



COMPREHENSIVE HEALTH  
RESEARCH CENTRE

5th CHRC ANNUAL  
SUMMIT

Sept 23 & 24  
2024 | Évora



# Book of abstracts of the 5th CHRC Annual Summit

## Abstracts

Évora, Portugal, September 23 and 24, 2024

---

### Editorial Board

*Jorge Bravo:* Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal. (jorgebravo@uevora.pt)

*Rute Dinis de Sousa:* NOVA Medical School, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC) Universidade NOVA de Lisboa (NMS/UNL), Lisboa, Portugal. (rute.sousa@nms.unl.pt)

*Gabriela Almeida:* Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal. (gsna@uevora.pt)

*Dulce Cruz:* Escola Superior de Enfermagem São João de Deus, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal. (dcruz@uevora.pt)

*Otilia Zangão*: Escola Superior de Enfermagem São João de Deus, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal. (otiliaz@uevora.pt)

*Bruno Gonçalves*: Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal. (bgoncalves@uevora.pt)

*Rui Raimundo*: Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal. (rjcr@uevora.pt)

*Nadiya Bocharova*: Comprehensive Health Research Centre (CHRC), Universidade NOVA de Lisboa, Lisboa, Portugal. (nadiya.bocharova@nms.unl.pt)

*Andreia Santos*: Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal. (andrea.santos@uevora.pt)

*Lúcia Domingues*: NOVA Medical School, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC) Universidade NOVA de Lisboa (NMS/UNL), Lisboa, Portugal. (lucia.domingues@nms.unl.pt)

*Margarida Santos Dias*: Institute of Global Mental Health, Lisbon, Portugal. Comprehensive Health Research Centre (CHRC), Lisbon, Portugal. (margarida.dias@nms.unl.pt)

*Ana Rita Pedro*: National School of Public Health, Public Health Research Centre, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC), National School of Public Health, Lisboa, Portugal. (rita.pedro@ensp.unl.pt)

*Hugo Folgado*: Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal. (hfolgado@uevora.pt)

*Armando Raimundo*: Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal. (ammr@uevora.pt)

Contact editor

*Jorge Bravo* (jorgebravo@uevora.pt)

Executive Committee Members

*Ana Rodrigues*

*Armando Raimundo*

*Helena Canhão*

*Rute Dinis de Sousa*

*Sónia Dias*

Scientific Committee Members (Reviewers)

*Ana Gama:* National School of Public Health, Public Health Research Centre, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC), National School of Public Health, Lisboa, Portugal.

*Ana Isabel Morais:* Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal.

*Ana Rita Goes:* National School of Public Health, Public Health Research Centre, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC), National School of Public Health, Lisboa, Portugal.

*Bárbara Gonçalves:* National School of Public Health, Public Health Research Centre, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC), National School of Public Health, Lisboa, Portugal.

*Bárbara Mendes:* NOVA Medical School, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC), Universidade NOVA de Lisboa, Lisboa, Portugal.

*Bruno Figueira:* Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal.

*César Fonseca:* Escola Superior de Enfermagem São João de Deus, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal.

*Joana Alves:* National School of Public Health, Public Health Research Centre, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC), National School of Public Health, Lisboa, Portugal.

*Lara Pinho:* Escola Superior de Enfermagem São João de Deus, Universidade de Évora, Évora, Portugal. Comprehensive Health Research Centre (CHRC), Universidade de Évora, Évora, Portugal.

*Luís Gomes:* NOVA Medical School, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC), Universidade NOVA de Lisboa, Lisboa, Portugal.

*Marta Silvestre:* NOVA Medical School, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC), Universidade NOVA de Lisboa, Lisboa, Portugal.

*Nuno Neuparth:* NOVA Medical School, Universidade NOVA de Lisboa, Lisboa, Portugal. Comprehensive Health Research Centre (CHRC), Universidade NOVA de Lisboa, Lisboa, Portugal.

---

## Disclosure Statement

The authors and editorial board elements declare no conflict of interest.

## Funding

This work is funded by national funds through the Foundation for Science and Technology, under the project UIDB/04923/2020.

S. Karger  
Medical and Scientific Publishers

### Disclaimer

The statements, opinions and data contained in this publication are solely those of the individual authors and contributors and not of the publisher and the editor(s). The appearance of advertisements in the journal is not a warranty, endorsement, or approval of the products or services advertised or of their effectiveness, quality or safety. The publisher and the editor(s) disclaim responsibility for any injury to persons or property resulting from any ideas, methods, instructions or products referred to in the content or advertisements.

### Drug Dosage

The authors and the publisher have exerted every effort to ensure that drug selection and dosage set forth in this text are in accord with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions. This is particularly important when the recommended agent is a new and/or infrequently employed drug.

### All rights reserved.

No part of this publication may be translated into other languages, reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, microcopying, or by any information storage and retrieval system, without permission in writing from the publisher or, in the case of photocopying, direct payment of a specified fee to the Copyright Clearance Center (see 'General Information').

© Copyright 2024 NOVA National School of Public Health  
Published by S. Karger AG, Basel,  
P.O. Box, CH-4009 Basel (Switzerland)

### Postural control in retired & pre-retired before and after 12 weeks of sensorimotor training

Carolina A. Cabo<sup>1,2,3,4</sup>, José A. Parraca<sup>1,2</sup>, Sara Santos<sup>1,2</sup>,  
Mário C. Espada<sup>2,3,4,5,6</sup>, Orlando Fernandes<sup>1,2</sup>

<sup>1</sup>Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Largo dos Colegiais 2, 7000-645 Évora, Portugal; <sup>2</sup>Comprehensive Health Research Centre (CHRC), University of Évora, Largo dos Colegiais 2, 7000-645 Évora, Portugal; <sup>3</sup>Instituto Politécnico de Setúbal, Escola Superior de Educação, 2914-504 Setúbal, Portugal; <sup>4</sup>Sport Physical Activity and Health Research & Innovation Center (SPRINT), 2040-413 Rio Maior, Portugal; <sup>5</sup>Life Quality Research Centre (CIEQV), Setúbal, Portugal; <sup>6</sup>CIPER, Faculdade de Motricidade Humana, Universidade de Lisboa, 1499-002 Lisboa, Portugal

**Keywords:** aging; balance; biomechanics; center of pressure; risk of falls; postural control

**Objective:** Maintaining balance and body orientation in humans depends on the proper functioning of the postural control system. This study aimed to evaluate the sensitivity of center of pressure (COP)-based measures to age-related changes in postural stability.

**Methods:** We analyzed 44 participants aged between 55 and 80 years. They were divided into two groups: a Control group (CG) and an Exercise group (EG). Various measures of postural stability were assessed under both open and closed-eye conditions. The intervention lasted six months, with sessions twice a week, involving six circuits of eight physical exercises. The difficulty of the exercises increased progressively, with alternatives provided for participants as needed. Preprocessing was performed using the EEGLAB toolbox, which is available for use in matlab (the mathworks inc., natick, ma). Descriptive statistics for the intervention and control groups were then generated using Jamovi (Desktop version 2.5.2.0). Normality was assessed using the Shapiro-Wilk test. Additionally, we performed T tests (Student's t) for paired samples. We then tested the variables using ANOVA (ANCOVA), which allowed us to investigate the significant effects of the variables under study. We also applied Estimation Statistics with Confidence Intervals to two groups on all variables that showed significant results.

**Results:** The measurements showed statistically significant differences in linear variables, specifically in the total excursion (TOTEXAP\_EO). For non-linear variables, significant differences were found in the anteroposterior position with both eyes open (SaEnAP\_EO2) and eyes closed (SaEnAP\_EC2).

**Conclusions:** Regarding the COP-based measures, the EG demonstrated improvements compared to the CG. Both groups showed significant improvements, indicating the effectiveness in

measuring and enhancing postural stability. COP-based measures are sensitive indicators of age-related changes in postural stability and can effectively capture improvements in balance.

### Body Composition, Physical Activity and Health-related Quality of Life throughout Aging

Carolina A. Cabo<sup>1,2,3,4</sup>, Orlando Fernandes<sup>1,2</sup>, Mário C. Espada<sup>2,3,4,5,6</sup>,  
Pablo Tomas-Carus<sup>1,2</sup>, José A. Parraca<sup>1,2</sup>

<sup>1</sup>Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Largo dos Colegiais 2, 7000-645 Évora, Portugal; <sup>2</sup>Comprehensive Health Research Centre (CHRC), University of Évora, Largo dos Colegiais 2, 7000-645 Évora, Portugal; <sup>3</sup>Instituto Politécnico de Setúbal, Escola Superior de Educação, 2914-504 Setúbal, Portugal; <sup>4</sup>Sport Physical Activity and Health Research & Innovation Center (SPRINT), 2040-413 Rio Maior, Portugal; <sup>5</sup>Life Quality Research Centre (CIEQV), Setúbal, Portugal; <sup>6</sup>CIPER, Faculdade de Motricidade Humana, Universidade de Lisboa, 1499-002 Lisboa, Portugal

**Keywords:** body composition, older people, physical activity, quality of life, questionnaire

**Objective:** This study aims to evaluate body composition (BC), physical activity (PA) and health-related quality of life throughout the aging process. Increased morbidity and mortality are linked to age-related changes in body composition. Keeping up an active lifestyle has a favorable impact on BC and is a major sign of healthy aging. The World Health Organization has established activity guidelines for all age groups to emphasize this point. For the elderly, it is recommended to weekly engage in at least 150 minutes of moderate physical activity (PA) or 75 minutes of vigorous PA.

**Methods:** This study analysed data from 124 participants, 46 in the exercise group (EG) and 78 in the control group (CG), including both men and women aged between 65 and 80 years old. The PA levels were measured using the International Physical Activity Questionnaire. Moreover, mental activity was assessed using the Physical Activity Enjoyment Scale, and the quality of life was evaluated using the SF-36 questionnaire. Body composition, PA, and health-related quality of life were measured at baseline and after 12 weeks of physical training.

**Results:** After the intervention program, both the EG and CG showed reductions in body composition. Statistically significant differences were found in walking activity (minutes per week), with an effect size of  $\eta^2 = 0.148$  and  $p = 0.022$ .

**Conclusions:** Both groups showed improvements in body composition, physical activity, and quality of life after the 12-week

training period. However, the EG demonstrated significantly greater improvements compared to the CG, even though the overall changes were not significant for most of the studied variables.

## Body Image and Suicidal Ideation in Portuguese Adolescents: The Mediating Effect of Internalized Psychopathology

Rui C. Campos<sup>1,2</sup>, Alexandre André<sup>1</sup>

<sup>1</sup>Departamento de Psicologia, Escola de Ciências Sociais, Universidade de Évora; <sup>2</sup>Comprehensive Health Research Center

**Keywords:** Suicidal Ideation; Body Image; Adolescents; Internalized Psychopathology

**Objective:** This study aims to contribute to the understanding of the relationship between body image and suicidal ideation in adolescents by testing a mediating effect of internalized psychopathology.

**Methods:** A sample of 248 high school students (47.2% boys) aged between 15 and 20 years (8.4%  $\geq$  18) from a school cluster in Alentejo participated and was collected in the year of 2022. A mediation model was tested using Structural Equation Modeling (SEM), introducing positive body image (PBI) as the independent variable, as well as demographic variables that correlated with suicidal ideation as covariates. A latent variable (internalized psychopathology) with four indicators: anxiety, phobic anxiety, depression, and interpersonal sensitivity, was specified as the mediating variable, and suicidal ideation was introduced as the dependent, endogenous variable. **Results:** A significant negative direct effect of PBI on internalized psychopathology and a positive effect of internalized psychopathology on suicidal ideation were found. An indirect effect of the PBI variable on suicidal ideation was also observed. In a model without the mediating variable, PBI showed a significant relationship with suicidal ideation.

**Conclusions:** The results demonstrate a full mediation effect of the internalized psychopathology variable in the relationship between PBI and suicidal ideation, suggesting that this dimension may help explaining the relationship between body image and suicidal ideation. Despite limitations, notably the cross-sectional design, this study contributes to the scientific field of clinical psychology by helping to understand adolescent suicidal ideation in the context of psychopathological functioning.

## Effect of the Heart Pillow on the functionality of the homolateral upper limb after treatment: perception of Breast cancer patients

José Moreira<sup>1,2</sup>, Maria J. Bule<sup>1</sup>, Paula Sousa<sup>3</sup>, Carmelinda Talhinhos<sup>3</sup>, Sofia Braga<sup>3</sup>, Isabel Bico<sup>1,4</sup>

<sup>1</sup>Nursing Department, Universidade de Évora, Évora, Portugal;

<sup>2</sup>Comprehensive Health Research Centre, National School of Public Health, Lisbon, Portugal; <sup>3</sup>Hospital do Espírito Santo de Évora, ULS Alentejo Central, Évora, Portugal; <sup>4</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal

**Keywords:** Breast neoplasms; Heart Pillow; Prehabilitation; Rehabilitation; Upper Limb

**Objective:** Analyze the effect of the Heart Pillow (HP) on the reported functionality of the ipsilateral upper limb of patients with breast cancer undergoing mastectomy in adjuvant treatment (chemotherapy and/or radiotherapy). Research question: What is the perceived benefit of using the HP on the functionality of the homolateral upper limb in breast cancer patients undergoing adjuvant treatment?

**Methods:** Longitudinal, retrospective, descriptive-correlational study. All adult and elderly participants from the Hospital Day Chemotherapy service (n=93) with breast cancer who underwent adjuvant treatment and had HP between January 2017 and June 2023 were included. The study protocol was submitted to the Ethics Committee of ULSAC Hospital do Espírito Santo de Évora and was approved (nº.042/23). Data was collected using a semi-structured interview, after accepted informed consent, with a script previously tested on a population with the same characteristics as the study. The data was analyzed using descriptive statistics, bivariate and inferential analysis (significance level  $\alpha=0.05$ ) through IBM SPSS Statistics 29.

**Results:** Most of the sample were women, with an average age of 58.82 (sd $\pm$ 11.04) years, and 67.7% living in urban areas. The most representative group attended secondary school (n=35) and only 9 participants had higher education qualifications. Around 92% of the participants who used HP reported an improvement in the comfort of the homolateral upper limb after adjuvant treatment. A binomial test showed that the participants' perception of telephone use improved significantly ( $\alpha=0.05$ ;  $p=0.001$ ). After healing following treatment with surgery (n=85), there was unanimous agreement that HP had a positive effect on the functionality of the homolateral upper limb, and 96.5% benefited from postural correction ( $p=0.0001$ ).

**Conclusions:** A high number of participants praised the benefits of HP in managing the symptoms of breast cancer patients undergoing adjuvant treatment, particularly in optimizing the functionality of the homolateral upper limb and preventing postural changes.

## Effect of the Heart Pillow on the perception of Breast cancer patients: A Retrospective Longitudinal Study

Maria J. Bule<sup>1</sup>, Isabel Bico<sup>1,2</sup>, Carmelinda Talhinhos<sup>3</sup>, Paula Sousa<sup>3</sup>, José Moreira<sup>1,4</sup>

<sup>1</sup>Nursing Department, Universidade de Évora, Évora, Portugal;

<sup>2</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>3</sup>Hospital do Espírito Santo de Évora, ULS Alentejo Central, Évora, Portugal; <sup>4</sup>Comprehensive Health Research Centre, National School of Public Health, Lisbon, Portugal

**Keywords:** Breast neoplasms; Heart Pillow; Pain Management; Prehabilitation; Rehabilitation

**Objective:** It is essential to innovate in the specialized nursing care provided to people with breast cancer in a chemotherapy service, focused on well-being, the level of self-care recovery, symptom management, and prevention of complications. The aim is to analyze the effect of the Cardiac Pillow (HP) on patients with breast cancer undergoing adjuvant treatment, identifying the results of its use in pain management and perception. Research question: What are breast cancer patients' perceptions of the use of HP in the pre and/or post-surgery period?

**Methods:** Longitudinal, retrospective, descriptive-correlational study. Participants included (n=93) adults and elderly people with breast cancer who underwent adjuvant treatment and had HP between January 2017 and June 2023. The study protocol was submitted to the Ethics Committee of ULSAC Hospital do Espírito Santo de Évora and was approved (nº.042/23). Data was collected using a semi-structured interview, after accepted informed consent, with a script previously tested on a population with the same characteristics as the study. The data was analyzed using descriptive statistics, bivariate and inferential analysis (significance level  $\alpha = 0.05$ ) through IBM SPSS Statistics 29.

**Results:** A predominance of female participants (n=91), with a mean age of 58.82 (sd±11.04) years, and 57% included in the 50-70 age group. In terms of disease history, the largest number of participants had undergone surgery 1 year previously (n=21), with a prevalence of breast-conserving surgery (n=49) and a surgical approach without lymph node dissection (n=48). The average duration of chemotherapy treatment was 6.47 months (sd±4.79), and 85.1% underwent radiotherapy. There was no relationship between age and treatment period ( $r=0.117$ ;  $p=0.272$ ). When HP was used before surgery, the majority reported a positive effect on pain mitigation, regardless of the type of surgery.

**Conclusions:** The use of HP contributes to symptom control in breast cancer patients undergoing adjuvant treatment, particularly in terms of pain management, and preventing postural disorders that could compromise functionality.

## Can a psychomotor intervention enhance attention and balance impairments in community-dwelling older adults?

Hugo Rosado<sup>1,2</sup>, Jorge Bravo<sup>1,2</sup>, Armando Raimundo<sup>1,2</sup>, Joana Carvalho<sup>3,4</sup>, Catarina Pereira<sup>1,2</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Évora, Portugal; <sup>3</sup>CIAFEL - Research Centre in Physical Activity, Health and Leisure, Porto, Portugal; <sup>4</sup>Faculdade de Desporto, Universidade do Porto, Porto, Portugal

**Keywords:** Aging; Cognition; Falls; Physical function

**Objective:** Age-associated changes in physical and cognitive functions are linked to falls. Specifically, attention and balance impairments are considered risk factors for falls, and it is recommended to include these components in fall prevention programs. Psychomotor intervention, which uses the body and movement as mediators through neurocognitive and sensorimotor stimulation, has shown promising results in addressing the fall risk factors. This study aimed to investigate the effects of a 12-week psychomotor intervention on attention and balance in community-dwelling older adults at risk of falling.

**Methods:** Eighteen older adults (74.1 ± 5.3 years old; F: 16, M: 2) performed a psychomotor intervention program. Attention and balance were assessed using the d2 Test of Attention (n) and the short version (5-item) of the Fullerton Advanced Balance scale (points), respectively. The Wilcoxon test was used for statistical analysis.

**Results:** Significant within-group improvements were found at post-intervention in attention (items recognized correctly: 95.8 ± 26.8 vs. 105.6 ± 33.4,  $p=0.020$ ,  $r=0.39$ ; total efficacy: 235.3 ± 68.9 vs. 261.2 ± 83.6,  $p=0.017$ ,  $r=0.40$ ; concentration index: 89.8 ± 31.1 vs. 100.4 ± 37.3,  $p=0.019$ ,  $r=0.39$ ) and balance (9.8 ± 3.9 vs. 13.9 ± 3.5,  $p<0.001$ ,  $r=0.61$ ). The effect size ranged from small to medium in attention and was large in balance.

**Conclusions:** Our results suggested that the psychomotor intervention was effective by inducing enhancements in attention and balance, crucial factors in fall risk reduction among older adults. These findings highlight the potential of incorporating psychomotor interventions into fall prevention programs, offering a promising approach to enhance safety for community-dwelling older adults. Moreover, the reduction in fall risk could lead to decreased healthcare and social costs.

## SARS-CoV-2 serological 6-months follow-up study of a hospital-based cohort of healthcare workers following 2023 COVID-19 vaccination program

João Almeida Santos<sup>1-3</sup>, Vânia Gaio<sup>1-3</sup>, Palmira Amaral<sup>4</sup>, Camila Henriques<sup>5</sup>, Raquel Guiomar<sup>5</sup>, Ausenda Machado<sup>1</sup>

<sup>1</sup>Epidemiology Department, National Health Institute Dr. Ricardo Jorge, Lisboa, Portugal; <sup>2</sup>Public Health Research Centre, National School of Public Health, NOVA University of Lisbon, Lisbon, Portugal; <sup>3</sup>Comprehensive Health Research Centre, NOVA University of Lisbon, Lisbon, Portugal; <sup>4</sup>Centro Hospitalar e Universitário de Tondela Viseu (Unidade Local de Saúde Viseu Dão Lafões), Viseu, Portugal; <sup>5</sup>Infectious Diseases Department, National Health Institute Dr. Ricardo Jorge, Lisboa, Portugal

**Keywords:** SARS-CoV-2 spike protein, Antibodies, Vaccines, Public Health

**Objective:** Healthcare workers (HCWs) have a higher risk of SARS-CoV-2 infection due to their direct contact with patients. On the other hand, they can also act as a source of in-hospital transmission. We assessed SARS-CoV-2 serological status of HCWs at a Portuguese central hospital before vaccination, three and six months after the 2023 COVID-19 booster vaccination program.

**Methods:** We conducted a serological follow-up study among a cohort of HCWs from a Portuguese central hospital, with three rounds of testing: pre-COVID-19 vaccination (September/October 2023), three months (January/February 2024), and six months (April/May 2024) post-vaccination. During follow-up, only participants who underwent pre-vaccination serology and were vaccinated were included.

SARS-CoV-2 spike receptor-binding domain (anti-RBD/S) protein-specific IgG antibodies were measured (upper limit of detection 40000 AU/mL). Descriptive statistics and Pearson Chi-Square test analysis were performed.

**Results:** All participants (n=177, median age: 47 years, 77,4% females) had the complete primary COVID-19 vaccination with 78,0% having received 2 additional booster doses prior to 2023 vaccination program. At pre-vaccination, all HCWs had anti-RBD/S IgG antibodies with 11,9% (n=21) presenting a concentration >40000 AU/mL. Three months later, 35,0% HCWs (n=62) underwent retesting, with 40,3% presenting anti-RBD/S IgG antibody concentrations >40000 AU/mL. After six months, 26,6% HCWs (n=47) repeated testing, with 21,3% (n=10) having antibody concentrations >40000 AU/mL. The differences in anti-RBD/S IgG antibody concentrations between the three rounds of testing were significant.

**Conclusions:** Three months post-COVID-19 2023 autumn vaccination, an increase in the concentration of anti-RBD/S antibodies was identified among HCW, but after six months this concentration decreased. These results are in line with the expected decay of antibodies over time after 3 months of vaccination and reinforce the importance of revaccination in HCWs.

## Serological evidence of SARS-CoV-2 infection in a hospital-based cohort study of healthcare workers following the 2023 COVID-19 vaccination program

João Almeida Santos<sup>1-3</sup>, Vânia Gaio<sup>1-3</sup>, Palmira Amaral<sup>4</sup>, Camila Henriques<sup>5</sup>, Raquel Guiomar<sup>5</sup>, Ausenda Machado<sup>1</sup>

<sup>1</sup>Epidemiology Department, National Health Institute Dr. Ricardo Jorge, Lisboa, Portugal; <sup>2</sup>Public Health Research Centre, National School of Public Health, NOVA University of Lisbon, Lisbon, Portugal; <sup>3</sup>Comprehensive Health Research Centre, NOVA University of Lisbon, Lisbon, Portugal; <sup>4</sup>Centro Hospitalar e Universitário de Tondela Viseu (Unidade Local de Saúde Viseu Dão Lafões), Viseu, Portugal; <sup>5</sup>Infectious Diseases Department, National Health Institute Dr. Ricardo Jorge, Lisboa, Portugal

**Keywords:** SARS-CoV-2 nucleocapsid protein, Antibodies, hospital-acquired infection, Public Health

**Objective:** Healthcare workers (HCWs) are a high-risk population to acquire SARS-CoV-2 infection and becoming a focus of transmission. It is therefore important to monitor these professionals, especially due to asymptomatic infections. The objective the study was to assess SARS-CoV-2 infection rates in healthcare professionals at a central Portuguese hospital using serological tests, three and six months after the 2023 COVID-19 booster vaccination program.

**Methods:** A prospective cohort study was established through serological follow-up in a cohort of healthcare professionals from a central Portuguese hospital, with three rounds of tests: pre-COVID-19 vaccination (September/October 2023), 3 months (January/February 2024) and 6 months (April/May 2024) post-vaccination. IgG antibodies specific to the SARS-CoV-2 nucleocapsid protein (anti-N) were measured. Data was analyzed through descriptive statistics (frequency, mean, percentages) and infection rates at each testing moment (0, 3 and 6 months).

**Results:** At baseline, all participants (n=177, median age: 47years, 77,4% females) had the complete primary COVID-19 vaccination, with 78% having received 2 additional booster doses prior to 2023 vaccination program. Pre-vaccination, 48,6% (86/177) of HCWs had detectable anti-N IgG antibodies, of which 24,4% (21/86) self-reported having had a SARS-Cov-2 infection in 2022/2023. After 3 months, 17,7% (n=11/62) had detectable anti-N IgG antibodies although being negative in the pre-vaccination testing. After 6 months, 4,3% (n=2/47) had detectable anti-N IgG antibodies but were negative in the previous two rounds.

**Conclusions:** During the study period, several cases of SARS-CoV-2 infection (n=13) were identified serologically among the HCW monitored, without concomitant signs and symptoms that would allow the identification of a potential infection. These results support that monitoring the infection among HCW (regardless of history of symptoms) can provide valuable information for assessing the level of exposure among hospital personnel and identifying high-risk departments. This information could allow early intervention by, for example, reminding and reinforcing the importance of personal protection standards for HCWs.

---

## Use of Artificial Intelligence tools in supporting decision-making in hospital management

Maurício Alves<sup>1,2</sup>, Joana Seringa<sup>2,3</sup>, Tatiana Silvestre<sup>4</sup>,  
Teresa Magalhães<sup>2,3</sup>

<sup>1</sup>Unidade Local de Saúde de Coimbra, Coimbra, Portugal;

<sup>2</sup>NOVA National School of Public Health, NOVA University Lisbon, Lisbon, Portugal; <sup>3</sup>NOVA National School of Public Health, Public Health Research Centre, Comprehensive Health Research Center, CHRC, NOVA University Lisbon, Lisbon, Portugal;

<sup>4</sup>Unidade Local de Saúde da Lezíria, Santarém, Portugal

**Keywords:** Artificial Intelligence; Decision Making; Digital Transformation; Hospital Management

**Objective:** The integration of Artificial Intelligence (AI) tools in hospital management holds potential for enhancing decision-making processes. This study investigates the current state of decision-making in hospital management, explores the potential benefits of AI integration, and examines hospital managers' perceptions of AI as a decision-support tool.

**Methods:** A descriptive and exploratory qualitative study was conducted with semi-structured interviews of 15 hospital managers from different departments and institutions, with varying years of experience. The interviews were transcribed, anonymized, and analyzed using thematic coding to identify and interpret key themes and patterns in the participants' responses.

**Results:** Hospital managers highlighted the current inefficiencies in decision-making processes, often characterized by poor communication, isolated decision-making, and limited data access. The use of traditional tools like spreadsheet applications and business intelligence systems remains prevalent, but there is a clear need for more advanced, integrated solutions. Managers expressed both optimism and skepticism about AI, acknowledging its potential to improve efficiency and decision-making while raising concerns about data privacy, ethical issues, and the loss of human empathy. The study identified key challenges, including the variability in technical skills, data fragmentation, and resistance to change. Managers emphasized the importance of robust data infrastructure and adequate training to ensure successful AI integration.

**Conclusions:** The study reveals a complex landscape where the potential benefits of AI in hospital management are balanced with significant challenges and concerns. Effective integration of AI requires addressing technical, ethical, and cultural issues, with a focus on maintaining human elements in decision-making. AI is seen as a powerful tool to support, not replace, human judgment in hospital management, promising improvements in efficiency, data accessibility, and analytical capacity. Preparing healthcare institutions with the necessary infrastructure and providing specialized training for managers are crucial for maximizing the benefits of AI while mitigating associated risks.

---

## AlenRiscos Observatory - Monitoring psychoactive substances consumption among 3<sup>rd</sup> cycle students in Alentejo region

Ana Dias<sup>1,2</sup>, Ermelinda Caldeira<sup>1,2</sup>, Leonel Lusquinhos<sup>2</sup>,  
Anabela Coelho<sup>1,2</sup>, Margarida Goes<sup>1,2</sup>, Manuel Lopes<sup>1,2</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Departamento de Enfermagem, Universidade de Évora, Évora, Portugal

**Keywords:** Adolescence; Addictive Behaviors; Prevention

**Objective:** Worldwide, various studies have shown a worrying prevalence of tobacco, alcohol, and psychoactive substance use among young people, starting at an increasingly younger age. This scenario highlights the urgent need to deepen our understanding of this phenomenon and implement intervention strategies for this age group. In this context, the ALENRISCOS Observatory has emerged as a critical resource for analyzing and monitoring adolescent consumption patterns in the Alentejo region. Aim: This study aims to assess the prevalence and factors associated with tobacco, alcohol, and other psychoactive substance use among 7th and 9th-grade students in the Alentejo region.

**Methods:** An observational study surveyed 12,767 students from public and private educational institutions from the “Ensino Básico” 3rd cycle. Data collection and subsequent analysis focused on tobacco, alcohol, and psychoactive substance use, providing a detailed examination of addictive behaviors in this population.

**Results:** This study uncovered a decline in tobacco and alcohol use among adolescents in Alentejo, with a more significant decline in tobacco consumption from 19.5% in 2019/2020 to 12.2% in 2021/2022. This decline occurred simultaneously with the COVID-19 pandemic lockdown period, thus highlighting the significant role of the social environment. However, a noticeable increase in glue, varnish, and solvent consumption was observed, exceeding cannabis/hashish consumption. This fact underscores the urgent need to draw special attention to potentially harmful alternative consumption patterns among students.

**Conclusions:** The results reinforce the demand for prevention and education strategies tailored to the needs of young people to reduce the prevalence of addictive behaviors and their adverse effects on long-term health. The need for early and targeted interventions is highlighted as a vital strategy for mitigating the risks associated with tobacco, alcohol, and psychoactive substance use among adolescents.

---

## Effects of Telemonitoring on Self-Care and Quality of Life in Adults with Heart Failure: A Systematic Review

Telmo Pequito<sup>1</sup>, Maria Marques<sup>1,2</sup>, Margarida Goes<sup>1,2</sup>, Henrique Oliveira<sup>1,3,4</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Departamento de Enfermagem, Universidade de Évora, Évora, Portugal; <sup>3</sup>Instituto de Telecomunicações, Aveiro, Portugal; <sup>4</sup>Instituto Politécnico de Beja, Beja, Portugal

**Keywords:** Heart Failure; Nursing Care; Quality of Life; Self-Care; Telemonitoring

**Objective:** This study gathered the most up-to-date evidence on the contribution of home telemonitoring programs in promoting self-care, quality of life, and clinical condition management in heart failure (HF) patients.

**Methods:** A systematic literature review was conducted following PRISMA guidelines. The project was registered on PROSPERO (CRD42022303773). Searches covered MEDLINE, CENTRAL, and CINAHL databases. Two independent reviewers selected studies, examining titles, abstracts, and keywords. Conflicts were resolved by a third reviewer. Full texts of selected articles were evaluated, and a PRISMA flowchart summarized the screening results. Risk of bias and certainty of evidence were assessed using the Cochrane risk of bias tool and GRADE system.

**Results:** The following Boolean expression was used, assuming the PICO strategy: (“adult” OR “Age Factors” OR “middle age”) AND (“Self-care” OR “Activities of Daily Living” OR “Community Living”) AND (“Health Promotion” OR “Wellness” OR “Nursing Outcomes”) AND (“Heart Failure” OR “Cardiac Insufficiency”). Data analysis showed statistically significant benefits in self-care behavior and quality of life among HF patients in telemonitoring programs. Self-care and quality of life scores were higher in telemonitoring groups compared to control groups, at all included studies. Additionally, positive relationship was found between telemonitoring and improvements in clinical status and disease self-management.

**Conclusions:** The systematic review mapped current evidence on nursing interventions promoting self-care in adults with HF. Evidence indicates that telemonitoring programs significantly increase self-care capacity and empower HF patients to manage the disease autonomously, improving quality of life. The findings support integrating personalized telemonitoring solutions into HF patient care. Future studies should explore optimized, patient-centered telemonitoring programs.

---

## DESIROUS: A New Protocol to Evaluate Binocular Vision and Ocular Surface in Digital Eye Strain Syndrome

Maria João Barata<sup>1-4</sup>, Pedro Aguiar<sup>4,5</sup>, Carla Lança<sup>3,4</sup>, André Moreira-Rosário<sup>6-8</sup>

<sup>1</sup>Unidade Local de Saúde de São José, Lisbon, Portugal; <sup>2</sup>University of Evora, Evora, Portugal; <sup>3</sup>Escola Superior de Tecnologia da Saúde de Lisboa (ESTeSL), Instituto Politécnico de Lisboa, Lisbon, Portugal; <sup>4</sup>Comprehensive Health Research Center, Escola Nacional de Saúde Pública, NOVA University of Lisbon, Lisbon, Portugal; <sup>5</sup>Escola Nacional de Saúde Pública, NOVA University of Lisbon, Lisbon, Portugal; <sup>6</sup>NOVA Medical School, Faculdade de Ciências Médicas, NMS, FCM, Universidade NOVA de Lisboa, Lisboa, Portugal; <sup>7</sup>CINTESIS@RISE, NOVA Medical School, Faculdade de Ciências Médicas, NMS, FCM, Universidade NOVA de Lisboa, Lisboa, Portugal; <sup>8</sup>Comprehensive Health Research Center, NOVA Medical School, Faculdade de Ciências Médicas, NMS, FCM, Universidade NOVA de Lisboa, Lisboa, Portugal

**Keywords:** Accommodation; Convergence; Dry eye; Health Occupations; Orthoptic

**Objective:** The DESIROUS protocol was developed with the objective of standardizing the assessment of binocular vision and ocular surface in Digital Eye Strain Syndrome (DESS). DESS is caused by prolonged use of digital devices. While some observational studies have investigated the relationship between DESS and changes in binocular vision and ocular surface, the diverse assessment methods employed make comparisons between studies difficult.

**Methods:** The study incorporates three questionnaires: Computer Vision Syndrome Questionnaire, Convergence Insufficiency Symptom Survey and Dry Eye Questionnaire-5 were translated into Portuguese and subsequently validated. The protocol includes assessments of visual acuity, motor and sensory aspects of binocular vision (cover test, stereopsis and measurements of the near point of convergence and accommodation, fusional vergence and accommodative flexibility) and ocular surface (tear break up time test). Data collection instruments were validated in a pilot study. Three hundred higher education students from a polytechnic school in Lisbon will be recruited. The sample size was based on a 76.6% prevalence of DESS in Spanish university students, ensuring a margin of error under 5%.

**Results:** The sample consisted of 18 students (participation rate 69.2%) of health technologies in Portugal (average age 21.5±0.618 years). The feedback from the participants was unanimous in affirming the appropriate length and ease of interpretation of the questionnaires. A total of 16.7% of participants declined further contact. Consequently, 10 students from the remaining participants were randomly selected to complete the entire assessment protocol, with an average duration of 25 minutes. This was found to be an appropriate length by all students.

**Conclusions:** DESIROUS has been designed for use in both research and clinical settings, with the aim of facilitating accurate diagnoses and targeted interventions. This should result in improvements in the management of DESS and an enhancement of patients' quality of life.

## Innovative Medicines: An Analysis of EMA Approvals from the Perspective of Active Substances

Paula Costa<sup>1-3</sup>, Ana Margarida Advinha<sup>1,4,5</sup>,  
Sofia de Oliveira-Martins<sup>1,2</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, 7000-811 Évora, Portugal; <sup>2</sup>Faculty of Pharmacy of University of Lisbon, 1649-003 Lisboa, Portugal; <sup>3</sup>APIFARMA, Associação Portuguesa da Indústria Farmacêutica, Av. Dom Vasco da Gama, nº 34 1400-128 Lisboa, Portugal; <sup>4</sup>Department of Health and Medical Sciences, School of Health and Human Development, University of Evora, 7000-671 Évora, Portugal; <sup>5</sup>Pharmacovigilance Regional Unit of the Central and North Alentejo, University of Évora, Portugal

**Keywords:** Innovative medicines, Advanced Therapy Medicinal Products, Regulatory affair, Patient Access

**Objective:** To analyse the new molecules that have been approved since 2015 by EMA, in several dimensions such as the type of molecule (e.g. chemistry, biotechnology, advanced therapies) therapeutic areas, regulatory classifications (e.g. orphan drugs, conditional approval, first in class, breakthrough therapies) and access status in Portuguese landscape.

**Methods:** Cross-sectional study with a descriptive statistical analysis of the new medicines' attributes. The research is based on the elaboration of a database with all the new active substances approved by EMA since 2015, and its characterization in multiple dimensions. The information was gathered through research on regulatory databases and literature.

**Results:** preliminary results show that innovative medicines cover multiple therapeutic areas, from the most prevalent diseases to different rare diseases. There are some therapeutic areas where the number of new drugs is more significant, such as oncology, there is a steady increase in the number of new orphan drugs, there is an increasing number of new types of active substances. But innovation is not all the same, some are disruptive, others incremental and other alternative solutions, therefore not all of them improve survival rates or quality of life at the same level. Thus, cost-effectiveness assessment of these new molecules is paramount to decided public financing. The analyse shows that most of these medicines are not yet accessible to Portuguese patients. Only 41% of the more than 430 new molecules are financed.

**Conclusions:** Pharmaceutical Industry has been developing and delivering every year a steady flow of new therapeutic solutions, increasing the therapeutic arsenal available for treatment of the diverse pathologies, improving the hope and quality of life of patients. In this path there are new trends: target therapies, new types of molecules, with increasing complexity, emergence of new technologies that have started to come to market including cell and gene therapies, heterobifunctional molecules, molecular glue and anti-body-drug conjugates (ADCs). On the other hand, from a national point of view, being approved is different from being accessible to the patients.

## Continuous Cardiometabolic Risk Score in low-risk cardiac patients: the impact of a 6-week MICT program

Liliana Faria<sup>1</sup>, Catarina Gonçalves<sup>1,2</sup>, Armando Raimundo<sup>1,2</sup>,  
Jorge Bravo<sup>1,2</sup>

<sup>1</sup>Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Portugal; <sup>2</sup>Comprehensive Health Research Centre (CHRC), Universidade de Évora, Portugal

**Keywords:** Coronary Artery Disease; Metabolic Syndrome; Physical Exercise; Prevention; Training Programs

**Objective:** This study aims to investigate the impact of a 6-week moderate-intensity continuous training (MICT) program on the continuous cardiometabolic risk score (cCRs) in low-risk cardiac patients.

**Methods:** Twenty-three participants (mean age: 55.3±10.6 years) engaged in an exercise-based MICT program. The cCRs for each participant were derived by summing the standardized residuals (Z-scores) associated with individual cardiometabolic risk factors, comprising waist circumference (cm), triglycerides (mg/dL), glucose (mg/dL), and systolic and diastolic blood pressure (mmHg), as well as HDL cholesterol (mg/dL). The computation of Z-scores for each risk factor involved regression onto age and sex variables to mitigate potential age- and sex-related variations. Given the inverse relationship between HDL cholesterol Z-scores and cardiometabolic risk, a multiplication by -1 preceded the summation of Z-scores. A higher cCRs is indicative of an elevated cardiometabolic risk level. Within-group comparisons and effect size were assessed using the Friedman test and Cohen's d, respectively.

**Results:** Patients' continuous cardiometabolic risk score significantly improved ( $p < 0.001$ ) from baseline (Z-score = 4.01±3.51) to post-intervention (Z-score = 0.89±2.78), indicating a substantial positive effect on patients' cardiometabolic health ( $d = 1.37$ ).

**Conclusions:** Our study highlights the crucial role of a 6-week MICT program in significantly improving the continuous cardiometabolic risk score, showcasing notable enhancements in key risk factors. These findings emphasize the substantial positive impact on the cardiometabolic health of low-risk cardiac patients, advocating for the integration of targeted exercise interventions as a tangible strategy to address immediate health concerns and contribute to broader community health initiatives.

---

## Digital health for rural populations with chronic musculoskeletal conditions: a scoping review

Lara Campos<sup>1,2</sup>, Alexandre Moniz<sup>3</sup>, Helena Donato<sup>4,5</sup>, Baltazar Nunes<sup>2,3,6</sup>, Eduardo B. Cruz<sup>1-3</sup>

<sup>1</sup>ESS, Polytechnic Institute of Setúbal, Setúbal, Portugal; <sup>2</sup>National School of Public Health, NOVA University of Lisbon, Lisboa, Portugal; <sup>3</sup>Comprehensive Health Research Center (CHRC), Lisboa, Portugal; <sup>4</sup>Documentation and Scientific Information Service, Hospitais da Universidade de Coimbra, Unidade Local de Saúde de Coimbra, Portugal; <sup>5</sup>Faculty of Medicine, University of Coimbra, Coimbra, Portugal; <sup>6</sup>Epidemiology Department, Instituto Nacional de Saúde Dr. Ricardo Jorge, Lisboa, Portugal

**Keywords:** Digital Health; Implementation Science; Musculoskeletal Conditions; Rural

**Objective:** Digital health can improve healthcare delivery and reduce disparities, but rural populations face significant access barriers, highlighting the need for tailored evaluation and implementation. This scoping review aimed to synthesize the evidence regarding the implementation of digital health interventions in rural populations with chronic musculoskeletal conditions

**Methods:** Following the Arksey and O'Malley and Joana Briggs Institute (JBI) guidance, studies from 2000 onwards, in any language, and reporting the use of digital interventions in rural areas for chronic musculoskeletal conditions or pain were included. Searches were conducted across several databases, including Medline (PubMed), EMBASE, Web of Science, Scopus, and grey literature sources. Two independent reviewers performed the screening process and the data charting. The Expert Recommendations for Implementing Change (ERIC) and the Proctor's framework guided the charting and synthesis of implementation strategies and implementation outcomes, respectively. Content analysis was applied to interpret qualitative data and align the findings with these frameworks.

**Results:** Seventeen studies met the inclusion criteria, showcasing diverse digital programs and generally positive clinical outcomes. Concerning the implementation processes, five studies evaluated barriers and facilitators, but only one conducted the assessment before the implementation. A total of 22 discrete implementation strategies were described and eight studies evaluated implementation outcomes.

**Conclusions:** This scoping review highlights that digital health interventions for rural individuals with musculoskeletal conditions seem to be effective in improving clinical outcomes, but theory-informed implementation is lacking. Despite its increasing importance in ensuring sustainable adoption and deployment of evidence-based interventions in real-world settings, implementation science is still poorly represented in the field of rural digital health.

---

## Screening the Microbiome of House Dust in the Alentejo Region

Ramiro Pastorinho<sup>1,2</sup>, Raquel Ramalhosa<sup>3</sup>, Alexandra Penha<sup>1</sup>, Ana Catarina Sousa<sup>2,3</sup>

<sup>1</sup>Department of Medical and Health Sciences, School of Health and Human Development, University of Évora, Évora, Portugal; <sup>2</sup>Comprehensive Health Research Centre (CHRC), University of Évora, Évora, Portugal; <sup>3</sup>Department of Biology, University of Évora, Évora, Portugal

**Keywords:** COVID-19; SARS-COV-2; virus, Viral Surveillance

**Objective:** In this study, in the context of project HERO (Impact of Artificial Habitats and Environmental contaminants on Chronic Respiratory Diseases), we conduct a pilot study to determine the presence of Sars-Cov-2 in house dust collected in Alentejo Region Homes.

**Methods:** Seven volunteers were recruited to participate in this study to providing house dust samples obtained by vacuum cleaning (in a total of 16 samples collected between June 2021 and May 2023). Sample were sorted and sieved, and the <63 µm fraction used for nucleic acid extraction and after processing, amplified by RT-qPCR using the ALS SARS-CoV-2 commercial kit.

**Results:** 83.3% of the samples tested positive for the presence of SARS-CoV-2. In 42% of the houses with positive detection, the occupants reported to have been Covid free. One of the houses tested around a whole year always had amplifiable virus in all collected samples despite a single positive test for one of the occupants being reported. In two of the samples only after dilution (1:5) was it possible to detect the virus.

**Conclusions:** Infectious agents can be used as surrogates of Environmental Contaminants (chemical and biological) with potential effects in Chronic Respiratory Diseases' symptoms/exacerbations. Furthermore, indoor dust can be used as a straightforward, suitable and effective matrix for viral surveillance, being able to detect asymptomatic infections and, potentially, be used in early detection of spreading infections (particularly important in the presence of vulnerable people). The fact that only after dilution was possible to attain some detections, attests to the presence of PCR inhibiting chemicals, more prevalent in areas influenced by rural practices. The small number of houses sampled limits these conclusions.

---

## Ischemic heart disease burden attributable to ambient nitrogen dioxide exposure in Portugal between 2011 and 2021

Marta Clemente<sup>1</sup>, Mariana Corda<sup>2</sup>, Dietrich Plass<sup>3</sup>, Carla Martins<sup>4</sup>

<sup>1</sup>NOVA National School of Public Health, Public Health Research Centre, NOVA University Lisbon, Lisbon, Portugal;

<sup>2</sup>Egas Moniz Center for Interdisciplinary Research (CiiEM), Egas Moniz School of Health & Science, Caparica, Almada, Portugal;

<sup>3</sup>German Environment Agency, Section Exposure Assessment and Environmental Health Indicators, Berlin, Germany; <sup>4</sup>NOVA National School of Public Health, Public Health Research Centre, Comprehensive Health Research Centre (CHRC), NOVA University Lisbon, Lisbon, Portugal

**Keywords:** Air pollution; burden of disease; cardiovascular diseases; environmental exposure; public health

**Objective:** Air pollution is a significant risk factor for public health, associated with morbidity, mortality, and premature death. This study aimed to estimate the burden of ischemic heart disease (IHD) attributable to ambient nitrogen dioxide (NO<sub>2</sub>) exposure within Portugal from 2011 to 2021, by age, sex and 2013 NUTS II regions of mainland Portugal.

**Methods:** Data on IHD mortality and incidence were sourced from Statistics Portugal and the Portuguese Hospital Morbidity Database, respectively. Ambient NO<sub>2</sub> levels were obtained from the QualAr online database of the Portuguese Environment Agency, considering only monitoring stations with valid data for at least 75% of the year. The burden of IHD attributed to NO<sub>2</sub> exposure over the decade was quantified in disability-adjusted life years (DALYs) for individuals aged 25 years and older in Portugal, using the population attributable fraction (PAF).

**Results:** Between 2011 and 2021, mainland Portugal experienced a declining trend in NO<sub>2</sub> mean levels, with occasional fluctuations. A total of 110,706.80 (95% CI 56,093.58 – 172,494.03) DALYs from IHD due to NO<sub>2</sub> were estimated, corresponding to a rate of 1,455.41 (95% CI 737.43 – 2,267.69) DALYs per 100 000 inhabitants. About 86% of the burden of disease was attributed to mortality. Additionally, a decrease was observed in the DALYs rate per 100,000 inhabitants across mainland Portugal and its different regions over the ten-year period.

**Conclusions:** Despite declining DALYs rates, these findings emphasize the profound impact of air pollution on human health, highlighting the critical role of environmental studies in informing policies to mitigate air pollution and improve public health.

---

## The role of social determinants of health on low back pain: analysis of the 2019 National Health Interview Survey

Susana Tinoco Duarte<sup>1,2</sup>, Pedro Aguiar<sup>1</sup>, Joana Alves<sup>1</sup>, Bruno Heleno<sup>3</sup>, Eduardo Brazete Cruz<sup>2,4</sup>

<sup>1</sup>NOVA National School of Public Health, Public Health Research Centre, NOVA University Lisbon, Lisbon, Portugal;

<sup>2</sup>Egas Moniz Center for Interdisciplinary Research (CiiEM), Egas Moniz School of Health & Science, Caparica, Almada, Portugal;

<sup>3</sup>German Environment Agency, Section Exposure Assessment and Environmental Health Indicators, Berlin, Germany; <sup>4</sup>NOVA National School of Public Health, Public Health Research Centre, Comprehensive Health Research Centre (CHRC), NOVA University Lisbon, Lisbon, Portugal

**Keywords:** Air pollution; burden of disease; cardiovascular diseases; environmental exposure; public health

**Objective:** Air pollution is a significant risk factor for public health, associated with morbidity, mortality, and premature death. This study aimed to estimate the burden of ischemic heart disease (IHD) attributable to ambient nitrogen dioxide (NO<sub>2</sub>) exposure within Portugal from 2011 to 2021, by age, sex and 2013 NUTS II regions of mainland Portugal.

**Methods:** Data on IHD mortality and incidence were sourced from Statistics Portugal and the Portuguese Hospital Morbidity Database, respectively. Ambient NO<sub>2</sub> levels were obtained from the QualAr online database of the Portuguese Environment Agency, considering only monitoring stations with valid data for at least 75% of the year. The burden of IHD attributed to NO<sub>2</sub> exposure over the decade was quantified in disability-adjusted life years (DALYs) for individuals aged 25 years and older in Portugal, using the population attributable fraction (PAF).

**Results:** Between 2011 and 2021, mainland Portugal experienced a declining trend in NO<sub>2</sub> mean levels, with occasional fluctuations. A total of 110,706.80 (95% CI 56,093.58 – 172,494.03) DALYs from IHD due to NO<sub>2</sub> were estimated, corresponding to a rate of 1,455.41 (95% CI 737.43 – 2,267.69) DALYs per 100 000 inhabitants. About 86% of the burden of disease was attributed to mortality. Additionally, a decrease was observed in the DALYs rate per 100,000 inhabitants across mainland Portugal and its different regions over the ten-year period.

**Conclusions:** Despite declining DALYs rates, these findings emphasize the profound impact of air pollution on human health, highlighting the critical role of environmental studies in informing policies to mitigate air pollution and improve public health.

---

## Reviving Hearts Post-Myocardial Infarction: High-Intensity vs. Moderate-Intensity Exercise Training in Coronary Artery Disease Patients – a 6- and 12-Month Follow-up Randomized Controlled Trial

Catarina Gonçalves<sup>1,2</sup>, Jorge Bravo<sup>1,2</sup>, João Pais<sup>3</sup>, Ana Abreu<sup>4</sup>, Armando Raimundo<sup>1,2</sup>

<sup>1</sup>Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Portugal; <sup>2</sup>Comprehensive Health Research Centre (CHRC), Portugal; <sup>3</sup>Hospital do Espírito Santo de Évora, Portugal; <sup>4</sup>Hospital de Santa Maria, Lisboa, Portugal

**Keywords:** Cardiovascular Diseases, Cardiovascular Risk Factors, Clinical Trials, High-Intensity Interval Training, Randomized Controlled Trial

**Objective:** Investigate the long-term effects of two exercise-based cardiac rehabilitation (CR) programs on physical activity (PA), sedentary behavior (SB) and physical fitness in patients with coronary artery disease (CAD).

**Methods:** Seventy-two CAD participants were divided into three groups: HIIT, MICT, and control. Both programs lasted 6 weeks with three supervised treadmill sessions per week. MICT targeted 70-75% of peak heart rate, while HIIT aimed for 85-95%. Assessments at 6- and 12-months post-intervention included body composition, aerobic capacity, muscle strength, PA and SB.

**Results:** Both exercise groups maintained higher aerobic capacity and PA compared to baseline over 6 and 12 months ( $p < 0.001$ ). The HIIT group showed better maintenance of post-intervention results compared to MICT. The control group experienced deteriorations in body composition and SB over time.

**Conclusions:** It is crucial to emphasize the importance of maintaining high levels of PA for patients with CAD to improve their cardiovascular health. HIIT has proven to deliver lasting improvements surpassing MICT, underscoring the vital role of exercise-based CR programs for CAD patients.

---

## High-Intensity Interval Training vs. Moderate-Intensity Continuous for Enhanced Quality of Life and Mental Well-being – A Randomized Controlled Trial with 6- and 12-Month Follow-up

Catarina Gonçalves<sup>1,2</sup>, Armando Raimundo<sup>1,2</sup>, Ana Abreu<sup>3</sup>, João Pais<sup>4</sup>, Jorge Bravo<sup>1,2</sup>

<sup>1</sup>Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Portugal; <sup>2</sup>Comprehensive Health Research Centre (CHRC), Portugal; <sup>3</sup>Hospital de Santa Maria, Lisboa, Portugal; <sup>4</sup>Hospital do Espírito Santo de Évora, Portugal

**Keywords:** Cardiovascular Diseases, Health-Related Quality of Life, High-Intensity Interval Training, Mental Health, Randomized Controlled Trial

**Objective:** Investigate the impact 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 a control group (no exercise-based

program) on quality of life (QoL), anxiety, and depression following a myocardial infarction (MI).

**Methods:** Seventy-two patients with MI were randomly divided into three groups: HIIT, MICT, and a control group. Both exercise programs involved 6-week of supervised treadmill workouts, with MICT exercising at 70-75% of their peak heart rate and HIIT exercising at 85-95% of peak heart rate. The control group made the usual medical recommendations. Assessments at baseline, 6-week, 6- and 12-months post-intervention included QoL (SF-36), and anxiety and depression (HADS).

**Results:** In the exercise groups, 6 out of 8 SF-36 dimensions improved significantly after six weeks compared to the control group. HIIT showed notable improvements in physical functioning and general health dimensions compared with MICT. Baseline anxiety scores decreased significantly after the 6-week interventions in both exercise groups ( $p < 0.05$ ). Over the 6- and 12-month follow-up periods, both exercise groups maintained higher levels of QoL ( $p < 0.001$ ) and the symptoms of anxiety and depression remained lower than baseline ( $p < 0.001$ ). In contrast, the control group experienced deteriorations in QoL, anxiety and depression scores over time.

**Conclusions:** Both exercise programs were equally effective in improving QoL and mental health among MI patients, with HIIT showing additional benefits compared to MICT. Not undertaking exercise-based post-MI programs correlates with lower QoL, and higher anxiety and depression scores, underscoring the importance of implementing exercise-based rehabilitation strategies to optimize the well-being of patients with MI.

---

## Usability and user experience of the COTIDIANA app for people with hip and knee osteoarthritis – Preliminary Results

Ana Rita Henriques<sup>1</sup>, Pedro Matias<sup>2</sup>, Ricardo Graça<sup>2</sup>, Fernando Pimentel<sup>3</sup>, Joana Silva Dinis<sup>4</sup>, Ana Teresa Melo<sup>4</sup>, Alexandre Moniz<sup>1</sup>, Francisco Nunes<sup>2</sup>, Ana Maria Rodrigues<sup>1,5</sup>

<sup>1</sup>CHRC, NOVA Medical School, NMS, Universidade NOVA de Lisboa; Lisboa, Portugal; <sup>2</sup>Fraunhofer Portugal Research Center for Assistive Information and Communication Solutions, Porto, Portugal; <sup>3</sup>Unidade Local de Saúde Lisboa Ocidental, Hospital Egas Moniz, Serviço de Reumatologia, CHLO- E.P.E, Lisboa, Portugal; <sup>4</sup>Unidade Local de Saúde São José, Hospital Santo António do Capuchos, Serviço de Reumatologia, CHLO, Lisboa, Portugal; <sup>5</sup>Hospital dos Lusíadas, Serviço de Reumatologia, Lisboa, Portugal

**Keywords:** mHealth, rheumatic diseases

**Objective:** Hip and Knee Osteoarthritis (HKOA) is the most common form of arthritis in adults, characterized by chronic pain and loss of mobility. To maintain/improve functionality, control pain levels, and improve quality of life of people with HKOA, it requires long-term approaches to continue behavior-dependent core interventions over time. To address these challenges, COTIDIANA consortium developed a mobile solution to support clinical care. The primary objective of this study was to evaluate the usability and user experience of patients with HKOA with the COTIDIANA smartphone app.

**Methods:** This field observational prospective study with a three-month follow-up recruited participants in 3 Portuguese hospitals (private and public). The inclusion criteria included having a diagnosis of hip or knee OA and being an Android smartphone user. Participants were invited to install the app and use it for three months. Three assessment points were planned: two presentational and one by phone. Participants installed the app, and their expectations regarding it were evaluated. One month after, the app usability and utility was assessed using a structured questionnaire with eight items. The usability and utility will be assessed again 3 months after installing the app.

**Results:** The study included 15 participants. At baseline, most participants viewed the app as beneficial and capable of addressing some daily challenges. One month later, 10 participants continued to use the app, rating its utility and easy to use with an average rating above 5, on a 7-point scale. Participants also reported appreciation for features like the medication reminders. Nevertheless, some users noted issues such as inconvenient login processes and considered the questionnaires excessive and repetitive.

**Conclusion:** While these are preliminary findings, participant feedback suggests that the app was useful and easy to use. Some adjustments are needed to this first prototype before the clinical trial study.

### Effects of a sixteen-weeks High-Speed Resistance Training program on heart rate variability indexes in community-dwelling independent older adults

Alexandre Duarte Martins<sup>1,2,3</sup>, João Paulo Brito<sup>2,3,4</sup>, Orlando Fernandes<sup>1</sup>, Bruno Gonçalves<sup>1</sup>, Rafael Oliveira<sup>2,3,4</sup>, Nuno Batalha<sup>1</sup>

<sup>1</sup>Comprehensive Health Research Centre (CHRC), Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Largo dos Colegiais, 7000-727 Évora, Portugal; <sup>2</sup>Life Quality Research Center (CIEQV), Santarém Polytechnic University, Complexo Andaluz, Apartado 279, 2001-904 Santarém, Portugal; <sup>3</sup>Santarém Polytechnic University, School of Sport, Av. Dr. Mário Soares, 2040-413 Rio Maior, Portugal; <sup>4</sup>Research Center in Sport Sciences, Health and Human Development (CIDESD), Santarém Polytechnic University, Av. Dr. Mário Soares, 2040-413 Rio Maior, Portugal

**Keywords:** Strength training; Aged; Musculoskeletal System; Nonlinear Dynamics; Nervous System

**Objective:** This study examined the effects of a sixteen-week high-speed resistance training (HSRT) program on heart rate variability (HRV) indexes (time, frequency, and non-linear domains).

**Methods:** Seventy-nine independent older adults were divided into an intervention group (IG) [N=40, age, 68.50±3.54 years; body mass index (BMI), 27.88±4.37 kg/m<sup>2</sup>] and a control group (CG) [N=39, age, 72.08±5.89 years, BMI, 26.53±3.04 kg/m<sup>2</sup>]. The IG participated in supervised HSRT sessions three times weekly, with 5–6 exercises, 2–3 sets, and 6–10 repetitions, lasting 60–70 minutes. Intensity increased progressively based on movement velocity (>1.3 to 0.75 m/s), representing approximately 10% to 65% of one repetition maximum. Exercises were performed rapidly during the concentric phase, monitored via a BEAST™ sensor

(Beast Technologies, Brescia, Italy), followed by a controlled 2–3 second eccentric phase. The CG maintained daily activities, tracked by the IPAQ Questionnaire.

HRV was assessed using a heart rate band (Polar® H10, Kempele, Finland) and analyzed with Kubios HRV software (Kubios HRV, University of Kuopio, Finland). The study was approved by the Ethics Committee of the University of Évora (approval no. 22030).

**Results:** After HSRT program, ANCOVA results showed significant improvements in total variability, expressed by mean RR in favour of the IG ( $p=0.049$ ,  $\eta^2_p=0.050$ ), and decreases in general heart rate (HR) variables in favour of the IG, such as mean HR ( $p=0.030$ ,  $\eta^2_p=0.060$ ), min HR ( $p=0.043$ ,  $\eta^2_p=0.053$ ) and max HR ( $p=0.050$ ,  $\eta^2_p=0.049$ ). Additionally, significant increases in stress index ( $p=0.002$ ,  $d_{unb}=0.52$ ), SampEn ( $p=0.035$ ,  $d_{unb}=0.38$ ), and DFA  $\alpha_1$  ( $p=0.039$ ,  $d_{unb}=0.38$ ) were obtained in the CG after intervention.

**Conclusions:** This clinical trial highlights the significant potential of the HSRT program to improve overall variability and cause favorable modifications in older persons' parasympathetic indexes.

### Effectiveness of Rivaroban's Portuguese Educational Materials – a Qualitative Study

Ana Margarida Advinha<sup>1-3</sup>, Margarida Perdigão<sup>1,2</sup>, Filipe Alfaiate<sup>1,4,5</sup>, João Paulo Fernandes<sup>6</sup>, Márcia Silva<sup>6</sup>, Manuel Lopes<sup>1,2,4</sup>

<sup>1</sup>Pharmacovigilance Regional Unit of Center and North Alentejo, University of Évora, Évora, Portugal; <sup>2</sup>Comprehensive Health Research Centre, University of Évora, Évora, Portugal; <sup>3</sup>School of Health and Human Development, University of Évora, Évora, Portugal; <sup>4</sup>Nursing School of S. João de Deus, University of Évora, Évora, Portugal; <sup>5</sup>Hospital Espírito Santo of Évora – Alentejo Central Local Health Unit, Évora, Portugal; <sup>6</sup>INFARMED – National Authority of Medicines and Health Products, I.P., Lisbon, Portugal

**Keywords:** Factor Xa Inhibitors; Pharmacovigilance; Qualitative Research; Risk Assessment

**Objective:** To analyze the Rivaroxaban prescriber's guide (PG) and patient alert card (PAC), evaluating their legibility, intelligibility, and comprehension, as well as how this information is transmitted and understood by healthcare professionals and patients, in Portugal.

**Methods:** In the first phase, the readability and intelligibility of the text of the educational materials under study were assessed using textual analysis. The second phase consisted of determining the readability, knowledge, comprehension, application, and access of the written and illustrated information in the documents, by carrying out individual semi-structured interviews with the main target audiences (prescribing doctors (n=10) and patients (n=10)) and focus groups with pharmacists (n=10) and nurses (n=10), as health professionals who are also involved in patient care and education process. Software's used were ALT, Coh-Metrix-Port 2.0, and MAXQDA-24.

**Results:** Both the PG and the PAC showed a medium level of readability and intelligibility. In terms of lexical analysis, it was found that the texts of the educational materials place special emphasis on issues related to taking the medication, as well as those related to risk management, particularly bleeding. More than half of the doctors interviewed reported not using the PG. It stands out that doctors were more aware of the existence of the PG while most pharmacists and nurses were more aware of the PAC. Most of the pharmacists and nurses reported not having access to educational materials in their professional practice and believe that their use is an asset in their practice. Only half (n=5) of the patients interviewed were aware of the card and, of these, the majority said they had never used the PAC. However, those who habitually carry this material with them say that they feel it has had a positive impact on their use of the medicine.

**Conclusions:** Generally, healthcare professionals and patients considered the educational materials to be materials that are legible, intelligible, with an appropriate design and typographic factors. What stands out is the doctors' lack of knowledge and reading of the educational material aimed at them-the PG. As for the patients' readability, only three had read the educational material aimed at them-PAC.

### Nurses' Perception of Healthy Environments in the South of the Country

Telma Quaresma<sup>1,2,3</sup>, Maria Céu Marques<sup>1,3</sup>, Liliانا Mota<sup>4,5</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Algarve Local Health Unit – Portimão Unit;

<sup>3</sup>University of Évora; <sup>4</sup>School of Health North of the Portuguese Red Cross; <sup>5</sup>Centre for Research in Health Technologies and Services (CINTESIS@RISE)

**Keywords:** nurses' perception; favorable environments; Clinical Practice

**Objective:** To describe the perception of nurses about environments favorable to clinical practice in hospitals in southern Portugal.

**Methods:** This is a quantitative, exploratory study. A total of 440 nurses from hospitals in the south of the country participated. Data collection was carried out from September 2022 to March 2023, using an online questionnaire, using the validation of the Portuguese version of the Practice Environment Scale of the Occupational Health Nursing Index validated by Amaral, Ferreira, & Lake in 2012. For the analysis of quantitative data, we will use descriptive and inferential statistics according to the nature of the variables and using the Statistical Package for the Social Sciences, see 27.

**Results:** In a total of 10 public and private health organizations in the south of the country, most are female (82.5%, N=363), with an average age of 42.6±9.788 years, ranging from 23 to 67 years. In which 95.4% (N= 419) of the nurses work in the public sector. Nurses' perception of healthy environments presented a higher average in the factor Nursing Fundamentals for quality of care (2,710±0.5119), Collegial relations between physicians and nurses (2,683±0.595), Adequacy of human and material resources (2,360±0.637), Participation of nurses in hospital policies

(2,232±0.564), Management skills, leadership and support for nurses (2,203±0.614).

**Conclusions:** The study allows us to allude that nurses' perception of clinical practice environments for nursing care denotes weaknesses. There is scientific evidence that an adequate environment for the practice of care is a good indicator of quality. Undoubtedly, it is very important to call nurses to participate in hospital policies, since this dimension (Nurses' participation in hospital policies) was the one that obtained one of the lowest averages compared to the other dimensions of the evaluation instrument, since this is the opinion of nurses.

### Effect of Sociodemographic Determinants on the Functional and Cognitive Capabilities of Portuguese Older Adults

Inês Cardoso<sup>1</sup>, Margarida Goes<sup>1,2</sup>, Manuel Lopes<sup>1,2</sup>, Paula Pimpão<sup>1</sup>, Henrique Oliveira<sup>1,3,4</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Departamento de Enfermagem, Universidade de Évora, Évora, Portugal; <sup>3</sup>Instituto de Telecomunicações, Aveiro, Portugal; <sup>4</sup>Instituto Politécnico de Beja, Beja, Portugal

**Keywords:** Aged; Institutionalization; Activity of daily living; Mental Health

**Objective:** A cross-sectional, descriptive study designed to estimate the effect of sociodemographic determinants on the functional and cognitive capabilities of Portuguese older adults residing in nursing homes in the Alentejo region.

**Methods:** A total of 510 older adults were sampled. The structured interview method was used, with the instruments Elderly Nursing Core Set (ENCS) and the Mini Mental State Examination (MMSE). The interviews took place between June 2019 and 2021. A multivariate logistic regression model was applied using R to infer the relationships between sociodemographic determinants and older adults' functional and cognitive abilities.

**Results:** The respondents' average age was 86 years. Approximately 66% were aged 85 or over, 69% were women, 65% had multimorbidity, 57% had attended school but not higher education, and 84% had no spouse. Older women and individuals with poor cognitive function were significantly more likely to depend on others for functional capability (OR=1.85, 95% CI: 1.30-2.62, p<0.001 for women; OR=2.42, 95% CI: 1.71-3.42, p<0.001 for poor cognitive function).

**Conclusions:** Promoting literacy and self-care among older adults residing in nursing homes has proven essential for active and healthy aging. It is recommended to implement educational programs focused on improving cognitive and functional abilities, as well as managing multimorbidities, to promote better health outcomes among older adults.

## Usability and user experience of the Healthy Bone digital platform for patients with Osteoporosis: a mixed methods study

Alexandre Moniz<sup>1,3</sup>, Anabela Barcelos<sup>2,6</sup>, Marta M. Marques<sup>3,4</sup>, Carolina Mazeda<sup>2,5,6</sup>, Ana Rita Henriques<sup>1,3</sup>, Nuno Mendonça<sup>1,2</sup>, Ana Machado<sup>1,2</sup>, Helena Canhão<sup>1,2,7</sup>, Sónia Dias<sup>3,4</sup>, Ana Maria Rodrigues<sup>1,2,8,9</sup>

<sup>1</sup>Comprehensive Health Research Center (CHRC), NOVA Medical School|Faculdade de Ciências Médicas, NMS|FCM, Universidade NOVA de Lisboa, Lisbon, Portugal; <sup>2</sup>EpiDoc Unit, NOVA Medical School|Faculdade de Ciências Médicas, NMS|FCM, Universidade NOVA de Lisboa, Lisbon, Portugal. National School of Public Health, Universidade NOVA de Lisboa, Lisbon, Portugal; <sup>3</sup>National School of Public Health, Universidade NOVA de Lisboa, Lisbon, Portugal; <sup>4</sup>Comprehensive Health Research Center (CHRC), National School of Public Health, Universidade NOVA de Lisboa, Lisbon, Portugal; <sup>5</sup>Rheumatology Department, Unidade Local de Saúde da Região de Aveiro, Aveiro, Portugal; <sup>6</sup>Centro Académico Clínico Egas Moniz Health Alliance, Aveiro, Portugal; <sup>7</sup>Rheumatology Department, Centro Hospital Universitário Lisboa Central (CHULC), Lisbon, Portugal; <sup>8</sup>Rheumatology Department, Centro Hospitalar Lisboa Ocidental (CHLO), Lisbon, Portugal; <sup>9</sup>Rheumatology Department, Hospital dos Lusíadas, Lisbon, Portugal

**Keywords:** Digital health; Healthy aging; Osteoporotic fractures; User-centered design

**Objective:** The Healthy Bone digital platform, which includes short videos with physical exercise, nutrition tips, treatment reminders, and health education, was developed to promote the adoption of pharmacological and non-pharmacological treatment and behavior change among older adults with osteoporosis and osteoporosis-related fractures. This study evaluated the system usability and user experience of the desktop version of the Healthy Bone digital platform prototype from patients' perspectives.

**Methods:** A mixed methods study was conducted to test the usability of Healthy Bone through in-person interviews with audio/screen recording. Participants (n=7) were asked to complete tasks representing real use of the platform, using a thinking-aloud approach. Satisfaction (After Scenario Questionnaire) and usability (System Usability Scale[SUS]; eHealth Usability Benchmarking Instrument[HUBBI]) were measured. Semi-structured interviews were conducted to explore participants' use of the platform. Qualitative data was analysed through deductive content analysis (ontology of eHealth usability issues) and inductive thematic analysis (Braun and Clarke method). Descriptive statistics were performed for the quantitative analysis.

**Results:** High levels of task satisfaction were reported (6.7±0.5). In total, 24 unique usability issues were found across 6 categories of the eHealth usability ontology. Overall, participants expressed positive perceptions and acceptability towards the digital platform. Barriers to using the digital platform included lack of skills, suitable equipment, and time. Facilitators included motivation for behavior change, health benefits, and the decrease of potential inequalities. High levels of usability according to the SUS were found (87.1±13.3). Good usability was also reported for

all categories of the HUBBI, except Guidance & Support, which presented moderate levels of usability (3.3±1.1).

**Conclusions:** This study provided valuable insights into the usability and user experience of the desktop version of the Healthy Bone digital platform prototype. The inclusion of more participants might have provided more robust data; however this information will allow the optimization of the digital platform.

## Physiological stress responses of horse and rider in Dressage tests

Carlota Duarte<sup>1,2</sup>, Rute Santos<sup>2,3</sup>, José Freitas<sup>2</sup>

<sup>1</sup>CHRC - Comprehensive Health Research Centre, Universidade de Évora, 7004-516 Évora, Portugal; <sup>2</sup>Instituto Politécnico de Portalegre, Portalegre, 7300-110, Portugal; <sup>3</sup>VALORIZA - Research Centre for Endogenous Resource Valorization, Portalegre, 7300-555, Portugal

**Keywords:** Anxiety; Equestrian Sports; Heart Rate; Ocular temperature; Self-esteem

**Objective:** In the current study physiological parameters associated with stress were monitored in horses (heart rate and ocular temperature) and riders (heart rate, systolic and diastolic blood pressure and ocular temperature) during Dressage tests, to better understand possible relations between these parameters and performance.

**Methods:** To evaluate this effect, 100 Dressage tests (using Preliminary, Elementary and Medium level protocols of the Portuguese Equestrian Federation) were performed by a sample of 23 horse riders and 15 horses. Heart rate and ocular temperature at rest, before and after each test, were evaluated for horses and riders, and blood pressure was also evaluated in the latter. Records of riders' anxiety and self-esteem levels were obtained using the Sports Anxiety Scale-2 (scores ranging from 15 - low levels of sports anxiety, to 30 - high levels of sports anxiety) and the Rosenberg Self-Esteem Scale (a score of 0 indicates very low self-esteem and 30, maximum score, very high self-esteem). The scores of the Dressage (minimum score 0%, maximum score 100%) tests were also recorded.

**Results:** Significant p values were found for heart rate (p<0.001) and ocular temperature (p<0.05) in horses, and heart rate (p<0.001) and diastolic blood pressure (p<0.05) in riders. Moderate negative correlations were observed between riders' physiological variables and Anxiety and Self-Esteem scores: ocular temperature at rest with concentration disruption (r=-0.44) and heart rate post-Dressage test with RSES score (r=-0.46). SAS-2 somatic anxiety (r=-0.31) and RSES (r=-0.39) also negatively correlated with Dressage collective mark scores for riders. In horses, ocular temperature at rest showed a moderate positive correlation (r>0.33) with overall score, submission, and rider scores, while ocular temperature before the Dressage test showed a negative correlation (r<-0.30) with overall scores, gaits, impulsion, and submission.

**Conclusion:** The study found significant correlations between physiological variables and performance in horses and riders. Heart rate and ocular temperature in horses, and heart rate and diastolic blood pressure in riders, were significant. Moderate

negative correlations between riders' physiological measures and their Anxiety and Self-Esteem scores suggest stress impacts performance. The horse's ocular temperature also correlated with Dressage scores, indicating its potential as a performance marker. These findings highlight the importance of monitoring physiological indicators to enhance performance and well-being in equestrian sports, suggesting regular physiological assessments in training and further research on stress reduction interventions.

### Reliability of The MyBack Physical Performance Battery

Bruna Costa<sup>1</sup>, Diogo Moço<sup>1,3</sup>, Diogo Pires<sup>1,2</sup>, Eduardo Cruz<sup>1,2</sup>, Rita Fernandes<sup>1,2</sup>

<sup>1</sup>Departamento de Fisioterapia, Escola Superior de Saúde, Instituto Politécnico de Setúbal, Setúbal, Portugal;

<sup>2</sup>Comprehensive Health Research Center, Universidade NOVA de Lisboa, Lisbon, Portugal; <sup>3</sup>LBMF, CIPER, Faculdade de Motricidade Humana, Universidade de Lisboa, Lisbon, Portugal

**Keywords:** Low back pain; Measurement error; Physical performance tests; Reliability

**Objective:** During an episode of low back pain (LBP) physical performance impairments (PPI) can occur, and in remission of symptoms they can persist (1-4). To evaluate PPI related to cardiorespiratory capacity, motor control, trunk/lower limb resistance, and flexibility the literature suggests several Physical performance (PP) tests. However, the information on the psychometric properties of these tests when applied to individuals who have recovered from LBP is scarce or non-existent (5-28). The aim of this study was to evaluate the intra-rater reliability of a PP battery of tests to assess individuals who have recovered from LBP.

**Methods:** A test-retest study was conducted with a sample of 22 individuals who have recovered from LBP. The participants performed the PP battery composed of 12 tests in two different moments, with an interval of  $5.27 \pm 1.83$  days. For tests scored as numerical variables the Intraclass Correlation Coefficient ( $ICC_{3,1}$ ) was determined; for tests scored as categorical variables Cohen's  $k$  was estimated (29-33). Measurement Error was estimated for all tests.

**Results:** The CCI was  $>0.87$ , suggesting high intra-rater reliability. The measurement error was diverse between tests, with standard error of measurement % values varying between 4.47% for the 6-Minute Walk Test (6-MWT) to 19.43% for the Trunk Flexor Test (TFT). Minimal detectable change % varied between 12.38% for 6-MWT and 53.87% for the TFT. Prone Instability, Aberrant Movement Pattern and Modified Thomas tests showed high reliability values ( $0.71 \leq \text{Cohen's } k \leq 1$ ) and a high percentage of agreement ( $>86\%$ ).

**Conclusions:** The results of this study showed high intra-rater reliability for the MyBack Physical Performance battery of tests, which supports its use when the aim is to evaluate cardiorespiratory capacity, motor control, trunk and lower limb resistance, and flexibility in individuals who recovered LBP.

### Predictors of Breastfeeding Behavior in COVID-19 Pandemic in Women of Baixo Alentejo, Portugal

Solange Silva<sup>1</sup>, Maria Inês Soares<sup>1</sup>, Maria Úrsula Carvalho<sup>1</sup>, Margarida Sim-Sim<sup>2</sup>, Sónia Fernandes<sup>1</sup>

<sup>1</sup>Unidade Local de Saúde do Baixo Alentejo, Beja, Portugal;

<sup>2</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal

**Keywords:** breastfeeding, pandemics, logistic regression

**Objective:** Analyze the factors associated with breastfeeding behavior in pandemic times in women users of Primary Health Care in Baixo Alentejo.

**Methods:** A cross-sectional study with 321 women, with mean age 33.28 (SD= 5.69) years old. The online questionnaire allowed the collection of sociodemographic data, childbirth characteristics, health care services provided and breastfeeding-related behaviors. Statistical analysis was accomplished using IBM-SPSS software. Bivariate analysis was performed to select predictor variables with  $p$ -value  $<.25$ . It was followed by a logistic regression, starting with the inclusion of 11 categorical variables. Ethical principles were safeguarded.

**Results:** It was observed that exclusive breastfeeding, up to six months, was performed by 87 (27.1%) of the participating women. Breastfeeding protective factors were identified: a) not having been administered formula during hospitalization, were 2.46 times more likely to continue breastfeeding (OR .405, 95% CI .209-.785,  $B=-.904$ ); b) not having been given a pacifier were 2.55 times more likely to breastfeeding (OR .391, IC 95% .212-.723,  $B=-.938$ ); c) women with a prior history of breastfeeding were 7.8 times more likely to nurse (OR 7,895, 95% CI 3,004-20,744,  $B=2,066$ ); d) women separated from the newborn due to COVID-19 pandemic were 9.08 times higher chances of breastfeeding (OR 9.080, 95% CI 1.171-70.414,  $B=2.206$ ).

**Conclusions:** The study suggests the need for local health policies that promote exclusive breastfeeding practices. It was unexpected that women separated from their newborn due to COVID-19 pandemic had more chances of breastfeeding. Short and long term morbidity can be reduced.

### Which symptoms and stressors explain sexual orientation inequalities in mental health services use? A longitudinal study with young adults

Luis Roxo<sup>1,2</sup>, John Pachankis<sup>3</sup>, Richard Bränström<sup>2</sup>

<sup>1</sup>Comprehensive Health Research Centre (CHRC), Universidade NOVA de Lisboa, Lisbon, Portugal; <sup>2</sup>Division of Psychology, Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden; <sup>3</sup>Department of Social and Behavioral Sciences, Yale School of Public Health, New Haven, CT, USA

**Keywords:** mental health services; minority stress; sexual minorities; Sweden

**Objective:** Compared to heterosexuals, sexual minority (i.e., lesbian, gay, and bisexual [LGB], and other non-heterosexual) individuals are more likely to use mental health services (MHS).

Yet, information is scarce about factors shaping this difference. This study aims to: 1) determine whether sexual minority individuals' elevation of common mental health symptoms fully explain differences in MHS use; 2) understand whether general stressors also explain this association; and 3) investigate whether minority-specific stressors are related to sexual minorities individuals' MHS use.

**Methods:** This study used longitudinal data from young adults (aged 18-36) in Sweden (N=1,137). We used mediation analysis to examine if common mental health symptoms (i.e., depressive, anxiety and social anxiety symptoms, suicidality, and alcohol use) and general stressors (i.e., low social support, loneliness, and perceived stress) mediate sexual orientation differences in mental health services use. After that, logistic regression models were used to understand if minority-specific stressors (i.e., dimensions of sexual minority identity and family reaction) predict MHS use among sexual minority individuals (N=498), adjusting for common mental health symptoms.

**Results:** Common mental health symptoms only partially mediated the association between sexual orientation and MHS, as the direct effect remained significant ( $\beta=0.11$ ,  $p<0.01$ ). When adding general stressors to the model, the direct effect remained significant ( $\beta=0.11$ ,  $p<0.01$ ) and the total effect explained only slightly increased. Among sexual minority individuals, a negative family reaction towards one's sexual orientation ( $\beta=0.15$ ,  $p<0.05$ ) and a difficult process of coming out ( $\beta=0.12$ ,  $p<0.05$ ) predicted MHS use (adjusting for common mental health symptoms).

**Conclusions:** Results show that MHS use among sexual minority individuals is not only driven by common mental health symptoms but also by minority-specific stressors. This highlights the need to provide suitable care for this population and to empower sexual minority individuals to cope with minority stress.

---

### Understanding stakeholders' role in Cancer Primary Prevention: results from a survey within the 4P-CAN project

Luis Roxo<sup>1,2</sup>, Ana João Santos<sup>3</sup>, Ana Cristina Garcia<sup>2</sup>,  
Andreia Leite<sup>1,2</sup>, Carlos Dias<sup>1,2</sup>, Mafalda Uva<sup>1,2</sup>

<sup>1</sup>Comprehensive Health Research Centre (CHRC), Universidade NOVA de Lisboa, Lisbon, Portugal; <sup>2</sup>Department of Epidemiology - National Institute of Health Doctor Ricardo Jorge, Lisbon, Portugal; <sup>3</sup>CINTESES@RISE, Department of Education and Psychology, University of Aveiro, Aveiro, Portugal

**Keywords:** cancer; Europe; inequalities; primary prevention

**Objective:** Cancer Primary Prevention (CPP) is a cost-effective way to reduce cancer-related morbidity and mortality, by preventing cancer cases from ever developing. This involves a multifaceted role from several stakeholders, who may contribute to policy development, resource allocation, community engagement, research, innovation, advocacy and education efforts, among others. This study uses a penta-helix framework to understand stakeholders' role in CPP and the perceptions of involvement between different sectors.

**Methods:** This study was developed within the project 4P-CAN, funded by the European Commission under the Horizon

EUROPE Programme 2021-2027 (MISS-CANCER-01). Snowball sampling was used to recruit CPP stakeholders, inviting them to an online survey (January and February 2024). Participants were asked to rank sectors from the penta-helix framework (public governance, academia/ research, private sector, media and civil society) regarding which could have the main role, was the most proactive and the most influential in CPP.

**Results:** Overall, 110 stakeholders from 23 countries answered the survey. Almost two-thirds of the sample (62.2%) reported collaborating with other key national actors. Public governance was the sector that participants most often reported that could have the main role in CPP (61%). Public governance (39%) and civil society (31%) were considered the most proactive sectors. Public governance was considered the most influential sector by 36% of the participants, while 24% assessed the media as the most influential.

**Conclusions:** The public sector seems to have a pivotal role in CPP. Yet, these results highlight the importance of the involvement of other sectors. Further information about activities, barriers and motivations of each sector and collaboration between sectors will be obtained through interviews with stakeholders from different countries of the project.

---

### STarT MSK Tool: Can health outcomes be predicted in individuals with nonspecific musculoskeletal pain?

Ana Filipa Ricardo<sup>1</sup>; Diogo Pires<sup>1,2</sup>

<sup>1</sup>Escola Superior de Saúde – Instituto Politécnico de Setúbal, Setúbal, Portugal; <sup>2</sup>Comprehensive Health Research Center, NOVA Medical School, Lisboa, Portugal

**Keywords:** discriminative validity; musculoskeletal pain, predictive validity, STarT MSK Tool

**Objective:** Current evidence suggests that various musculoskeletal conditions (CME) share common prognostic factors, making their identification essential. The STarT MSK tool, applicable to several CMEs, can be used for prognostic screening. This study aimed to analyze the predictive validity of the Portuguese version of the STarT MSK for pain intensity, quality of life, global perception of change, and the consumption of medication and health resources after 3 months. Additionally, discriminative validity was also assessed.

**Methods:** An observational, prospective cohort study was carried out with individuals over 18 years of age with musculoskeletal pain of non-specific origin (neck, back, shoulder, knee and/or polyarticular pain). At the first assessment moment (T0), the sociodemographic and clinical characterization questionnaire, the Numerical Pain Scale (END), the European Quality of Life Questionnaire (EQ-5D-3L) and the STarT MSK (Portuguese version) were applied. After 3 months (T1), the EQ-5D-3L, the END, the Patients' Global Impression of Change were applied, and questions were asked about the consumption of medication and health resources. Predictive validity was analyzed by calculating the relative risk for the STarT MSK medium and high-risk group, compared to the low-risk group. The area over the ROC curve was used to analyze the discriminative validity of the instrument.

**Results:** Of the 201 participants at baseline: 51 (25.4%) belonged to the low-risk group, 106 (52.7%) to the medium-risk group and 44 (21.9%) to the high-risk group in STarT MSK. The results suggest a good predictive capacity with most relative risk values  $\geq 4$ . There was also good discriminative validity (65 to 75%).

**Conclusions:** The STarT MSK revealed good predictive validity and a good ability to discriminate cases of failure/success after 3 months. These results reinforce the advantage of its use in clinical practice and future investigations in Portugal with users with musculoskeletal pain.

### Characterization and Predictors of Functionality in Elderly with Multimorbidity, in Long-Term Care

António Lista<sup>1,2</sup>, Lara Guedes de Pinho<sup>1,2</sup>, César Fonseca<sup>1,2</sup>

<sup>1</sup>Comprehensive Health Research Center, University of Évora, Évora, Portugal; <sup>2</sup>Nursing Department, University of Évora, Évora, Portugal

**Keywords:** Functional Profile, Multimorbidity, Elderly, Long-term Care, Cognitive Function

**Objective:** Understanding the association between aging, functional deficits, and multimorbidity is essential for targeted health interventions. This study aimed to characterize and explore predictors of functionality among elderly in long-term care settings.

**Methods:** A cross-sectional study was conducted with 620 elderly from Day Centers, Nursing Homes (NH), and Home Care Services. Data on demographics, chronic diseases, comorbidities, functionality, and cognition were collected. Functionality was assessed using the Elderly Nursing Core Set (ENCS) and cognition with the Mini-Mental State Examination (MMSE). Statistical analyses included descriptive statistics, Pearson and Spearman correlations, chi-square tests, and multiple regression analyses.

**Results:** The mean age was 86.77 years (SD = 6.32), with 68.4% women. Regarding marital status, 19.4% were married and 67.4% widowed. In terms of education, 46.8% did not attend school. Most participants (96.6%) had two or more chronic diseases, with an average of 6.14 diseases (SD = 3.464) per individual. The average functional profile was 2.61 (SD = 1.133), indicating “moderate disability.” The average cognition score was 15.11 (SD = 9.131). Age was positively correlated with worse functionality ( $r = 0.142$ ,  $p < 0.01$ ). Functionality and cognition showed a strong negative correlation ( $r = -0.822$ ,  $p < 0.01$ ). Multiple regression analyses showed age ( $\beta = 0.107$ ,  $p = 0.008$ ) predicted worse functionality, while education ( $\beta = -0.167$ ,  $p < 0.001$ ) predicted better functionality.

**Conclusions:** This study highlighted the impact of age, education, and cognitive function on functionality in elderly long-term care residents. These individuals, predominantly women and the oldest old with moderate disability and multimorbidity, need tailored interventions. Psychosocial and rehabilitation interventions are necessary to improve functionality, particularly in older women and those with lower education levels. Integrated, comprehensive, and individualized care plans are essential for the health needs of elderly in long-term care.

### Symptoms management and quality of life in cancer patients

Isabel Bico<sup>1,2</sup>, Susana Mendonça<sup>1,2</sup>, Ermelinda Caldeira<sup>1,2</sup>, Manuel José Lopes<sup>1,2</sup>

<sup>1</sup>Comprehensive Health Research Centre; <sup>2</sup>Universidade de Évora, Évora, Portugal

**Keywords:** Quality of life; Cancer; Patients; Symptoms; Management

**Objective:** Assess the most significant physical and psychological symptoms for the cancer patient. Assess the quality of life perceived by the patient.

**Methods:** We opted for an exploratory study, with a mixed, based on the description of symptoms given by cancer patients. Participants included (n=50) adults cancer patients with advanced disease. Most of participants (63,5%), are female. The age of participants varies between 27 and 87 years, the average age is 63 years, Standard Deviation (SD)=11,6. In terms of medical diagnostic stands intestinal cancer in 46,2% of the cases, following breast cancer in 23,1% of the cases, liver metastasis 26.9%, peritoneal carcinomatosis 23.1%, lung 21.2%. Study was submitted to the Ethics Committee of ULSAC Hospital do Espírito Santo de Évora and was approved. Data was collected after informed consent had been accepted. The Rotterdam Symptom Checklist (RSCL) was used to assess the relationship between symptoms and quality of life in cancer patient. The data was analyzed using descriptive statistics, bivariate and inferential analysis (significance level  $\alpha = 0.05$ ) through IBM SPSS Statistics 29.

**Results:** A descriptive analysis of the subscales of the RSCL was carried out. The RSCL assesses patients' quality of life in four domains: physical symptoms, psychological symptoms, activities of life and overall quality of life. The most frequently identified physical symptoms were tiredness, lack of energy, pain and lack of sexual interest. The patients had some psychological symptoms, although 42.13% (n=22) reported some hope for the future and 17.3% (n=9) quite a lot. With regard to quality of life, which ranges from 1 (excellent) to 7 (very poor), both the mean and median values were 4 (neither good nor poor). 7.7% (n=4) said their quality of life was excellent; 11.5% (n=6) said it was good; 17.3% (n=9) moderately good; 17.3% (n=9) neither good nor bad; 25% (n=13) moderately bad and 9.6% (n=5) very bad. This assessment referred to quality of life in the week prior to the start of the study.

**Conclusions:** Quality of life is very subjective; some patients describe it as very poor and others as excellent. The majority of patients reported that their quality of life was neither good nor bad when assessed in relation to their symptoms.

---

## Psychometric properties of the self-care inventory for chronic diseases in older adults residing in Portugal

Maria Marques<sup>1,2</sup>, Margarida Goes<sup>1,2</sup>, Henrique Oliveira<sup>1,3,4</sup>, César Fonseca<sup>1,2</sup>, Lara Pinho<sup>1,2</sup>, Catarina Marques<sup>1,2</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Departamento de Enfermagem, Universidade de Évora, Évora, Portugal; <sup>3</sup>Instituto de Telecomunicações, Aveiro, Portugal; <sup>4</sup>Instituto Politécnico de Beja, Beja, Portugal

**Keywords:** Aged; Factor Analysis; Health Assessment; Reliability; Self-management

**Objective:** Chronic illness requires various treatments, and self-care is a crucial aspect of the care process. Assessing self-care behaviors not only makes identifying patients' needs easier but also enhances education and care processes. This study assessed the psychometric properties (validity, reliability, and measurement error) of the Chronic Disease Self-Care Inventory questionnaire, patient version, in Portuguese.

**Methods:** A sample of individuals with multiple chronic diseases was carefully recruited from outpatient clinics in Portugal. Patients completed the questionnaire, which included three subscales: self-care maintenance, monitoring, and management. Factorial validity was examined for each subscale using exploratory factor analysis employing FACTOR software. Reliability was estimated using the factor loadings of the factorial model (composite reliability coefficient as a reliability measure). Confirmatory factor analysis employing the *lavaan* package for R statistics software was used to ascertain the relationships between the questionnaire's subscales: self-care maintenance, monitoring, and management.

**Results:** The self-care maintenance and monitoring subscales had a unidimensional structure, while the self-care management subscale presented a two-dimensional structure. Reliability estimates were adequate. Construct validity was supported. The measurement error was adequate.

**Conclusions:** The Portuguese version of the SC-CII showed good psychometric properties in the Portuguese sample, proving to be a valid and reliable instrument for assessing self-care maintenance, monitoring, and management in individuals with chronic illnesses.

---

## A new approach to monoclonal antibody purification: ionic liquids for one-step processing

João Vasco Valente<sup>1,2</sup>, M. Raquel Aires-Barros<sup>3</sup>, Ana M. Azevedo<sup>3</sup>, Emanuel V. Capela<sup>2</sup>, A. C. A. Sousa<sup>1</sup>, Mara G. Freire<sup>2</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>CICECO – Aveiro Institute of Materials, Department of Chemistry, University of Aveiro, 3810-193 Aveiro, Portugal; <sup>3</sup>IBB – Institute for Bioengineering and Biosciences, Department of Bioengineering, Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais, 1049-001 Lisbon, Portugal

**Keywords:** Alternative solvents; Aqueous biphasic systems; Biopharmaceuticals; Downstream

**Objective:** This study investigated the capture and purification of monoclonal antibodies (mAbs) from serum-free and serum-containing Chinese Hamster Ovary (CHO) cell culture supernatants using IL-based aqueous biphasic systems (ABSs).

**Methods:** ABSs comprised of two polymers, polyethylene glycol (PEG) and dextran, and the ILs, 1-butyl-3-methylimidazolium bromide ([C4mim]Br) and cholinium acetate ([Ch][Ac]), were used to extract and purify mAbs from cell culture supernatants. Affinity chromatography performed on ÄKTA™ pure system facilitated the quantification of mAbs present in each ABS phase. mAbs integrity and activity were evaluated sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) protocol and enzyme-linked immunosorbent assay (ELISA), respectively.

**Results:** A single-step methodology utilizing ABSs achieved high recovery yields (%Yield<sub>IgG</sub>), which is defined as the percentage ratio between the amount of protein in the PEG-rich aqueous phase and the IgG concentration in the initial mixture, adjusted to volume differences. Namely, %Yield<sub>IgG</sub> of 81.5% and 85.4% were registered for [C4mim]Br and [Ch][Ac] respectively. Furthermore, high purity of IgG (%Purity<sub>IgG</sub>) were obtained, being calculated as percentage by dividing the concentration of IgG and the total proteins in the PEG-rich phase, it reached values of 69.3% and 92.4 for [C4mim]Br and [Ch][Ac]), respectively. A triplicate analysis of each sample was performed.

Additionally, protein's profile shown in SDS-PAGE gel revealed its integrity in each ABS phase and, subsequently, ELISA assay corroborated mAbs functional activity.

**Conclusions:** This study provides compelling evidence for the potential of ILs in streamlining the downstream processing of mAbs. IL-based ABSs facilitate a single-step purification strategy, offering significant advantages in terms of simplicity, cost-effectiveness, and processing time. These benefits culminate in improved accessibility of current mAb-based therapies.

## Non-MHC Ankylosing Spondylitis susceptibility in Azorean families

Bruno Filipe Bettencourt<sup>1,2</sup>, Jácome Bruges-Armas<sup>1</sup>

<sup>1</sup>Serviço Especializado de Epidemiologia e Biologia Molecular (SEEBMO), Hospital de Santo Espírito da Ilha Terceira, Angra do Heroísmo, Portugal; <sup>2</sup>Comprehensive Health Research Center, CHRC, Hospital de Santo Espírito da Ilha Terceira E.P.E.R., Angra do Heroísmo

**Keywords:** 2p15, B3GNT2, ERAP1, Spondyloarthritis

**Objective:** We intended to investigate the association of Single Nucleotide Polymorphisms (SNPs) in chromosomes 1, 2p, 4, 5, 9, 12, 17, and 21q with Ankylosing Spondylitis (AS) in HLA-B27-positive Azorean families.

**Methods:** The study included 15 AS and 14 control families (total of 124 subjects) accordingly with the following criteria: minimum two generations; one or more HLA-B27 positive subjects; one or more diagnosed AS patients (AS families); HLA-B27 positive subjects over 35 years old (control families); Portuguese (Azorean) origin; all signalized and diagnosed at Hospital de Santo Espírito da Ilha Terceira. Twenty-six SNPs were genotyped in fourteen regions: *RUNX3*, *IL23R*, *KIF21B*, *2p15*, *IL1A*, *IL1B*, *ANTXR2*, *PTGER4*, *ERAP1*, *IL12B*, *CARD9*, *LBTR-TNFRSF1A*, *TBKBPI*, *21q22* considering only <10% missingness. The MARKERINFO module of S.A.G.E. software detected possible genotyping errors and Mendelian inconsistencies. The Transmission Disequilibrium Test (TDT) and the Parental Discordance Test (PDT), as implemented in PLINK 1.07, calculated the transmission of specific alleles and SNP association analysis. The result evaluation took into account the combined test asymptotic p-value.

**Results:** The PDT revealed no associations. The TDT has shown an association with *IL23R*-rs1004819 (OR=0.1,  $p=1.2 \times 10^{-2}$ ), *ERAP1* - rs17482078 ( $p=1.6 \times 10^{-3}$ ), rs10050860 ( $p=1.6 \times 10^{-3}$ ) and rs2287987 ( $p=1.4 \times 10^{-2}$ ), all confirmed and increased by the combined test asymptotic p-value. The combined test indicated associations with 2p15 (*B3GNT2* region) - rs10865331 ( $p=1.8 \times 10^{-2}$ ) and with *CARD9* - rs10781500 ( $p=4.5 \times 10^{-2}$ ).

**Conclusions:** The available data on AS demonstrated that several non-HLA genes influence the disease risk, onset, and progression due to gene combination and interaction rather than a single SNP influence. Comparison of familial versus sporadic AS has revealed milder phenotypes in patients with familial AS, what could be explained by the influence of non-MHC genes, although there are contradictory conclusions. The obtained data reinforce the established association between *IL23R*, *ERAP1* and AS and highlights the influence of other genes and regions such as 2p15 and *CARD9*. To our knowledge, there are no other reports about AS association and 2p15 (*B3GNT2* region) in other European cohorts. The obtained results should be deepened in further studies among European populations. It should consider, with emphasis, the gene-environment interaction, especially in familial AS.

## Estimating the Disability-Adjusted Life Years of cardiovascular disease attributable to PM<sub>2.5</sub> exposure in Portugal

Mariana Corda<sup>1,2</sup>, Marta Clemente<sup>2</sup>, Ricardo Assunção<sup>1</sup>, Carla Martins<sup>2</sup>

<sup>1</sup>Egas Moniz Center for Interdisciplinary Research (CiiEM), Egas Moniz School of Health & Science, Caparica, Almada, Portugal; <sup>2</sup>NOVA National School of Public Health, Public Health Research Centre, Comprehensive Health Research Center (CHRC), NOVA University Lisbon, Lisbon, Portugal

**Keywords:** fine particles; comparative risk assessment; cardiovascular disease; DALYs

**Objective:** To estimate the DALYs attributable to exposure to PM<sub>2.5</sub> - cardiovascular diseases (CVD), between 2011 and 2021, in Portugal.

**Methods:** In-patient Morbidity Database and National Statistics Institute databases were used to collect the number of cardiovascular morbidity and mortality cases. The atmospheric levels of PM<sub>2.5</sub> were obtained from the Database on Air Quality of the Portuguese Environment Agency. DALYs for CVD were estimated considering the intermediate calculation of the number of years of life lost (YLL) and the number of years lived with disability due to morbidity (YLD). The CVD DALYs attributable to PM<sub>2.5</sub> exposure in the Portuguese adult population, older than 30 years, were determined using the population-attributable fraction (PAF).

**Results:** Between 2011 and 2021, in mainland Portugal, the exposure to ambient PM<sub>2.5</sub> was responsible for a total of 293,499.16 DALYs for IHD which corresponded to 26,681.74 per year (95% CI: 24,159.45 - 29,204.04). The PM<sub>2.5</sub> exposure was responsible for a total of 473,916.83 DALYs for stroke which corresponded to 43,083.35 per year (95% CI: 36,458.88 - 49,707.82). The estimated number of YLL for IHD and stroke has more weight in the estimate of DALYs than the YLD.

**Conclusions:** The cardiovascular impact of PM<sub>2.5</sub> exposure has been substantial in the last 10 years. Implementation of interventions to improve the air quality are needed to reduce the impact related to the exposure of the leading cause of death and disability in the Portuguese population and the associated costs.

---

## The economic burden of Acute Coronary Syndromes due to ambient PM<sub>2.5</sub> exposure in Portugal, 2011-2021

Francisco Madeira<sup>1</sup>, Carla Martins<sup>1</sup>, Mariana Corda<sup>1,2</sup>, Julian Perelman<sup>1</sup>

<sup>1</sup>NOVA National School of Public Health, Public Health Research Centre, Comprehensive Health Research Center (CHRC), NOVA University Lisbon, Lisbon, Portugal; <sup>2</sup>Egas Moniz Center for Interdisciplinary Research (CiiEM), Egas Moniz School of Health & Science, Caparica, Almada, Portugal

**Keywords:** Fine particles, air pollution, cardiovascular diseases, economic evaluation

**Objective:** To estimate the attributable and avoidable economic burden of acute coronary syndromes (ACS) due to ambient particulate matter (PM) with a diameter of 2.5µm or less (PM<sub>2.5</sub>) exposure in Portugal between 2011 and 2021.

**Methods:** The annual incidence of ACS (hospitalisations and deaths) during the 11 years under study was determined using national databases. A direct, bottom-up, micro-costing analysis was used to calculate the average annual costs to assess the direct economic burden of ACS. Morbidity and mortality population attributable fraction (PAF) values were considered to estimate hospital admissions, deaths and the costs attributable to exposure to ambient PM<sub>2.5</sub>. An additional scenario was considered for the years 2019 and 2021, based on the World Health Organization (WHO) Air Quality Guidelines (AQG) for 2021. The potential impact fraction (PIF) was applied to estimate avoidable morbidity and mortality costs.

**Results:** Exposure to ambient PM<sub>2.5</sub> was responsible for 7,395 ACS hospital admissions, with a direct cost of more than 50 million euros, and 10,756 ACS deaths, with a cost of more than 196 million euros. In 2019, implementation of the proposed 2021 WHO AQG could have potentially prevented 336 cases and 451 deaths, resulting in savings of approximately 4.5 million euros. In 2021, the estimated avoided costs would have been approximately 4.24 million euros, corresponding to 158 cases and 360 deaths prevented. Although recommended in the literature for environmental burden of disease calculations, the use of PAF encompasses the limitation of assuming independence between exposure and outcome and may not be accurate in scenarios involving interacting risk factors.

**Conclusions:** PM<sub>2.5</sub> pollution in Portugal drives ACS morbidity and mortality, with significant economic costs. Compliance with WHO AQG promises a substantial reduction in the incidence of ACS, saving millions in health care expenditure annually.

---

## Communicating with people undergoing laryngectomy: integrating new technologies in the post-operative period

Inês Rodeira<sup>1</sup>, Madalena Tomé<sup>1</sup>, Susana Mendonça<sup>2</sup>, Ana Ramos<sup>3</sup>, Sara Morais Pires<sup>4</sup>

<sup>1</sup>Student at the Lisbon School of Nursing, Portugal;

<sup>2</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>3</sup>Center For Nursing Research of Lisbon, Lisbon School of Nursing, Portugal; <sup>4</sup>Center For Nursing Research of Lisbon, Lisbon School of Nursing, Portugal

**Keywords:** communication; nursing care; technological innovations; laryngectomy; post-surgery

**Objective:** To identify technological innovations that promote communication with the laryngectomized person in the post-operative period.

**Methods:** Integrative literature review, according to Whittemore & Knafl (2005), with a search in the EBSCO and Google Scholar search engine databases, with the following MeSH descriptors: “Cancer Patients”, “Nursing Care”, “Communication”, “Technology” and “Assistive technology devices”, retrospectively from January 1, 2014 to May 1, 2024.

**Results:** From a total of 243, 10 articles of primary and secondary studies were selected, with different methodological designs: systematic reviews (n=4), observational studies (n=5), qualitative (n=1). The research was carried out in Portugal (n=1), Brazil (n=3), the United Kingdom (n=1), Canada (n=1) and the United States of America (n=4). Communication is a basic nursing tool that enables person-centered care and effective interventions. Technological innovations can optimize the communication process and can be divided into three categories: i) electronic devices, such as iPad, Tablet, Smartphone, Computer and SpringBoard which allow messages to be stored, retrieved and speech generated through voice synthesizers present in all these devices; ii) communication applications and software, such as Verbally, Proloquo2Go, Scala Alternative Communication System, Boardmaker, Speaking Dynamically Pro, Amplisoft, Livox, TalkRocketGo, Speak it, which are examples of software and applications that allow text, symbols and images to be converted into artificial voice; and iii) technologies in the pilot phase, such as the prototype under development Silent Speeches Interfaces, which attempts to automatically recover the speech produced by the person, thus revolutionizing the communication strategies available.

**Conclusions:** The integration of new technologies in laryngectomy situations provides an alternative method of effective verbal communication for people with speech disorders.

## Self-Care Needs in Persons Living with a Chronic Condition: A Systematic Review

Marques, M.<sup>1,2</sup>, Escoval, A.<sup>1,3</sup>, Nicolau, V.<sup>1,3</sup>, Mendonça, S.<sup>1,2</sup>,  
Moreira, J.<sup>1,2</sup>, Bico, I.<sup>1,2</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Nursing Department, University of Évora, 7000-811 Évora, Portugal; <sup>3</sup>NOVA National School of Public Health, Public Health Research Center, Lisboa, Portugal

**Keywords:** Chronic diseases; Needs assessment; Multimorbidity; People-centered care

**Objective:** To identify the self-care needs of an aged persons living in their own residences with a chronic condition or multiple chronic conditions. A systematic review was performed to identify the self-care needs of an aged persons living in their own residency with a chronic condition or multiple chronic conditions, in high income countries.

**Methods:** Two electronic databases were searched, MEDLINE (PubMed) and Web of Science, between January 1, 2017, and April 2023. An analysis of the studies was carried out in order to extract, synthesize, and clarify the data. Registration in PROSPERO (CRD42023429034). The evaluation of the methodological quality of included studies was performed by four researchers, in accordance with the Joanna Briggs Institute guidelines.

**Results:** In the included studies (n=14), which identified self-care needs in older people with multimorbidity, they considered three dimensions - Self-maintenance (n=10); Self-monitoring (n=6); Self-management (n=4). The methods and tools that researchers used most frequently to identify and analyze self-care needs were questionnaires and interviews. All the participants with self-care needs had two or more chronic pathologies (diabetes, cardiovascular disease, arthritis, kidney disease, among others). Health priorities for optimising the self-care of the target population were identified as: acquiring knowledge about diseases and health literacy; the importance of spirituality; social and family support; and personalised strategies for managing the disease. Regarding treatment, it was found that an integrative approach is accepted by non-institutionalised elderly people with multimorbidity, as well as by health professionals.

**Conclusion:** It is crucial to prioritize self-care for older adults with multimorbidity who are living independently, by adopting an integrated approach to their healthcare that addresses their unique needs.

## Effect of exercise training on prostate remodeling in a rat model of prostate cancer

Elisabete Nascimento-Gonçalves<sup>1</sup>, Fernanda Seixas<sup>2</sup>,  
Ana I. Faustino-Rocha<sup>1,3</sup>, Maria João Neuparth<sup>4,5</sup>, Paula A. Oliveira<sup>1</sup>

<sup>1</sup>Centre for the Research and Technology of Agro-Environmental and Biological Sciences (CITAB), Institute for Innovation, Capacity Building and Sustainability of Agri-Food Production (Inov4Agro), UTAD, Vila Real, Portugal; <sup>2</sup>CECAV, Associate Laboratory for Animal and Veterinary Science (AL4Animals), UTAD, Vila Real, Portugal; <sup>3</sup>Comprehensive Health Research Centre, Department of Zootecnics, University of Évora, Évora, Portugal; <sup>4</sup>Laboratory for Integrative and Translational Research in Population Health (ITR), Research Center in Physical Activity, Health and Leisure (CIAFEL), Faculty of Sports, University of Porto, Porto, Portugal; <sup>5</sup>Toxicology Research Unit, University Institute of Health Sciences (TOXRUN), CESPU, Gandra, Portugal

**Keywords:** animal model; physical activity; oncology; rodent  
**Objective:** This study aimed to evaluate the effects of exercise training on a hormonally and chemically-induced rat model of prostate cancer (PCa).

**Methods:** Forty male Wistar Unilever rats were assigned to four groups (n=10/group): control-sedentary, PCa-sedentary, control-exercised and PCa-exercised. The treadmill exercise program started at 8 weeks of age and continued for 28 weeks (5 days/week). PCa induction commenced at 12 weeks of age through a sequential administration of flutamide (50mg/kg), testosterone propionate (100mg/kg), N-methyl-N-nitrosourea (30mg/kg), and subcutaneous implants of crystalline testosterone. The animals were sacrificed at 35 weeks of age, and a necropsy was performed. Data were analysed using SPSS.

**Results:** The final body weight of PCa animals was significantly lower when compared to the matched controls (p<0.05). Moreover, the body weight was lower in exercised groups than in sedentary groups (control-exercised: 408.47±7.38g, PCa-exercised: 366.05±4.05g, control-sedentary: 471.72±9.82g and PCa-sedentary: 408.47±7.38g; p<0.05). The relative prostate weights were significantly higher in the PCa-induced groups (p<0.05) and exercised groups (p>0.05) when compared with their respective control groups (control-exercised: 0.003±0.000g, PCa-exercised: 0.005±0.000g, control-sedentary: 0.002±0.000g and PCa-sedentary: 0.004±0.000g). No significant differences were observed in the serum levels of albumin, total protein, glucose and ALT among the groups. An increase in testosterone concentration was observed in PCa-exercised group compared to PCa-sedentary group (2603.24±239.09 and 1862.20±370.74pg/mL, respectively, p>0.05). Dorsolateral prostate lesions were classified as dysplasia, prostatic intraepithelial neoplasia, and microinvasive carcinoma. Although differences were not statistically significant, rats from PCa-induced groups showed a high number of dorsolateral prostate lesions compared to the control groups (p>0.05).

**Conclusions:** Our results suggest that neither the duration nor the type of exercise implemented in this study was able to prevent the influence of chronic testosterone exposure on prostate remodeling. These findings indicate a need for further investigation to clarify the role of exercise training in prostate cancer prevention.

---

## Health literacy among displaced higher education students in the Alentejo region, Portugal – a cross-sectional study

Jorge Rosário<sup>1,2,3</sup>, Sónia Dias<sup>1,4</sup>, Ana Rita Pedro<sup>1,4</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Polytechnic Institute of Beja, Beja, Portugal;

<sup>3</sup>Institute for Research and Advanced Training, University of Évora, Évora, Portugal; <sup>4</sup>NOVA National School of Public Health, Public Health Research Centre, NOVA University Lisbon, Lisbon, Portugal

**Keywords:** Health Literacy; Higher Education Students, Alentejo

**Objective:** To determine the level of health literacy and to analyse its relationship with determinants among displaced higher education students in the Alentejo region of southern Portugal.

**Methods:** An observational, cross-sectional study was carried out between May and September 2023 with 934 higher education students in Alentejo. A structured online questionnaire was applied, consisting of the Portuguese version of the European Health Literacy Survey Questionnaire - 16 items (HLS-EU-PT-Q16). The study data were analysed using the independent samples t-test, one-way ANOVA and Bonferroni post-hoc test, followed by multivariate logistic regression analyses with a significance level of 0.05. The study protocol was approved by the Ethics Committee of the University of Évora, and all participants gave written informed consent.

**Results:** It was found that 85.1% of students had limited health literacy. The mean score of the general health literacy index among higher education students was  $18.1 \pm 12.6$  (on a scale of 0 to 50). Regression analysis showed that lower levels of health literacy were associated with the presence of chronic disease ( $p < .001$ ). Conversely, higher levels of health literacy were associated with older age ( $p = .029$ ), enrolment in health-related courses, living with a health professional, perceived financial stability and satisfactory health status ( $p < .001$ ).

**Conclusions:** The observed percentage of limited health literacy may compromise the health and well-being of displaced higher education students in the Alentejo. These findings contribute to the design and development of targeted interventions aimed at improving health literacy among higher education students and improving health outcomes in the region.

---

## Assessment of antimicrobial susceptibility patterns and resistance-associated genes prevalence in environmental *Legionella* spp. isolates from Portugal

Bernardo Beirão Pereira<sup>1</sup>, Carolina Cruz<sup>2</sup>, Ricardo Santos<sup>3,4</sup>, Margarida Passanha<sup>5</sup>, Paulo Paixão<sup>2</sup>, Maria Jesus Chasqueira<sup>2</sup>

<sup>1</sup>NOVA Medical School, Faculdade de Ciências Médicas, Universidade NOVA de Lisboa, Lisboa, Portugal; <sup>2</sup>CHRC, NOVA Medical School, Faculdade de Ciências Médicas, Universidade NOVA de Lisboa, Lisboa, Portugal; <sup>3</sup>CERIS, Instituto Superior Técnico, Universidade de Lisboa, Lisboa, Portugal; <sup>4</sup>Laboratório de Análises de Água, Instituto Superior Técnico, Universidade de Lisboa, Lisboa, Portugal; <sup>5</sup>Laboratório de Saúde Pública do Alentejo, Évora, Portugal

**Keywords:** *Legionella*; Antimicrobial susceptibility; Resistance; Public Health

**Objective:** In this study, we evaluated the susceptibility patterns and the presence of resistance-associated genes in environmental *Legionella* spp.

**Methods:** The EUCAST microdilution method was used to assess the susceptibility pattern for 83 environmental isolates, recovered in Portugal over a year, for 8 antimicrobials. Resistance-associated genes *tet56* and *lpeAB*, which encode the tetracycline destructase Tet56 and the efflux pump LpeAB, were screened using PCR for 156 DNA extracts. Sanger sequencing for *gyrA* was performed to identify mutations in the quinolone resistance-determining regions. In *lpeAB*-positive isolates, efflux pump activity was assessed through inhibition assays.

**Results:** Overall, the susceptibility pattern identified was higher than that reported by EUCAST. Fluoroquinolones showed the greatest inhibition in opposition to the tetracyclines. Sixteen percent of the isolates showed a non-wild type (NWT) profile where azithromycin was the antimicrobial with the highest NWT isolates (10/83). The *tet56* gene was detected for the first time in the *bozemani* species, and a mutation in codon 101 of the *gyrA* gene was identified in 3 isolates with loss of susceptibility for quinolones. The *lpeAB* gene was present in 21% of the sample and inhibition of this efflux pump increased susceptibility 2-4 fold.

**Conclusions:** This study revealed worrying data for public health given the high prevalence of the resistance-associated genes found in the Portuguese environmental *Legionella* spp.

---

## Effect of a 16-week Combined Supervised Exercise Program on Sarcopenia prevention after bariatric surgery based on FNIH, EWGSOP2, EASO/ESPEN criteria – The results of the EXPOBAR randomized trial program

Cláudia Mendes<sup>1,2,3,4</sup>, Manuel Carvalho<sup>1,2</sup>, Jorge Bravo<sup>3,4</sup>, Sandra Martins<sup>5,6</sup>, Armando Raimundo<sup>3,4</sup>

<sup>1</sup>Unidade Local Saúde Alentejo Central - Hospital Espírito Santo de Évora, EPE, Évora, Portugal; <sup>2</sup>CRI.COM - Centro Responsabilidade Integrada de Cirurgia da Obesidade e Metabólica, Évora, Portugal; <sup>3</sup>CHRC - Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>4</sup>Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Portugal; <sup>5</sup>Universidade Europeia, Lisboa, Portugal; <sup>6</sup>Instituto de Saúde Ambiental (ISAMB), Faculdade de Medicina da Universidade de Lisboa, Lisboa, Portugal

**Keywords:** exercise, bariatric surgery, fat-free mass, sarcopenia, skeletal muscle mass, quality of life

**Objective:** Bariatric surgery stands as a recognized treatment option for severe obesity. However, bariatric surgery may lead to a decrease in skeletal muscle mass and strength, increasing the risk of sarcopenia among patients after surgery. This randomized clinical trial aims to study the effects of a 16-week supervised combined exercise program on the prevention of sarcopenia in patients undergoing bariatric surgery.

**Method:** A total of 37 bariatric surgery candidates were included in the EXPOBAR (EXercise POst BARIatric) program and randomized into experimental and control groups. The intervention has a duration of 16 weeks and started one month after surgery. Body composition and physical fitness parameters were determined. For each participant, outcomes were measured at five different time points. The bariatric procedure was gastric bypass in all cases.

**Results:** After surgery, there was a decrease in muscle strength and quality, but there was a less marked reduction in both parameters in the intervention group. Our results show that there is an important impact on the improvement of functional physical capacity and strength with combined exercise after an initial decline following bariatric surgery. Exercise was able to reverse functional and strength loss that was the result of surgery, with a reduction in the number of patients at risk of sarcopenia after obesity surgery. Physical and functional capacity is an important parameter that can be improved with exercise and is an important non-invasive indicator for diagnosing muscle quality and sarcopenia.

**Conclusion:** Long-term management of sarcopenic and sarcopenia obesity in the setting of bariatric surgery requires ongoing monitoring of both body composition and muscle function. Regular assessments of skeletal muscle mass, strength, and functional status are essential for tracking progress and optimizing treatment strategies over time.

---

## Patient centered and task centered care: impact on patients with pressure ulcers in long term care

Katia Furtado<sup>1,2</sup>, Paulo Infante<sup>3,4</sup>, Filipa Cartaxo<sup>5</sup>, Ligia Banha<sup>5</sup>, Daniela Rodrigues<sup>6</sup>, Diana Pires<sup>6</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Outpatient Department, Hospital of Portalegre, Unidade Local de Saúde do Alto Alentejo, 7300-312 Portalegre, Portugal; <sup>3</sup>CIMA, IIFA, Universidade de Évora, 7000-671 Évora, Portugal; <sup>4</sup>Departamento de Matemática, ECT, Universidade de Évora, 7000-671 Évora, Portugal; <sup>5</sup>Unidade de Cuidados Continuados Inácio Coelho Perdigão; <sup>6</sup>Unidade de Cuidados Continuados Fundação Joaquim António Franco e seus Pais

**Keywords:** Complex intervention; Knowledge; Nursing; Quality of Care; Work Environment

**Objective:** Pressure ulcers (PU) can be painful and negatively affect health-related quality of life and healthcare costs. Many people living in nursing homes and in long-term care units are at risk of developing a PU due to age, immobility and multiple comorbidities. This study aimed to develop and test a nursing intervention to prevent PU in long term care units in Alentejo.

**Methods:** We performed three quantitative studies to identify barriers and facilitators in structure and process associated with prevention and treatment of patients with PU: (1) To assess knowledge, we have used the Pressure Sore Status Tool; (2) Quality of care was evaluated using the Pressure Sore Score Tool and wounds documentation in the electronic platform; (3) Nursing work environment was evaluated through Nursing Work Environment Revised tool. The Medical Research Council framework was used for the development and implementation phases. The intervention was developed according to the barriers and facilitators found in the quantitative studies. first phase of the Framework for Developing and Evaluating Complex Interventions. Secondly, the intervention protocol was tested in three units as a pilot study. The intervention comprised empowerment of nurses responsible for the implementation in their units (5 evidence-based practice actions monitored in each shift) developing of a friendly documentation platform, online education on prevention of PU and monthly visits from two experts in order to help the implementation phase. The pilot study was conducted between July and December of 2023. The control group just received online education on PU.

**Results:** The intervention was tested in 58 patients with mobility problems, with mean age of 77 years old. Initial PU prevalence was 15,1%. Healing rate in the intervention group was 67,5% compared with 19,1% in the control group. The selected actions: Pain, nutrition, hydration, moisture control and use support surfaces were better managed by nurses in the intervention group and PU incidence rate was 3% compared with 18,1% in the control group.

**Conclusions:** We found evidence that involving nurses in Institution projects and top decisions are strategies to promote knowledge transfer, capacity building and evidence-based practice in long-term care units.

## Motor competence of 10-year-old children according to the type and weekly frequency of sports practice

Vítor Padinha<sup>1,2</sup>, Hugo Folgado<sup>1</sup>, Tomás Aleixo<sup>1</sup>, Raul Rosa<sup>1</sup>, Rodrigo Silva<sup>1</sup>, Nuno Batalha<sup>1</sup>, Gabriela Almeida<sup>1</sup>

<sup>1</sup>Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Portugal Comprehensive Health Research Centre (CHRC), Universidade de Évora, Portugal; <sup>2</sup>Sport Physical Activity and Health Research & Innovation Center (SPRINT), Centro de Investigação e Inovação em Desporto, Atividade Física e Saúde, 2001-904 Santarém, Portugal

**Keywords:** Children; Individual Sports; Motor Competence; Sports Practice; Team Sports

**Objective:** Describe and compare Motor Competence of 10-year-old children according to two dimension of their sports practice – type of sports: no practice, individual, team sports, both individual and team sports; and weekly frequency: no practice, 1 to 2 times per week, 3 to 4 times per week, more than 4 times per week.

**Methods:** Motor Competence of 142 primary school age children (68 girls; 74 boys; mean age = 9.96 ± 0.36) was assessed by the Motor Competence Assessment (MCA) Scoring Method. Results were normalized into percentile for comparison. Sports practice information was collected via a parent-reported questionnaire.

**Results:** Children enrolled in sports practices demonstrated higher motor competence, with a positive correlation between the frequency of weekly practice and motor competence. Children involved in team sports exhibited higher motor competence than those in individual sports, but the highest results were observed in children practicing both types of sports.

**Conclusions:** Practicing sports more frequently and engaging in various types of sports are associated with higher levels of motor competence.

## Impact of psychomotor interventions on postural control in stroke patients: case-control series

Ana Simeão<sup>1,2,3</sup>, Gabriela Almeida<sup>1,2</sup>, Catarina Pereira<sup>1,2</sup>

<sup>1</sup>Arronches Health Care Unit, Portugal; <sup>2</sup>Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Évora, Portugal; <sup>3</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal

**Keywords:** posture, stroke recover, haemorrhagic stroke; ischemic stroke

**Objective:** To determine the effects of two psychomotor interventions on postural control in stroke patients.

**Methods:** 45 stroke cases were distributed into a control intervention (CI, n: 15) and two experimental interventions (EI1, n: 15 and EI2, n: 15). The CI was a conventional rehabilitation intervention (physiotherapy: 5 sessions/week). EI1 included physiotherapy (5 sessions/week) added to psychomotor intervention comprising praxis gnosis and global motricity (5 sessions/week); EI2 included physiotherapy (5 sessions/week) added to

psychomotricity comprising global motricity sessions (5 sessions/week). The 3 intervention sessions lasted 40 minutes, for 12 weeks. Postural Assessment Scale for Stroke (PASS) was used to assess postural control. This scale is divided into two subscales: maintenance (MPS) and changing posture (CPS), with highest scores 15 and 21 respectively.

**Results:** The comparisons performed by the Wilcoxon test showed that all interventions induced improvements in PASS scores on MPS and CPS,  $p \leq 0.05$ . Comparisons intergroup performed by Kruskal-Wallis regarding the variation ( $\Delta$ : post-intervention-baseline) evidenced differences significant differences between interventions variation on MPS ( $\Delta E1_{MPS}$ : 7.6 vs.  $\Delta E2_{MPS}$ : 5.3 vs.  $\Delta CI_{MPS}$ : 3.6 points,  $p = 0.011$ ), in which pairwise post-test has shown that the differences were between the EP1 and the CI variation. On the CPS variation, no differences between groups were found ( $\Delta E1_{CPS}$ : 7.8 vs.  $\Delta E2_{CPS}$ : 6.7 vs.  $\Delta CI_{CPS}$ : 6.3 points,  $p: 0.719$ ).

**Conclusion:** The study results showed that the psychomotor intervention comprising praxis gnosis and global motricity effectively maximized post-stroke rehabilitation's impact on postural control. Thus, this intervention would be an appropriate complementary therapy for continued poststroke rehabilitation.

## Influence of Sociodemographic Variables on Physical, Mental, and Social Dimensions in Middle-Aged Adults in Baixo Alentejo, Portugal: A Cross-Sectional Study

Eunice Santos<sup>1,2</sup>, Lara Pinho<sup>1,3</sup>, Helena Arco<sup>1,4</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Institute for Research and Advanced Training, University of Évora, Évora, Portugal; <sup>3</sup>University of Évora, Évora, Portugal; <sup>4</sup>Polytechnic Institute of Portalegre, Portalegre, Portugal

**Keywords:** Sociodemographic Factors; Middle-aged Adults; Health Outcomes

**Objective:** To analyse the relationship between sociodemographic variables and the physical, mental and social dimensions of middle-aged adults aged 55 to 59 in Baixo Alentejo, Portugal.

**Methods:** An observational, cross-sectional study was conducted between May 2023 and February 2024, involving 366 middle-aged adults aged between 55 and 59 years. A structured questionnaire was used, including the Portuguese version of the World Health Organization Disability Assessment Schedule 2.0 12-item (WHODAS 2.0 - PT12), the Patient Health Questionnaire-9 (PHQ-9) and the Satisfaction with Social Support Scale (SSSS). Participants' sociodemographic characteristics, including gender, marital status, educational level, employment status, and socioeconomic status, were collected and analysed. Given the sample size and the central limit theorem, parametric tests such as t-Student test and one-way ANOVA were used, followed by linear regression analyses with a significance level of .05. The study protocol was approved by the Ethics Committee of the University of Évora, and all participants gave written informed consent.

**Results:** The sample comprised 35% males and 65% females; 61.2% were married. Regarding education, 40.2% had completed secondary education, 24% had basic education, and 35.8% had higher education. Employment status showed that 82.0% were employed, and 51.4% reported that their monthly income was sufficient with some difficulty. The mean score on WHODAS 2.0 – PT12 was  $17.7 \pm 6.7$ , with a median value of 15.5, a minimum score of 12, and a maximum of 53. The mean score on the Patient Health Questionnaire was  $4.5 \pm 4.6$ , with a median value of 3, a minimum score of 0, and a maximum of 26. The mean score on the Satisfaction with Social Support scale was  $77.2 \pm 13.8$ , with a median value of 77.3, a minimum score of 28, and a maximum of 100. The results indicated that gender, education level, and socioeconomic status were predictors of disability ( $p < .001$ ). The results indicated that socioeconomic status was a predictor of depressive symptoms ( $p < .001$ ), while gender was identified as a predictor of social support ( $p < .001$ ).

**Conclusions:** These findings will help to design and develop targeted interventions to improve health outcomes in the region. This study is justified by the need for specific and contextualised data to support health policies and clinical practices adapted to the unique characteristics of the Baixo Alentejo population. The results will contribute to the development of programmes to promote active and healthy lifestyles.

### Violence Towards Health Professionals in the Alentejo Region

Otilia Zangão<sup>1,2</sup>, Laurência Gemito<sup>1,2</sup>, Anabela Coelho<sup>1,2</sup>, Antónia Chora<sup>1,2</sup>, Luz Barros<sup>1,2</sup>, Dulce Cruz<sup>1,2</sup>, Isaura Serra<sup>1,2</sup>, Carolina Santos<sup>1,3</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>Departamento de Enfermagem, Escola Superior de Enfermagem São João de Deus, Universidade de Évora, Évora, Portugal; <sup>3</sup>Escola Nacional de Saúde Pública, Universidade Nova de Lisboa, Lisboa, Portugal

**Keywords:** Workplace Violence; Health Personnel; Nurses, Male; Physicians

**Objective:** To analyze the context of violence against health professionals in the Alentejo region.

**Methods:** Descriptive and exploratory study, with methodological triangulation. A qualitative study was carried out on the “perceptions and practices of regional, institutional and local focal points in the context of violence against health professionals”. 48 semi-structured interviews were carried out until data saturation. Data analysis using IRaMuTeQ software version 0.7 alpha 2. A quantitative study “Violence against nurses and doctors in the Alentejo region”. This was followed by a Simple Random Probabilistic Sampling of 440 nurses and doctors from health institutions in the Alentejo region. A structured questionnaire was applied via electronic link. Data analysis using IBM SPSS Statistic version 28.

**Results:** In the first study, from the perspective of the focal points, the importance of safety and continuous training in relation to the management and prevention of violence in healthcare teams stands out. There is a concern to carry out a systematic

analysis of episodes of violence in order to understand the causes, consequences and possible improvements in procedures. In the second study, we found that 38.9% of the respondents, doctors and nurses, had already been victims of violence in their workplace. Of these, the majority (94.15%) had suffered psychological violence and 46.19% had suffered physical violence, of which 11.7% said they were victims of ongoing episodes and 3.5% said the situation of violence was permanent. The situation of violence was reported in the local notification system by 41.57% of the participants and only 26.97% did so in NOTIFICA.

**Conclusions:** Most of the participants recognized the importance of the issue. The importance of training to acquire skills in situations of violence is highlighted. It should be noted that violence against health professionals is a significant problem in the Alentejo region, and that measures are needed to combat violence, in particular to counteract the underreporting of cases of violence in this region.

### Non-pharmacological interventions in depression, anxiety and stress among university students: A systematic review and meta-analysis

Pedro Amaro<sup>1,2</sup>, César Fonseca<sup>1,3</sup>, Anabela Afonso<sup>4,5</sup>, Sabina Valente<sup>2,6</sup>, Revés Silva<sup>1</sup>, Lara Guedes Pinho<sup>1,3</sup>

<sup>1</sup>Comprehensive Health Research Centre, Universidade de Évora, Évora, Portugal; <sup>2</sup>CARE -Research Center on Health and Social Sciences, Instituto Politécnico de Portalegre, Portalegre, Portugal; <sup>3</sup>Nursing Department, Universidade de Évora, Évora, Portugal; <sup>4</sup>CIMA, IIFA, Universidade de Évora, 7002-554 Évora, Portugal; <sup>5</sup>Mathematics Department, ECT, Universidade de Évora, 7000-671 Évora, Portugal; <sup>6</sup>Research Center in Education and Psychology, Universidade de Évora, Évora, Portugal

**Keywords:** Mental health, psychological well-being, therapeutic

**Objective:** The aim of this study was to synthesize scientific evidence on the effects of nonpharmacological interventions in depression, anxiety, and stress symptoms among university students.

**Methods:** EBSCO databases (CINAHL Plus, MEDLINE, Psychology and Behavioural Sciences Collection), PubMed, and Scopus were searched comprehensively for articles (randomised control trials) with results of interventions in depressive, anxiety, and stress symptomatology in college students. Articles published between 2017 and 2023 were included in this systematic review of the literature with meta-analysis. The quality of the studies quality was evaluated (Joanna Briggs Institute critical appraisal tools), and sensitivity (Egger’s test, I-squared, Cochran’s Q test, subgroup analysis) were analysed. Used as effect size the standardized mean difference (Hedge’s  $d_{adjusted}$  g).

**Results:** Our review included 57 articles with outcomes for depression (n=37), anxiety (n=36) and stress (n=29), involving 5566 university students from several countries (Australia, Belgium, Brazil, Canada, China, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Nigeria, South Korea, Southeast Nigeria, Spain, Sweden, Switzerland, Turkey, UK, USA). Interventions were grouped by domains (cognitive behavioral,

exercise, relaxation, sensory therapies, support group and healthy lifestyle), cognitive behavioral therapy had a large effect on depression symptoms (Hedge's  $g_{\text{adjusted}} = 1.11$ ,  $p < .001$ ) and a small effect on anxiety symptoms (Hedge's  $g_{\text{adjusted}} = .46$ ,  $p < .001$ ). Self-compassion therapies had a large effect on reducing stress in college students (Hedge's  $g_{\text{adjusted}} = 1$ ,  $p < .001$ ).

**Conclusions:** Non-pharmacological therapies show promising results as mental health-promoting responses in university students. It is therefore important to include it in the plans to promote the mental health of students developed by the institutions with the collaboration of all school stakeholders.

---

### Is *Pteridium aquilinum* a partner of cancer?

#### Preliminary data from K14-HPV16 transgenic mice

Medeiros-Fonseca B<sup>1,2</sup>, Faustino-Rocha, AI<sup>1,3,4</sup>, Neuparth MJ<sup>5</sup>  
Medeiros R<sup>2</sup>, Gil da Costa RM<sup>6</sup>, Oliveira PA<sup>1</sup>

<sup>1</sup>CITAB, Inov4Agro, UTAD, Vila Real, Portugal; <sup>2</sup>Molecular Oncology and Viral Pathology - IPO Porto, Porto, Portugal;

<sup>3</sup>Department of Zootechnics, ECT, University of Évora, Évora, Portugal; <sup>4</sup>CHRC, Évora, Portugal; <sup>5</sup>UCIBIO, Gandra, Portugal;

<sup>6</sup>PPGSAD, São Luís, Brazil

**Keywords:** extract, HPV16, rodent, toxicological

**Objective:** *Pteridium aquilinum* (PA) contains a carcinogenic compound called ptaquiloside, which may promote cancer induced by human papillomavirus (HPV). Humans are exposed to this compound through ingestion of the plant, physical contact with the spores, ingestion of milk and meat from animals fed on

the plant, or through contact with contaminated soil and water. Our work aimed to evaluate the effects of PA extract on biochemical parameters (albumin, alanine aminotransferase, creatinine and urea) of K14-HPV16 transgenic mice.

**Methods:** The study was approved by ORBEA and DGAV (014139). Twenty female mice aged between 35 and 37 weeks were used. The PA extract was freshly prepared every two days and administered in drinking water, for 28 days. The mice were divided into four groups (n=5): GI (HPV16, control), GII (HPV16, 0.0125g/ml), GIII (HPV16, 0.025g/ml), GIV (HPV16, 0.05g/ml). Body weight, food, and water consumption were recorded. Animal welfare was assessed daily. At the end of the study, the animals were humanely sacrificed. Blood was collected for analysis of biochemical parameters. Data were analyzed using SPSS.

**Results:** All treated groups showed higher values of albumin than the control. Inversely, treated groups showed lower values of alanine aminotransferase (ALAT) than the control. The variability of creatinine between groups was minimal. Urea levels were lower in the treated groups compared to the control. Statistically significant differences were not found among groups for any of the parameters ( $p > 0.05$ ).

**Conclusions:** Our results suggest that the PA extract appears to have a beneficial effect on certain biochemical parameters, including increased albumin levels, and decreased urea and ALAT levels. This suggests a potential hepatoprotective property or a beneficial effect of the extract on liver function and protein metabolism. However, creatinine levels did not appear to be significantly affected by the treatment. In order to draw more definitive conclusions, we are processing additional results to better understand the mechanism under action.

- Abreu, Ana 14  
 Advinha, Ana Margarida 11, 15  
 Afonso, Anabela 28  
 Aguiar, Pedro 10, 13  
 Aires-Barros, M. Raquel 21  
 Aleixo, Tomás 27  
 Alfaiate, Filipe 15  
 Almeida, Gabriela 27  
 Alves, Joana 13  
 Alves, Maurício 9  
 Amaral, Palmira 8  
 Amaro, Pedro 28  
 André, Alexandre 6  
 Arco, Helena 27  
 Assunção, Ricardo 22  
 Azevedo, Ana M. 21
- Banha, Ligia 26  
 Barata, Maria João 10  
 Barcelos, Anabela 17  
 Barros, Luz 28  
 Batalha, Nuno 15, 27  
 Bettencourt, Bruno Filipe 22  
 Bico, Isabel 6, 7, 20, 24  
 Braga, Sofia 6  
 Bränström, Richard 18  
 Bravo, Jorge 7, 11, 14, 26  
 Brito, João Paulo 15  
 Bruges-Armas, Jácome 22  
 Bule, Maria J. 6, 7
- Cabo, Carolina A. 5  
 Caldeira, Ermelinda 9, 20  
 Campos, Lara 12  
 Campos, Rui C. 6  
 Canhão, Helena 17  
 Capela, Emanuel V. 21  
 Cardoso, Inês 16  
 Cartaxo, Filipa 26  
 Carvalho, Joana 7  
 Carvalho, Manuel 26  
 Carvalho, Maria Úrsula 18  
 Chasqueira, Maria Jesus 25  
 Chora, Antónia 28  
 Clemente, Marta 13, 22  
 Coelho, Anabela 9, 28  
 Corda, Mariana 13, 22, 23  
 Costa, Bruna 18  
 Costa, Paula 11  
 Cruz, Carolina 25  
 Cruz, Dulce 28  
 Cruz, Eduardo 18
- Cruz, Eduardo B. 12  
 Cruz, Eduardo Brazete 13
- de Oliveira-Martins, Sofia 11  
 Dias, Ana 9  
 Dias, Carlos 19  
 Dias, Sónia 17, 25  
 Dinis, Joana Silva 14  
 Donato, Helena 12  
 Duarte, Carlota 17  
 Duarte, Susana Tinoco 13
- Escoval, A. 24  
 Espada, Mário C. 5
- Faria, Liliana 11  
 Faustino-Rocha, Ana I. 24, 29  
 Fernandes, João Paulo 15  
 Fernandes, Orlando 5, 15  
 Fernandes, Rita 18  
 Fernandes, Sónia 18  
 Folgado, Hugo 27  
 Fonseca, César 20, 21, 28  
 Freire, Mara G. 21  
 Freitas, José 17  
 Furtado, Katia 26
- Gaio, Vânia 8  
 Garcia, Ana Cristina 19  
 Gemito, Laurência 28  
 Gil da Costa RM 29  
 Goes, Margarida 9, 10, 16, 21  
 Gonçalves, Bruno 15  
 Gonçalves, Catarina 11, 14  
 Graça, Ricardo 14  
 Guiomar, Raquel 8
- Heleno, Bruno 13  
 Henriques, Ana Rita 14, 17  
 Henriques, Camila 8
- Infante, Paulo 26
- Lança, Carla 10  
 Leite, Andreia 19  
 Lista, António 20  
 Lopes, Manuel 9, 15, 16, 20  
 Lusquinhos, Leonel 9
- Machado, Ana 17  
 Machado, Ausenda 8  
 Madeira, Francisco 23
- Magalhães, Teresa 9  
 Marques, Catarina 21  
 Marques, M. 24  
 Marques, Maria 10, 21  
 Marques, Maria Céu 16  
 Marques, Marta M. 17  
 Martins, Alexandre Duarte 15  
 Martins, Carla 13, 22, 23  
 Martins, Sandra 26  
 Matias, Pedro 14  
 Mazedo, Carolina 17  
 Medeiros R 29  
 Medeiros-Fonseca B 29  
 Melo, Ana Teresa 14  
 Mendes, Cláudia 26  
 Mendonça, Nuno 17  
 Mendonça, Susana 20, 23, 24  
 Moço, Diogo 18  
 Moniz, Alexandre 12, 14, 17  
 Moreira, José 6, 7, 24  
 Moreira-Rosário, André 10  
 Mota, Liliana 16
- Nascimento-Gonçalves,  
 Elisabete 24  
 Neuparth, Maria João 24  
 Neuparth MJ 29  
 Nicolau, V. 24  
 Nunes, Baltazar 12  
 Nunes, Francisco 14
- Oliveira, Henrique 10, 16, 21  
 Oliveira, Paula A. 24  
 Oliveira, Rafael 15  
 Oliveira PA 29
- Pachankis, John 18  
 Padinha, Vítor 27  
 Pais, João 14  
 Paixão, Paulo 25  
 Parraca, José A. 5  
 Passanha, Margarida 25  
 Pastorinho, Ramiro 12  
 Pedro, Ana Rita 25  
 Penha, Alexandra 12  
 Pequito, Telmo 10  
 Perdigão, Margarida 15  
 Pereira, Bernardo Beirão 25  
 Pereira, Catarina 7, 27  
 Perelman, Julian 23  
 Pimentel, Fernando 14  
 Pimpão, Paula 16
- Pinho, Lara Guedes 20, 21, 27, 28  
 Pires, Diana 26  
 Pires, Diogo 18, 19  
 Pires, Sara Morais 23  
 Plass, Dietrich 13
- Quaresma, Telma 16
- Raimundo, Armando 7, 11, 14, 26  
 Ramalhosa, Raquel 12  
 Ramos, Ana 23  
 Ricardo, Ana Filipa 19  
 Rodeira, Inês 23  
 Rodrigues, Ana Maria 14, 17  
 Rodrigues, Daniela 26  
 Rosa, Raul 27  
 Rosado, Hugo 7  
 Rosário, Jorge 25  
 Roxo, Luis 18, 19
- Santos, Ana João 19  
 Santos, Carolina 28  
 Santos, Eunice 27  
 Santos, João Almeida 8  
 Santos, Ricardo 25  
 Santos, Rute 17  
 Santos, Sara 5  
 Seixas, Fernanda 24  
 Seringa, Joana 9  
 Serra, Isaura 28  
 Silva, Márcia 15  
 Silva, Revés 28  
 Silva, Rodrigo 27  
 Silva, Solange 18  
 Silvestre, Tatiana 9  
 Simeão, Ana 27  
 Sim-Sim, Margarida 18  
 Soares, Maria Inês 18  
 Sousa, A. C. A. 21  
 Sousa, Ana Catarina 12  
 Sousa, Paula 6, 7
- Talhinhas, Carmelinda 6, 7  
 Tomas-Carus, Pablo 5  
 Tomé, Madalena 23
- Uva, Mafalda 19
- Valente, João Vasco 21  
 Valente, Sabina 28
- Zangão, Otilia 28

- ACS. *See* acute coronary syndromes (ACS)
- active substances 11
- acute coronary syndromes (ACS) 23
- adolescents  
body image and suicidal ideation in Portuguese 6  
tobacco and alcohol use in Alentejo 9
- adults  
chronic diseases in 21  
with heart failure 10  
heart rate variability indexes in 15  
physical, mental, and social dimensions in Baixo Alentejo 27–28  
sexual orientation inequalities in mental health services 19–20
- aging 5
- AI. *See* Artificial Intelligence (AI)
- AlenRiscos Observatory 9
- Alentejo region  
health literacy displaced higher education students in 25  
microbiome of house dust 12  
psychoactive substance use, students in 9  
violence against health professionals in 28
- antimicrobial susceptibility patterns 25
- anxiety 28–29
- Artificial Intelligence (AI) 9
- Baixo Alentejo  
breastfeeding behavior in COVID-19 pandemic in women 18  
physical, mental, and social dimensions in middle-aged adults in 27–28
- breast cancer patients, Heart Pillow on 6–7
- breastfeeding behavior in COVID-19 pandemic in women 18
- CAD. *See* coronary artery disease (CAD)
- cancer patients, symptoms management and quality of life in 20
- Cancer Primary Prevention (CPP) 19
- cardiac patients 11
- cardiovascular diseases (CVD) 22
- cCRs. *See* continuous cardiometabolic risk score (cCRs)
- chronic conditions 24
- chronic diseases in older adults 21
- chronic musculoskeletal conditions 12
- continuous cardiometabolic risk score (cCRs) 11
- coronary artery disease (CAD) 14
- COTIDIANA app 14–15
- COVID-19 9  
breastfeeding behavior in 18  
vaccination program 8
- CPP. *See* Cancer Primary Prevention (CPP)
- CVD. *See* cardiovascular diseases (CVD)
- DALYs. *See* disability-adjusted life years (DALYs)
- depression 28–29
- DESS. *See* Digital Eye Strain Syndrome (DESS)
- Digital Eye Strain Syndrome (DESS) 10
- digital health 12
- disability-adjusted life years (DALYs) 22
- Dressage tests 17–18
- EASO/ESPEN 26
- EMA 11
- EWGSOP<sub>2</sub> 26
- exercise post bariatric (EXPOBAR) program 26
- EXPOBAR program. *See* exercise post bariatric (EXPOBAR) program
- FNIH 26
- 4P-CAN project 19
- functionality in elderly with multimorbidity 20
- HCWs. *See* healthcare workers (HCWs)
- healthcare workers (HCWs) 8
- health literacy 25
- heart failure 10
- Heart Pillow (HP)  
functionality of ipsilateral upper limb of patients with breast cancer 6  
perception of breast cancer patients 7
- heart rate variability (HRV) 15
- high-speed resistance training (HSRT) 15
- Hip and Knee Osteoarthritis (HKOA) 14–15
- HKOA. *See* Hip and Knee Osteoarthritis (HKOA)
- HP. *See* Heart Pillow (HP)
- HRV. *See* heart rate variability (HRV)
- HSRT. *See* high-speed resistance training (HSRT)
- IHD. *See* ischemic heart disease (IHD)
- ionic liquids 21
- ischemic heart disease (IHD) 13
- K14-HPV16 transgenic mice 29
- laryngectomy 23
- Legionella* spp. 25
- mental well-being 14
- MI. *See* myocardial infarction (MI)
- microbiome of house dust in Alentejo Region 12
- MICT. *See* moderate-intensity continuous training (MICT)
- middle-aged adults, physical, mental, and social dimensions in 27–28
- mixed methods study 17
- moderate-intensity continuous training (MICT) 11
- monoclonal antibody purification 21
- musculoskeletal pain 19–20
- MyBack Physical Performance battery of tests 18
- myocardial infarction (MI) 14
- National Health Interview Survey 13
- nitrogen dioxide (NO<sub>2</sub>) 13
- NO<sub>2</sub>. *See* nitrogen dioxide (NO<sub>2</sub>)
- non-MHC ankylosing spondylitis, Azorean families 22
- nurses' perception 16
- older adults  
chronic diseases in 21  
functional and cognitive capabilities of Portuguese 16  
heart rate variability in 15  
psychomotor intervention enhances attention and balance impairments 7
- osteoporosis 17
- PCa. *See* prostate cancer (PCa)
- physiological stress responses of horse 17–18
- PM<sub>2.5</sub> exposure in Portugal  
acute coronary syndromes 23  
cardiovascular disease 22
- Portugal  
body image and suicidal ideation of adolescents 6  
breastfeeding behavior in COVID-19 pandemic in women of Baixo Alentejo 18  
chronic diseases in older adults 21  
functional and cognitive capabilities of older adults 16

Portugal (*continued*)  
 health literacy displaced  
 higher education students  
 in Alentejo region 25  
 nitrogen dioxide  
 exposure in 13  
 PM<sub>2.5</sub> exposure in 22  
 Rivaroban's educational  
 materials 15–16  
 postural control  
 retired & pre-retired before  
 and after 12 weeks of  
 sensorimotor training 5  
 stroke patients 27  
 postural control in stroke  
 patients 27  
 pressure ulcers (PU) 26  
 prostate cancer (PCa) 24  
 psychoactive substance use,  
 young people 9

psychomotor intervention  
 attention and balance  
 impairments in  
 community-dwelling  
 older adults 7  
 postural control in stroke  
 patients 27  
 psychopathology 6  
*Pteridium aquilinum* 29  
 PU. *See* pressure ulcers (PU)

quality of life  
 in adults with heart  
 failure 10  
 aging process 5  
 in cancer patients 20  
 high-intensity interval  
 training vs. moderate-  
 intensity continuous  
 for 14

randomized controlled trial 14  
 rat model of prostate cancer  
 (PCa) 24  
 resistance-associated genes 25  
 Rivaroban's Portuguese  
 educational materials 16

sarcopenia 26  
 SARS-CoV-2 8, 12  
 self-care  
 inventory for chronic  
 diseases in older adults 21  
 persons living with chronic  
 condition 24  
 telemonitoring on 10  
 self-care needs, persons with  
 chronic condition 24  
 sexual orientation inequalities  
 in mental health  
 services 18–19

sociodemographic  
 determinants, older  
 adults 16  
 sports practice 27  
 STarT MSK tool 19–20  
 stress 28–29  
 stroke patients, postural  
 control in 27  
 symptoms management 20  
 telemonitoring programs 10  
 violence against health  
 professionals in  
 Alentejo region 28  
 young adults, sexual  
 orientation inequalities  
 in mental health  
 services 18–19