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Evaluating Insulin and C-Peptide Levels: How Method and Brand Affect Results

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Keywords: C-Peptide; Diabetes; Evaluation methods; Insulin

Objective: Throughout the past several decades, diabetes diagnosis and treatment have focused on glycemia and glycated hemoglobin. However, it has become apparent that the evaluation of other biochemical indicators, such as insulin and C-peptide, provides a broader view of each individual's metabolic status, enabling a precision medicine approach since diabetes therapy goes beyond glucose control. Our aim was to assess the differences, if any, on C-peptide and insulin levels' results when using different methods and/or the same method from different vendors, to evaluate the reproducibility of results throughout the distinct approaches.

Methods: Participants recruited at the APDP clinic underwent a 75 g OGTT, and blood samples were collected at baseline, 30, 90, and 120 minutes after the glucose load. Insulin and C-peptide were measured by chemiluminescence and three commercially available ELISA kits from different brands (A, B, and C).

Results: Using the chemiluminescence assay for both insulin and C-peptide resulted in higher levels than ELISAs ($p<0.05$). Regarding insulin, there were discrepancies in the results obtained both between the different ELISAs and the chemiluminescence method. Although in the detection range, ELISA C did not perform well below 40 μIU/mL. In contrast, ELISA A was very sensitive, and a dilution was required. In general, there were also discrepancies in C-peptide results, but less than with insulin. Overall, ELISA A seemed to be the most reliable. ELISA B is the only one that shows peaks at 90 min, with all the other three following the same trend between them, although with slightly different levels: Chemiluminescence presents the highest values, followed by ELISA A and then by ELISA C.

Conclusions: In conclusion, we found that different methods and vendors do not provide consistent results between them, and consequently, the evaluation of results may be biased. This should be considered when using these values for disease management evaluation or further used in indexes of insulin secretion, metabolism, and/or resistance.

Depression in older adults during the pandemic by COVID-19: Rethink the future

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Keywords: Crisis; Depressive symptoms; Health policy; Older adults, Pandemic consequences

Objective: To describe the determinants of depressive symptoms in adults aged 60 years and older related with the COVID-19 pandemic and contribute to the definition of health policies in similar situations in the future.

Methods: This study adopts a systematic literature review and the search was conducted in several databases to identify eligible studies that were published between December 2019 and March 2022. The inclusion criteria were as follows: Studies in which participants were diagnosed with or screened for a depressive disorder, regardless of progression status and the presence or absence of other conditions, in older adults aged 60 years or older. The review includes studies on factors associated with depression in older adults since the onset of the pandemic by COVID-19, regardless of geographical location and context (community, culture or specific environment). The review includes primary quantitative empirical studies: cross-sectional, longitudinal, observational or experimental studies. This review also includes studies with or without a comparison group. Search terms included combinations of the following three subject headings according to Medical Subject Headings (MeSH) terms: Depression, Depressive Symptoms, Older Adult or COVID-19. Articles with the following terms or combinations or terms in the title, keywords and/or abstract were retained: ("Depression") OR ("Depressive Disorder") OR ("depressive symptoms") AND ("Older Adults") OR ("Aging") OR ("Elderly") AND ("Pandemic") OR (COVID-19).

Results: Fifty-three studies were included, seventeen of which identified determinants of depression directly associated with the pandemic COVID-19, while the remainder identified determinants of depression already widely known. Regarding the determinants directly associated with the pandemic COVID-19 we grouped the results into 4 categories: 1) Factors and feelings related to stress or worries related to the COVID-19 pandemic: Distress related to COVID-19, the feeling of being very vulnerable to the risk of contracting COVID-19, the fear of infecting others and feelings related to the high mortality due to COVID-19. 2) Factors related to receiving news about COVID-19 in the media: Receiving news about COVID-19 through the media,

having insufficient knowledge about the pandemic and receiving COVID-19 related information from health workers. 3) Factors related to measures that were taken to reduce the spread of COVID-19: Containment measures, COVID-19 related social agitation, difficulty receiving healthcare, difficulty obtaining medication. 4) Factors related to concerns about family, friends, and acquaintances: Existence of infected acquaintances and the loss of family and friends.

Conclusions: A better understanding of the pandemic-associated factors that may determine the onset of depression in this population may be helpful in reassessing and rethinking health responses in a future pandemic situation. There needs to be a balance between the need to contain the virus and the concern for maintaining the mental health of older adults.

Rehabilitation technologies with the potential to be incorporated into the clinical practice of physiotherapists: a systematic review

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Keywords: Physiotherapy; Rehabilitation; Health technologies; Artificial intelligence; Technological rehabilitation

Objective: This review seeks to identify and synthesise the best available evidence on technologies used for the management of physical rehabilitation in patients, with the potential to be integrated into the physiotherapist's clinical practise.

Methods: We carried out a prospective record of the protocol for carrying out this systematic review that was published on the PROSPERO platform. The guidelines of the list of PRISMA recommendations were considered following the guidelines of the updated guidance and examples for reporting systematic reviews. A search was carried out through the databases Embase, PubMed, Physiotherapy Evidence Database (PEDro) and Ovid, carried out in the time period from 2000 to 2020, published until 2021 in Portuguese or English.

Results: There were a total of 121 publications found, 18 of which were fully selected randomized studies for analysis and inclusion. In the included studies, the use of technology during various phases of the clinical approach to rehabilitation was evident. The studies that met the inclusion criteria were classified according to the type of technology and its role in the clinical approach to rehabilitation, namely digital technologies; Artificial Intelligence and Robotics; virtual technologies or hybrid technologies, given that their composition includes more than one of the aforementioned types of technology.

Conclusions: Rehabilitation technologies can effectively mediate clinical activities of the physiotherapist, such as preventing injuries, monitoring movements, and coordinating rehabilitation programmes, with minimal or no intervention from the physiotherapist. More research is required to demonstrate with greater specificity the potential for different technologies to assist the physiotherapist in the curative or preventative care of patients' physical health.

Health policies and public health and social measures impact measures on COVID-19 in Europe: a review and modified Delphi technique

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Keywords: COVID-19; Europe; health policy; Public Health and Social Measures; Non-pharmaceutical interventions

Objective: This study aimed at reviewing the literature regarding the key results of the public health and social measures (PHSM) implemented during COVID-19 pandemic, and it identified the three PHSM considered to have most impacted the epidemiological curve of COVID-19 over the last two years, in different stages of the pandemic.

Methods: The PHSM under study were selected from the Oxford Stringency Index Government Response Tracker (OxCGRT) combined with the topics presented during the Rapid Exchange Forum (REF) meetings in the scope of the Population Health Information Research Infrastructure (PHIRI) project (H2020). A Rapid Review was conducted using Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines to identify which reviews have already been published about each PHSMs and their results. In addition, two Modified Delphi Panel surveys were conducted to uphold the results found.

Results: There were 3212 studies retrieved from PubMed and 162 full texts assessed for eligibility and 37 were included in this PHSMs summary. The three most significant and evidence-based measures from the review were hygiene measures, mask measures and vaccination policies. From the modified Delphi Panel, the most priority PHSMs identified on the four waves in questions were case isolation at home, face coverings, testing policy and social distancing, respectively.

Conclusions: The evidence found is very important for both researcher and policy-makers. The study of PHSM's impact on COVID-19 is significant as a lesson learned for the expected next pandemic and as a contribution to the health systems resilience discussion. These lessons should also be considered in both educational and preparedness programs as well as the understanding from the perspectives of the subject matter experts and the scientific evidence.

Patients' Voice in Breast Cancer Surgery Through PROM and PREM

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Keywords: Patient Outcomes; Quality in Health; PROM; PREM; Health System

Objective: The aim of this study is to measure breast surgery outcomes reported by Portuguese patients.

Methods: The current study was a prospective transversal study conducted by the research team from Évora University and Lusiadas University in Portugal. Data were anonymously collected by 10 public hospitals from National Health Service from March 2021 to March 2022. The data collection procedure and analysis followed the "OECD Breast Cancer Patient Reported Outcomes Working Group" protocol, allowing subsequent comparability with data from other OECD member countries. The quality of life, as a complementary variable, was measured through the reduced version of the 6-item WHOQoL-bref scale.

Results: The study included 378 women with breast cancer, with the age distribution being 19.8% aged 15 to 49 years and 80.2% aged 50 years and over. Most women were satisfied with the treatment outcome regarding the shape of their lumpectomy breast when wearing a bra (96.1%) and with the equal size of both breasts (78.3%). Obese women (p-value= 0.006) and women whom did radiotherapy (p-value=0.028) show less satisfaction with the treatment.

Conclusions: Measuring the outcomes and experiences is a fundamental step for the continuous improvement of quality in healthcare. Measuring breast cancer outcomes and experiences from Portuguese patients' perspectives gives us insight into the quality-of-care services and reinforces that patients' satisfaction and quality of life depended on multiple factors like the existing previously to the treatment (e.g. obesity); factors related to treatment (e.g. radiotherapy; breast asymmetry), and also factors that were unrelated with treatment (e.g. social relationships).

Fungal and Bacterial Infections Discrimination in ICU Patients based on serum molecular fingerprint

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Keywords: FTIR spectroscopy; Intensive Care Unit; Fungal infection; Bacterial infection, Diagnostics

Objective: The rapid discrimination between fungal and bacterial infections in intensive care unit (ICU) patients is crucial for an efficient antimicrobial therapy. This work aims to develop a predictive model capable of discriminating fungal and bacterial infections among these patients based on a rapid serum analysis.

Methods: Serum from 46 patients at ICU, with COVID-19, were analyzed by Fourier-Transform infrared (FTIR) spectroscopy: 17 did not present any other infection; 12 presented bacterial infections (including Enterobacter aerogenes (2), Escherichia coli (4), Enterococcus faecalis (1), Haemophilus influenzae (1) and Serratia marcescens (1), Klebsiella pneumoniae (3)), isolated from blood, tracheobronchial aspiration, bronchoalveolar lavage and urine; 17 with fungal infections (including Candida albicans (14), C. tropicalis (1), C. parapsilosis (1) and C. glabrata (1), isolated from bronchoalveolar lavage, urine and urethral exudate. The impact of a Fast Correlation Based Filter (FCBF) of normalized second derivatized spectra (between 406-1800 and 2800-3992 cm^{-1}) was evaluated on a t-distributed Stochastic Neighbor Embedding (t-SNE), and a Naïve-Bayes model. The predictive models were based on 10 random iterations, with 80% of samples used for training and the remaining 20% for validation.

Results: The impact of FCBF was evaluated on t-SNE to select the spectral bands with high significance in detecting the infection and in discriminating the bacterial from the fungus infection. Optimized Naïve-Bayes models enabled to detect the infection with a sensitivity of 83% and a specificity of 81%, and the discrimination of the bacterial and fungal infection with a sensitivity and specificity of 86% and 96%, respectively.

Conclusions: Serum analysis, based on FTIR spectroscopy associated to machine learning algorithms presents a high potential to detect in a rapid and economic mode either the infection either the discrimination between bacterial or fungal infection.

The association of Internet use and health related quality of life in older adults: longitudinal analysis of a population-based cohort

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Keywords: Older adults; Internet use; Quality of life

Objective: The relationship between internet use and the health of older adults is still unclear. Therefore, we aimed to assess the impact of internet use on quality of life and physical function among Portuguese older adults (60+ years) using a prospective analytical approach.

Methods: This study included participants aged 60 or over from a nationwide population-based cohort (EpiDoC Cohort) and followed them up to 7 years. The second wave of the EpiDoC cohort was used as the baseline. Being an internet user, the years as user, and length of usage per/week was self-reported. Health-related quality of life (HRQoL) was measured using the EuroQol 5-dimensions questionnaire, physical function was assessed using the Health Assessment Questionnaire. Linear mixed model and random intercept tobit regression were used to assess the association between internet usage with HRQoL and physical function, respectively. A sensitivity analysis was performed considering years as an internet and frequency of use.

Results: This study followed 2272 participants, of which 20.9% reported using internet for an average of 9.5 years. The average internet usage per week was 8.2 days, and 4.9% of users reported using it for purposes related to their health. There was an association between internet users (β=0.06 [0.02; 0.09]; β=-0.15 [-0.25; -0.04]) and improved HRQoL and physical function over time, respectively, when compared with non-users, adjusting for time from baseline, sex, age, education level, BMI, smoking habits, alcohol consumption, regular exercise and multimorbidity.

Conclusions: Our results suggest that internet use among older adults is associated with an improvement in HRQoL and physical function. Thus, investing in digital literacy and digital solutions becomes essential for this population. Sensitivity analysis revealed that being an experienced internet user vs. a non-user (β=0.07 [0.03; 0.12]; β=-0.24 [-0.38; -0.10]) was associated with improved HRQoL and physical function over time, respectively.

Trajectories and determinants of Ageing in Portugal: Insights from EpiDoC, a nationwide population-based cohort

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Keywords: Disability; Quality of life; Older adults; Trajectories; Longitudinal

Objective: Portugal's population is ageing due to increased life expectancy and reduced fertility rates. We aimed to estimate the health trajectories of the Portuguese older adults in a 10-year period and to assess associated sociodemographic, lifestyle factors and multimorbidity status.

Methods: Using data from the population-based EpiDoC cohort, we estimated, using linear mixed models, the trajectories of quality of life and physical function over 10 years in 4135 Portuguese older adults. Associated factors were assessed using linear mixed models (quality of life) and random intercept tobit regression (physical function).

Results: Physical disability of participants increased by 0.26 (0.24, 0.29), and quality of life declined by 0.07 (-0.08, -0.06), over 10 years. With advancing age, older adults reported a faster reduction in quality of life and faster increase in physical disability. At baseline, 24.8% of older adults reported a lot of difficulty or were unable to perform activities in dressing, arising, eating, and bathing. In general, women were in worse health than men at baseline, albeit with a similar rate of change throughout the follow-up. Higher education, alcohol consumption and regular exercise were associated with better quality of life and physical function while multimorbidity and excess weight were associated with worse reporting of these outcomes.

Conclusions: These findings, based on longitudinal data with 10 years of follow-up, are essential to effectively plan resource allocation, plan better healthcare and design informed public health policies in Portugal.

Family-Centered Care Effects in Family with Child(ren) with Intellectual Disability: A Review

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Keywords: Family Nursing; Health Promotion; Intellectual Disability; Outcome Assessment, Health Care; Systematic Review

Objective: To determine what effects or health gains result from family-centered care (FCC) in families with child(ren) with intellectual disabilities and identify its components considered effective.

Methods: A systematic review of quantitative studies was conducted. MEDLINE *with Full Text*, CINAHL PLUS *with Full Text*,

Academic Search Complete and *Psychology and Behavioral Sciences Collection* databases were searched through EBSCOhost Web platform. The PRISMA guidelines were applied, and the protocol of the study was registered with PROSPERO (CRD42023398902). The quality of the included studies was appraised using the STrengthening the Reporting of OBservational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies.

Results: Eight studies were selected and the study of the perception's and involvement of family in care was the main source of outcomes on FCC. It was identified as main components: collaboration between family members and healthcare professionals; assessment of the family context; and health policies/access to healthcare services.

Conclusions: FCC is widely used in the paediatric context, but its implementation remains a challenge for health services. The effects of FCC refer to the promotion of family well-being and self-care; family satisfaction and consequent evaluation of the care process; and family readaptation. The needs and expectations arising from the family perception should be studied to provide a more effective response to the FCC.

AlenRiscos Observatory: tobacco, alcohol and drugs use among adolescents

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Keywords: Adolescence, Health Risk Behaviors, Illicit Drugs; Licit Drugs

Objective: To understand and analyze the prevalence and factors associated with the use of tobacco, alcohol and other drugs in grade students.

Methods: Observational study included in the AlenRiscos Observatory. The sample is composed of 12767 adolescents from public and private schools of the 3rd cycle of basic education (7th and 9th grades) in the Alentejo region. Data collection was carried out during 5 school years, the last one in 2021/2022. An online self-completion questionnaire was applied from the LimeSurvey platform, accessible by the University of Évora.

Results: Most of the participants were female (52%) and aged between 11 and 18 years. 50.4 % of students were in 7th grade and 49.6% were in 9th grade. During the period under observation, the consumption of tobacco, alcohol and drugs fluctuated, with alcohol being the most consumed substance, followed by drugs and finally tobacco, in all school years. Regarding alcohol consumption, the school year with the highest consumption was 2016/2017 (48.6%). The results showed a significant decrease in consumption over the years, however, there is a higher consumption with increasing student age.

Conclusions: The evaluation of results regarding the consumption (of licit and illicit addictive substances) in adolescents allows us to define preventive measures at earlier ages, thus avoiding morbidity and mortality in adulthood.

Effects of a yoga practice on respiratory capacity in military pilots from the Portuguese Airforce

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Keywords: Airforce pilots; Ashtanga vinyasa yoga; Forced expiration volume; Pranayama

Objective: Spirometry and respiratory training modalities in the airforce context are of great importance. It is especially relevant in cases where pilots are deployed to aircraft flying missions at altitudes where air is rarefied. This specific training might even impact focus and mission performance in these less oxygenated environments. The goal of this study was to verify the effects of a yoga practice on respiratory capacity in military pilots from the Portuguese Airforce.

Methods: A total of 18 military pilots in the Portuguese Air Force Academy course "Masters in Military Aeronautics: aviator pilot specialist" participated in this randomized controlled trial. Respiratory capacity was analyzed with a spirometer (Vitalograph copd-6™) before and after a 12-week yoga program. Participants were randomly divided in yoga class (intervention n=10) and waiting list (control n=8); the intervention group had practice twice a week while control group did only the regular course training from the Portuguese Air Force. Data was analyzed with Jamovi (version 2.3.26), parametric tests were conducted: differences at baseline were studied using the t-test for paired samples.

Results: A pulmonary alteration was noted in FEV1% (p=0.017) for the intervention group with Mean (Standart Deviation (SD)) baseline values being 95.300 (12.0467) and becoming 120.750 (24.5459) after the 12-week yoga protocol, but not for the control group (p=0.135).

Conclusions: Military pilots already have a strong adaptative physiological response to stress due to the military training they receive. Even then, the practice of yoga leads to differences in forced expiration volume that are related to an increase in the strength and endurance of respiratory muscles following yoga training.

Functional Capacity, Quality-Of-Life and "Patient Satisfaction" with Nursing Care of Older Adults

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Keywords: Aging; Functionality; Quality of Life; Satisfaction; Nursing Interventions

Objective: Firstly, to determine the Functional Capacity profile of people aged 65 and over residing in the Baixo Alentejo Region (BAR) based on a self-care model and standardize it concerning the age of the respondents. Second, to determine the

Quality of Life (QOL) profile of the same individuals, identifying the biological and sociodemographic predictors of the QOL domains. Third, to quantify the "Patient Satisfaction" indicator as a sensitive measure of nursing care.

Methods: Cross-sectional, descriptive study. A random sample stratified by gender and age group was used, with 351 people aged 65 and over residing in BAR. A confidence level of 95% and an error margin of 4.5% were adopted. Several statistical analysis techniques were used: psychometric, descriptive, and inferential. Mainly used were Confirmatory Factor Analysis as an application of Structural Equation Modelling, Multiple Linear Regression Methods, and Ordinal Regression Methods.

Results: The standardization of Functional Capacity profiles as a function of age revealed that up to 74 years of age, the "NO problem" profile presents the highest probability. Beyond this age, the "MILD PROBLEM" profile shows the highest probability, and after 85 years and over, the "MODERATE Problem" profile presents a higher probability in relation to the former. "Education level" and "living together" were considered the biological and sociodemographic predictors of QoL domains. The most important of all facets were "Activities of daily living", "Work capacity", "Self-esteem", and "Opportunities to acquire new information and skills". The population sample showed a "Patient Satisfaction" score of 62.1% concerning the nursing care received.

Conclusions: It is proposed to assess the needs of nursing care of older adults residing in BAR based on the assessment of their Functional Capacity, QoL, and "Patient Satisfaction".

Keratinocyte Cancer Prevention at Primary Healthcare Centres in Portugal

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Keywords: Clinical pathway; Keratinocyte cancer; Prevention, Primary health care; Health information systems; Skin cancer

Objective: To identify the clinical pathway of the patients diagnosed, or with suspicion of with keratinocyte cancer in the Agrupamento de Centros de Saúde Arco Riberinho (ACES-AR), that comprises Alcochete, Barreiro, Moita and Montijo, providing care to 219359 people.

Methods: Two focus groups were conducted. A randomized number was assigned to all the Family Physicians of the ACES, a selection of two per healthcare organization was done and they were invited to participate in this study. The selection and invitation procedures were done by the Clinical Research Group of the ACES-AR. Eleven physicians have agreed to participate, but just six, from three healthcare organizations, were able to participate. All participants have signed an informed consent and interviews were recorded.

Results: The focus groups were conducted by a trained researcher in qualitative methods and assisted by a second peer. Researchers have used a semi-structured guide to conduct the process and achieve the goal of the study. Interviews were transcribed and analysed on NVIVO 10. Main themes emerged were: distance care (from dermatologist), hospital referral system, and skin lesions.

Conclusions: Family physicians are concerned with the topic as their district hospital does not have capacity of response in dermatology, and other hospitals are considered too far-away by patients. Patients' follow-up for this disease is minimal as Family Physicians usually lose contact with the patient's information on treatment. There is no integration of medical information systems. There is a lack of technical infrastructure to facilitate the referral triage process (such as digital cameras).

Metabolome profile of critically ill patients regarding invasive mechanical ventilation

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Keywords: ICU; COVID-19; Metabolomics; FTIR spectroscopy; Invasive mechanic ventilation

Objective: Invasive mechanical ventilation (IMV) is used to treat critically ill patients, including those with COVID-19. In this exploratory analysis, we aimed to perform a comparative analysis of the clinical characteristics and serum metabolomic profile between ventilated and non-ventilated COVID-19 patients.

Methods: Sixteen critically ill COVID-19 patients from an intensive care unit (ICU) were included, with half being submitted to IMV. The patient groups didn't differ in age, sex, or comorbidities. Serum metabolome was obtained after macromolecules precipitation by a mixture of methanol, acetonitrile and water. The molecular profile associated to the serum metabolome was acquired by Fourier-transform infrared (FTIR) spectroscopy between 400-4000 cm^{-1}, with a 2 cm^{-1} resolution. Spectra were pre-processed by diverse methods, including baseline correction and different kinds of normalizations, and analyzed using principal component analysis (PCA) associated or not with linear discriminant analysis (LDA).

Results: The serum metabolome acquired by FTIR spectroscopy enabled the development of a PCA-LDA model that predicted whether patients were under IMV, with 83% accuracy in the validation set, and that the serum metabolome was significantly different between the two groups. The PC2 loading vector

highlighted two relevant zones. One of them in the fingerprint zone (1028 to 1170 cm^{-1}) and another (between 1585 and 1686 cm^{-1}) that involved the vibrational frequencies of N-H and C=O bonds, such as from peptides' amides, possibly related to increased proinflammatory cytokines. This may be due to the increased inflammatory status from ventilated patients, also evidenced by increased hematological markers (e.g., C-reactive protein at $p<0.03$), and higher levels of blood glucose and lactate ($p<0.001$).

Conclusions: The molecular fingerprint associated with the serum metabolome enabled the detection of the general metabolic impact of IMV. This technique can be applied in an economic, rapid, and high-throughput mode to detect critical metabolic shifts, leading to better patient management.

Effects on Cardiovascular Risk Factors: A Randomized Controlled Trial comparing HIIT and MICT in Coronary Artery Disease Patients

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Keywords: Cardiovascular Diseases; Cardiorespiratory fitness; Cardiovascular Risk Factors; High-intensity interval training; Randomized Controlled Trial

Objective: Investigate the effects of two community-based exercise programs using two short-term protocols: High-intensity interval training (HIIT) and moderate-intensity continuous training (MICT) in cardiovascular risk factors in stable coronary artery disease (CAD) patients.

Methods: We conducted a RCT, recruiting 46 CAD patients from Hospital Espírito Santo of Evora. Participants were randomized to three sessions weekly HIIT (n = 23) or MICT (n = 23) for 6 weeks. HIIT consisted of 4 × 4 min intervals of vigorous exercise (≈85-95% maximum capacity) interspersed with 1 min periods of recovery. MICT was 28 min of moderate-intensity continuous exercise (≈70-75% maximum capacity). The primary outcome was the change in cardiorespiratory fitness [peak oxygen uptake (VO_2peak)] after 6 weeks. Secondary outcomes included cardiovascular disease risk biomarkers, blood pressure, body composition, physical activity (PA) levels, and health-related quality of life.

Results: At 6 weeks, VO_2peak improved more with HIIT (2.3 ml $kg^{-1}min^{-1}$, Δm2−m1%HIIT: 14%) compared with MICT (1.4 ml·$kg^{-1}min^{-1}$, Δm2−m1%MICT: 9%). HIIT also showed significantly effects on sedentarism time (Δm2−m1%HIIT: 15% vs. Δm2−m1%MICT: 10%), body fat mass (Δm2−m1%HIIT: 4.5% vs. Δm2−m1%MICT: 3.2%), waist circumference (Δm2−m1%HIIT: 4.1% vs. Δm2−m1%MICT: 2.5%), HbA1c (Δm2−m1%HIIT: 10.4% vs. Δm2−m1%MICT: 32.3%) and TSH (Δm2−m1%HIIT: 16.5% vs. Δm2−m1%MICT: 3.1%).

Conclusions: In stable CAD, HIIT improved cardiorespiratory fitness, fat loss, and decreased sedentarism time more than MICT by a clinically meaningful margin. HIIT is a safe, well-tolerated, and clinically effective intervention that produces short-term improvement in cardiovascular risk factors. It should be considered by all cardiac rehabilitation programs as an adjunct or alternative to MICT.

Exercise-based Programs for cardiac patients: HIIT vs MICT – A Randomized Controlled Trial comparing Fat Loss and Blood Biomarkers

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Keywords: Cardiovascular Disease; Cardiovascular Risk Factors; Clinical Trials; High Intensity Interval Training; Randomized Controlled Trial

Objective: The aim of this study was to investigate the effects of two exercise-based programs using two short-term (six-week) protocols: High-intensity interval training (HIIT) and moderate-intensity continuous training (MICT), compared to the control group in fat loss and blood biomarkers.

Methods: 72 patients with coronary artery disease (CAD) were individually randomized (1:1:1) into three groups: HIIT, MICT, and control. Both training programs consisted of 6 weeks of supervised treadmill exercise, three sessions per week. The MICT at ≈70-75% of heart rate (HR) peak and HIIT at ≈85-95% of HRpeak. The control group were given recommendations to adopt healthy lifestyles. Outcome measurements included an assessment of anthropometric variables (DXA) and blood biomarkers.

Results: The HIIT group demonstrated greater improvements comparing to MICT in body fat mass (Δm2−m1% HIIT: 4.5%, $p < .001$ vs. Δm2−m1% MICT: 3.2%, $p < .001$), waist circumference (Δm2−m1% HIIT: 4.1%, $p = .002$ vs. Δm2−m1% MICT: 2.5%, $p = .002$), HbA1c (Δm2−m1% HIIT: 10.4%, $p < .001$ vs. Δm2−m1% MICT: 32.3%, $p < .001$) and TSH (Δm2−m1% HIIT: 16.5%, $p = .007$ vs. Δm2−m1% MICT: 3.1%, $p = .201$). Both HIIT and MICT exercise protocols promoted a significant improvement in anthropometric variables and blood biomarkers compared to the control group.

Conclusions: This RCT showed that both training programs were equally effective in improving fat loss and blood biomarkers in CAD patients, but the HIIT group showed further improvements compared to MICT. On the contrary, not doing any type of exercise-based program after a cardiovascular problem has shown worse results.

Improving health outcomes in myocardial infarction patients with two short-term protocols: A randomized controlled trial

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Objective: Investigate the effects of two community-based exercise programs using two short-term (six-week) protocols: High-intensity interval training (HIIT) and moderate-intensity continuous training (MICT) in physical fitness and physical activity (PA) levels in myocardial infarction (MI) patients.

Methods: Physical fitness (aerobic capacity and muscle strength) and daily PA (accelerometry) were assessed before and after six weeks of intervention in 69 patients diagnosed with MI. All patients were randomly assigned to the two exercise groups (HIIT or MICT) or the control group (no exercise). Both training programs consisted of six weeks of supervised treadmill exercise, three sessions per week. The MICT at ≈70-75% of heart rate (HR) peak and HIIT at ≈85-95% of HRpeak. The control group only did the medical recommendations.

Results: Both HIIT and MICT could significantly improve VO_2peak, but HIIT increased considerably by 14% (Δ=2.3 ml $kg^{-1}min^{-1}$, d = 1.54) compared with 9% of MICT (Δ=1.4±1.2 $ml{\cdot}kg^{-1}min^{-1}$, d=0.68). HIIT also showed more positive effects on sedentarism time with a decrease of 15% (Δ= −148.6±106.1 min/day, d = −1.20) compared with 10% of MICT (Δ= −105.5±88.0 min/day, d = −0.91). Moreover, the control group showed negative results on physical fitness and daily PA measurements and sedentarism time.

Conclusions: HIIT can improve physical fitness and daily PA more considerably than MICT without adversely affecting patient safety. These findings indicate that HIIT may be an alternative and effective training method in community-based exercise programs for patients with MI. On the contrary, not doing any exercise-based program after a cardiovascular problem has shown worse results.

The future of digitalisation in chronic disease management in Primary Health Care: a foresight case study in Lisbon Health Region

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Keywords: Chronic Diseases; Digital Health; Foresight; Primary Health Care; Strategic Scenarios; Primary Health Care

Objective: Due to the pressure on healthcare systems, the COVID-19 pandemic has forced administrators to quickly leverage and integrate existing technology to provide remote consultations to reach chronically ill patients. As such, this study aims to develop scenarios about the digitalisation of PHC in the Portuguese Healthcare System to support evidence-based policymaking.

Methods: This study follows a collaborative foresight approach using a scenario development methodology. Based on previous literature reviews and stakeholder interviews, a conceptual model of PHC services was developed to consider the role of information (e.g. supported by digital services). The study included three focus groups involving primary managers and health professionals with a ten-year timeframe.

Results: The driving forces that may influence the digitalisation of PHCs over the next ten years were identified as the potential for service innovation, the role of governance and regulations, and the impact of climate change. These resulted in the design of three relevant and plausible scenarios: "Digital PHC and active patients", "NHS transition", and "Climate exigency". The scenarios where governance and climate change stand out showed limited benefits compared to the scenario where there is technology investment. In this, combining innovation skills to establish digital services with improved governance policies enabling direct investment in digital technologies would go much further towards the goals of more patient-centred care.

Conclusions: The collaborative reflection process to identify the driving forces made the different stakeholders engage, discuss the different points of view and identify essential measures to be taken in different scenarios. Furthermore, it allowed the understanding of the impact of the actions to be taken for PHC digitalisation to be implemented most effectively, enabling the sustainability of the National Health Service in the Lisbon region, which up to this point has only been discussed at a limited and theoretical level.

Pharmacogenomic biomarkers as a source of evidence for effectiveness and safety in Alzheimer's disease therapy

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Keywords: Alzheimer disease; Biomarkers; Pharmacogenomic; Safety; Effectiveness

Objective: This study aimed to describe the pharmacogenetic biomarkers, contained in the Summary of Product Characteristics (SmPC) of the medicines with marketing authorization applications in Portugal, as a source of effectiveness and safety profile for medicines used in the therapy of Alzheimer's disease.

Methods: The work was developed in two phases: i) the search for pharmacogenomic biomarkers in SmPC of the medicines used in the therapy of Alzheimer's disease with marketing authorization in Portugal; and ii) a systematic literature review based on the data obtained in the first phase, with objective of finding studies in international literature that could describe and characterize the biomarkers found before and possibly identifying other relevant biomarkers. Finally, the levels of evidence and recommendation grades were classified for every study, according to Oxford Centre for Evidence-Based Medicine classification.

Results: Were identified 4 drugs with marketing authorization in Portugal to be used in Alzheimer disease treatment, and pharmacogenomic information was pointed for all. The pharmacogenomic biomarker identified more often was CYP2D6, followed by CYP2E1, CYP3A4, CYP1A2, CYP2C9. These results will be mostly supported by the systematic review. More detailed information should be considered and included in the main medicine's information source.

Conclusions: Most pharmacogenomic variants are not studied or acknowledged by the genetic tests and still need more scientific research that confirm their usefulness. Therefore, only a small number of variants is considered when prescribing drugs used in the therapy of Alzheimer's disease. It is expected that the results and information obtained through the systematic review contribute to develop more actual recommendations for each medicine pharmacogenomic profile into the SmPC, representing an improved tool for clinical decisions.

Portuguese Global Medicines Access Index 2022: Intercalary study

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Keywords: Access to medicines, Healthcare quality indicators, Health services accessibility, Real-world evidence

Objective: To study the process of introducing new drugs in Portuguese National Health Service (NHS) hospitals, after funding decision; to understand how results are measured in hospitals; to deepen the impact of drug shortages; and to identify barriers to accessing medication.

Methods: Cross-sectional, observational study (period under analysis – 2021). Data collection was carried out through an electronic questionnaire, sent to all NHS hospitals (September 15 and October 15, 2021.) Participation was voluntary.

Results: The response rate was 45% (n=22/N=49). Regarding the introduction of innovative drugs, 95% of the hospitals reported having a specific internal procedure, prior to this introduction, after a funding decision. Only 68% (n=22) of the responding institutions stated that they select the drugs used based on their real value. However, only 27% reported performing data management in the real-world context. Half of the respondents stated that shortages constituted a serious problem affecting all types of medicines. Only 27% had implemented pharmaceutical consultations, a fact that is worrisome, having attention to the need to control ambulatory patients. The main barriers identified to access to medicines were administrative burden (68%), lack of human resources (55%) and medication financing model (41%).

Conclusions: In this study, previously identified barriers to access to medicines were studied, namely the payment model, lack of human resources, acquisition process, and administrative burden. Results point to the need to rethink the health system organization at the hospital level, to allow early access to innovation.

How is low back pain being managed in primary healthcare? Findings from a scoping review on models of care

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Keywords: Implementation science, Low back pain, Models of care, Primary care

Objective: Models of care (MoCs) are frameworks that describe evidence-informed healthcare that should be delivered to patients in a given setting. This study aimed to synthetize research evidence regarding the core characteristics, context features and key common elements of MoCs implemented in primary healthcare for the management of low back pain (LBP).

Methods: Searches on MEDLINE(Pubmed), EMBASE, Cochrane Central Register of Controlled Trials, PEDro, Scopus, Web of Science and grey literature databases were conducted. Handsearching in relevant peer-reviewed journals and organisations' websites was also performed. Title/abstracts and full-text screenings were carried out independently by two researchers and disagreements were solved through consensus. Eligible records report findings of MoCs implemented for LBP patients in primary healthcare settings, which were investigated through a descriptive qualitative content analysis.

Results: Thirty studies reporting 12 MoCs were included. The majority evaluated acceptability, implementation strategies, clinical effectiveness and cost-effectiveness of new MoCs, mostly through randomized controlled trials and qualitative studies. All MoCs were implemented in high-income countries and had clear objectives, which included, but were not limited to, delivery of guideline-concordant care and reduction of healthcare resources utilization. In general, most MoCs followed a stratified care approach. Assessment of LBP patients typically occurred in primary healthcare, while the care delivery usually took place in community-based settings or outpatient clinics. The involvement of general practitioners and physiotherapists was reported in the majority of the studies. Education and exercise were the most common health interventions, but intervention content, follow-ups and discharge criteria were not fully reported.

Conclusions: MoCs for LBP in primary healthcare share relevant key elements, but report of interventions is heterogenous. This study provides a comprehensive understanding of the characteristics of the existing MoCs, which is essential new information to underpin future research implementation studies for LBP.

Models of care for low back pain patients in primary healthcare: a scoping review on implementation processes and outcomes

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Keywords: Implementation science, Low back pain, Models of care, Primary care

Objective: Models of care (MoCs) are frameworks that describe evidence-informed healthcare that should be delivered to patients in a given setting. This study aimed to map the current literature about the implementation of MoCs for low back pain (LBP) in primary healthcare, analysing their implementation strategies, process evaluations and changes in patient-, organizational- and implementation-level outcomes.

Methods: This study followed the Joanna Briggs Institute guidelines for scoping reviews. Searches on MEDLINE(Pubmed), EMBASE, Cochrane Central Register of Controlled Trials, PEDro, Scopus, Web of Science and grey literature databases were conducted. Additionally, handsearching was also performed in relevant peer-reviewed journals and organisations' websites. Title/abstracts and full-text screenings were carried out independently by two researchers and disagreements were solved through consensus. Data concerning frameworks and implementation strategies, barriers and facilitators, outcomes, outcome measures and main results were extracted and examined through a descriptive qualitative content analysis.

Results: Thirty studies reporting 11 MoCs were included. Only 5 MoCs reported the use of frameworks/theories to develop or evaluate the implementation process. When described, implementation strategies varied across studies. The most used strategy was the training of health professionals involved in providing care. Patient-level outcomes (symptoms and disease severity, psychosocial and work-related) were reported in 11 MoCs and organizational-level outcomes (healthcare resources utilization, costs and quality assessment) were evaluated in 10 MoCs. Few studies reported implementation-level outcomes, such as acceptability, feasibility and adoption.

Conclusions: As most MoCs were not informed by implementation frameworks, the results of this scoping review are inconclusive. Systematic approaches for the development, evaluation and report of implementation processes of the MoCs are crucial to justify their effectiveness and changes in outcomes.

CkeckAP: Psoriatic Arthritis Prevalence Among Portuguese Psoriasis Patients and Evaluation of the EARP Questionnaire Performance

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Keywords: Psoriasis; Psoriatic arthritis; EARP Questionnaire

Objective: The present study aims to estimate the percentage of Psoriatic Arthritis (PsA) in psoriasis patients in the Portuguese dermatology setting. Additionally, it aims to evaluate the performance of the EARP questionnaire in Portuguese psoriasis patients and determine the appropriate cut-off point for early diagnosis of PsA.

Methods: A multicentre, cross-sectional, observational study with two independent assessments: one by the dermatologist and the other by the rheumatologist. Patients were recruited at one of eight Portuguese study sites (private and public settings). PsA diagnosis was defined by a combination of expert opinion with CASPAR criteria among psoriasis patients in a dermatology consultation setting. PsA prevalence estimates were computed as proportions together with the corresponding 95% confidence interval. Prevalence by gender and age strata was computed. PsA screening results, mediated by the EARP questionnaire, were compared with the gold standard (PsA diagnosis made by a rheumatologist) and sensitivity, specificity, positive predictive value, negative predictive value, and area under the curve were determined.

Results: 172 patients were included with a mean age (SD) of 53.8 (14.5) years, 53.5% male. The prevalence of psoriatic arthritis in patients with psoriasis in our sample was 8.70% (95% CI: 4.8-14.2). Psoriatic arthritis is more frequent in women (9.09%) than in men (8.33%) and in the 31-59 years age group. The EARP questionnaire showed a good internal consistency (Cronbach's α=0.81). For an EARP questionnaire cut-off point of 3, the questionnaire's sensitivity and specificity were 71.4% and 40.1%, respectively. The AUC was 0.558 (95% CI: 0.429-0.687).

Conclusions: The Portuguese version of the EARP questionnaire has an acceptable sensitivity, albeit with a low specificity. Nevertheless, the Portuguese version of the EARP (EARP-PT) questionnaire is a helpful tool for the early detection of PsA symptoms by dermatologists when assessing patients who are susceptible to this condition.

Patient-reported outcome measures in cardiac rehabilitation programs: preliminary results of a Systematic Review

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Keywords: Cardiac rehabilitation; Patient-reported outcome measures; Quality of life; Randomized controlled trial; Treatment outcome

Objective: Patient-reported outcome measures (PROMs) are recommended as important endpoints in cardiac rehabilitation programs (CRP), highlighting patients' health status, functioning and health-related quality of life (HrQol), as well as enabling clinical and health decisions to be made in an informed manner. Analyze which PROMs are used to assess the HrQol of patients participating in a CRP following a cardiac event, as a function of assessment time.

Methods: A systematic review of peer-reviewed English language articles was undertaken according to recommendations of the PRISMA group, conducted in MEDLINE, CINAHL and Cochrane Library from date of inception up to January 2017 and up to December 2022. The PICO strategy was used, to select RCTs studies comparing CRP against usual care, focusing time on HrQol assessment through PROMs. The protocol registered with PROSPERO: CRD42022344240.

Results: A total of 533 articles were found and 453 articles were eliminated after reading the title, abstract and removing duplicates. After reading full text the sample was 13 articles. The total number of participants was 4194, 2858 male, with a mean age of 61.7 years, and conducted in different countries: Germany and USA[n=2], Italy, UK, Lithuania, Egypt, China, Israel, Pakistan, UAE, Netherlands[n=1]. The intervention included the four phases of a CRP, using different PROMs to assessment HrQol (EQ5D[n=4], SF36[n=2], SF12[n=3], KCCQ, HeartQol, MacNewQLMI[n=1]) and different moments since the end of CRP over a period quantified in months: 3[n=6], 6[n=5], 12[n=6], 1, 8, 9, 18, 24, 36, 48 months[n=1].

Conclusions: Although different PROMs in CRP, the most prevalent HrQol assessment time was at 3, 6 and 12 months after program start.

Effects of an eight-weeks High-Speed Resistance Training program on heart rate variability in community-dwelling independent older adults

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Keywords: Older adults; Resistance training; Velocity-based training; Variability; Heart Rate

Objective: This study examined the effects of an eight-week high-speed resistance training (HSRT) program on heart rate variability (HRV) indices (time and frequency domain).

Methods: This study included thirty-nine physically independent older adults (age, 68.50±3.52y; BMI, 27.88±4.37 kg/m^2). The HSRT program lasted eight weeks, with three sessions per week with 50–60min, each session being comprised of five-six exercises, two-three sets, and six–ten reps/exercise. The intensity was gradually increased after each session in accordance with the movement velocity (>1.3 to 0.75 m/s) representing approximately 20% to 60% of one repetition maximum. Participants executed the exercises rapidly and explosively making all repetitions for each shortening phase (concentric phase) performed as quickly as possible with the lengthening phase of the muscle (eccentric phase) being controlled for 2–3 s. The velocity of the concentric phase in each exercise was monitored through a BEAST™ sensor (Beast Technologies, Brescia, Italy). The heart rate band has been used to assess the variation in sinus origin heartbeat intervals (Polar® H10, Kempele, Finland). Using the Kubios HRV software (Kubios HRV, University of Kuopio, Finland), HRV indices were calculated. The Ethics Committee of the University of Évora approved this study (approval no. 22030). A paired sample t-test (with a cut-off of $p< 0.05$ for statistical significance) was used for comparing each outcome.

Results: After the intervention period, the HRV indices showed significant improvements: on SDNN (Δchange=22.42; p=0.028; effect size [ES]=0.206); RMSSD (Δchange=28.54; p=0.022; ES=0.213); pNN50% (Δchange=52.25; p=0.045; ES=0.238); and on HF (Δchange=48.65; p=0.023; ES=0.150). There were no differences on Average RR (Δchange=-0.79; p=0.615; ES=-0.055); LF (Δchange=-0.44; p=0.974; ES=0.01); and on the Ratio LF/HF (Δchange=-1.98; p=0.899; ES=-0.023).

Conclusions: The results suggest that the HSRT program is an effective and safe exercise approach to improve several HRV indices, especially SDNN and RMSSD indices.

Analysis of postural control through linear and non-linear methods throughout aging

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Keywords: Aging; Balance; Falls; Force platform; Postural control

Objective: The natural aging process is defined as continuous and irreversible and is associated with a decline in physical and cognitive functions. The maintenance of balance and body orientation in humans is guaranteed by the proper functioning of the Postural Control system. This study evaluated the effect of sensory-motor training on postural control in pre-retirement adults. The study evaluated the effectiveness of an active retirement program on postural control over six months of intervention, trough evaluating the relative sensitivity of center of pressure measures to age-related changes in postural stability.

Methods: Measures of postural stability in the time and frequency domain were compared between a group of nine elderly adults (≤64 years), a group of fifty-nine elderly (65-74 years), and a group of thirty-eight elderly (≥75 years) in the eyes open and eyes closed conditions.

Results: The measurements identified statistically significant differences in the group ≤64 years in the amplitude of displacement and approximate entropy in the anteroposterior position with eyes open and in the mediolateral position with eyes closed. In the age group of 65-74 years, there were no significant differences in variables from linear methods, however there were differences between groups in variables of approximate entropy and scaled correlation. In the ≥75 years group, the tests performed revealed that there are statistically significant differences between the groups in the variables of total excursion and mean velocity and that there are statistically significant differences between the groups in all the variables of approximate entropy and dimensional correlation with the exception of anteroposterior position with eyes closed. In addition, there are significant differences in the comparison within the group in the three age groups evaluated.

Conclusions: In conclusion, both groups showed significant improvement in most of the analyzed variables; however, the improvements in the exercise group were significantly greater.

A view on bullying by Focal Groups in a Group of Schools in Central Alentejo

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Keywords: Bully; Bullying; Literacy; Perception; Victim

Objective: To characterise the way in which the phenomenon of bullying is perceived by adults in the educational community.

Methods: Focus group with analysis of responses through categories. Two focus groups were created with homogeneous constitution between them. Each group was composed of 10 individuals with the same professional characteristics. However, each group had heterogeneous characteristics in its constitution, including teachers, operational assistants, specialised technicians, managers and parents. With the organization of focus groups we intended to verify the perception of individuals about the phenomenon of bullying, as well as the perception of it by bullies and victims. We also tried to characterise the adults responsible for the students involved.

Results: After the analysis we can conclude that the perception of bullying is essentially referred to as a phenomenon repeated over time that causes real distress to the victim. This repeated process is extremely facilitated by the systematic use of social media. It was also concluded that both victims and bullies have problems at the level of social interaction. Bullies are often unaware of the harm they are doing to the victim. Victims are often fragile and easy targets for the bully, who is often part of people the victim trusts. Families sometimes initially devalue the phenomenon, and sometimes, by the time they appreciate it, it's too late to try to solve it. It was also found that the participants think it is very important to have a comprehensive intervention plan to prevent this phenomenon.

Conclusions: The phenomenon of bullying is increasingly serious and causes lifelong damage to both the bully and the victim. The social media helps to increase the cyber bullying, because the bully is protected by your computer, can use a false identity. It is essential to prevent this phenomenon in a school environment. Focus group participants were unanimous in stating that increased literacy of parents and students can help prevent bullying.

Models of Care for People with Knee Osteoarthritis in Primary Healthcare: A Scoping Models of Care for People with Knee Osteoarthritis in Primary Healthcare: A Scoping Review

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Keywords: Implementation Science; Models of care; Osteoarthritis; Primary Care

Objective: To identify Models of Care (MoCs) for knee osteoarthritis implemented in primary healthcare and describe its characteristics namely, the intervention components, the implementation and context features.

Methods: This scoping review, following Joanna Briggs Institute methodology, identified studies in peer-reviewed and gray literature databases. Studies about the implementation of MoCs, defined as complex interventions with an evidence-informed framework that defines the principles of care and how care should be delivered, according to local context, were included.

Results: Thirteen MoCs, among thirty studies, were included. The main objectives of these studies addressed clinical effectiveness and cost-effectiveness, evaluation of the implementation strategies using observational cohort studies, cluster RCTs or mixed-methods studies. Care was delivered mostly through stepped care pathways, but the progression, discharge criteria and follow-up plans were often poorly described. Education and structured exercise (supervised or home-based) were the most considered interventions. Physiotherapists and general practitioners were the professionals most included, but nurses, rheumatologists and pharmacists were considered, depending on context. Professionals training was often described. Some MoCs were implemented only on primary care, others also integrated community services, hospital-based and/or outpatient clinics in the care pathway. Coordination of care elements reported relied on tools to exchange information. All MoCs were implemented in high-income countries, but the context features were often poorly described. The findings of these studies suggest benefits in pain, physical function, physical activity level, healthcare utilization, quality of care, and in implementation outcomes, like fidelity and adherence.

Conclusions: This scoping review gives a comprehensive view of MoCs for knee osteoarthritis in primary care. These have been designed according to national system organization and underlying health policy, however the report of MoCs is heterogeneous. Research is needed regarding the effectiveness and process evaluation, as well as guidelines for the development and implementation report of MoCs.

Exposure of the Portuguese population to mycotoxins – the mixtures approach

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Keywords: Mycotoxins; Mixtures; Human biomonitoring

Objective: Mycotoxins are a group of food contaminants with associated health outcomes such as estrogenic, immunotoxic, nephrotoxic and teratogenic effects. Human biomonitoring (HBM) studies have been developed to assess the exposure to mycotoxins at the individual level and to several compounds

simultaneously. This study aimed to obtain data through a human biomonitoring study to assess the simultaneous exposure of the Portuguese population to multiple mycotoxins.

Methods: In the scope of the National Food, Nutrition, and Physical Activity Survey of the Portuguese General Population (2015-2016), 24h-urine samples from 94 participants were analyzed by liquid chromatography–mass spectrometry (LC-MS/MS) for the simultaneous determination of 42 mycotoxins' urinary biomarkers.

Results: Results revealed the exposure of Portuguese population to aflatoxins, zearalenone, deoxynivalenol, ochratoxin A, alternariol, citrinin and fumonisin B1. The human exposure to several mycotoxins was confirmed, with participants being exposed simultaneously to two (45%), three (22%), four (6%) and five (2%) mycotoxins. The most frequent combination was the binary mixture of zearalenone and deoxynivalenol. Zearalenone and alternariol, two mycotoxins with endocrine disruptive activity, were found simultaneously in 13% of participants.

Conclusions: The present study generated, for the first time and within an HBM study, reliable data on internal exposure to multiple mycotoxins at the individual level for the Portuguese population. These data are a first step for estimating the risk associated with exposure to mixtures of mycotoxins and contribute to support risk managers in the establishment of preventive policy measures to ensure public health protection.

Atmospheric levels of $PM_{2.5}$ – the exceedance of air quality guidelines in Portugal

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Keywords: Air quality; Particulate matter; Public health

Objective: Air pollution is the main environmental cause of mortality and premature death worldwide. The main objectives were to present the levels of exposure to $PM_{2.5}$ in Portugal during the year 2021 and to determine the exceedance of World Health Organization air quality guidelines (WHO AQG) and EU Air Quality Directive.

Methods: Data available in the platform QualAR Portugal were collected for the year 2021. For each monitoring station, the variables collected were region, city, station, emission influence (traffic, background, industrial), and environment (urban, suburban, rural). The percentage of hourly exceedances of EU Air Quality Directive (25 $\mu g/m^3$) and WHO AQG of 2006 and 2021 (10 $\mu g/m^3$ and 5 $\mu g/m^3$, respectively) was determined.

Results: For 2021, mean and median atmospheric levels of $PM_{2.5}$ in Portugal were 6.53 and 4.29 $\mu g/m^3$, respectively. The mean atmospheric levels of $PM_{2.5}$ were lower when compared to the previous three-year period, except for the Center region. The percentage of hourly exceedance of guideline levels ranged from 0.07% to 11.70%, from 0.3% to 37%, and from 6% to 72%, when compared to the EU Air Quality Directive, WHO AQG 2006 and WHO AQG 2021, respectively.

Conclusions: Despite the efforts of environmental policies aimed at increasing air quality, Portugal registered at some time points levels above the EU Air Quality Directive, being more challenging to keep within the WHO Air Quality Guidelines. Results presented herewith showed the need of continuous efforts and will support decision-making for the reduction of admissible levels of atmospheric pollutants in Portugal.

Depression and anxiety and their associated factors in university students

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Keywords: Mental health; Depression; Anxiety; COVID-19; Students

Objective: To evaluate the prevalence of depressive and anxious symptoms in university students, and to compare mental health with sociodemographic characteristics.

Methods: Cross-sectional study with a sample of 3399 university students from 7 Portuguese higher education institutions was conducted. The following questionnaires were applied: sociodemographic data, Mental Health Inventory (MHI-5), Generalized Anxiety Disorder Assessment Scale (GAD-7) and Patient Health Questionnaire (PHQ-9).

Results: 75% of the participants presented mild to severe anxious symptoms and 61.2% mild to severe depressive symptoms. 6.8% of participants reported that their mental health has worsened with the COVID-19 pandemic. 19.5% reported being diagnosed with a mental disorder and of these, 38.7% reported being diagnosed after the start of the pandemic. 23% of participants reported take medication for anxiety, depression, or another psychic problem and 11.7% reported having had thoughts that they would be better off dead or hurting themselves. The results showed better mental health for men, for students with better socio-economic status, for those who travel home more frequently and for those in a loving relationship. Students with previously diagnosed mental disorder have worse mental health.

Conclusions: There was a decrease in the mental health of university students after the pandemic compared to pre-pandemic studies and the proportion of students with anxious and depressive symptoms was alarming. It is necessary to review and readapt programs to promote the mental health of university students with the aim of improving their well-being.

An optimized method for the preliminary detection of Microplastics in the Indoor Environment

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Keywords: Confocal microscopy; Density separation; Exposome; House dust, Fluorescence microscopy

Objective: Microplastics (MPs) are plastic particles with sizes between 100 nm and 5 mm, regarded as emerging contaminants and responsible for multiple deleterious effects on human health. Due to MPs ubiquity, humans are continuously exposed. However, exposure dosimetry is very rarely performed, particularly for the indoor environment. This work describes a simple protocol to evaluate the presence of MPs in the indoor environment.

Methods: Passive dust samples were collected in two divisions (kitchen and bedroom) of the same house during one-week periods. Active dust samples were retrieved from the vacuum cleaner bag. Different methods for the extraction of MPs were tested, including the combination of density separation with sodium chloride and digestion with hydrogen peroxide. Since no standard protocol for MPs quantification in dust samples was available, the amount of dust to be used in the analysis was also optimized. The MPs were then visualized and identified by confocal microscopy after Nile Red staining.

Results: For passive samples, only the oxidative digestion of the lipids content with H_2O_2 is necessary. For active samples, it is necessary to perform a density separation with NaCl prior to oxidative digestion. Overall, the results from the passive dust samples revealed that the bedroom exhibited a higher number of fibers than the kitchen and that the highest fluorescence intensity was also registered in the bedroom samples. Concerning the active samples, the optimization of the amount of dust to be analyzed indicated that a minimum of 0.5 g of the 63 μm dust fraction should be used.

Conclusions: Nile Red visualization technique proved to be efficient in MPs detection and quantification. However, it cannot discern the composition of different MPs present in a sample. Hence, this technique should be used as a preliminary approach to confirm the existence/non-existence of MPs.

Effects of multimodal training with augmented reality in global cognition, executive function, and inhibition in older adults

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Keywords: Elderly, Multimodal training, Augmented reality training, Cognition

Objective: This study aimed to examine the effects of a multimodal intervention with augmented reality in executive functions, global cognition, and inhibition in community-dwelling elderly.

Methods: Sixty-four elderly people (72.4±5.9 years) living in the community participated in this study. Participants were divided into three groups: a control group (CG) with 22 participants, an experimental group with multimodal training (EGMT) with 21 participants, and an experimental group with multimodal training and augmented reality (EGAR) with 21 participants. All participants were assessed at the beginning of the program and after 12 weeks (at the end of the program). The experimental group exercised three times per week for 60 minutes while the control group continued their activities of daily living. In addition, global cognition was assessed with the Mini Mental State Examination (MMSE), executive functions with the Frontal Assessment Battery (FAB), and inhibition with the Stroop Test.

Results: There were significant differences when we compare the pretest and posttest within each group. In EGAR, significant differences were observed in MMSE (p=0.020; Δ% = 2.85%), FAB (p=0.013; Δ% = 6.16%) and ST -Color (p=0.028; Δ% = 11.09%), and in EGMT in FAB (p=0.012; Δ% = 5.52%). Independent samples tests showed in the changed scores, significant differences between the three groups in MMSE (p=0.026), but there are no differences in Stroop Test (Stroop words, p=0.756; Stroop color, p=0.186; Stroop word/color, p=0.470).

Conclusions: Overall, the results show that both interventions have positive effects on some of the variables studied. However, when comparing pretest and posttest within each group, EGAR has effects on more variables (MMSE, FAB and on Stroop Test - Color) than an intervention with multimodal training only (FAB).

The relationship between nursing practice environment and pressure ulcer care quality in Portugal's long-term care units

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Keywords: Healing; Nursing homes; Nursing Work-Revised Scale; Pressure injury; Prevention

Objective: Pressure ulcers (PUs) are responsible for high morbidity and mortality. This study aims to describe the nursing work environment in Portuguese long-term care units and to assess how this environment relates to the quality of PU care, in long term care units of Alentejo.

Methods: We looked at associations between the nursing work environment through the Nursing Work Index-Revised Scale (NWI-R) and wound healing rates obtained from a prevalence study.

Results: A total of 165 nurses completed the NWI-R-PT. Most were women (74.6%), and less than half (38.4%) had education in wound care. Of the 88 patients identified with PUs, only 63 had their PU documented. The results showed that the level of concordance with Q28 "Floating so that staffing is equalised among units" is strongly associated with a shorter PU healing time. We found no evidence for possible associations with questions on participation in policy decisions, salary level, staffing educational development and PUs healing time.

Conclusions: Good distribution of nursing staff over the units will likely improve the quality of wound care. We found no evidence for possible associations with questions on participation in policy decisions, salary level, staffing educational development and PUs healing times.

Effects of Feel-Own-Move program on the experience of the body, sleep quality and physical activity of female victims of violence. A mixed-methods study

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Keywords: Embodiment; Psychomotor therapy; Trauma; Women; Health

Objective: Women victims of intimate partner violence (IPV) tend to experience their bodies as heavy, slow or anxious. As a result of trauma, they also feel disconnected from their body. To promote healthy bodily experiences is both a therapeutic and a social need in the field of IPV. The aim of this study was to explore the effects of Feel-Own-Move (FOM) on the experience of the body, physical activity (PA), sedentary behavior (SB) and sleep quality of female victims of IPV, through a mixed methods approach.

Methods: Nine women living in shelter homes (mean age 45.9 years; range= 32- 64 years) received FOM, an 8-week psychomotor intervention with 2 individual sessions and 1 group session per week. At week 1 (T1, baseline), week 5 (T2, pre-intervention) and week 9 (T3, post-intervention), participants were asked to use an accelerometer for seven days and nights to assess PA, SB and sleep quality. At T3, brief semi-structured interviews were conducted with each participant to explore their experience of the body and perceived internal changes.

Results: There was a decrease in SB (Δ%= -16%) and in sleep fragmentation index (Δ%= -27%) between T2 and T3, as well as an increase in light PA (Δ%= +19%) although not statistically significant. Women shared experiences of increased bodily awareness regarding breathing sensations, the body-mind connection, tension-relaxation differences, and feelings of strength. Also, improvements in self-regulation, self-confidence, inner strength, motivation and vitality were reported, along with relaxation skills.

Conclusions: Feel-Own-Move showed promising results in improving bodily experiences, sleep quality and active behavior of women victims of IPV.

Gender Differences in Adolescents' Self-Knowledge Organization: The Moderating Role of Adolescence Phase

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Keywords: Implicative dilemmas; Self-concept; Self-esteem; Identification; Adolescent development; Personal constructs

Objective: To examine the effect of gender on adolescents' organization of self-knowledge and the moderation effect of adolescence phase.

Methods: The repertory grid technique, a procedure based on a structured interview and a rating task, was administered to 68 early and late adolescents. Six measures of self-knowledge organization were computed from the data matrix obtained from each participant: differentiation; polarization; discrepancies between actual self (A), ideal self (I) and others (O); and the presence of inner conflicts. Regression-based moderation analyses were performed considering gender, adolescence phase and the interaction gender*adolescence phase as predictors. The association of the presence of conflict with gender and adolescence phase was tested with non-parametrical tests.

Results: Gender main effects suggested higher A-I (b = 0.16, boot 95% *CI*: 0.09, 0.57) and A-O (b = 0.12, boot 95% *CI*: 0.01, 0.26) self-discrepancies for boys, and gender*adolescence phase interaction effects were significant for polarization (b = -22.51, boot 95% *CI*: -41.92, -3.10), A-I (b = -0.35, boot 95% *CI*: -0.64, -0.01) and A-O (b = -0.27, boot 95% CI: -0.54, -0.05). Conditional effect probes revealed that polarization was lower at late adolescence only for boys, A-I and A-O self-discrepancies were higher at late adolescence only for girls. Moreover, more girls presented conflicts at late than early adolescence [χ^2 (1, N = 47) = 4.850, p = .028] and boys scored higher than girls on A-I and A-O self-discrepancies at early adolescence.

Conclusions: Gender differences were revealed in early adolescence: boys showed both lower self-esteem (higher A-I) and identification with others (higher A-O). Additionally, diverse patterns of developmental differences were suggested, such that, at late adolescence, polarization was lower only for boys, and self-esteem (higher A-I) and identification (higher A-O) were lower and conflicts more likely only for girls. Mixed results for differentiation and I-O self-differentiation recommend further research.

What rejection looks like: the proximity contacts of rejected children in a therapeutic setting – a preliminary study

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Keywords: Radio-frequency; Sensor data; Sociometrics; Inclusion; Interactions; Psychomotor intervention

Objective: Peer rejection during childhood is related to many negative outcomes in adolescence and adulthood. During group psychomotor intervention children are able to cooperate with their peers, observe their skills, and share playful and ludic experiences together with the therapist as a mediator of their interactions. However, even in this protected setting rejected children might still struggle to fit in with their peer group. This pilot study has two aims: examine whether proximity contacts of rejected children differ from their peers at the baseline of a group psychomotor intervention; examine if proximity contacts of rejected children change throughout the intervention. Considering the importance of proximity contacts for the social emotional development of children, gaining knowledge on this matter is important so psychomotor therapist can adjust their practice in order to promote more social participation for children who are rejected within the peer group.

Methods: 17 children (4 rejected and 13 non-rejected) from grade 2 who attended schools in Évora participated in this study. The data used in this study derived from 14 psychomotor intervention sessions (2x week with 40min duration). During the session each child wore a RFID sensor that recorded their proximity contacts with other peers during the whole session. A proximity contact was recorded when children were in proximity (< 1.5 meters) and facing each other within a 65º angle. Information regarding partners of interaction, duration of social contacts, and time in solitude were obtained. Peer status was obtained through a peer nomination procedure. All scores were standardized per class.

Results: The Mann Whitney U test showed no differences regarding proximity contacts of rejected children and their peers were found at the baseline of a group psychomotor intervention. The Mann Whitney U test showed that regarding the means throughout the whole intervention rejected children spent less time in groups (U = 4, p = .05), and more time alone in total (U = 3.00, p = .02). Additionally their times in solitude lasted longer (U = 7, p =.03). However, a Wilcoxon matched paired test showed no differences between the social contacts of rejected children at baseline and after 14 sessions, variables suggesting that the intervention did not influence proximity contacts.

Conclusions: While the proximity contacts of rejected children at the beginning of the intervention program did not differ from their peers, their overall results throughout the sessions show that rejected children struggle with being included in the peer group even in the context of group psychomotor interventions.

Although group psychomotor intervention allows children to cooperate and develop together, our preliminary findings suggest that a more directed approach to group cohesion may be necessary to promote social inclusion of rejected children within the peer group. Future with larger sample sizes are necessary to provide more concrete and reliable conclusions about proximity contacts of rejected children in psychomotor interventions.

Relations between Motor Competence and Spatial Exploration of the Playground in first cycle children

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Keywords: Motor Competence; Motor Coordination Test for Children (KTK); Playground; Positional Data; Spatial Exploration

Objective: The research aimed to examine the relationship between children's motor competence and spatial exploration, measured through individual spatial-temporal displacements during recess, in first grade elementary school students.

Methods: Motor competence was assessed through the Motor Coordination Test for Children (Körperkoordinationstest Für Kinder - KTK) and the results were crossed with the indicators of spatial exploration, calculated through the distances of each student to their midpoint at recess, identified from positional data collected by individual GPS devices placed of the playground. The study had 52 participants (23 girls and 29 boys) with a mean age of 6.25 years (SD ± 0.44 years), from three first grade classes, located in the same school group in Évora-Portugal. To calculate the relationships between the variables, the non-parametric correlation tests of Kendall's Tau_b and Spearman's Rô were used.

Results: The results showed a negative correlation (ρ= -0.287; τ = -0.196; $p < 0.05$), between General Motor Coordination Coefficient (GMC – KTK) (M:363.24 ±62.22) and the spatial exploration, captured by the average distance from to each children midpoint (11.47 ±3.81m).

Conclusions: The results suggest a negative relationship between motor competence and spatial exploration during recess. The better children perform on motor tasks, the less they explore the space around. This finding, combined with other studies, might suggest that children with better motor competence might be more stable on their engagement in physical activities during recess.

Effect of a motor-cognitive intervention on depression in middle-aged and older patients with type 2 diabetes mellitus

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Keywords: Mental health, Depression, Dual-task exercise, Type 2 Diabetes Mellitus

Objective: The main purpose of this study was to investigate the effect of a short-term motor-cognitive intervention on depression in patients with type 2 diabetes mellitus.

Methods: A one-group design with repeated measures was used. Twenty-six middle-aged and older patients with type 2 diabetes mellitus (68.6 ± 6.2 years; diabetes duration of 14.8 ± 8.4 years) acted as their own controls. Patients underwent baseline testing twice, with a 4-week interval between tests (pretest 1 and pretest 2) before participating in an exercise programme for a total of 8-weeks (3 times per week; average duration of 55-60 minutes per session). They were retested immediately after the end of the training programme. Exercise intensity, enjoyment level of exercise, and adverse events were systematically recorded at the end of each session. Depression symptoms was measured with the Geriatric Depression Scale (*GDS-15*), a self-administered questionnaire developed and validated to measure depressive symptoms in the older population.

Results: Participants reported a mean subjective exercise intensity and enjoyment level of 10.7 ± 1.4 points (Borg scale ranging from 6 to 20 points) and 4.0 ± 0.8 (out of 5 possible points), respectively. No adverse events were reported. After the training programme, statistical tests showed no significant improvement in depression symptoms over time ($p > 0.017$, Bonferroni adjustment to compensate for multiple comparisons).

Conclusions: The multimodal intervention combining physical and cognitive stimulation was found to be safe and enjoyable. Regarding depression scores, the intervention did not lead to significant changes in middle-aged and older patients with type 2 diabetes mellitus.

A method to quantify postural control during attention task in preschoolers

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Keywords: Children; Postural assessment; CAS

Objective: The relation between motor tasks (such has handwriting) and attention are closely related. It is common that educators mention postures readjustment in children with attention difficulties, which is not surprising considering that maintaining posture requires attentional resources. The attention task is from Cognitive Assessment System (CAS) is structured into four areas: planning, attention, and successive and simultaneous processing. Therefore, it is important to understand postural control behavior during an attention task to better prepare child's environment during motor tasks. This study aims to relate the traditional variables of postural control with the attention level of children assessed by the CAS.

Methods: Sixty-seven children (5-6 years) performed an attention task (CAS) while standing on a force plate to measure the center of pressure (CoP) excursions. For the assessment of postural control, the children were standing on the force plate (Plux -Portugal). The displacement of the CoP was sampled at 100 Hz.

Results: The results of this study show that there is a significant negative association between all traditional parameters and the outcome of the attention task (TOTEX;-0.399;< .001; TOTEX_AP;-0.364; 0.002; TOTEX_ML;-0.424;< .001; A_AP;-0.376; 0.002; A_ML;-.394;< .001; AREA_CC; -0.448;< .001; AREA_CE;-0.343; 0.004).

Conclusions: We can conclude that the better the outcome in the task, the lower the values in the postural control parameters. This procedure will allow a deeper analysis of attention during motor tasks. The inclusion of other nonlinear measures will allow us to assess the complexity and regularity of the behavior of sway during these motor tasks.

The main concerns of people with Chronic Kidney Disease in disease management: a systematic review

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Keywords: Chronic Kidney Disease; Concerns; Patient-centered care; Patient experience; Systematic review

Objective: This study aimed to identify in a comprehensive way concerns of people with Chronic Kidney Disease (CKD) at different stages of this disease.

Methods: A systematic review was conducted according to PRISMA Statement Guidelines. Were searched qualitative, quantitative and mixed-methods studies in 4 databases (Scopus, Web of Science, PubMed and SCIELO) consulted in January´22 using established criteria, to answer the following research question: What are the concerns of people with CKD, in managing their disease? The protocol of this review was registered and published in PROSPERO (CRD42022308154). A methodological quality assessment was conducted using MMAT (Mixed Methods Appraisal Tool) version 2018. The results were integrated into a thematic synthesis.

Results: A total of 252 articles were identified, of these 10 met the methodological quality standards and inclusion criteria. The included studies were published between 2003 and 2020, originated from different countries and have a qualitative approach. The thematic synthesis identified 4 dimensions or general themes of concerns of people with CKD, namely: (i) concerns about treatment; (ii) concerns related to general health; (iii) concerns related with personal life and (iv) concerns related to self-care. A total of 37 items of concerns were identified from these dimensions, being the most identified: "fear of dying", "fear of not receiving the kidney transplant", "becoming ill or have complications before transplantation" and "fear of starting dialysis" and "change in lifestyle".

Conclusions: The most prevalent themes identified in this systematic review are directly related to the end-stage renal disease (ESRD), which reinforces the concentration of evidence at this stage. The available evidence on the concerns of people with CKD is still limited, which is an important barrier to be overcome for a better understanding of CKD and hence the effectiveness of health-focused actions, particularly in the early stages of the disease.

Evaluation of manual coordination and visuospatial attention using the adapted Fitts test in students with and without dyslexia in higher education

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Keywords: Visuospatial attention; visuomotor control; specific learning disorder; Fitts' law

Objective: Difficulty in literacy acquisition skills is just one of the symptoms of specific learning disorder (SLD). Children with this disorder demonstrate disturbances in motor coordination. Children, adolescents, and adults with SLD with a deficit in reading (dyslexia), exhibit difficulties performing various manual tasks that require motor skills and precision in timing and control of serial tasks. Fitts' law demonstrated that the average time it takes a performer to hit two targets using the computer mouse increases as the ratio of movement distance to target width increases known also as the inverse speed-precision relationship paradigm. We thus propose an adapted test keeping target width and distance to target constant to control two key variables in assessing speed-precision.

Methods: Twelve subjects, six with dyslexia and six without dyslexia were evaluated using the adapted Fitts test. Each student was asked, to mobilize a mouse and click on a random target displayed on the screen. After clicking on the random target, they would click on the central target as quickly and accurately as they could. This procedure was repeated for five minutes.

Results: The group of students with dyslexia showed higher sample entropy values reflecting less regularity in behavior and a lower performance index in both the horizontal and vertical components of mouse movements.

Conclusions: The adapted Fitt's test allowed: a) to differentiate visuospatial attention in college students without and with SLD; b) to quantify the time/number (speed) of clicks during the test; c) to evaluate visuomotor control as well as visual perception, due to the difficulties presented in visualizing close targets that have to be regulated through effective fine motor skills.

Effects of Covid-19 confinement in older persons: benefits of home-based psychomotor intervention in a multidisciplinary context

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Keywords: Aging; Psychomotricity; Psychomotor Profile; Wellbeing; Independence

Objective: This study aimed to determine the effect of Covid-19 and the viability and effects of two multidisciplinary home-based therapeutic programs on the psychomotor profile, balance, well-being, and independence of older people.

Methods: This quasi-experimental pilot study included 16 weeks of Covid-19 confinement without intervention and an eight-week intervention period. During the intervention period, a control group maintained its daily activities. Two experimental (EG1 and EG2) integrated a multidisciplinary therapeutic program, including Psychomotricity, Physiotherapy, and Speech Therapy (EG1: 8 weeks, biweekly; EG2: 8 weeks, once a week). The psychomotor profile, balance, pain, depression, and independence were accessed by Gerontopsychomotor Exam, Berg Scale, Visual Analogic Scale (EVA), Geriatric Depression Scale, and by Lawton and Brody Scale, respectively, at baseline, after 16 weeks of confinement and after the intervention.

Results: The confinement induced significant losses in most study variables ($p<0,05$). The programs were well tolerated. An inversion of the adverse losses induced by Covid-19 confinement, replaced by the maintenance of results in most variables, was observed. EG1 induced significant improvements in the balance ($p<0,05$).

Conclusions: The study shows that multidisciplinary home-based therapeutic programs, including psychomotricity, are viable and beneficial for the maintenance or improvement of the psychomotor profile, balance, well-being, and independence of older people. A frequency of at least twice-week and a duration equal to or greater than eight weeks are recommended for the intervention's effectiveness.

Impact of psychomotor therapy on psychomotor profile and interoceptive body awareness in stroke patients: A multiple case report

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Keywords: Stroke; Rehabilitation; Experimental intervention; Psychomotricity; Intervention programs

Objective: There is a gap in studies focused on the effects of psychomotricity on stroke rehabilitation, although conventional therapies such as physiotherapy have been demonstrated to be beneficial. This study aimed to explore the effects of two psychomotricity interventions on interoceptive body awareness and on the psychomotor profile in stroke patients.

Methods: 45 stroke cases were distributed into two experimental programs (EP1, n: 15 and EP2, n: 15) and a control program (CP, n: 15). The conventional rehabilitation intervention (physiotherapy) was attended by all participants. EP1 added psychomotricity intervention comprising praxis gnosis and global motricity sessions; EP2 added psychomotricity comprising global motricity sessions. All programs lasted 12 weeks (5 sessions/week of 40 minutes). Geronto Psychomotor Exam (EGP), and Multidimensional Assessment of Interoceptive Awareness (MAIA) were used to assess psychomotor profile and interoceptive body awareness, respectively.

Results: Comparison performed by ANOVA repeated measures revealed that the changes induced by the EPs were greater than the changes induced by the CP on EGP scores [EP1=59.6 to 84.4 ($p<.001$) vs. P2=58.4 to 72.4 ($p<.001$) vs. CP=49.9 to 62.8 ($p<.001$)], on MAIA scores [EP1=112.0 to 129.7 ($p<.001$) vs. P2=113.0 to 125.5 ($p<.001$) vs. CP= 76.2 to 78.1 ($p<.001$)].

Conclusions: Study results showed that both psychomotricity programs positively affected stroke patients' psychomotor profile and interoceptive body awareness. Thus, both programs emerged as appropriate therapies for these patients' rehabilitation.

Daphnia magna: a viable, alternative model for Parkinson's research

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Keywords: Acute toxicity; Movement disorders; Parkinson Disease; Protocol optimization

Objective: Despite a high level of toxicity, Paraquat is a widely used herbicide. Respiratory failure is the most severe consequence of acute poisoning, but a mechanistic link was also established to Parkinson's disease (PD). Consequently, paraquat has become a reference neurotoxin used to induce Parkinson's in experimental models, particularly mice. However, given the increasing restriction on the use of mammals in basic research, alternative models for PD research are needed. In line with this, we explored the possibility to use the invertebrate crustacean *Daphnia magna*. In this work we assessed paraquat's acute toxicity to *D. magna*.

Methods: Paraquat acute toxicity was evaluated in *D. magna* neonates using the OECD Protocol No.202, with slight modifications. Neonates with less than 24h were exposed to increasing concentrations of paraquat. After 24 and 48h of exposure, immobilization was evaluated and the EC50 (concentration responsible for 50% immobilization) was calculated. Since one of PD characteristics is movement disorders, daphnids' movement after 24 and 48h was evaluated, and the heartbeat was also monitored.

Results: Overall, the results disclosed large variations in mortality with EC50 values varying widely depending on the age of neonates, from 6.95 ± 1.32 mg.L^{-1} for 2h-old organisms and 10.22 ± 0.13 mg.L^{-1} for 20h-old organisms. The heartbeat was dependent on the paraquat concentrations, with higher heartbeat rates at higher concentrations. An opposite trend was observed in the *Daphnia* movement, with paraquat exposure being responsible for a reduction of movements at higher concentrations.

Conclusions: *Daphnia magna* showed sensitivity to increasing concentrations of Paraquat, as demonstrated by variations of heart frequency and perturbations of movement. However, results showed age-dependent variability. As such, even though the OECD protocol recommends that acute tests should be performed with neonates with less than 24h, our results highlight the need to narrow the age range to ensure reproducibility.

A scoping review of practice recommendations to use virtual reality on pain management in pediatric healthcare settings

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Keywords: Clinical practice, Pain management, Virtual reality

Objective: To generate an overview of available recommendations on how to incorporate virtual reality in clinical practice, recognized as an effective distraction intervention to reduce pain and anxiety in pediatric patients.

Methods: A scoping review was conducted. Two researchers searched PubMed and CINAHL databases, grey literature sources and contact an international researcher expert directly to identify appropriate studies for inclusion. Data on provided clinical implementation of virtual reality in daily practice were extracted (eg, device's management). Recommendations were synthesized to generate a summary of the methods used internationally to develop and implement evidence-based guides for healthcare practitioners.

Results: Sixteen publications were included. After synthesis, four categories of recommendations emerged overarching goals: (a) inclusion criteria to apply virtual reality as a pain management strategy (eg. age groups, clinical protocols), (b) virtual reality devices (eg. equipment system, clinical infection control), (c) clinician preparation (eg. provider's familiarity with and comfort in using the system), and patient preparation (eg. patient safe place).

Conclusions: Evidence studies of virtual reality as a pain management intervention are available, but most lack evidence base about how to do the implementation in clinical practice. For a deeper understanding of virtual reality in organizations more support is needed to assess and manage devices and facilitate the best clinical care. Develop research based on virtual reality scenarios in Portuguese language is warranted.

Physical and tactical performance indicators in U-11, U-13 and U-15 youth football players during small-sided games: A cross-sectional analysis

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Keywords: GPS; Positional Data; Youth Football Players Development

Objective: This study aims to verify differences in physical and tactical performance indicators in youth football players, during a Gk+4vs4+Gk small-sided game (SSG), between U-11, U-13 and U-15 age groups.

Methods: A total of seventy-eight youth football players (n=26 for each age group) from two Portuguese clubs performed a total of eighteen SSG (Gk+4*vs*4+Gk). During two training sessions, the SSG was played in a 40x30m (length x width) pitch with six minutes duration, interspersed with a three-minute recovery period. Positional data were collected with GPS units and subsequently treated and processed to determine physical – distance covered and covered at different displacement intensities – and tactical performance measures – Team areas, length and width, dyadic synchronization, and individual space exploration and stretch index. For the computation of the metrics, the goalkeeper was not considered.

Results: Results revealed significant differences (p<.05) between U-11 compared to U-13, highlighting more distance covered at moderate-speed for U-13 (p= .047 (Cohen's d with 95% of confidence intervals: -0.499 [-0.906; -0.091])). There were also significant differences in the variability in the stretch index – i.e., the average distance from each player to the team's centroid - which was greater in the U-13 (p= .003 (-0.679 [-1.09; -0.267])). The U-11 age group compared to U-15, despite covering less total distance (p<.001 (-1.361 [-1.795; -0.927])), performed more distance in high-speed running (p=.007 (0.637 [0.227; 1.047])). We also find that U-11 have a higher percentage of longitudinal (p<.001 (1.313 [0.961; 1.664])) and lateral (p<.001 (0.967 [0.626; 1.309]) synchronisation between dyads than the older age group. Finally, the U-15 age group covered more distance (p<.001 (-1.184[-1.611; -0.757])) with significant differences (p<.001) in the less intense speed zones (walking, jogging and low-speed running) compared to the U-13. U-15 players also show significant differences in space exploration index (p=.015 (-0.580[-0.989; -0.171])) and stretch index covariance (p= .002 (0.725[0.312; 1.137])).

Conclusions: In conclusion, during SSG, different age groups present specific levels of tactical performance, that may be related to their particular level of development and seems to influence their consequent physical responses.

Is *Pteridium aquilinum* a partner of cancer? Preliminary data from K14-HPV16 transgenic mice

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Keywords: Extract, HPV16, Rodent, Toxicological

Objective: *Pteridium aquilinum* (*PA*) contains a carcinogenic compound called ptaquiloside, capable of promoting cancer induced by human papillomavirus (HPV). Humans are exposed to this compound through the plant ingestion, physical contact with the spores, ingestion of milk and meat from animals fed with the plant, or through contact with contaminated soil and water. Our work aimed to evaluate the effects of *PA* extract in physiological parameters of K14-HPV16 transgenic mice model of HPV.

Methods: The study was authorized by ORBEA and DGAV (014139). Thirty-six female mice aged between 35 and 37 weeks were used. The *PA* extract was freshly prepared every two days and provided in drinking water, for 28 days. Thus, mice were divided into six groups (n=6): Group I (wildtype (WT), control), Group II (WT, 0.05g/ml), Group III (HPV16, control), Group IV (HPV16, 0.0125g/ml), Group V (HPV16, 0.025g/ml), Group VI (HPV16, 0.05g/ml). Body mass, food, and water consumption were recorded. Animal welfare was assessed once a day. At the end of the study, the animals were humanely sacrificed. Data was analyzed using SPSS.

Results: Body weight was higher in WT groups (Groups I and II) when compared with HPV groups (Groups III, IV, V and VI) ($p<0.05$). In general, the water or *PA* extract consumption was higher in transgenic animals. Although no animals reached the critical score that implied their sacrifice, the humane endpoints score was higher in HPV16 animals.

Conclusions: Our results suggest that *PA* extract does not interfere with the mice physiological parameters. More studies are ongoing to better understand the relationship between the *PA* extract and HPV16.

Metal Plasma Levels In Adults With Obesity Undergoing A Weight Loss Dietary Intervention – A Randomized Controlled Trial

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Keywords: Endocrine Disruptors; Essential metals; Obesogens; Priority toxic metals

Objective: To evaluate the impact of plasma levels of 15 different metals in weight loss and metabolic-inflammatory status in adults with obesity undergoing a 12-week dietary intervention for weight loss.

Methods: Data and biological samples were collected from a clinical trial (NCT02169778) conducted in Norwegian adults (78% women; mean age: 39.7 ± 9.8 years) with obesity (mean BMI: 35.2 ± 3.7 kg/m^2). Plasma levels of metals were measured by inductively coupled plasma mass spectrometry and it was determined their reference values at P95th percentile. Plasma inflammatory cytokines were measured by flow cytometry.

Results: Metals were present in all participant's samples (n=27). At baseline, essential metals selenium, molybdenum and zinc were below the reference values, while the non-essential metals antimony, beryllium, and nickel were above them. After weight loss, there were significant increases in the plasma levels of ∑essential metals (22.42 vs. 23.51 mg/L, P=0.004). Higher median priority toxic metal levels (cadmium, lead and mercury) at baseline were associated with lower cholesterol HDL (Rs= -0.478, P=0.012) and lower weight loss percentage (Rs= -0.491, P=0.009). There was no association between priority toxic metal plasma levels at baseline and inflammatory markers after weight loss.

Conclusions: This study allows us to confirm that exposure to metals is unavoidable since their ubiquitous distribution. Our results highlight two critical issues that could be relevant not only for the development of obesity but also to be included in obesity treatment strategies: the improvement of essential metal levels and the decrease of exposure to non-essential and priority toxic metals. Raising public awareness about exposure to environmental pollutants and the identification of measures to mitigate this exposure must remain a priority.

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