders/etiology/therapy, pelvic organ prolapse, surveys and questionnaires, urinary incontinence/epidemiology/ etiology

Introduction: The increasing prevalence and impact of pelvic floor disorders (PFD) on women's quality of life highlights the importance of improving awareness and knowledge of these conditions. To date, several studies have examined knowledge of PFDs among women. All studies showed that there is a lack of knowledge among women and that education programs are necessary to fill this gap. According to the NICE guidelines on best practice in healthcare, public awareness of pelvic floor health should be increased by promoting throughout life.

Aim: The hypothesis assumes that health and medical science students have some knowledge of pelvic floor disorders, including urinary incontinence (UI) and pelvic organ prolapse (POP). The study aims to accurately evaluate this knowledge to identify potential gaps and areas that require educational improvement in their degree programs.

Material and methods: In a cross-sectional survey, the Prolapse and Incontinence Knowledge Questionnaire (PIKQ) was used to assess students' knowledge of pelvic floor disorders, focusing on UI and POP. The PIKQ, which is divided into a UI and a POP scale, contains 12 questions each on etiology, diagnosis, and treatment, scored with correct (one point) or incorrect/unknown (zero points) answers. Competence was defined as a score of ≥80% on the PIKQ-UI (≥10 correct answers) and ≥50% on the PIKQ-POP (≥6 correct answers).

Results: A total of 179 respondents returned the questionnaire. Among them, 46 respondents reported their gender as male, 131 as female and 1 as non-binary; age (18-22 65%, 23-26 34%, 27-30 1%). Respondents overall showed a good knowledge of PFD in general, with a PIKQ overall score of 18,22±3,44. UI knowledge was deemed proficient in 78,78% (mean 10,51; median 11; SD 1,38) of participants (n=141), while POP knowledge was deemed proficient in 83,8% (mean 7,71; median 8; SD 2,45) of participants (n=150).

Conclusions: The majority of health and medical science students have a good knowledge of pelvic floor disorders. This supports the hypothesis that these students have a solid understanding of PFDs and emphasizes their preparedness in this aspect of healthcare.

SELECTED ASPECTS OF NURSING CARE OF A CHILD WITH WOLFF-PARKINSON-WHITE SYNDROME AFTER ABLATION SURGERY: A CASE REPORT

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KEYWORDS: Wolff-Parkinson-White Syndrome, ablation techniques, nursing care, case report

Introduction: Wolff-Parkinson-White syndrome is a congenital supraventricular heart rhythm disorder. Its essence is the presence of an additional conduction pathway in the cardiac stimulus-conduction system. Symptoms characteristic of WPW syndrome in children include rapid heartbeat, malaise, a feeling of shortness of breath and weakness, and the presence of characteristic abnormalities on ECG: short PR interval, presence of delta wave and widened QRS complex. The treatment of the syndrome is to perform an ablation procedure.

Aim: To present the main aspects of nursing care of a child with Wolff-Parkinson-White syndrome after an ablation procedure.

Material and methods: The study included a patient aged 14 years with Wolff - Parkinson - White syndrome after ablation surgery. The study used the individual case method. The main technique of the study was an interview conducted with the minor patient and his parents. The technique of observing the child was applied and vital and anthropometric parameters were measured. An analysis of medical records was carried out to obtain a comprehensive clinical picture of the patient.

Results: Performing an ablation procedure in patients diagnosed with Wolff-Parkinson-White syndrome reduces the occurrence of symptoms including: palpitations and accelerated heart rate, and improves comfort and quality of life. Successfully performed, the procedure allows the patient to gradually return to performing physical activities comparable to the period before the onset of clinical symptoms.

Conclusions: The use of ablation reduced clinical symptoms of cardiac arrhythmia, while regular aerobic exercises improved overall physical endurance and decreased fatigue during physical activities. Furthermore, belonging to a social group and receiving support from peers and parents contributed to enhancing the child's quality of life after ablation, although he may still experience some psychological and physical challenges.

DEPRESSIVE SYMPTOMS AND COGNITIVE FUNCTION STATUS IN SENIORS FROM DIFFERENT LIVING ENVIRONMENTS

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KEYWORDS: aged, depression, cognitive dysfunction

Introduction: Depression is one of the most common mood disorders affecting the elderly. The association of depression with other health complications is still insufficiently studied. Therefore, continuous monitoring of their cognitive-emotional state is an important task in caring for the elderly.

Aim: The aim of the study was to assess and compare the prevalence of depression and the state of cognitive function among seniors living in the community and in nursing homes (NH), and to analyze the relationship between cognitive and emotional state and selected socio-demographic characteristics.

Material and methods: A total of 285 older people were assessed, including 105 community-dwelling older people and 180 NH residents. The Geriatric Depression Scale (GDS) was used to assess the presence of depressive symptoms. The Abbreviated Mental Test Score (AMTS) was used to assess cognitive function. Data on age, sex, education and marital status were also collected.

Results: The presence of depression was found in 29.5% of community-dwelling seniors and 57% of NH residents. Cognitive dysfunction was found in 8.5% of community dwellers and 44.5% of NH residents. NH residents had significantly higher levels of depressive symptoms and greater cognitive dysfunction ($p<0.001$). In both groups there was a significant negative correlation between age and AMTS score. In the group of seniors living independently, there was a significant positive correlation between age and GDS score and a significant negative correlation between GDS and AMTS score. No differences were found in the prevalence of depression and cognitive status between men and women.

Conclusions: Living in a NH promoted the occurrence of depression and cognitive decline. Greater intensity of depression symptoms is associated with older age and lower cognitive function among community-dwelling seniors. Older age affects cognitive decline.

PEPTIDE DIVERSITY AND SPECIFICITY IN MICROBIAL DEFENSE

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KEYWORDS: peptides, calorimetry, spectrophotometry, fungi, bacteria, growth

Introduction: Bioactive peptides can have various positive effects, such as the prevention of diseases or the modulation of physiological systems. For our research, we selected four peptides identified in kombucha-treated milk extracts that have been shown to have a strong antihypertensive effect, as well as two histatins (Hst5 and Hst8) that have an antimicrobial effect. Their interactions with Cu(II) metal ions were investigated using isothermal titration microcalorimetry (ITC) and UV-Vis techniques. In addition, the antimicrobial activity of these peptides against *C. albicans, S.aureus* and *E. coli*, an opportunistic human pathogens, was investigated. *C. albicans* causes mucosal and systemic infections in susceptible individuals and E. coli is involved in various intestinal and extra-intestinal infections.

Aim: The aim of our work was to investigate the interactions of peptides with potential biological activity with Cu(II) ions and their influence on *C. albicans* S. aureus and *E. coli* growth.

Material and methods: The affinity of the metal-peptide interaction and the changes in enthalpy and entropy were studied using the ITC technique. The UV-Vis technique was used to characterize the formation of Cu (II) complexes with each of the peptides studied. All these experiments were performed at a pH around 6 to mimic the pH of human skin. The microbiological studies were performed using the dilution susceptibility testing method in Sabouraud Dextrose liquid medium and Mueller-Hinton medium (MH).

Results: All peptides: AVPQEVLNENLLR, YLQGSNLVVPLTDD, KFKGFVEPFPAVE, FVAPEPFVFGKEK, DSHAKRHHGYKRKFHEKHHSHRGY, KFHEKHHSHRGY (named by us Pep1-Pep4, Hst5 and Hst8 respectively) bind Cu (II) ions with quite high affinity (Kd in the range of 35-92μM). All reactions were endothermic and entropy-driven. A microbiological assay showed that Pep3 and Pep4 have an inhibitory effect on *E. coli* by binding Cu(II) ions. Pep4 also has inhibit influence of *S. aureus* growth. In addition, Hst5 and Hst8 with the addition of Cu(II) inhibit the growth of *C. albicans* and *E. coli* to a small extent.

Conclusions: Peptides 3 and 4 as well as histatin 8 have potential, as they have a slightly inhibitory effect on the microorganisms *C. albicans, S. aureus* and *E. coli*. They therefore represent material for planning further research with them and their analogues designed by us in the future.

URINARY INCONTINENCE AS A COMMON PROBLEM AFFECTING WOMEN

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KEYWORDS: quality of life, urinary incontinence, women

Introduction: Urinary incontinence is a common problem affecting mainly women. It is defined as an episode of uncontrolled loss of urine and belongs to disorders of the urine storage stage, along with daytime and nighttime frequency (nocturia/noctu-ria) and urgency. Urinary incontinence is one of the most common chronic diseases in women. However, due to its complicated etiopathogenesis, it should not be perceived as a homogeneous disease entity, but as a set of symptoms indicating impaired functioning of the lower urinary tract. Urinary incontinence is a common problem among women around the world, causing significant economic burden and reduced quality of life.

Aim: To assess the quality of life of women with urinary incontinence.

Material and methods: The study was conducted using a survey questionnaire cre-ated and made available in the online between July and November 2023 in a group of 218 women. The method used in the work was a diagnostic survey using the survey technique. The survey consisted of 5 personal details questions, ICIQ-UI SF question-naire and the ICIQ-LUTSqol questionnaire.

Results: More than half (n=111, 51%) of the surveyed women declared urinary in-continence. These women are statistically significantly older (49.75±15.44 years vs. 37.34±12.46 years). Another 52 (24%) describe it as mild, another 48 (22%) moder-ate and 11 women (5%) suffer from severe urinary incontinence. Among the circum-stances in which women leak urine, the most frequently mentioned situations were when sneezing, coughing (n=75, 68%), while sleeping (n=54, 49%) and during physical activity or exercise (n=51, 46%).

Conclusions: Most women who took part in the study declared urinary incontin-ence. Women reporting this problem are older. The problem of urinary incontin-ence does not depend on the level of education or place of residence. The quality of life of women reporting urinary incontinence is lower than that of women declaring no problem, and it decreases with increasing age and the severity of urinary tract symptoms.

ASSESSMENT OF THE POLISH POPULATION'S KNOWLEDGE OF HEPATITIS C

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KEYWORDS: hepacivirus, infectious disease transmission, knowledge

Introduction: Hepatitis C (HCV) is a major public health problem worldwide. The hepatitis C virus, HCV, responsible for its evolution, developing over years can lead to serious health consequences, among which is cancer. The elimination of hepatitis B and hepatitis C virus infections, by 2030, is one of the greatest challenges currently facing the World Health Organization.

Aim: Assessment of the Polish population's knowledge of hepatitis C.

Material and methods: A standardized 19-items questionnaire was used for the study: "Polish version of the validated Brief Hepatitis C Knowledge Scale (BHCKS_PL),". The study showed a high level of reliability: Cronbach's Alpha was 0.85. Based on the scores, five knowledge assessment thresholds were adopted.

Results: A total of 304 respondents participated in the survey. The vast majority show a medium level of knowledge about hepatitis C (n=125, 41%). Only 7 (2%) respondents have a very high level of knowledge. The analysis shows a statistically significantly higher knowledge of persons with medical education (n=93, $p<0.001$). Knowledge across the whole study group is statistically significantly weakly correlated with age (rho=0.171; p=0.002) and education (rho=0.202; $p<0.001$) of respondents.

Conclusions: The results carried out show that the level of public knowledge about hepatitis C is not satisfactory. Education about the possibilities of HCV transmission is needed. The results of this study can be used to create an educational program to promote knowledge about hepatitis C.

RELATIONSHIP BETWEEN LATENT TRIGGER POINTS AND MUSCLE FATIGUE IN SHORT TRACK ATHLETES

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KEYWORDS: myofascial pain, electromyography, short track athletes

Introduction: Short track movement involves asymmetric overloading of the lower left side of the body. The fatigue of the gluteus maximus muscle has been shown to influence the athlete's capacity and a possible link between muscle fatigue and the presence of latent trigger points (LTrPs) in the affected muscle has been posited.

Aim: To examine if the lower left side of short track athletes' bodies manifests any persistent musculoskeletal impairments compared to healthy non-athletes.

Material and methods: Short track athletes as the experimental group (EXP)=9, 19±1.2 years and healthy subjects as the control group (CON)=18, 18±1.2 were examined towards: (i) the fatigue of the gluteus maximus measured with surface electromyography (sEMG) during the Biering-Sorensen test, and (ii) LTrPs presence in the 14 evaluated muscles of the pelvic girdle and lower limbs.

Results: There were between-group differences in the number of LTrPs, with the EXP group showing more LTrPs compared to the CON group ($p<0.001$), and within-group differences in the EXP group only ($p<0.001$). There were also significant differences in muscle fatigue for the left side ($p<0.001$) both between the groups and within the EXP group ($p \leq 0.001$).

Conclusions: The study confirmed an increased prevalence of LTrPs, increased fatigue and left-sided load asymmetry in short track athletes.

ASSESSMENT OF THE IMPACT OF THE TYPE OF DELIVERY ON WOMEN'S SEXUAL SATISFACTION

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KEYWORDS: natural childbirth, vacuum, obstetric forceps, caesarean section

Introduction: Sexual life after childbirth, changes significantly, especially in the first weeks and months after the appearance of a newborn. An important factor influencing sexual satisfaction is the level of perceived fear of childbirth. The conception and birth are a breakthrough for a woman's sexuality.

Aim: The aim of the study was the assessment of women' sexual satisfaction after natural childbirth, surgical delivery and caesarean section. The study concentrates on the factors affecting satisfaction with the intercourse, including: the number of births, injuries in the perineal area and the attitude of the respondents basing on the method of delivery. The aim of the study was also to show the changes taking place in the woman's feelings about her body - low self-esteem, pain, lack of self-acceptance.

Material and methods: The study involved one hundred women of various ages who gave birth physiologically, surgically or by cesarean section. Their participation in the research was voluntary and anonymous. The method that allowed to examine sexual satisfaction was a questionnaire consisting of 20 questions. The survey included: metric questions, evaluating the number of births, the manner, in which the delivery was completed, injuries in the perineal area after vaginal or surgical delivery, and sexual activity and during pregnancy. The respondents assessed which factors affect and reduce satisfaction with sex life before.

Results: Women's sexual experience is influenced by the way pregnancy ends. Women who have suffered injuries in the perineal area are more likely to experience pain and discomfort during penetration. The respondents who gave birth by caesarean section complained to a small degree of any pain associated with sexual life. Satisfaction with sex life and its quality is not dependent on the number of deliveries or the sexual activity before pregnancy.

Conclusions: The type of delivery can affect satisfaction of sex life.

NGS SEQUENCING AS AN IMPORTANT SUPPLEMENT TO ELECTROPHYSIOLOGICAL STUDIES IN MAKING THERAPEUTIC DECISIONS IN RARE CARDIAC DISEASES ON THE EXAMPLE OF THE BRUGADA SYNDROME

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KEYWORDS: Brugada syndrome, NGS sequencing, cardiac diseases, cardiology, electrophysiological studies

Introduction: The pathophysiology of Brugada Syndrome is abnormal signaling in the myocardium as a direct result of molecular changes in specific genes. These criteria correspond to the picture of the ECG record of the examined person recruited for our project. Unfortunately, often the ECG examination turns out to be insufficient.

Aim: Electrophysiological tests were performed on an anonymized family (father and two daughters). The father's current tests were aimed at verifying the results of ECG tests, received after a cardiac incident. Based on the results he was diagnosed with Brugada Syndrome. Since 2012, the father has been under constant cardiological supervision and has an implanted cardioverter. The aim of the research project was to find and identify at least one specific mutation in the 18 genes defined so far associated with Brugada Syndrome and to try to link the obtained result with the electrophysiological picture and clinical implications of Brugada Syndrome.

Material and methods: The NGS sequencing included a panel study of all known mutational changes associated with the risk of Brugada syndrome within 18 established genes. No pathogenic or potentially pathogenic variants were found in any member of the study group.

Results and conclusions: The molecular basis proving Brugada Syndrome has not been confirmed, thus the decision made 11 years ago to implant a cardioverter in the patient in response to the suspected Brugada Syndrome, taken only on the basis of electrophysiological tests and incriminating family history, may not have turned out to be entirely correct. This proves the extremely important role of molecular diagnostics in cardiological research.

THE EFFICACY OF PHYSIOTHERAPY INTERVENTIONS IN THE TREATMENT OF PREMENSTRUAL SYNDROME: A SYSTEMATIC REVIEW

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KEYWORDS: premenstrual syndrome, physical therapy, exercise

Introduction: Premenstrual syndrome (PMS) encompasses both somatic and psychological symptoms that occur during the luteal phase of the menstrual cycle and subside within a few days of menstruation. The prevalence of PMS in women of reproductive age is 47.8%, with 20% experiencing symptoms that disrupt daily activities, while the remaining individuals have mild to moderate symptoms.

Aim: The aim of this systematic review is to assess the effectiveness of various physiotherapeutic interventions in the treatment of premenstrual syndrome.

Material and methods: Randomized controlled trials (RCTs) published from 2013 to 2023 were searched using keywords in electronic databases PEDro and PubMed. RCTs published in English, comparing the effects of physiotherapy with controls or other interventions were included. The PEDro scale was used to assess the methodological quality of included trials. Data from the included study and the participants' characteristics, outcomes, results, and interventions were extracted.

Results: Nine RCTs with 799 participants were included in this systematic review. Methodological quality assessed by PEDro (7.33/10). Yoga, kinesiotaping, aerobic exercises, breathing exercises, auriculotherapy, pelvic rocking exercises, stretching, and acupuncture were performed in the RCTs. Physiotherapy is effective in improving physical and physiological symptoms among women with premenstrual syndrome (PMS).

Conclusions: Based on current evidence, some physiotherapy interventions may be an effective treatment for premenstrual syndrome. Although in some cases, it may result from the placebo effect.

DOES MEDICS KNOW WHAT HEALTHCARE MANAGEMENT IS?

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KEYWORDS: healthcare management, staff, knowledge, attitudes

Introduction: Modern research trends indicate changes leading to implementation of knowledge from other disciplines, including management. The latest knowledge provides evidence of effectiveness of management concepts and tools in: improving the level of quality, patient safety and satisfaction, staff satisfaction. These concepts include Lean Healthcare with: 5s, checklists, cabinet descriptions, waste elimination. It is used more often in the world, but relatively rarely in Poland.

Aim: Assessment of the level of knowledge and attitudes of medical staff towards selected tools and concepts of health care management.

Matherial and methods: A diagnostic survey method using a self-administered electronic questionnaire was used. Completing the survey was tantamount to consent to participate in the study.

Results: 164 respondents took part in the study. The majority were female, aged 31-45, with a master's degree and not beeing managers. Most of them worked in a hospital, and the least in the HEMS and a prison. Less than half declared knowledge of the lean healthcare and the 5s method. The use of cabinet descriptions, checklists and procedures was confirmed by over half of them. Areas in which these tools were most often used were: increasing the level of patient satisfaction, reducing costs, increasing the level of staff satisfaction, improving patient flow. They were least often used to improve the quality of services and reduce time wasting by employees. Respondents indicated the types of waste occurring in their organization.

Conclusions: Managers rarely visits the place where health services are provided (Gemba walk), which may indirectly indicate a lack of knowledge about problems occurring in everyday work. Medical staff see the need of implementation management tools into their daily work. Most often medics does not know what the lean healthcare concept and the 5s method are. Checklists and process maps are not commonly used in everyday work.

THE INFLUENCE OF KOMBUCHA ON THE GROWTH OF SELECTED MICROORGANISMS

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KEYWORDS: kombucha, antimicrobial activity

Introduction: Kombucha is a symbiotic culture composed of acetic acid bacteria and various yeasts. These microorganisms thrive in sugared tea, fermenting naturally at room temperature and transforming it into a lightly carbonated, slightly sour beverage. Research indicates that kombucha may exhibit antimicrobial properties against various species of human-pathogenic microorganisms. Components found in kombucha, including acetic acid, gluconic acid and specific phenolic compounds, might impede the growth of diverse bacteria and fungi.

Aim: The aim of the study was to examine the effect of kombucha filtrate on the growth of pathogenic bacteria and fungi, aiming to better understand the potential benefits or risks associated with its use in public health or the food industry contexts.

Material and methods: The study involved opportunistic pathogenic yeast *Candida albicans* (strain ATCC 10231) and bacteria *Escherichia coli* (ATCC 25922). Petri dishes were prepared with Sabouraud agar (Oxoid) for *C. albicans* and Nutrient agar (Sigma) for *E. coli*, each containing kombucha concentrations of 10%, 30%, 50%, and 70%. Prior to use, kombucha underwent filtration through 0.22 micrometer membrane filters. Subsequently, 500 microliters of 24-hour cultures of the tested strains were inoculated onto the respective agar plates. Incubation of the plates occurred at 30°C for 48 hours.

Results: No effect of kombucha on the growth of *C. albicans* was observed. Regarding *E. coli,* complete growth inhibition was observed on the substrate containing 70% kombucha, with no inhibition visible on substrates with lower concentrations.

Conclusions: The presented results suggest that kombucha may exhibit antimicrobial activity against *E. coli*, but it does not inhibit the growth of *C. albicans*. Other studies have demonstrated the effect of kombucha on the growth of *Candida* species and pathogenic Enterobacteriaceae. This impact can vary depending on the composition of kombucha and fermentation conditions. Further research is needed to fully understand the mechanisms of action of kombucha its potential health benefits and antimicrobial activity.

SUBJECTIVE WORKLOAD, WORK ENVIRONMENT AND JOB SATISFACTION OF ANAESTHESIA AND INTENSIVE CARE NURSES

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KEYWORDS: intensive care units, workload, environment, job satisfaction, nurse anesthetists

Introduction: Nurses working in anaesthesia and intensive care units are faced with changing workloads and constant duties, as well as constant patient monitoring. Therefore, due to its characteristics and working conditions, the anaesthesia and intensive care unit is considered to be a place where nurses are at high risk of psychological distress and increased workload. These factors can have a negative impact on nurses' job satisfaction and have negative consequences for patient care and quality of care.

Aim: To analyse the workload, environment and job satisfaction of anaesthesia and intensive care nurses.

Material and methods: A systematic review of the literature by keyword. Analysis of the most recent literature for 2020-2024, in English. Seven literature sources were selected and analysed using Wiley Online Library, PubMed databases.

Results: Studies performed show that the mental and physical workload of anaesthesia and intensive care nurses influence each other, and that as physical workload increases, mental workload also increases. A work environment with inadequate human and organisational resources increases workload. High workload is associated with an increased risk of nosocomial infections in ICU patients and patient-centred outcomes, and has a negative impact on nurses' perceived overall assessment of patient safety. It has been found that nurses are at greater risk of job dissatisfaction when dealing with critical patients and life-and-death issues. When nurses lack time to perform patient-related activities, stress increases and job satisfaction decreases.

Conclusions: High workload and an unfavourable work environment for anaesthesia and intensive care nurses are significantly associated with nurses' job satisfaction and patient safety in the department. Appropriate management of nursing workload can help to reduce adverse events and risks associated with the care provided by nurses.

SYNTHESIZING ENANTIOMERICALLY ENRICHED NON-PROTEIN α-AMINO ACIDS AND EXPLORING THEIR EFFICACY AS INHIBITORS TARGETING ALDOSE REDUCTASE

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KEYWORDS: amino acid, aldolase, enzyme

Introduction: Unnatural amino acids, both natural and synthetic, are increasingly significant in modern medical chemistry, often serving as enzyme inhibitors in pharmacology. Selective inhibition of ALR2 is particularly sought after to prevent diabetic complications, yet inhibitors often affect both ALR1 and ALR2 due to their structural similarities.

Aim: The study aims to synthesize novel unnatural amino acids, evaluate their potential as aldose reductase inhibitors, and conduct molecular docking to understand their binding interactions.

Material and methods: The research comprised three steps: first, developing a novel method for asymmetric synthesis of unnatural amino acids and isolating them; second, conducting biological studies to evaluate their efficacy; and third, employing molecular docking to comprehend their interactions.

Results: Ten unnatural amino acids were synthesized and evaluated as potential inhibitors for ALR1 and ALR2. Several of these synthesized compounds demonstrated significant biological activity. Thus, (2S,9S)-2,9-diamino-2,9-bis(2-chlorobenzyl)deca-4,6-diynedioic selectively inhibited ALR2 with IC50= 0.335 mM, while (S)-2-(2-chlorobenzyl)-2-aminopent-4-ynoic and (2S,9S)-2,9-diamino-2,9-bis(3-fluorobenzyl)deca-4,6-diynedioic acids showed inhibitory effect on ALR1 with IC50=0.49 mM and IC50=0.289 mM, respectively.

Conclusions: In our study, we successfully synthesized 10 non-protein α-amino acids. Bis-derivatives with halogen content in the phenyl ring showed significant inhibitory effects on both ALR1 and ALR2 enzymes. Among mono derivatives, only amino acid with a chlorine atom in the second position of the phenyl ring exhibited inhibitory activity against ALR1 (IC50 0.49). Inhibitory effect was attributed to six π-π interactions, including three with amino acids (Tyr48, Trp111) in the catalytic subpocket, one with Phe122 specific to ALR2, and two with Trp20.

FROM A NURSING STUDENT TO A PROFESSIONAL NURSE – PROFESSIONAL ADAPTATION BARRIERS STEMMING FROM IMPAIRED INTERPERSONAL RELATIONSHIPS: A PILOT STUDY

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KEYWORDS: nurses, workplace aggression, professional adaptation, adultism

Introduction: Nurses in their daily work face high levels of stress and emotional burden, often experiencing aggression, which is considered one of the main threats in healthcare facilities. In addition to the challenges associated with the work environment, the problem of adultism arises - discrimination and prejudices directed against younger workers, rooted in the belief in the superiority of adults over youth based on age. Adultism can result in the marginalization of young nurses, disregard for their opinions and needs, and non-recognition of their competencies, creating obstacles in the professional adaptation process for newly graduated nurses.

Aim: Identification of barriers in the professional adaptation process faced by newly graduated nurses when transitioning to professional practice.

Material and methods: The study involved 105 nurses with no more than five years of work experience, recruited via social media. The study was conducted using a proprietary survey questionnaire containing questions about the frequency, types, and causes of aggression in the workplace.

Results: 82% of newly graduated nurses encountered aggression at work, with the vast majority (69%) citing adultism as the cause. A significant impact of age on the occurrence of aggressive behaviors was confirmed (p=0.009), with older coworkers (39%) and patients (34%) as the predominant aggressors. Spreading rumors about them by more experienced staff (92%), uneven distribution of tasks (81%), public highlighting of mistakes (70%), and infantilization (61%) were particularly burdensome for young nurses. A significant relationship between adultism and workplace aggression was demonstrated (p=0.008), where individuals experiencing adultism were more often victims of aggression from older colleagues (49.30% compared to 17.65%). Difficult relationships between employees (69%), conflicts over schedules and salaries (65%), and overload of duties (58%) worsened the work atmosphere. Experiencing aggression was associated with lower job satisfaction (p=0.019) and an increased tendency to consider changing employment (p=0.005), underscoring the negative impact of impaired interpersonal relationships on the adaptation process of young nurses.

Conclusions: Difficult interpersonal relationships constitute a significant source of occupational stress and negatively affect the overall well-being of nurses.

SHIFT WORK AND SLEEP DISORDERS AMONG NURSING STAFF

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KEYWORDS: sleep disorders, shift work, nursing staff, stress

Introduction: Shift work affects the reduction of performance and work quality, increases accident absence, sick leave, and professional errors. The basis of these effects lies in the disruption of the human circadian rhythm. Considering that the average age of nurses and midwives in Poland is increasing year by year, it is necessary to consider the reduction of work capacity, which results from the natural process of aging and a decrease in work efficiency.

Aim: The aim of the study was to assess the impact of shift work on the occurrence of sleep disorders among nursing staff.

Material and methods: The study was conducted among 244 nurses via the Internet using a Google Form from October 10, 2023, to January 15, 2024. For the study, a questionnaire of our own design consisting of 20 questions and three standardized ones: the Athens Insomnia Scale (AIS), the Insomnia Severity Index (ISI), and the Epworth Sleepiness Scale was used. During statistical calculations, the significance of differences between two independent groups in terms of ordinal variables was tested using the Mann-Whitney U test, while between a larger number of independent groups – respectively, the Kruskal-Wallis test along with a post hoc test based on multiple comparisons. The relationships between two ordinal variables were verified using Spearman's rank correlation method. During the interpretation of the results, a statistically significant level was set at $p < 0.05$

Results: Both shift-working (65.67%) and non-shift-working (55.81%) participants struggled with clinical insomnia according to the ISI Scale, with the former group having a higher percentage of cases. Meanwhile, on the AIS scale, differences between both groups were slightly larger. Shift workers less often than non-shift workers recorded an AIS score considered the norm (29.85% and 44.19%), more often a score qualified as clinical insomnia (28.86% and 16.28%). In the case of the Epworth Sleepiness Scale results, both moderate (36.82%) and severe sleepiness (35.82%) were slightly higher among shift workers. Analysis with the Mann-Whitney U test showed that the work of the subjects in the shift system did not significantly statistically affect their categorized results both in the ISI Scale: $Z=0.96$; $p=0.335$ and the Epworth Sleepiness Scale: $Z=0.7$; $p=0.481$. Only the analysis in AIS showed statistical significance: $Z=1.96$; $p<0.05$.

Conclusions: The scale of sleep disorders occurring among nursing staff is large, although the results of individual assessment tools for said disorders differ. According to the ISI scale, there are most cases of clinical insomnia, in AIS – risk of insomnia, while Epworth – moderate and severe sleepiness.

THERAPEUTIC POTENTIAL OF CRISPR-CAS TECHNOLOGY BREAKTHROUGH

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KEYWORDS: crisp, genome editing, bacterial immune system

Introduction: The CRISPR-Cas9 technology, awarded the Nobel Prize, marks a significant advancement in biomedical sciences. Derived from a bacterial immune system, it acts as gene scissors, targeting and editing specific DNA sequences. This innovative method promises cheaper, simpler, and more precise gene editing across various research fields, heralding a new era of scientific innovation.

Aim: The aim of this research is to explore the applications of CRISPR-Cas9 technology in various biological research areas, ranging from cellular studies to therapeutic trials for genetic diseases. By elucidating the mechanism of CRISPR-Cas9, the research aims to understand its potential in precise gene editing and mutation repair.

Material and methods: The CRISPR-Cas9 technology employs manipulation of its main components, gRNA, and Cas9 nuclease, guiding Cas9 to genomic loci for mutation or repair. This process involves forming crRNAs at transcribed CRISPR loci with gRNA, inducing precise DNA breaks, and relying on the cell's repair mechanisms (NHEJ, HDR, or HDR) to maintain genetic integrity.

Results: Implementation of CRISPR/Cas9 has significantly advanced scientific research, enabling studies at the cellular level and therapeutic trials for genetic diseases. It has demonstrated efficacy in reducing centriolin levels, aiding in cytokinesis failure, and shows promise in treating diseases like β-thalassemia and Leber congenital amaurosis. Additionally, CRISPR/Cas9 offers potential solutions for rare genetic diseases like Duchenne muscular dystrophy and has yielded positive results in correcting mutations causing cystic fibrosis. Furthermore, it holds promise in understanding lipid metabolism and physiology, potentially offering novel treatments for conditions such as atherosclerosis.

Conclusions: CRISPR-Cas9 as a gene editing technology, has brought remarkable advancements to biomedical sciences and anticipates its transformative impact on medicine. Ongoing research efforts are expected to further enhance its capabilities, paving the way for revolutionary therapies that offer hope to individuals globally.

THE USE OF HYDROXYAPATITE-COLLAGEN NANOPARTICLES IN BONE REGENERATION PROCESSES SUPPORT IN CELL CULTURES

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KEYWORDS: bone tissue, nanoparticles, tissue engineering, collagen-hydroxyapatite compound

Introduction: Modern regenerative medicine is a field that is constantly evolving and seeking new scientific solutions. The role of cell culture and tissue engineering is growing, and new solutions are finding rapid application in practice. This is also the case with bone tissue regeneration, using a mixture of hydroxyapatite and collagen nanoparticles.

Aim: The purpose of this review is to examine current scientific research on the use of hydroxyapatite and collagen nanoparticles to promote bone regeneration.

Material and methods: The study analyzed scientific publications from 2020-2024, posted in online databases such as PubMed , ScienceDirect and GoogleScholar.

Results: The nanohydroxyapatite-collagen complex shows higher cell adherence and subsequent growth, which allows it to be used as a scaffold material for the bone regeneration process. Both hydroxyapatite and collagen are components from which bones are naturally built. They show biocompatibility with the body's cells, which is used in numerous studies. The use of nanoparticles allows the complex to work more comprehensively, which shows higher cell adhesion. Hydroxyapatite-collagen nanoparticles effectively promote bone regeneration processes by stimulating cell proliferation and differentiation. The complex has also been shown to have a positive effect on bone mineralization. Changes in the expression of osteogenesis-related genes prove that under the influence of the nanoparticles in question it is possible to influence the process of healing, remodeling and strengthening of tissue structure.

Conclusions: The demonstrated properties make it possible to conclude that the potential for the application of nanohydroxyapatite-collagen complex in medicine is enormous. Possible support in regeneration, both in post-injury conditions and tissues weakened by diseases such as osteoporosis or filling defects in bones after removal of tumors, opens wide possibilities for the development of regenerative medicine. It is necessary to work on the optimization of processes that will improve and standardize the treatment of patients, and in the future allow the comprehensive use of the potential of nanohydroxyapatite with collagen.

ANALYSIS OF THE OCCURRENCE OF BACK PAIN IN EMPLOYEES AND STUDENTS STAYING FOR A LONG TIME IN A SITTING POSITION

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KEYWORDS: back pain, sitting position, VAS, Rolland-Morris

Introduction: The occurrence of back pain often affects working people in a sitting position. The most common problems associated with sitting down relate to the musculoskeletal system, where the muscles undergo adaptive stiffness as the body's defense mechanism for a long time spent in the wrong sitting position, often hunched over.

Aim: Comparison of back pain in employees and students staying for many hours in a sitting position, in terms of their occurrence, subjective assessment of ailments and assessment of the degree of disability caused by pain in the spine.

Material and methods: 50 people took part in the study (n=27 – assembly workers performing sedentary work and n=23 – physiotherapy students). To assess pain were used abbreviated Visual Analog Scale (VAS). The functional status of the subjects was assessed using the Rolland-Morris questionnaire (RMQ).

Results: The obtained results indicate the occurrence of back pain in both the group of employees and students. Pain in the lower spine was observed in 51% of employees and 52% of students, pain in the cervical spine 66% of employees and 9% of students, and in the thoracic section 14% of employees and 21% of students. In the assessment of pain measured using the VAS scale the research results show that the average score among employees is 4.75 and means significant pain, and among students it is 2.70 and is considered mild pain. When determining the degree of disability, the analysis of the results showed that in the surveyed group of employees the arithmetic mean of points is 5.5, which indicates a low degree of disability and a medium reduction in the quality of life, while among students it is 2 points, indicating no disability and a slight reduction in the quality of life.

Conclusions: Prolonged sitting position may cause back pain. There is a need to educate people who spend many hours in a sitting position about the principles of ergonomics and prevention of back pain.

ASSESSMENT OF THE EFFECTIVENESS OF SELECTED TRIGGER POINTS THERAPY TECHNIQUES IN PATIENTS WITH PAIN IN THE DESCENDING PART OF THE TRAPEZIUS MUSCLE

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KEYWORDS: trigger points, trapezius muscle, ESWT, CRET, vibration massage, algometer

Introduction: Myofascial trigger points are defined as particularly sensitive places, located within the skeletal muscle and palpable. Pressure of the trigger point may cause pain and symptoms of the autonomic nervous system.

Aim: The aim of the study was to compare the analgesic effect of three selected forms of trigger point therapy in patients with pain in the descending part of the trapezius muscle.

Material and methods: The study involved 60 people assigned to three comparison groups (n=20 - ESWT; n=20 - CRET (capacitive-resistive electric transfer); n=20 - vibration massage. Before starting the therapy and a week after its completion, the patients underwent measuring the degree of pain intensity around the trigger point using an electronic algometer (The Wagner FPX™ Algometer).

Results: Highly significant ($p<0.01$) differences were found in measurements between groups (ESWT, CRET, vibration massage). In measurements before and a week after its completion, the results of the ESWT group are higher than those of the other groups, the difference compared to the CRET group is significant. Highly significant ($p<0.01$) differences between measurement dates were found. In each group, the measurement one week after the intervention is significantly higher than the results measured before the therapy. Each of the therapies used may increase the pain threshold at the treatment site. The interaction between group and measurement is not significant ($p>0.05$). There was no difference in the improvement of results depending on the type of therapy. This indicates that all therapies are comparably effective.

Conclusions: Each of the forms of therapy used in the research: ESWT, CRET and vibration massage, may reduce the pain of the trapezius muscles and increase the perceived pain threshold. All selected methods are characterized by comparable effectiveness in the treatment of myofascial trigger points.

IDENTIFICATION OF FACTORS DETERMINING THE QUALITY OF LIFE OF STUDENTS IN THE FIELD OF HEALTH SCIENCES

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KEYWORDS: quality of life, stress, student, health

Introduction: In today's world, an increasing number of students are experiencing a low quality of life (51%), significantly affecting their emotional state, well-being, and ability to function effectively in daily life.

Aim: The aim of the study was to identify the factors influencing the quality of life of students in the health sciences field, determine the financial situation of students and the need for them to take up work to sustain themselves during their studies, and also assess the severity of depression symptoms among the surveyed respondents.

Material and methods: The research was conducted as part of our own project among 212 students from various universities in Poland. The research method utilized was a diagnostic survey, using questionnaire techniques, as well as the WHOQOL-BREF questionnaire and Beck's Depression. The research was conducted using a survey on the Google Forms platform. The survey was anonymous and voluntary.

Results: Our study revealed that the quality of life among students in the health sciences field remains at a moderate level, with 51% of respondents declare average quality of life. A key factor influencing quality of life is the financial situation of the student, which is a significant factor for 54.3% of those surveyed. We observed an increase in the percentage of students with depression symptoms, reaching 61.7%. Fatigue and excessive responsibilities are common reasons for dropping out of studies, as stated by 34% of respondents.

Conclusions: There is a need to consider changes in educational programs that incorporate aspects of students' mental and physical health. Additionally, there is a need for actions aimed at improving students' financial situations to reduce the necessity of work and enable them to focus on learning and personal development. The study can indicate a direction for changes that will contribute to an increase in the number of students in health sciences fields.

AN INFLUENCE OF TERPEN ALCOHOL GERANIOL ON DPPC LIPOSOME MEMBRANE PHASE TRANSITION

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KEYWORDS: DPPC (dipalmitoyl-phosphatidylcholine), phase transition temperature, membrane fluidity, geraniol

Introduction: Cell membrane consists of a lipid bilayer in which membrane proteins are embedded. To study different cell membrane properties, liposomes - small spherical particles composed mainly of different kind of lipids are used. One of the cells' properties that are associated with anizotropy (cell membrane disorder) and fluidity is cell membrane phase transition. These key properties for maintaining cell functionality depend on lipid composition and cell environment.

Aim: of this study was to determine changes that occure in DPPC cell membrane bilayer in presence of geraniol in ethanol solution. Geraniol is a terpene alcohol occurring in the essential oils of several aromatic plants.

Material and methods: Liposoms from DPPC (dipalmitoyl-phosphatidylcholine) lipids were prepared using the extrusion method. Multilamellar vesicles (MLV) were extruded multiple times through a thin polycarbonate membrane filter of the first 200 mM and then 100 mM pore size to obtain LUV (Large unilamellar vesicles) using an extruder.

To assess phase transition temperature, and thus the membrane fluidity of liposomes, measurements with the use of spectrofluorometer were conducted. When liposomes were in a gel state (room temperature), a fluorescent probe RH421, were embedded in the lipid bilayers. Then the fluorescence at wavelenghts ex440/em670 / ex540/em670 was measured.

Results: Standard temperature of DPPC phase transition from gel to liquid phase occures in around 42'C. When heat was applied, the fluidity of the lipid bilayers increased, thus the DPPC mobility increased. Presence of terpene alcohol geraniol lowered this temperature, depending on the used concentration, up to 30'C which means that the use of geraniol causes transition from gel phase to liquid phase to occure faster than it is made only by raising temperature of the environment.

Conclusions: Lowering the temperature of cell phase transition and highering cell fluidity are useed to disturb proper cell functionality. Disturbed cell functionality is especially desirable to fight pathogenic bacteria.

PROSPECTS FOR THE USE OF MICROALGAE IN PHARMACEUTICAL INDUSTRY

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KEYWORDS: microalgae, pharmaceuticals, nutraceuticals, natural products, physiology, biotechnology

Introduction: Microalgae are thought to be one of the most promising biotechnological platforms potent to meet the future demands for biopharmaceutical and human nutraceutical production, as they are fast-growing, solar-powered "biofactories".

Aim: Consideration of the perspective use of microalgae in the pharmaceutical industry, based on the biochemical and physiological characteristics of these organisms.

Material and methods: A review of current scientific information in terms of the promising implementation of microalgal bioactive compounds in pharmaceuticals. Specialized databases in the field of medicine and healthcare such as PubMed, Embase, Web of Science, Medline, Access Medicine, Science Direct (Elsevier) from the academic databases of the Main Library of the University of Opole were used.

Results: Information focused on the potential and prospect use of microalgae in the pharmaceutical industry was selected. A wide range of bioactive metabolites that are possible to be obtained from microalgae possess demanding properties including: antibacterial, antiviral, anticancer, nutritive and protease inhibitory. The possibility of discovering new, natural pharmaceuticals puts microalgae in a very favourable light. The more that these photosynthetic microorganisms exhibit many favourable features as: rapid growth rate, low cost of culture maintenance, carbon neutrality, ease of modification of cellular composition following application of abiotic stress and induction of metabolism in the desired direction, as well as adaptability to different environmental conditions and ease of culture scale-up. In addition, several microalgae have been granted GRAS status, making their use as cell factories for pharmaceutical purposes very attractive.

Conclusions: Despite the inspiring potential of microalgae, there are still many technical challenges to overcome before they can be used for large-scale commercial production of pharmaceuticals. Future microalgae development work will need to focus on: safe evaluation of transgenic strains; development of recombinant protein standards under GMP conditions; pre-clinical studies; and full clinical trials. Despite these limitations and challenges, the future of microalgae-based pharmaceuticals is promising.

THE COSMETIC POTENTIAL OF DRAGON'S BLOOD

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KEYWORDS: dragon's blood, *Croton lechleri*, plant extracts, antioxidants, cosmetics

Introduction: Natural cosmetics are consistently gaining popularity in today's cosmetic market. To meet the systematically growing demand for unique natural cosmetics, the manufacturers are searching for innovative ingredients. Such an ingredient is dragon's blood, a latex from *Croton lechleri* tree. This resin is widely known in South American countries as it has played a significant role in traditional medicine thanks to its anti-microbial, anti-inflammatory, and wound-healing properties. Dragon's blood extracts are also used in cosmetic formulations.

Aim: The aim of this study was to experimentally investigate the polyphenolic content, antioxidant activity of ethanolic, hydroethanolic (50%, *v/v*) and aqueous extract from dragon's blood as well as to evaluate the influence of dragon's blood extract on the stability of a prototypic cosmetic emulsion.

Material and methods: The extracts were prepared using ultrasound-assisted extraction and filtered. The total polyphenolic content was compared using spectrophotometric method with Folin-Ciocalteu reagent and sodium carbonate. The antioxidant potential was determined using DPPH scavenging assay. The stability test of the prototypic cosmetic emulsion was carried out by storing it at various temperatures (4°C, 25°C, 40°C, -10°C) for 28 days. The study included organoleptic evaluation of color, consistency and odor as well as measurements of viscosity, density, and pH of the cosmetic.

Results: Among the prepared extracts the ethanolic extract displayed the highest antioxidant activity (DPPH radical scavenging at 0.39% was above 90%) and polyphenolic content (1330.55 μg gallic acid equivalents, GAE/mL). Almost no antioxidant activity and significantly lowest content of polyphenols (23.15 μg GAE/mL) was determined for the aqueous extract. The addition of 1% (*m/m*) dragon's blood extract to the prototypic cosmetic emulsion did not affect its stability during the storage at various temperature conditions.

Conclusions: To summarize, the results showed that dragon's blood extracts are auspicious active ingredients of cosmetic formulations. The addition of dragon's blood extract to the emulsion did not affect its stability and physiochemical properties.

DAPAGLIFLOZIN TRANSDERMAL SYSTEM TTS MTC-D DEVELOPED BY BIOTTS S.A. IN THE RELATIVE BIOAVAILABILITY CLINICAL STUDY COMPARING TRANSDERMAL SYSTEM WITH THE DAPAGLIFLOZIN TABLETS IN HEALTHY SUBJECTS

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KEYWORDS: transdermal patch, pharmacokinetics, type 2 diabetes, drug formulation

Introduction: Transdermal drug delivery systems for the management of diabetes are a promising approach to provide better clinical outcomes compared to conventional dosage forms. The prolonged and sustained release profile of the drug will provide better glucose control and better prediction of the glucose profile. The use of an extended-release transdermal system in the treatment of type 2 diabetes offers the possibility of increasing patient comfort and reducing side effects, e.g., from the gastrointestinal tract, resulting from the often-observed polypragmasy.

Aim: The primary objective of the phase 1 clinical study was to evaluate the safety, relative bioavailability and pharmacodynamic effect of a newly developed Dapagliflozin Transdermal System TTS MTC-D, after administration in healthy volunteers.

Material and methods: The study was randomized, crossover, open label, 2-way, 2-period, one center, single dose of TTS compared to daily oral dosing of reference treatment in healthy subjects. Subjects were randomized to either wear TTS MTC-D for 7 days or to receive once a day dapagliflozin film-coated tablets – Forxiga for 7 days under fasting conditions in study period 1. The treatment was switched for subjects in period 2. A wash-out time between study periods was 7 days. During dosing blood and urine samples for PK were collected and the safety evaluation were performed.

Results: The pharmacokinetic profiles of the study product and the reference product were confirmed to be consistent. Statistical analysis showed that the mean efficiency of the TTS system expressed by the EXTRA value was 0.94 (94%) and statistically existed higher than that calculated for Forxiga tablets - 0.68 (68%).

Conclusions: After transdermal administration of the TTS MTC-D developed by BIOTTS, dapagliflozin penetrates the skin barriers and enters the bloodstream. Good safety and tolerability of the study product was found, with only mild to moderate adverse events.

NURSES' PROFESSIONAL, DIGITAL, AND SOCIAL COMPETENCES

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KEYWORDS: nursing, digital competence, professional competence, social skills

Introduction: Nowadays a nurse's job is complex, interdisciplinary, and has many components. The opinion of the profession itself has been shaped by the mass media or by information from the public, and so some nurses have a critical view of themselves or do not value themselves high enough as professionals. It is therefore important to analyse the nursing profession from different perspectives such as professional, societal, and digital.

Aim: We aimed to investigate the complexity of professional, digital, and social competences of nurses.

Material and methods: Quantitative research was carried out using the DSS – MAP questionnaire to reveal the digital skills of nurses and Professional self-image instrument for nurses.

Results: Professional, digital, and social competences are positively related and influence overall higher level of self-image of research participants.

EFFECT OF NORDIC WALKING TRAINING COMBINED WITH INTERMITTENT FASTING ON SERUM LEVELS OF WNT PATHWAY INHIBITORS IN PATIENTS WITH PLASMOCYTIC MYELOMA

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KEYWORDS: myeloma, exercise, Wnt pathway inhibitors, nordic walking, intermittent fasting

Introduction: Multiple myeloma (MM) is a hematologic malignancy mainly affecting the elderly. Myeloma cell activity causes a number of organ consequences of MM, among which are bone disease associated with increased osteolysis. Canonical inhibitors of the Wnt pathway, including Dickkopf-related protein 1 (DKK-1) and sclerostin (SOST), play an important role in regulating this process. According to the literature, both physical training and intermittent fasting can positively affect the concentrations of the mentioned markers, leading to its activation.

Aim: The aim of this study was to evaluate the effects of Nordic walking training cycle and intermittent fasting on the serum concentrations of SOST and DKK-1 in patients with MM.

Material and methods: The present study included 21 patients (M=10, K=11, mean age: 65.5±4.7 years, disease duration: 57.6±12.3 months, BMI=29.2±4.0 kg/m^2), of which 7 participated in Nordic walking (NW) training cycle for 6 weeks, 7 in training combined with intermittent fasting (NW IF), and 7 undertook only intermittent fasting for the same period (IF). Blood parameters and body composition parameters were assessed twice – before (I) and after 6 weeks of participation (II).

Results: In the training intervention groups, RMANOVA analysis showed a significant time-dependent decrease in SOST levels (respectively: IF NW – from 283.5±118.9 pg/ml to 203.7±102.4 pg/ml, p=0.002 and NW - from 275.6±102.1 pg/ml to 202.2±70.2 pg/ml, p=0.004) with a statistically insignificant decrease in DKK-1 protein concentrations. No significant changes in the concentrations of these proteins were indicated in the IF group. No significant changes in body composition were also obtained in either group, suggesting the need for a longer duration of intervention.

Conclusions: The obtained direction of changes in DKK and SOST concentrations is favorable and indicates that the types of interventions used in this study may improve the prognosis of patients.

RESPONSE OF THE GUT-BRAIN AXIS TO POSTBIOTIC SUPPLEMENTATION: STUDIES ON AN ANIMAL MODEL

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KEYWORDS: bacteria, microbiome, sodium butyrate, chicken model

Introduction: The gut-brain axis is an important communication system between the gut and brain, facilitating bidirectional communication via neural, hormonal, and immunological pathways. Research on the gut-brain axis following sodium butyrate stimulation in animal models has gained attention in recent years due to the growing interest in the potential therapeutic effects of postbiotics on neurological and psychiatric conditions. Chickens, like mammals, have a complex nervous system, including an enteric nervous system within the gastrointestinal tract. This system can function independently of the central nervous system and plays a crucial role in regulating gastrointestinal functions such as motility, secretion, and local blood flow.

Aim: The study aimed to analyze changes occurring in the gut-brain axis in chickens stimulated with sodium butyrate at the stage of embryonic development.

Material and methods: One thousand eggs were incubated and, on day 12, were injected with three different doses of sodium butyrate (0.1% SB; 0.3% SB; 0.5% SB). The control group was injected with saline. Samples were collected *post-mortem* (eight random individuals from each group were sacrificed on day 42 after hatching). RNA isolated from the brain was tested by RT-qPCR method for expression of immunity-related genes (*IL-1*β, *IL-2*, *IL-4*, *IL-6*, *IL-8*, *IFN*γ, *IFN*β), neurotransmission-related genes (*BDNF*, *GSK3*β) heat shock genes (*HSPB1, HSPB5, HSPB8, HSPB9, HSP70*) and other genes (*TLR4*, *GR*, *NR2A*, *CRH*, *NF-κB p65*). Additionally, the relative abundance of indicator bacteria (*Lactobacillus spp., Bifidobacterium spp., Escherichia coli, Faecalibacterium prausnitzii*) in the intestines was analyzed by qPCR based on bacterial DNA isolated from the contents of the cecum and ileum.

Results: The dose of 0.3% SB showed the most optimal effect on gene expression in the brain. SB in each dose significantly reduced the abundance of *Lactobacillus* spp. 0.3% SB supplementation affected the promotion of *Bifidobacterium* spp. and *F. prausnitzii*.

Conclusions: The results indicate a relationship between the stimulation of intestinal microbiota *in ovo* and the response in the level of expression in the brain.

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THE USE OF SPECIALIZED PROBES TO MEASURE SELECTED SKIN FEATURES

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KEYWORDS: skin, reference values, adolescent, swimming

Introduction: The skin is the first line of defense against ingress of pathogens, chemical and physical agents and uncontrolled water loss. The barrier function of the skin depends on the epidermis, mainly its outermost *stratum corneum*. Specialized probes are used to assess the effects of various physical/chemical factors on changes in selected skin characteristics, allowing to evaluate: the level of hydration of the *stratum corneum* using corneometer, the level of TEWL (TransEpidermal Water Loss) using tewameter, the pH of the skin using pH meter. The probes can be widely used in a variety of studies for example: with chemicals applied to the skin, the effects of environmental conditions (air temperature and humidity) or the effects of physical stimuli (cryotherapy, sauna). Regular skin contact with pool water results in a decrease in the skin's ability to retain water in the body, leaching of NMF (Natural Moisturizing Factor) components and an increase in the pH of the *stratum corneum*, which can lead to dysfunction of the hydrolipid barrier.

Aim: The aim of the study was to use specialized probes to evaluate the skin parameters of young swimmers.

Material and methods: Twenty-seven adolescents, training swimming an average of 6 days a week, participated in the study. Selected skin characteristics (*stratum corneum* hydration level, TEWL, pH) were measured at two locations: the inner side of the forearm and the medial side of the calf.

Results: In both measured locations, pH and TEWL values (forearm: pH – 5.22±0.48; TEWL – 11.20±4.23; calf: pH – 5.18±0.57; TEWL – 11.83±5.73) were within the reference ranges for healthy skin. Corneometric measurement values, however, indicated dry skin (forearm: 26.41±5.74; calf: 24.97±6.42).

Conclusions: Daily skin contact with chlorinated water can lead to dysfunction of the hydrolipid barrier, causing decreased hydration of the *stratum corneum*.

ANALYSIS OF MEDICAL STUDENTS' KNOWLEDGE OF SAFETY PROCEDURES FOR THE TREATMENT OF VASCULAR ACCESSES

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KEYWORDS: vascular accesses, procedures, safety, medical students

Introduction: Intravenous therapy plays an important role in modern medicine, as it is used in millions of patients to save lives, treat metabolic disorders or for diagnosis. The theoretical basis and development of safe vascular access skills in medical students play an important role in ensuring high quality medical practice.

Aim: was to assess medical students' knowledge of procedures for the safe treatment of vascular access.

Material and methods: This is a cross-sectional study conducted in March 2024 among 192 nursing, midwifery and medical students. The author questionnaire was used for the study.

Results: The respondents were predominantly female (89.6 %; n=172). It was found that only slightly more than half of the respondents (52.6 %; n=101) answered the question on the care of the central catheter correctly. 32.3% (n=62) of respondents believed that the air vents on collapsible infusion devices should be opened during infusion. Just over 60% (n=120) knew the indications for using and removing a peripheral cannula. 44.3% (n=85) of respondents thought that a transparent, semi-permeable polyurethane dressing protecting the vascular access should be changed every three days, 17.2% (n=33) every 24 hours and 2.6% (n=5) every 10 days. 35.9% (n=69) correctly stated that the dressing should be changed every 7 days.

Conclusions: The level of knowledge of medical students regarding safety procedures for vascular access care is inadequate. It is therefore necessary to improve knowledge and skills in this area. Students' knowledge can be improved by additional activities during their training, e.g. interdisciplinary workshops, which increase the current level of knowledge about vascular access safety.

MUSCLE TISSUE CONTENT AND SPIROMETRY VARIABLES IN A NURSING HOME WOMEN

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KEYWORDS: spirometry, gerontology, sarcopenia

Introduction: It is unclear how exactly sarcopenia affects pulmonary function.

Aim: This study aims to retrospectively examine cross-sectional relating to the effects of body muscle content on ventilatory function in elderly women residing in nursing homes in Poland.

Material and methods: Forty-four women, aged 73 ±4, were divided into two groups: normal (n=23) and sarcopenia deficient (n=21) content of body muscle tissue. It was assumed that the subjects were not underweight or obese. They were non-obese, non-smokers, and with no overt diseases other than sarcopenia. The assessment of pulmonary function was based on spirometry. The following variables were evaluated: BMI, FVC, FEV_1, and FEV_1/FVC.

Results: Women with normal muscle mass content enjoyed significantly higher mean levels of the following variables: FVC $p<0.0001$, FEV_1 $p<0.0001$, FEV_1/FVC $p=0.009$.

Conclusions: It seems likely that the sarcopenia of old age may substantially impact the ventilatory function in women.

NURSES' EXPERIENCE OF BURNOUT SYNDROME WHILE WORKING IN ONCOLOGY DEPARTMENTS

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KEYWORDS: oncology nursing, nurse, burnout, psychological

Introduction: When experiencing burnout, the emotional and physical health of nurses deteriorates, the quality of work decreases, and patient dissatisfaction increases. Nurses working in oncology units, due to the nature of their specialty, face those with a cancer diagnosis, which causes a lot of fear and uncertainty.

Aim: to reveal the burnout experienced by nurses working in oncology departments.

Material and methods: During the research, ethical principles were observed. The research sample consisted of 143 male and female respondents who care for patients with oncological diseases. Respondents were selected by convenience non-probability sampling. Of all subjects, 120 (83.9%) were women, 23 (16.1%) were men. A quantitative study was carried out. Respondents were selected by convenience non-probability sampling. The research was conducted in 2023.10 – 11. The respondents were nurses working in the city of Klaipeda (Lithuania). The Copenhagen Burnout Inventory. The total Cronbach's alpha coefficient of the questionnaire's internal scales is 0.876. The obtained data were processed using the Microsoft 365® Excel computer program.

Results: The process of the study revealed that nurses working in oncology departments had the strongest personal and work-related burnout. The most common factors leading to burnout were lack of feedback from patients and decreased energy.

Conclusions: After examining the manifestation of burnout syndrome, it became clear that nurses with personal burnout usually experience frequent fatigue and emotional exhaustion. Burnout caused by work was most strongly related to emotionally exhausting work and fatigue at the end of the working day, and burnout caused by work with patients was most strongly determined by decreased energy due to work with patients, lack of feedback from patients. The least burnout caused by working with patients was caused by irritation while working with patients and difficult work with patients.

THE EFFECTS OF PROBIOTICS ON HASHIMOTO DISEASE

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KEYWORDS: Hashimoto disease, hypothyroiditis, probiotics

Introduction: Hashimoto's Disease (HD), affecting primarily women, poses significant challenges despite efficient hormone therapy, including weight gain, gastrointestinal disorders (e.g., SIBO), and skin issues, compromising quality of life. The altered gut microbiota observed in HD suggests probiotic therapy as a promising avenue.

Aim: This review seeks to explore the potential therapeutic application of probiotics in managing Hashimoto Disease.

Material and methods: A systematic search of MEDLINE (PubMed) and the Cochrane Library using keywords such as "Hashimoto's Disease," "hypothyroidism," "thyroid disorders," "probiotics," and "synbiotics" focused on randomized, double-blind, placebo-controlled trials in adults.

Results: Three trials, encompassing 187 participants, with 176 women and 127 with HD, were identified. Administered probiotics (including *Bf breve, Bf longum, Bf infantis, Lb acidophilus, Lb Plantarum Lb paracasei, Lb bulgaricus, Lb Rhamnus, Streptococcus thermophilus*) or synbiotics (bacteria and fructooligosaccharides) for 8-10 weeks yielded diverse outcomes:

– Ramezani (2023) noted reduced blood pressure, improved quality of life, and increased fT4 levels in both groups, with no change in TSH or depression.

– Talebi (2020) reported decreased TSH levels, reduced LT4 dosage, and diminished fatigue, with no significant changes in aTPO or blood pressure.

– Spaggiari (2017) observed no alterations in TSH, fT3, fT4, aTPO levels but noted a need for LT4 dosage reduction in the probiotic group.

Conclusions: The limited research on probiotics' impact on autoimmune thyroiditis underscores the need for further investigation. While initial findings hint at potential benefits, the efficacy of probiotics in managing Hashimoto's disease remains uncertain. Future studies should explore specific strains and their outcomes comprehensively.

EXPLORING THE DYNAMIC FLUCTUATIONS IN MRNA EXPRESSION LINKED TO THE HISTAMINERGIC SYSTEM IN ENDOMETRIOID ENDOMETRIAL CANCER

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KEYWORDS: endometrial neoplasms, histamine, RNA, messenger

Introduction: Endometrioid endometrial cancer ranks among the most prevalent malignant tumors affecting women in developed nations, with its incidence steadily rising. Over the past decade, its frequency currently reaching 79 cases per 100,000 women in Europe. Histamine, a biogenic amine, exhibits immunomodulatory properties and serves as the primary mediator of severe and acute inflammatory reactions, as well as immediate hypersensitivity reactions. Histamine operates via four distinct receptor subtypes: HRH1, HRH2, HRH3, and HRH4, with its expression documented across various cancer types.

Aim: This study aimed to assess alterations in the expression pattern of genes associated with the histaminergic system in both endometrial tissue samples and whole blood derived from women diagnosed with endometrioid endometrial cancer.

Material and methods: The study cohort comprised 30 women diagnosed with endometrioid endometrial cancer who underwent hysterectomy. Within this group, 15 cases were classified as G1 (well-differentiated), 8 cases as G2 (moderately differentiated), and 7 cases as G3 (poorly differentiated). The control cohort comprised 30 women with no neoplastic changes during routine gynecological examinations. Molecular analysis encompassed microarray analysis of mRNAs associated with the histaminergic system, reverse-transcription quantitative polymerase chain reaction (RT-qPCR), and enzyme-linked immunosorbent assay (ELISA).

Results: Among 65 mRNAs associated with the histaminergic system, 10 exhibited differentiations between tissue and blood samples obtained from endometrioid endometrial cancer patients compared to the control group ($p<0.05$). mRNA histamine receptor 1,3 (*HRH1, HRH3*), and solute carrier family 22 member 3 (*SLC23A2*) showed differentiation in endometrioid endometrial cancer samples irrespective of their comparison to the control or G group.

Conclusions: The findings reveal a complex architecture of the histaminergic system. The identified mRNA targets hold promise for molecularly targeted therapies in the context of endometrioid endometrial cancer. Furthermore, these results may offer insights into assessing the severity of endometrioid endometrial cancer.

TEACHING SURGERY: A NEW PERSPECTIVE

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KEYWORDS: teaching surgery; surgical curriculum; surgical clerkship

Introduction: Teaching medicine is a specific task consisting of transferring to the students current medical knowledge and rules of medical practice. Teaching surgery traditionally includes acquiring manual skills. The article touches several issues concerning surgical education (curriculum) in the course of medical studies. Attention was paid to specificity of operative room experience, risk of intimidation, anxiety provoking and potential benefits. The factors which motivate surgeons to engage in teaching students were discussed. It was noticed that the range an methods of transferring medical knowledge during medical studies (a curriculum) frequently do not comply with requirements of future medical practice. An usefulness of frequent, everyday testing of acquired knowledge was emphasised. Unreasonable hopes relevant to the introduction of novel techniques of teaching medicine in training centres with skills learning on dummies and simulators were questioned. An importance of ward-round and simple, manual skills teaching was emphasised.

ASSOCIATIONS BETWEEN SLEEP AND QUALITY OF LIFE IN SHIFT – WORKING NURSES

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KEYWORDS: nursing, quality oof life, sleep

Introduction: The correct organization of shift work of health care workers is necessary to ensure continuous 24-hour patient care. First of all, shift work causes significant interference in various areas of a person's life and changes a person's psychophysical balance, in particular: 1) disrupts the circadian rhythm; 2) reduced alertness and productivity, leading to an increased risk of errors and accidents; 3) negative health effects both in the short term, and in the medium and long term; 4) difficulties in maintaining social roles, which have negative consequences for interpersonal relationships and family care.

Aim: To determine the relationship between the quality of sleep and the general quality of life of nurses, taking into account objective and subjective indicators of sleep.

Material and methods: The latest systematic review of the scientific literature for 2019-2024 was carried out.

Results: Those working in shift work say that not only their well-being, but also their quality of life deteriorates due to working in shifts or a sliding schedule. Very often, lack of sleep or poor-quality sleep at night causes slowing down of reactions, difficulty concentrating, physical fatigue and other ailments, and affects the likelihood of more frequent mistakes and injuries. The most frequently mentioned health problems are sleep disorders, digestive disorders, cardiovascular diseases.

Conclusions: Caring for the quality of sleep and quality of life of nurses is an important factor in the long-term effectiveness of the health care system. Creating the right working conditions and organizational culture can help retain and attract employees, as well as improve service delivery efficiency and patient health.

BREAKING THE TABOO: TESTICULAR SELF-EXAMINATION IN THE LIGHT OF MEDICAL AND NON-MEDICAL STUDENT KNOWLEDGE

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KEYWORDS: testicular cancer, testicular self-examination, prevention of testicular cancer

Introduction: Testicular cancer is one of the most common forms of cancer in men. Early detection is a key element in the successful fight against this disease, and self-examination of the testicles plays an important role in this process.

Aim: The main aim of this study is to carry out an analysis of the of knowledge on the subject of testicular self-examination, with particular attention to differences between medical and non-medical students.

Material and methods: The study was conducted among male students at Stanisław Staszic State University of Applied Sciences in Piła in the academic year 2023/2024. 108 students took part, 61 of them from non-medical disciplines and 47 from medical disciplines. The research involved respondents completing a proprietary questionnaire on testicular cancer. The data were described in quantitative and percentage terms in order. Analysis of the distribution of traits in groups of students was performed using a chi-square test, assuming a significance level below 0.05 ($p<0.05$).

Results: The knowledge of students is determined by of factors, dependent on the profile of the field of study. Non-medical students show less knowledge of self-examination techniques, with 34.07% of those surveyed regularly using self-examination and only 40.98% declaring knowledge of these techniques. The results of the survey reveal that 50% of the knowledge acquired by both medical and non-medical students on self-examination of the testicles comes from online sources, while only 7.50% of respondents cited their parents as the source of information.

Conclusions: Students rarely undergo self-examination of their testicles, which indicates a low level of awareness of the issue. The knowledge of medical students is significantly higher than that of non-medical students. This highlights the urgent need to focus on promoting testicular self-examination.

THE METHOD OF FASCIAL MANIPULATION ® AND THE IMPROVEMENT OF RANGE OF MOTION IN A PERSON SUFFERING FROM CEREBRAL PALSY: CASE REPORT

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KEYWORDS: fascial manipulation, cerebral palsy, motor function

Introduction: Spasticity, a common complication of cerebral palsy (CP), significantly impacts patients' functionality and quality of life. We present the case of a 46-year-old man diagnosed with CP. Despite childhood outpatient rehabilitation, his condition remained unchanged. In 2024, he relies on a wheelchair and third-party assistance due to spastic quadriplegic palsy.

This study aimed to assess the effectiveness of Fascial Manipulation (FM) on joints range of motion (ROM). Before therapy, ROM was evaluated using a goniometer. The six-week FM therapy, combined with resistance exercises, improved ROM in all joints except the left hip. FM shows promise in enhancing limbs joints ROM for CP patients.

Aim: Improve ROM in humeral, cubital, radiocarpal, hip, genu and ankle joints in a person suffering from CP by applying FM.

Material and methods: Male, born on April 18, 1978, experienced hormonally induced labor. Intrauterine infection detected at birth led to juvenile CP diagnosis at 3 months. Currently, patient suffers from spastic quadriplegia, hypertonia, myoclonia. Therapy consisted of six sessions of FM weekly, along with resistance exercises. ROM in joints was assessed using a goniometer in the supine position before therapy, evaluated by the SFTR method. Therapies followed FM principles, employing centers of coordination and fusion.

Results: After FM treatment, patient showed increased ROM in all joints and planes, except for abduction and external rotation in the left hip. Additionally, the patient reported improved motor functions, being able to transition autonomously from supine position to either side.

Conclusions: This case report underscores the potential of fascial therapy in relieving motor dysfunction in CP patients by addressing ROM in peripheral joints. FM shows promise in enhancing the lives of those with central nervous system disorders by harmonizing body tensions and enhancing proprioception. Nonetheless, more research with longer sessions and follow-up is needed for validation.

THE INFLUENCE OF PHYSICAL ACTIVITY – SMOVEY ON BLOOD MORPHOLOGY AND RHEOLOGY

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KEYWORDS: blood morphology, blood rheology; Smovey, old people

Introduction: Smovey is an active vibration exercise equipped with beads that generate vibrations as you swing, strengthening your core muscles, stabilizing your spine and controlling intensity. By performing active vibration exercises using Smovey, the quality of life of patients improves and has a positive effect on endurance and balance. Additional benefits resulting from regular exercise are intertwined with improving the rheological properties of blood. The deformability of red blood cells is very important in the flow of blood cells through capillaries of very small diameter. There are many reasons for the decline in this efficiency, e.g. aging of the body or disease factors.

Aim: The aim of the study was to assess the effect of smovey on blood morphological and rheological parameters in a group of elderly women.

Material and methods: The experimental group consisted of 14 women aged 71±6.4. For the analysis of morphological and rheological blood parameters, venous blood was collected twice: before the start of Smovey training and after 3 months. The control group consisted of 14 women who did not participate in Smovey exercises. In the control group, venous blood was collected once.

Results: After three months of Smovey training in a group of older women, a statistically significant increase in WBC, RBC, HGB, HCT, PLT, MCH, MCHC, EI 0.30, EI 8.23, AI and a decrease in MCV, EI 2.19 were observed.

Conclusions: Smovey physical activity causes changes in both rheological and morphological properties of blood in a group of older women. The erythrocyte aggregation index increases, the number of WBC, RBC, HGB, HCT, PLT, MCH, MCHC increase. The study was financed by AWF Kraków as part of co-financing for statutory research - maintaining research potential for 2022/23 (No. 308/BS/INP/2023).

COMPARISON OF THE ANTIOXIDANT, ANTI-STAINING AND CYTOTOXIC ACTIVITIES OF EXTRACTS FROM VARIOUS MORPHOLOGICAL ORGANS OF IMMORTELLE (*Helichrysum spp.* Mill)

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KEYWORDS: *Helichrysum* sp, plant extract, tyrosinase, antioxidant activity, HaCaT cells

Introduction: "Zero Waste" is a philosophy of life and an economic approach to minimize the amount of waste produced by an individual or community.

Aim: The aim of the research was to evaluate selected cosmetic properties (antioxidant, skin-lightening and cytotoxic) of aqueous (**W**) and hydroethanolic (70% *v:v*, **WE**) extracts obtained from flowers of *H. arenarium* and herbs of *H. italicum*.

Materials and methods: In the cosmetics industry, this trend might be applicable in the production of natural cosmetics by the utilization of plant by-products of waste material (eg. leaves, stems, peels or foots) for the extraction of bioactive compounds. An example of a natural resource that could potentially be better utilized are immortelle species (*Helichrysum arearium, Helichrysum italicum*), rich in bioactive compounds with medicinal and cosmetic properties. The cosmetic industry uses mostly the extracts obtained from the flowers of *Helichrysum* species and the herbs (stems + leaves) are usually considered as waste.

Results: The results showed that the WE herb extract of *H. italicum* has the highest antioxidant properties as at the concentration of 1 mg/mL it neutralized ca. 95% of DPPH and ca. 100% of ABTS free radicals. The skin-lightening potential of Helichrysum extracts was analyzed using the lysate of B16F10 murine melanoma cells, containing murine tyrosinase. W and WE flower extracts of *H. arenarium* and WE extract of *H. italicum* showed dose-dependent inhibitory effect on tyrosinase, reducing the activity of the enzyme by ca. 41-45% at the highest tested concentration (1 mg/mL). In vitro cytotoxicity studies showed that *Helichrysum* sp. extracts are not toxic for human keratinocytes HaCaT – the highest reduction of cellular viability (30%) was noted for WE herb extract of *H. italicum* at 250 μg/mL.

Conclusions: To summarize, presented research showed that leaf extracts form *Helichrysum* sp. are valuable raw materials for the extraction of antioxidant, skin-lightening and safe active ingredients of cosmetics.

APPLICATION OF PEAR (*Pyrus communis* L.) AND BILBERRY (*Vaccinium vitis-idaea* L.). LEAF EXTRACTS IN FORMULATION OF SKIN LIGHTENING COSMETICS

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KEYWORDS: cosmetics, plant extracts, hyperpigmentation, *Pyrus communis*, *Vaccinium vitis-idaea*

Introduction: Hyperpigmentation is one of the most common aesthetic problems and a target of many cosmetic products. Unfortunately, many of recently used skin-lightening active ingredients are unstable in cosmetic formulations and lack expected effectiveness. Moreover, prolonged application of such ingredients often results in side effects, including skin irritation, contact dermatitis, leukoderma, or impaired wound healing. For this reason, modern cosmetology is constantly searching for new, effective and safe substances that reduce hyperpigmentation. The source of such substances are plant extracts.

Aim: The presented research assessed the possibility of using pear (*Pyrus communis* L.) and bilberry (*Vaccinium vitis-idaea* L.). leaf extracts in skinlightening cosmetics. Leaves of this plant species are currently used mostly as waste material, therefore their utilization in the cosmetic industry might help in more sustainable usage of natural resources.

Material and methods: The leaves were extracts in water (W extracts) or water:propylene glycol mixture (1:1,*v:v*, WG extracts) and compared for their phytochemical content (polyphenols and flavonoids) antioxidant activity (using DPPH and ABTS radical scavenging assays) and skin-lightening potential (using tyrosinase inhibitory assay).

Results: Bilberry WG extract showed the highest content of polyphenols and flavonoids among all tested extract (2751,5 μg GAE/mL and 199,3 μg QE/mL, respectively). Bilberry W extracts was the most effective antioxidant in DPPH assay and the WG bilberry extracts was the most active in ABTS assay. The highest tyrosinase inhibitory properties were observed for 1% (v/v) bilberry WG and pear W extracts – both inhibited the tyrosinase activity by 25%. Both extracts then incorporated in the formulation of cosmetic emulsion. To enhance the skin-lightening potential of the product kojic acid was also implemented in the formulation. Prepared cosmetic was analyzed for its physicochemical properties (colour, smell, viscosity, pH), microbiological safety and stability.

Conclusions: Presented results showed in practice that pear and bilberry leaf extracts might be applied in formulations of skin lightening cosmetics.

NURSES' COMMUNICATION WITH PARENTS AFTER ADENOIDECTOMY AND TONSILLECTOMY IN CHILDREN

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KEYWORDS: communication between nurses, adenoidectomy, tonsillectomy operations, parental attitude

Introduction: Communication between parents and nurses in hospital is of particular importance for the improvement of the child's health status. Children often feel fear and anxiety before surgical procedures and operations, and parents get lost and do not know how best to behave. Nurses are the people who must give a sense of calm not only to children but also to parents. Communication and understanding are essential for effective decision-making. Poor communication and misunderstanding can have a negative impact on a child's health.

Aim: To analyse nurses' communication with parents after adenoidectomy and tonsillectomy in children.

Material and methods: A systematic review of the literature by keyword. Analysis of the most recent literature in English for 2019-2024. Sources consulted in databases: Wiley Online Library, PubMed.

Results: Nurses often do not find free time to visit children's wards and reassure both them and their parents, who tend to feel more stress and anxiety about their children and the unknown. Parents would like to receive more information, knowledge and understanding about the possible complications after surgery and how to deal with certain situations so as not to get lost and cause additional feelings of fear for their children. Research shows that miscommunication between nurses and parents is prevalent.

Conclusions: Nurses must provide parents with as much information as possible about how to deal with certain situations in the event of a complication in the child, which could lead to parental confusion and uncertainty. Nurses must communicate competently with all parents, provide them with the information they need to improve their child's health, and make more frequent visits to the wards to ensure their child's safety and parents' peace of mind.

THE PROBABLE LINK BETWEEN REFERRED PAIN AND NOCIPLASTIC PAIN: A CROSS-SECTIONAL STUDY

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KEYWORDS: pain, central nervous system sensitization, trigger points

Introduction: Chronic primary musculoskeletal pain is a new concept of regional pain, which stems from the mechanistic descriptor of nociplastic pain. Myofascial pain is considered one of the possible sources of that subtype of chronic primary pain. Muscle alterations such as decreased pain pressure threshold (PPT), referred pain and myofascial trigger point (MTrPs) presence have been considered important for central sensitization processes. Yet, limited studies explored the connection between muscle alterations and the Central Sensitization Inventory (CSI) score.

Aim: The aim was to determine whether the CSI score relates to the number of latent MTrPs, latent MTrPs causing referred pain and muscles exhibiting lowered PPT values.

Material and methods: 114 healthy adults were assessed for demographic characteristics, CSI, number of latent MTrPs without and with eliciting referred pain, and PPT value across various muscles. Spearman's correlation and the Jonckheere-Terpstra test were utilized to examine the relationship between CSI scores and muscle alterations.

Results: A weak correlation was observed between individual CSI scores, the occurrence of referred pain, and the number of muscles with reduced PPT values. It was confirmed that individuals with a higher number of latent MTrPs associated with referred pain or muscles with decreased PPT showed elevated CSI scores, with women displaying significantly higher CSI scores.

Conclusions: The findings indicate that higher CSI scores are associated with increased number of latent MTrPs causing referred pain and a greater number of muscles with reduced PPT values.

HOLISTIC PRI THERAPY IN A PATIENT WITH LEFT LUMBAR IDIOPATHIC SCOLIOSIS, CONSIDERING PEDOBAROGRAPHIC DIAGNOSIS AND THE USE OF INDIVIDUAL INSOLES AND CHENEAU BRACE: A CASE REPORT

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KEYWORDS: scoliosis, rehabilitation, diagnosis, postural restoration, pedobarograph

Introduction: Idiopathic scoliosis poses significant challenges in modern physical therapy due to unresolved questions regarding its origins. Comprehensive diagnostics are crucial for accurate diagnosis and effective rehabilitation.

Aim: To evaluate the effects of holistic PRI therapy on a patient with left-convex idiopathic scoliosis in the lumbar spine, incorporating pedobarographic analysis, custom orthotics, and the Cheneau brace.

Enhance respiratory and walking functions, reduce lumbar pain, improve posture and body symmetry, and increase daily activity comfort.

Material and methods: A twelve-year-old patient with bilateral overpronation was assessed using pedobarography in February 2019, revealing a significant weight-bearing asymmetry between the feet (90.6% L, 9.4% R). Following the Adams test and scoliometer evaluation, X-Ray showed a 42° Cobb angle. The patient was prescribed custom orthotics and the Cheneau brace. In April 2019, began PRI therapy. Tests for myokinematic restoration of the lumbopelvic-femoral pattern were conducted. Individual PRI method compliant exercises started with core stabilization, later adding gait re-education and postural breathing improvement. Exercises were performed twice daily, with correct sitting and lying positions implemented. Patient was required to wear the Cheneau-type brace for twelve hours daily.

Results: After nine months, spinal curvature was reduced by 5° scoliometrically and Cobb angle was reduced by 20° radiologically. Pedobarographic assessment showed improved static pressure distribution between the feet (61.9% L, 38.0% R). PRI functional tests demonstrated enhanced gait symmetry and respiratory functions. The Lasegue test indicated significant flexibility improvements. Continued use of custom orthotics and specific exercises was recommended.

Conclusions: Nine months of holistic myokinematic pattern restoration exercises, gait re-education, and postural breathing reduced the Cobb angle from 42° to 22°. Therapy using the PRI method, with pedobarographic diagnostics and custom orthotic inserts and a Cheneau brace, can be an effective treatment method left-convex idiopathic scoliosis in the lumbar segment, improving motor functions and reducing pain.

BODY COMPOSITION AND PHYSICAL FITNESS AMONG FEMALE HEALTH SCIENCES STUDENTS

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KEYWORDS: body composition, FMS, university female students

Introduction: Research on body composition and physical fitness among female health sciences students aims to illuminate the interplay between academic pursuits and personal well-being. Understanding these factors can inform tailored interventions to promote holistic health within this demographic.

Aim: This study examined associations between body composition and physical fitness scores among female health sciences students

Material and methods: A total of 67 female university students were assessed, including 38 physiotherapy students and 29 dietetics students. Anthropometric variables included body height and body mass. Body mass index (BMI) was calculated. Body composition was measured by bioelectrical impedance analysis using the InBody 120 scale. The physical fitness was assessed using the Functional Movement Screen (FMS) test.

Results: The analysis of body composition showed that there were no statistically significant differences, except for muscle mass, in favor of the physiotherapy students. Dietetics female students achieved a better result in the TPSU and FMS composite score. There was a statistically significant negative correlation between body composition and FMS test results among female students of both groups.

Conclusions: The study highlights the significance of addressing body composition and physical fitness among female health sciences students to foster overall well-being. By implementing targeted interventions, institutions can empower students to prioritize their health.

EFFECTS OF NORMOBARIC HYPOXIA AND HIIT TRAINING ON SKIN CONDITION IN YOUNG, HEALTHY MEN

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KEYWORDS: normobaric hypoxia, interval training, corneometry, tevametrics, mexametrics, skin features

Introduction: Hypoxia is a condition characterized by deficiency of tissue oxygenation in relation to its requirements. The beneficial effects associated with chronic hypoxia are related with the slow and prolonged acclimatization of the body. This allows the induction of expression of genes responsible for, among other things, the control of glucose metabolism or vascular tone. It has been proven that physical activity conducted under hypoxia has a stimulating effect. Despite the promotion of this form of training, no information has been found in the available literature on the effects of training conducted under hypoxic conditions on skin condition.

Aim: Therefore, the purpose of this project was to evaluate how exposure to normobaric hypoxia and training conducted under normoxic conditions would affect skin condition in young, healthy men.

Material and methods: Six young (20-27 years old), non-athletically trained men were recruited for the project and subjected to the intervention of exposure to hypoxic conditions 3 times a week for a period of 4 weeks. For 12 nights, they were staying for 12 hours in a thermoclimatic chamber, in which conditions mimicked those at 3,000 meters above sea level.

Results: Exercise loads were determined individually based on the results of a graded test on a bicycle cycloergometer under normoxia conditions. A single training unit consisted of a 15 min warm-up (10 min of 90W effort and 5 min of stretching), the main part (30 min interval: 15x45 sec of work-progressed from 75 to 90% WRmax/rest: 75 sec at 90W load; and 10 min of calming: 70W and 5 min of stretching). Each subject performed 12 training units.

Conclusions: Skin characteristics (hydration, level of transepidermal water loss, viscoelasticity and redness) were examined before and after the first and the last night spent in hypoxic conditions by Courage+Khazaka electronic GmbH (Cologne) devices.

ASSESSMENT OF THE KNOWLEDGE PRINCIPLES OF PROPER NUTRITION, THE LEVEL OF AEROBIC ENDURANCE AND THE QUALITY OF LIFE PEOPLE OVER 60 LIVING IN THEIR OWN HOUSE IN THE OPOLSKIE PROVINCE

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KEYWORDS: nutrition, aerobic capacity, quality of life, senior

Introduction: A balanced diet adapted to age and needs of the body is the basis for well-being and health. It prevents or delays the occurrence of chronic diseases. Physical activity increases the efficiency and performance of seniors and improves their quality of life.

Aim: Assessment of knowledge of the principles of proper nutrition, the level of aerobic endurance and quality of life among people over 60 living on their own.

Material and methods: The study was conducted on 60 participants from the Opole Voivodeship, aged over 60 years. Among the participants, 67% were women and 33% were men. The average age of the participants was 69.73±5.49 years. A questionnaire assessing dietary habits and knowledge of proper nutrition was made based on current dietary guidelines. A 2-minute walking test was used to assess aerobic endurance. Quality of life was evaluated using the WHOQOL-BREF questionnaire.

Results: Seniors commonly make nutritional mistakes such as snacking excessively, frequently consuming sweets, or not drinking enough water. More than 60% of surveyed men are not familiar with the food pyramid, whereas among women it's 30%. The aerobic strength of the respondents was at a satisfactory level. The average number of steps among women was 83.27±20.14 and among men 79.45±18.70. The average quality of life of the participants was 3.72±0.64 points.

Conclusions: Women demonstrated better knowledge of proper nutrition. The majority of surveyed men were not familiar with the food pyramid and exhibit habits such as snacking between meals, frequent consumption of sweets and inadequate hydration. Women showed better aerobic endurance and lower BMI compared to men. Similarly, individuals living in rural areas achieve better results in the walking test than urban residents. It is essential to develop strategies promoting a healthy lifestyle in this age group.

ANTIOXIDANT ACTIVITY OF SYNTHETIC ORGANIC GERMANIUM COMPOUNDS ON HUMAN PANCREATIC CANCER CELL LINE PANC-1 *IN VITRO*

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KEYWORDS: oxidative stress, germanium, PANC-1 cell line, cancer

Introduction: Germanium is an element that occurs naturally in soil, animals and plants. In contrast to the inorganic form of this element, organic germanium compounds have low toxicity and many biological activities.

Aim: The aim of the study was to investigate the antioxidant activity of two synthetic organic germanium compounds on the human pancreatic cancer cell line PANC-1 *in vitro*.

Material and methods: A resazurin reduction assay was performed to assess the effect of the investigated compounds on cell viability. The cytotoxic effect of the compounds on the cancer cells was analysed by assessing the activity of lactate dehydrogenase (LDH) released into the culture medium. In addition, the influence of the germanium compounds on the activity of antioxidant enzymes such as catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GSH-Px) was analysed. Electron paramagnetic resonance (EPR) technique using TEMPO spin probe containing free radicals was used to verify the antioxidant properties of the tested compounds.

Results: The results of the study show that both organic germanium compounds have no effect on cell viability and are not cytotoxic to the cancer cell line PANC-1 *in vitro*. In addition, the studied organic germanium compounds increase the activity of antioxidant enzymes and exhibit the characteristics of free radical scavengers.

Conclusions: Our results suggest that the investigated organic germanium compounds have an antioxidant activity.

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CROSSTALK BETWEEN EXPRESSION PROFILE OF BRAIN-DERIVED NEUROTROPHIC FACTOR IN LUMBOSACRAL STENOSIS AND INTERVERTEBRAL DISC DEGENERATION

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KEYWORDS: spine, low back pain, intervertebral disc, spinal stenosis, nerve growth factor

Introduction: The role of Brain-Derived Neurotrophic Factor (BDNF) in intervertebral disc degeneration may contribute to the pathogenesis of lumbosacral stenosis through its influence on neuronal survival and synaptic plasticity within the spinal canal.

Aim: The aim of this study was to determine the differences in expression profiles of BDNF in IVD degeneration and L/S stenosis.

Material and methods: The study group comprised 113 patients diagnosed with IVDD who qualified for microdiscectomy. The comparison group included 60 patients with L/S stenosis. The expression profiles of BDNF were determined by enzyme-linked immunosorbent assay (ELISA).

Results: The concentration of BDNF in the IVD of patients was 17.91pg/mL ±19.58 pg/mL, while in the yellow ligament of patients with L/S spinal degenerative stenosis was 4.97 pg/mL ±0.25 pg/m ($p<0.05$).

Conclusions: In conclusion, our study highlights significant differences in the expression profiles of Brain-Derived Neurotrophic Factor (BDNF) between intervertebral disc degeneration (IVDD) and lumbosacral (L/S) spinal degenerative stenosis. We found that the concentration of BDNF in the intervertebral discs of patients with IVDD was notably higher compared to that in the yellow ligament of patients with L/S stenosis. This suggests a potential role of BDNF in the pathogenesis of IVDD, possibly through its influence on neuronal survival and synaptic plasticity within the spinal canal. These findings shed light on the molecular mechanisms underlying spinal degenerative disorders and may pave the way for targeted therapeutic interventions aimed at modulating BDNF expression to mitigate disc degeneration and associated symptoms. Further research is warranted to elucidate the exact mechanisms by which BDNF contributes to these pathologies and to explore its potential as a therapeutic target.

ASSESSING VARIATIONS IN EXPRESSION PATTERNS AMONG THREE ISOFORMS OF TRANSFORMING GROWTH FACTOR BETA IN INDIVIDUALS WITH LUMBOSACRAL STENOSIS

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KEYWORDS: spine, low back pain, spinal stenosis, transforming growth factors

Introduction: The clinical manifestation of degenerative stenosis of the lumbosacral (L/S) spine also has a molecular basis.

Aim: The study investigates molecular changes in the L/S spine's ligamentum flavum during degenerative stenosis, focusing on the role of transforming growth factor beta 1-3 (TGF-β1-3).

Material and methods: Sixty patients with degenerative stenosis and sixty control participants underwent molecular analysis using real-time quantitative reverse transcription reaction technique (RTqPCR), enzyme-linked immunosorbent assay (ELISA), Western blot, and immunohistochemical analysis (IHC).

Results: At the mRNA level, study samples showed reduced expression of TGF-β1 and *TGF-β3*, while *TGF-β2* increased by only 4%. Conversely, at the protein level, the study group exhibited significantly higher concentrations of TGF-β1, TGF-β2, and TGF-β3 compared to controls. On the other hand, at the protein level, a statistically significant higher concentration of TGF-®1 was observed (2139.33 pg/ml±2593.72 pg/ml vs. 252.45 pg/ml±83.89 pg/ml; $p<0.0001$), TGF-®2 (3104.34 pg/ml±1192.74 pg/ml vs. 258.86 pg/ml±82.98; $p<0.0001$), TGF-®3 (512.75 pg/mL±107.36 pg/mL vs. 55.06 pg/mL±9.83 pg/mL, $p<0.0001$) in yellow ligaments obtained from patients of the study group compared to control samples. The study did not establish a significant correlation between TGF-β1-3 concentrations and pain severity.

Conclusions: The findings suggest that molecular therapy aimed at restoring the normal expression pattern of TGF-β1-3 could be a promising strategy for treating degenerative stenosis of the L/S spine. The study underscores the potential therapeutic significance of addressing molecular changes at the TGF-β isoform level for better understanding and managing degenerative spinal conditions.

EVALUATION OF DIETARY HABITS OF FIRST-YEAR STUDENTS OF THE ANDRZEJ FRYCZ MODRZEWSKI KRAKOW UNIVERSITY (AFMKU): CORRELATION BETWEEN BMI, TIME CONSUMED BY MASS MEDIA, AND PHYSICAL ACTIVITY

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KEYWORDS: health, dietary habits, physical activity

Introduction: Diet, food preferences and physical activity are important parts of a person's life, essential inmaintaining her/his health. Lifestyles where these considerations are neglected may lead to inappropriate nutrition patterns. This may be due to the lack of knowledge of correct dietary habits.

Aim: The aim of this study was to obtain information on dietary habits and assess nutritional status of first-year AFMKU students, to determine their level of physical activity and time consumed by mass media,in relation to their BMI.

Material and methods: The questionnaire study included a group of first-year AFMKU students aged 17-24 years. The relationship of physical activity and time consumed by mass media to BMI was assessed using the Mann-Whitney U test and Spearman rank order correlation at $p<0.05$.

Results: The average waist circumference in women was 71 cm, and 84 cm in men. 11 % percent of the study group were underweight. In 17% of the respondents BMI exceeded 25. Among the most common dietary mistakes were: irregular meals (52% of respondents ate regularly). Insufficient consumption of vegetables and fruit was also noted (56% of respondents ate them daily), as well as an insufficient supply of fish (only 3% of respondents ate them several times a week). 54% of respondents reached for sugar and sweets every day. Frequent consumption of sweet and carbonated drinks was declared by 24% of respondents. Time consumed by mass media ranged between about 2 and 6 hours. Physical activity was undertaken in their leisure time by over 40% of respondents, most often 2-3 times a week. Those with a higher BMI were more willing to engage in physical activity.

Conclusions: Individuals with a higher BMI were more willing to engage in physical activity, probably desiring to reduce weight, and to follow medical recommendations. Despite broad availability of knowledge on correct nutrition, student education workshops are needed.

THE INFLUENCE OF GLYCEMIC DISORDERS AND LIFESTYLE HABITS ON THE LEVELS OF CERTAIN NEUROTROPHIC FACTORS IN INDIVIDUALS DIAGNOSED WITH LUMBOSACRAL INTERVERTEBRAL DISC DEGENERATION

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KEYWORDS: spine, low back pain, intervertebral disc, nerve growth factor

Introduction: Unhealthy habits such as overeating processed and high-calorie foods, alcohol abuse, and smoking negatively impact human health. It has been suggested that the inflammatory process and the resulting growth of nerve fibers within the intervertebral disc (IVD) fissures is the main reason for the pain accompanying IVD degeneration (IVDD).

Aim: The aim of this study was to determine whether smoking, alcohol consumption, overweight/obesity, or diabetes comorbidity contribute to the development of IVDD and how the aforementioned factors affect the levels of brain-derived neurotrophic factor (BDNF), glial cell-derived neurotrophic factor (GDNF), and growth associated protein 43 (GAP-43) in the study and control groups

Material and methods: The study group comprised 113 patients diagnosed with IVDD who qualified for microdiscectomy. Control group included 81 IVDs obtained from Caucasian human cadavers . The expression profiles of BDNF, GDNF, and GAP-43 were determined by enzyme-linked immunosorbent assay (ELISA).

Results: Our statistical analysis confirmed that patients who were overweight/obese, smoked tobacco, consumed alcohol, or had diabetes had a higher risk of IVDD (OR>1). Statistical analysis showed that BDNF, GAP-43, and GDNF concentrations were significantly higher in the IVDs obtained from the study group compared with the control group ($p<0.05$). In addition, higher levels of BDNF, GDNF, and GAP-43 were noted in IVDD patients who consumed alcohol, smoked tobacco, were overweight/obese, or had comorbid diabetes compared with patients without these risk factors ($p<0.05$).

Conclusions: We showed that changes in energy metabolism, habits, and lifestyle as well as the degenerative process of IVD in the lumbosacral spine contribute to changing the concentration profile of the analyzed neurotrophic factors.

DIFFERENCES IN THE CONCENTRATION OF SELECTED MICRO- AND MACRONUTRIENTS IN PATIENTS WITH INTERVERTEBRAL DISC DEGENERATION

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KEYWORDS: spine, low back pain, elements, intervertebral disc

Introduction: It effectively communicates the importance of evaluating changes in the concentration profiles of micronutrients and macronutrients in the intervertebral disc (IVD) in the context of osteoarthritis for identifying enzymes and metabolites involved in the degenerative process of the IVD.

Aim: This study aimed to evaluate changes in the concentrations of copper (Cu), iron (Fe), manganese (Mn), lead (Pb), zinc (Zn), sodium (Na), potassium (K), phosphorus (P), calcium (Ca), and magnesium (Mg) in the degenerative process of the lumbar/sacral (L/S) IVD segment.

Material and methods: The study group comprised 180 patients scheduled for microdiscectomy due to degenerative L/S IVD segments. Additionally, 90 individuals from the Caucasian Council were included in the control group, with post-mortem card collection from the L/S section of the circle.

Results: Chemical analysis revealed significantly higher zinc (Zn) concentrations in study group samples compared to control samples (32.95 mg/kg DM ±21.55 mg/kg DM vs. 21.26 mg/kg DM ±13.86 mg/kg DM). Phosphorus (P) levels were also significantly higher in study group samples (4968.45 mg/kg DM ±5469.92 mg/kg DM vs. 1543.80 mg/kg DM ±1332.49 mg/kg DM), as well as calcium (Ca) (6012.25 mg/kg DM ±13884.34 mg/kg DM vs. 1451.45 mg/kg DM ±722.63 mg/kg DM). One-way ANOVA analysis indicated that the changes in iron (Fe), manganese (Mn), sodium (Na), and magnesium (Mg) significantly correlated with the degree of IVD degeneration.

Conclusions: The altered profiles of zinc (Zn), magnesium (Mg), calcium (Ca), and phosphorus (P) concentrations characterize the degenerative process of the L/S IVD segment. Assessing changes in iron (Fe), manganese (Mn), sodium (Na), and magnesium (Mg) levels may aid in evaluating the progression of degenerative changes in the L/S IVD segment. However, micro- and macronutrient variations did not significantly correlate with the severity of pain in the L/S segment of the spine.

ANALYSIS OF STRATEGIES FOR MANAGING STRESS BY NURSING AND MIDWIFERY STUDENTS DURING THE COVID-19 PANDEMIC

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KEYWORDS: SARS-CoV-2, pandemic, stress, students, coping

Introduction: Stress is common among nursing and midwifery students and has been exacerbated during the COVID-19 pandemic. It seems extremely important to learn about their reactions to the coronavirus pandemic.

Aim: was to assess the stress coping strategies of nursing and midwifery students during the COVID-19 pandemic.

Material and methods: This is a cross-sectional study conducted in June 2020 among 190 nursing and midwifery students. The author interview questionnaire and the stress coping inventory (Mini-COPE) were used for the study.

Results: It was found that problem-focused strategies (active coping, planning, positive reappraisal, acceptance, seeking instrumental support) were used more frequently by students than emotion-focused strategies (sense of humor, turning to religion, seeking emotional support, venting emotions, using psychoactive substances) ($p<0.001$) and avoidance strategies (preoccupation with something else, denial, cessation of activities, self-blame) ($p<0.001$). Midwifery students were significantly more likely to choose a problem-centered style compared to nursing students ($p=0.020$). Those who were>25 years old and lived in large cities were significantly less likely to use an emotion-focused coping style than those who were<25 years old ($p=0.021$) and lived in rural areas ($p=0.009$) and small towns ($p=0.004$). There were no statistically significant differences in stress management strategies between the different study years and degrees ($p>0.05$). However, a correlation was found between the lifestyle of the test subjects and the stress management strategies they used ($p=0.012$).

Conclusions: During the pandemic, students coped with stress through active coping, seeking emotional support, planning, and seeking instrumental support. Age and place of residence determined emotion-focused behaviours, including seeking emotional support, turning to religion, discharging emotions, and using psychoactive drugs. Respondents with a healthy lifestyle were more likely to use a problem-focused style and less likely to engage in avoidance behaviours.

INSOMNIA, STRESSORS AND THE LEVEL OF ANXIETY AND DEPRESSION AMONG BACHELOR'S DEGREE NURSING STUDENTS IN POLAND

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KEYWORDS: nursing students, sleep initiation and maintenance disorders, anxiety, depression

Introduction: Nursing students experience higher stress and burnout compared to students in other health professions. Additional factors that may have increased the level of stress, anxiety and depression in recent years may have been the challenges faced by nursing education in connection with the COVID-19 pandemic.

Aim: To analyze the level of insomnia, the severity of stressors and the level of anxiety and depression among bachelor's degree nursing students in Poland depending on the year of study.

Material and methods: A cross-sectional study was conducted in 2022 among 841 bachelor's degree nursing students. An Insomnia Scale (AIS), Modified Hospital Anxiety and Depression Scale (HADS-M), The Perceived Stress Scale (PSS-10) and self-report questionnaire were used.

Results: The mean insomnia severity score on the AIS scale for the entire study group was 9.14 (elevated score). Students in the second year of the study, compared to students in the first and third years, achieved significantly higher ($p=0.008$) insomnia severity scores (second year 9.86±4.62 points vs. first year 8.88±4.43 points and third year 8.73±4.86 points). In addition, students in the second year of the study compared to students in the first and third years achieved significantly higher ($p=0.021$) levels of anxiety (second year 9.58±4.22 points vs. first year 8.83±4.37 and third year 8.64±4.48). The mean value for the clinical stressors subscale was also significantly higher in year II than in year III, where in turn it was significantly higher than in year I ($p<0.001$). In addition, the score on the academic stressors subscale was significantly higher in year II and III than in year I ($p<0.001$).

Conclusions: It is recommended to regularly screen nursing students for insomnia and for negative emotions such as anxiety, stress and depression. Depending on the results of these screenings, the implementation of interventions to reduce the negative effects of these phenomena should be considered (interventions that promote well-being and adaptive coping mechanisms).

NURSES' MORAL COURAGE: A SYSTEMATIC LITERATURE REVIEW

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KEYWORDS: courage, nurses, survey, research

Introduction: Moral courage is considered as an ethical competence in health care and is one of the main virtues, that is demonstrated through actions. Similar to other virtues, individuals can cultivate, enhance, and exercise moral courage. It is evident in actions aimed at preventing or addressing instances where others violate moral principles, like fairness or care. This may involve taking a stand even when not personally impacted and facing potential adverse consequences for intervening.

Aim: To find out how nurses' moral courage was investigated.

Material and methods: The literature search and evaluation was conducted according to the PRISMA guidelines. The PubMed database was searched using keywords such as courage, moral courage, nurse, research in various combinations during the period from November 2002 to February 2024. Only quantitative studies with nurses were selected for the review.

Results: Altogether five articles met the selection criteria. The most common type of study design was a descriptive survey. The Nurses' Moral Courage Scale was used in two articles and Sekerka's Moral Courage Scale was included in three articles. Three studies were conducted in Iran, others – China and Netherlands. In all selected studies, nurses rated their moral courage from moderate to high.

Conclusions: Moral courage is highly desirable for a nurse to possess. It might be concluded that the structure of moral courage in the selected studies is clear at the theorethical level. The most commonly used strategy to identify the moral courage in nurses was quantitative descriptive cross-sectional study. The Sekerka's Moral Courage Scale was used in most of the studies. Nurses expressed a level of moral courage ranging from moderate to high that shows they have moral courage in ethical situations. However, consistent approach to the multidimentional instruments is important.

ATTITUDES OF YOUNG PEOPLE TOWARDS PEOPLE WITH PHYSICAL DISABILITIES: UNIFIED RESEARCH OF A SCIENTIFIC CONSORTIUM FROM COUNTRIES ALONG THE EASTERN BORDER OF THE EUROPEAN UNION

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KEYWORDS: questionnaires, disability, wheelchairs, attitudes, students, European Union

Introduction: The goal of EU disability policy is to create an open and accessible society. In Western countries, much attention has long been paid to measures to make life easier for people with disabilities. Eastern Europe is working to catch up in this regard. This is conditioned not only by the economic state of the countries, but also by misconceptions and intolerant views firmly embedded in the public consciousness. It is up to young people to ensure that these will be passed on in future generations, but perhaps this attitude can be changed.

Aim: The purpose of this paper was to present the first results of an international scientific consortium to conduct a standardized study of the attitudes of young people in countries along the eastern border of the EU toward wheelchair users with disabilities.

Material and methods: The pilot study using the diagnostic survey method was implemented in 10 countries along the eastern border of the EU. According to the assumptions, the survey covered a total of 10,000 students, 1,000 from each country. The tool is an electronic version of the Multidimensional Attitudes Scale Toward Persons With Disabilities (MAS) survey questionnaire.

Results: Given the importance of the research issue undertaken, it was possible to attract the interest of scientists involved in the epidemiological study of social phenomena, forming an international research team, and carry out the study in a short period of time. In the course of their implementation, attention was paid to the emotional, cognitive and behavioral components of attitudes toward people with physical disabilities and multicultural factors.

Conclusions: The responses of the students surveyed often showed undecided and even negative attitudes. The group of Ukrainian students who were affected by the armed actions showed more positive attitudes toward people with physical disabilities. The presented results of the research carried out by an international scientific consortium can be used for both individual and group analyses of attitudes in individual countries and for the development of practical recommendations.

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PREVENTION OF VAGINAL CANDIDIASIS IN POLISH AND NORWEGIAN LITERATURE

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KEYWORDS: candidiasis, Candida albicans, vaginitis, educational activities, medical literature

Introduction: Popularization of preventing methods of vaginal candidiasis is necessary for women to reduce risk factors or take an appropriate action as a part of secondary or tertiary prevention.

Aim: This study was conducted to evaluate publications containing topics related to prevention of vaginal candidiasis in the selected parts of the resources of two sample countries – Poland and Norway – written in English and national languages.

Materials and methods: Literature catalogs were used to find sources of information about vaginal candidiasis / vaginal mycosis – the catalogue of the National Library of Poland (Biblioteka Narodowa, BN), the Polish Platform of Medical Research (Polska Platforma Medyczna, PPM), the National Library of Norway (Nasjonalbiblioteket) and Journal of the Norwegian Medical Association (Tidsskrift for Den norske legeforening). Only these with vaginal cadidiasis in the titles or very closed to it were chosen. In the above sets the records were planned to be categorized into four categories: i. prevention, ii. diagnostics and therapy, iii. pathogenesis and epidemiology and iv. others, including general description.

Results: Search engines did not show any records precisely corresponding to given phrases in Norwegian resources, while in Polish collections there were varied numbers of records in the following cathegories:
– in BN: i – 1, ii – 6, iii – 3, iv – 4,
– in PPM: i – 0, ii – 3, iii – 0, iv – 6,
wherein one article (in the periodical "Postępy Neonatologii", 2011) was present in both catalogues, so the total number of works from both catalogues is one less. The oldest one was published in the year 1999. Only one work was written in English and the rest – in Polish, therefore, the degree of content accessibility for Polish-speaking people may be high.

Conclusions: The above summary of results shows the paucity of literature in this range in Poland and Norway and a proportionally small number of publications devoted mainly to prevention of vaginal candidiasis (only one, about the importance of probiotics in gynecology). It follows that the number of reliable sources of information available to non-professionals in this area should be increased..

VAGINAL YEAST INFECTION AND CONGENITAL CANDIDIASIS IN MEDICAL TEACHING AND ACTIVITIES POPULARIZING SCIENCE IN SOCIETY

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KEYWORDS: candidiasis, Candida albicans, newborn, vaginitis, educational activities

Introduction: Congenital yeast infection in a newborn is a serious health and life-threatening condition. One of the causes of this condition may be an advanced vaginal fungal infection. Appropriate pharmacological treatment is necessary to reduce the risk of complications affecting both the woman herself, her reproductive health and the newborn.

Aim: Preventing congenital candidiasis by taking care of the proper microbiome of the female reproductive tract and proper male hygiene is not a frequently discussed topic in medical literature.

Material and methods: The authors present a position on including these issues in the content of training, both as part of detailed didactics (medical fields, nursing, and midwifery) and activities popularizing scientific knowledge. They propose including scientific articles in the reading material for students (e.g. Skoczylas M., et al. – Vaginal yeast infection as a cause of fungal sepsis with an unfavorable course in a newborn with extremely small birth size body weight, Postępy Neonatologia 2011;17(2): 50-53 // Skoczylas M.M., et al.. Congenital candidiasis as a subject of research in medicine and human ecology, Annals of Parasitology 2014;60(3):179-89) and encouraging students to learn about and discuss this topic at popular science meetings.

Results: The authors of this article, as part of the Lublin Night of Biologists 2024, organized a lecture on the topic: „From a small cell to a big problem, or the impact of genital tract infections on women's health" (Michał Skoczylas, et al.). The aim of the lecture was to expand the knowledge of students and other listeners interested in the prevention of fungal infections of the reproductive organs.

Conclusions: Topics discussed included not only the avoidance of risk factors but also actions aimed at preventing infections of the female reproductive organs. These included topics such as the use of probiotics to support treatment, actions to prevent infections in the course of diabetes, and ways to prevent urinary tract infections.

ASSESSMENT OF PEDIATRIC PATIENTS WITH ARTHROGRYPOSIS USING THE PEDIATRIC OUTCOME DATA COLLECTION INSTRUMENT SCALE

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KEYWORDS: pediatrics, arthrogryposis, happiness, quality of life, upper extremity

Introduction: Arthrogryposis Multiplex Congenita (AMC) is a congenital disorder, with its full clinical picture evident immediately after birth. Symptoms of arthrogryposis are apparent even in fetal life, while after birth, the child exhibits, among other things, symmetric muscle contractures, joint stiffness, and bone-joint deformities.

Aim: The aim of the study was to perform a functional assessment of pediatric patients with arthrogryposis using the Polish-validated Pediatric Outcome Data Collection Instrument, completed by parents. The use of this tool allowed for describing patients in terms of gross motor function, fine motor function, self-care, and quality of life.

Material and methods: The study included 50 patients treated for arthrogryposis at the University Children's Hospital in Krakow. A standardized and Polish-validated version of the Pediatric Outcome Data Collection Instrument was used for functional assessment and quality of life evaluation. Depending on the child's age, a scale designed for the age range of 2-10 years old or 11-18 years old was utilized.

Results: The average score for Upper Extremity function domain was 62, while for Transfer function domain it was 63. A significantly low average score was in the Sport and Activity domain (45). In the domain describing pain complaints, most caregivers did not report significant pain-related problems - the average score in this segment was 75. However, importantly, the older the child with arthrogryposis, the more frequently pain complaints were reported. The average score in the Happiness domain was 65. The averaged Global Functioning score according to the PODCI scale for a child with arthrogryposis was 61 points.

Conclusions: In children with arthrogryposis, there is observed a limitation in independent functioning and self-care compared to the population of healthy children. However, despite significant difficulties associated with movement limitations, individual compensatory mechanisms allow for the performance of basic activities in the environment.

BALLROOM DANCING AS A FACTOR IN THE DEVELOPMENT OF EATING DISORDERS

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KEYWORDS: bulimia, anorexia, orthorexia, binge eating disorder, women

Introduction: Ballroom dancing is a sport in which physical appearance plays a major role alongside dancing skills. This emphasis can lead to a harmful cycle that usually begins with strict, low-calorie diets as participants try to achieve the ideal appearance. Continued calorie restriction can lead to physical changes that slow metabolism and eventually result in a return to baseline weight. Failure to make progress often leads to feelings of guilt and frustration, causing people to fall back into their old habits. For some, repeated attempts can even lead to the development of behaviors and thoughts that are associated with the risk of developing more severe eating disorders.

Aim: The aim of this study was therefore to analyze how years of training in ballroom dancing correlate with the development of eating disorders.

Material and methods*:* A group of 200 young female ballroom dancers between the ages of thirteen and twenty-four, randomly selected from dance clubs in Poland. These dancers had at least two years of dance experience. Their body mass index (BMI) averaged 20.04±2.95 kg/m^2, height 165.9±0.06 cm, body weight 55.3±9.41 kg, and mean age 18±2.44 years. Dancers were divided into 3 groups: 1) 2 to 5 years of ballroom dance experience; 2) 5 to 9 years of ballroom dance experience; 3) more than 9 years of ballroom dance experience.

Results: 16% of the dancers surveyed had been diagnosed with an eating disorder by a medical specialist. 75% of dancers surveyed felt that overweight people are discriminated against in dance and that a slim silhouette can influence judges' scores at competitions. 20% of dancers admitted to inducing vomiting and/or using laxatives after meals. 40% of respondents confirmed that they think about food most of the day. 82% of respondents admit that eating disorders are widespread among dancers. Only 16% of dancers sought psychological help.

Conclusions: Ballroom dancing contributes to the development of eating disorders in female dancers. The most common disorders include anorexia nervosa, bulimia nervosa, orthorexia and binge eating disorder. The special nature of ballroom dancing as an aesthetic sport, the judging system at competitions and the lack of cooperation between dance clubs and nutritionists, psychologists or psychotherapists have the greatest influence on the development of these disorders in female dancers.

THE ASSOCIATION OF BLOOD TRIGLYCERIDE (TG) CONCENTRATION WITH THE COURSE OF HOSPITALIZATION IN PATIENTS WITH COVID-19

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KEYWORDS: triglycerides (TG), COVID-19, SARS-CoV-2 infection, intensive care unit, hospitalization, mortality

Introduction: Hypertriglyceridemia (HTG) is a very common problem in clinical practice. Assessment of lipid profile, including TG levels, has now become the subject of numerous studies involving patients with SARS-CoV-2 infection. Zinellu et al conducted a meta-analysis in which they found that hospitalized patients with COVID-19 with severe disease or patients who did not survive had significantly higher TG levels, compared to patients with milder disease or survival status during hospitalization.

Aim: The study evaluated the relationship between TG levels and the course of hospitalization and mortality in patients with COVID-19.

Material and methods: Our research included patients with laboratory-confirmed SARS-CoV-2 infection. Initially, 641 patients with COVID-19 who had TG measured were included in the study. The exlusion criteria was taking statins (n=171). Finally, the medical records of 470 patients were analyzed retrospectively.

Analysis of variance (ANOVA) with Welch correction evaluated the relationship between the TG concentration and COVID-19 severity and the final hospitalization course. Admission to the intensive care unit (ICU) is an indicator of the severity of COVID-19 disease.

Results: Patients who had a more severe course of COVID-19, due to their transfer to the ICU, were found to have significantly higher mean TG levels than those with a milder course of the disease (224.35±249.39 mg/dl vs. 143.88±153.52 mg/dl; p=0.0176). Mean TG levels during COVID-19 hospital admission were significantly different in patients who died during hospitalization compared to patients who survived (190.76±120.23 mg/dl vs. 157.22±112.92 mg/dl; p=0.0046).

Conclusions: Hypertriglyceridemia may be an adverse risk factor for the course of COVID-19. Routine testing of TG levels can be helpful as a marker of residual cardiovascular risk and stratifying the risk of disease severity as well as death in patients with COVID-19.

INVESTIGATING THE ROLE OF INITIAL DIETARY ENERGY INTAKE ON BODY COMPOSITION CHANGE IN PHYSICALLY ACTIVE WOMEN: A HARRIS-BENEDICT INTERVENTION STUDY

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KEYWORDS: diet, energy metabolism, visceral fat, adipose tissue, skeletal muscle mass

Introduction: An energy-reduced diet will lead to weight loss, but the consequence of such a method will be energy and nutrient deficiencies and malnutrition of the body.

Aim: The objective of this study was to examine the effects of a diet based on the Hariss-Benedict (H-B) formula on body composition change in physically active women, taking into account initial dietary energy intake.

Material and methods: Thirty-nine women (mean age: 33±7 years, mean weight: 61.18±6.75 kg; mean BMI: 22.79±1.94 kg/m^2) participated in the study and were divided into three groups based on their daily energy intake: predominantly low-energy, high-energy or normalized diet. The intervention involved determining baseline energy intake, adjusting it according to H-B principles, and analyzing body composition using the InBody120 analyzer before and after the 12-week dietary intervention. Dietary adjustments were tailored to the participants' existing habits.

Results: After the intervention, a significant reduction in visceral adipose tissue was observed in all groups (p=0.017). In particular, the predominant energy intake correlated with significant differences in absolute and relative body fat (p=0.020, p=0.001) and total body water (p=0.021).

Conclusions: Positive changes in body composition were observed when the diet was adjusted for H-B derived energy content, regardless of the primary energy intake. Variations in the energy content of the diet were associated with recognizable differences in body fat distribution. Specifically, in the low-calorie diet group, increased energy intake was associated with a reduction in visceral adipose tissue and a significant increase in skeletal muscle.

HALOPHYTES AS POTENTIAL ACTIVE INGREDIENTS OF SKIN CARE COSMETICS

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KEYWORDS: salt-tolerant plants, plant extracts, antioxidants, epidermal cells, polyphenols

Introduction: Halophytes are a group of relict plants found in areas with a high amount of easily soluble salts. They constitute a fascinating group of plants in terms of the high content and unique profile of active compounds, synthesized as defense mechanisms against stressful environmental conditions. Among produced compounds, antioxidants are the most common, as they reduce oxidative stress resulting from soil salinity or excessive solar exposure. Extracts and substances obtained from halophyte species may be a valuable source of active ingredients for multifunctional cosmetic products.

Aim: The aim of the presented research was to analyze the cosmetic potential of aqueous (W) and hydroethanolic (70%, *v/v*, WE) extracts from the leaves and flowers of sea lavender (*Limonium vulgare* Mill.) and sea fennel (*Crithmum maritimum* L.).

Material and methods: The extracts were compared for their antioxidant capacity by DPPH free radical scavenging assay, the content of active compounds and the depigmentation potential assessed by the tyrosinase inhibitory activity. Safety of the extracts was analyzed by the determination of cytotoxicity against human keratinocytes HaCaT *in vitro*.

Results: The comparative studies have shown that sea lavender extracts have a higher cosmetic potential than sea fennel extracts. WE extracts from sea lavender flowers and leaves shown the greatest antioxidant capacity as they neutralize ca. 50% of the radical at the concentration of 0,008 mg/mL. The same extracts contain the highest levels of flavonoids (209,65 and 210,77 μg QE/mL respectively). The highest content of polyphenols (886,15 μg GAE/mL) and tyrosinase inhibitory potential were found in WE flower extract from sea lavender. At the concentration of 0.5 mg/mL the extract reduced the activity of tyrosinase by 83.7%. All analyzed extracts were not cytotoxic for cells in vitro. The highest cytotoxicity was observed for flower extracts of sea lavender (W) and sea fennel (WE) as at the concentration of 100 μg/mL they reduced the viability by ca. 22%.

Conclusions: To sum up, extracts from sea lavender have a great application potential on the skin and can be used as active ingredients in skin care products with protecting and skin-lightening properties.

DIFFERENCES IN LOWER LIMBS MUSCLE POWER, BODY COMPOSITION AND PHYSICAL ACTIVITY LEVELS BETWEEN FRAIL, PRE-FRAIL AND ROBUST ELDERLY PERSONS FROM PRIMARY HEALTH CARE SERVICES IN SOUTH SPAIN

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KEYWORDS: frailty, sarcopenia, primary health care, older adults, lower limbs power, exercise

Introduction: Detecting frailty and previous status of frailty in the primary care services involves assessing physical conditions such as muscle power, body composition and the physical activity levels. This study aims to assess and characterize the variations in the lower limb muscle power, the body composition and the physical activity levels comparing three groups: frail, pre-frail and robust elderly individuals. Additionally, it seeks to analyse the performance differences between these groups.

Aim: Firstly, the objective is to characterize the variations in lower limb muscle power, the body composition and the physical activity levels comparing three groups' groups. This will be achieved by utilizing one linear encoder, the bioimpedance Inbody 770 and the accelerometer GT9X for physical activity level. Secondly, the aim is to examine the disparities between these three groups as observed in the study.

Material and methods: This cross-sectional study involves 51 participants aged over 65, comprising 22 frail, 15 pre-frail and 14 robust subjects. The participants were classified with frail syndrome by the Fried criteria and the lower limb muscle power.

Results: Significant differences were found between the three groups of frail, pre-frail and robust elderly persons in all the studied variables.

Conclusions: The lower limbs muscle power, the body composition and the physical activity level are able to study and analyse the difference between frail, pre-frail and robust elderly persons, and all these tools are susceptible to implemented in the clinical primary care environments. The lower limb muscle power values for the frail elderly are lower than pre-frail and the physically active elderly. However, the variability of the outcome of the other variables was unstable across the different recordings.

THE USE OF ARTIFICIAL INTELLIGENCE, NUMERICAL ALGORITHMS AND EXPERT APPROACH IN SELECTED NEPHROLOGY PROBLEMS

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KEYWORDS: artificial intelligence, expert systems, classification, kidney, nephrology, automation

Introduction: The integration of AI, numerical algorithms, and expert approaches in nephrology shows promise for enhancing patient care. Traditionally, nephrology relied on clinician expertise, but the growing volume of data requires innovative methods. AI, fueled by vast datasets, can uncover patterns and improve diagnostic accuracy and treatment optimization. Numerical algorithms enable computational modeling of renal physiology and disease progression, aiding in treatment prediction and optimization. Expert systems codify nephrologists' knowledge into decision support tools, aiding in diagnosis and treatment selection. Embracing these technologies can revolutionize nephrological practice, improving patient outcomes.

Aim: The aim of the research is to review scientific works on the use of artificial intelligence (AI), numerical algorithms, and expert algorithms in diagnosis, decision support and prediction of selected disease states and issues related to nephrology. Additionally, the author's decision support system in a selected disease entity is presented.

Material and methods: The study rigorously retrieved relevant publications from esteemed academic databases, Scopus and PubMed, and screened them based on predefined criteria. Through keyword-based searches, it analyzed the intersection of nephrology and artificial intelligence, offering insights into emerging trends and advancements. Then, as an example, an original system was presented that supports the nephrologist's decisions and classifies the patient's condition.

Results: Artificial intelligence in nephrology and medicine uses various technologies such as machine learning, deep learning and natural language processing to improve diagnosis, treatment and patient care. Analyzes clinical, laboratory, imaging and genetic data to accelerate the identification of kidney diseases. By integrating health information systems and research data, artificial intelligence enables pattern recognition, outcome prediction and treatment optimization. This is confirmed by the presented example of the original system.

Conclusions: Numerical algorithms, artificial intelligence, and expert algorithms show promise in nephrology, improving patient care and research.

MERCURY LEVEL DETERMINATION IN HAIR AND NAILS

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KEYWORDS: mercury, dental amalgam, mercury/analysis

Introduction: Mercury is a heavy metal commonly found in the environment and many food products due to pollution. It can enter the human body through dental procedures, such as caries restoration using dental amalgam or wearing orthodontic appliances. Dietary habits can influence mercury intake in daily life. The toxic effects of mercury manifest neurologically, causing issues with concentration, walking, insomnia, and more. The human body eliminates mercury by incorporating it into nail and hair structures, making them effective indicators for monitoring mercury levels in the body.

Aim: The aim of the study was to determine mercury levels in hair and nails samples of individuals to verify the correlation between them. The study also examined the possible influence of dietary behaviors and dental history on mercury levels in the material.

Material and methods: Hair and nail samples were collected from patients using certified mercury-free equipment. The samples were weighed (Radwag, Poland) and total mercury levels were determined using an AMA 254 analyzer (Altec, Czech Republic).

Results: The study revealed a strong correlation between hair and nail samples. Additionally, the average mercury level was higher in women than in men. No correlation was found between orthodontic procedures and mercury content in samples. Among men who frequently consumed fish and are physical active several times a week, the highest mercury levels were noted. The mercury content in the hair of past smokers was higher than the median for both groups.

Conclusions: The results of the preliminary studies confirm the influence of fish consumption on mercury levels in the body as a more significant factor than gender and age. Further research should be conducted on a larger group of patients to more accurately determine the impact of daily behaviors on possible mercury adsorption and accumulation, which can have a significant toxic effect on human health.

AUTHORS INDEX

INSTITUTE OF HEALTH SCIENCES
UNIVERSITY OF OPOLE

The Institute of Health Sciences was established in 2020 based on the Scientific Institute of Opole Medical School and continues the goals of developing scientific research and improving science in broadly defined medical sciences within the organizational structure of University of Opole.

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Conducting research and development work in the field of medical and health sciences, particularly in the discipline of health sciences, developing their results for publication or implementation in practice, and training a new generation of researchers specializing in health sciences.

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RESEARCH STRUCTURE:
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SCIENTIFIC JOURNAL:
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