Portuguese Journal of Public Health

Editorial

Port J Public Health
DOI: 10.1159/000540039

Received: June 22, 2024
Accepted: June 25, 2024
Published online: July 25, 2024

The Potential of Physical Activity for the Control of Cardiovascular Disease, Chronic Kidney Disease, and Cancer: An Often-Overlooked Ally for Public Health and Healthcare Management

Alberto J. Alves[a, b] João L. Viana[a]

[a]Research Center in Sports Sciences, Health Sciences and Human Development, University of Maia, Maia, Portugal; [b]Associação de Investigação de Cuidados de Suporte em Oncologia, Vila Nova de Gaia, Portugal

Keywords
Physical activity · Exercise · Chronic disease · Public health

O potencial da atividade física no controlo das doenças cardiovasculares, renais e oncológicas: um aliado frequentemente negligenciado pela saúde pública e pela gestão dos cuidados de saúde

Palavras Chave
Atividade física · Exercício · Doenças crónicas · Saúde pública

The physical and mental health benefits of regular physical activity (PA) across the lifecycle are indisputable. It is well established that PA reduces all-cause mortality and contributes to preventing and managing several noncommunicable diseases, including cardiovascular disease (CVD), chronic kidney disease (CKD), and several types of cancer. Hence, the current World Health Organization (WHO) guidelines recommend that all adults, including those living with chronic diseases without contraindications, should do at least 150–300 min of moderate-intensity aerobic PA, or at least 75–150 min of vigorous-intensity aerobic PA, or an equivalent combination of both throughout the week for substantial health benefits [1]. Further, muscle-strengthening activities that involve all major muscle groups at moderate or greater intensity should also be performed twice or more per week for additional health benefits [1]. In addition, older adults (including those living with chronic disease) should emphasize functional balance and strength training on 3 or more days a week to enhance functional capacity and prevent falls.

However, a considerable proportion of the global adult population is unable to meet the current guidelines for weekly PA. According to the latest estimates, the global prevalence of physical inactivity among adults is 31.3% [2]. In Portugal, self-reported PA data from the National Food, Nutrition and Physical Activity Survey indicate that most adults are classified either as low active (42.3%) or moderately active (30.6%) [3]. Although PA levels appear to remain stable, recent evidence collected from motion sensors also indicates that only approximately 15%, 71%, and 31% of the Portuguese youth, adults, and older adults meet the PA recommendations [4]. Furthermore, a recent economic analysis suggests that if the prevalence of physical inactivity remains unchanged, almost 500 million new cases of preventable major noncommunicable diseases will occur in the present decade, with estimated healthcare costs of approximately

karger@karger.com
www.karger.com/pjp

Correspondence to:
Alberto J. Alves, ajalves@umaia.pt

USD 47.6 billion per year [5]. Physical exercise, a subset of PA that is planned, structured, and repetitive purposefully focused on improving or maintaining physical fitness, has been shown to elicit several and profound physical and mental health benefits across a spectrum of chronic diseases [6], including CVD, CKD, and cancer, making exercise a crucial component of modern supportive healthcare.

There is solid evidence supporting the role of PA in reducing the risk and mortality from CVDs, which remain a leading cause of mortality worldwide [7]. Exercise programs have also been shown to improve cardiovascular function, body composition, glucose levels, insulin-sensitivity, cholesterol levels, and blood pressure in patients with and without CVD, all of which are critical factors in preventing cardiovascular events [7]. We and others have also demonstrated that exercise-based cardiac rehabilitation programs lead to improved vascular health and reduced systemic inflammation, which are known to play an important role in the initiation and progression of atherosclerotic disease [8–10]. These programs are cost-effective and improve patient's prognosis, including reduced risk of cardiovascular mortality, hospitalizations, and myocardial infarction [11].

In CKD, a condition characterized by a gradual loss of kidney function that ultimately might require some form of renal replacement therapy, such as kidney transplant or dialysis, accumulating evidence indicates that exercise enhances cardiovascular and musculoskeletal health, physical function, and overall quality of life, and might reduce the risk of developing common comorbidities, such as CVD, mineral and bone diseases, sarcopenia, obesity, and diabetes. Of note, an overarching mechanism underlying such effects is the is the anti-inflammatory effect of exercise, that we and others have demonstrated in CKD [12, 13]. The available evidence has already led to the first comprehensive set of clinical practice guidelines for exercise across all stages of CKD [14], from which it is worth highlighting, for example, that intradialytic exercise (i.e., exercise during dialysis) is safe and it is recommended to be available in all dialysis units. We and others have implemented sustainable clinical exercise programs for dialysis patients [15], but this is far from being widespread clinical practice. Importantly, data from our nationwide exercise program show that intradialytic exercise is associated with lower mortality risk [16].

Cancer, another major health challenge, also finds PA as a central ally to prevent and manage the disease [17]. Exercise training during and after cancer treatment is currently recommended by major medical societies, such as the American College of Sports Medicine and American Society of Clinical Oncology, to improve overall fitness and mitigate the side effects of treatment [18, 19]. These guidelines are based on strong evidence that exercise training leads to improvements in cardiovascular fitness, muscle strength, and body composition, as well anxiety and depression, fatigue, and quality of life in cancer survivors. There is also evidence that exercise training improves bone health, sleep quality, and neuropathic symptoms [18]. Furthermore, promising data suggest that the addition of exercise training is associated to a more favorable response to cancer treatment [20]. Research have been rising in a steady pace, promising to solidify the undisputable merits of exercise training in the supportive care of cancer survivors.

Given the compelling evidence on the benefits of PA, it is vital to recognize the importance of implementing programs that promote PA to enhance public health. These programs are essential not only for disease prevention but also for improving the quality of life and well-being of individuals living with chronic conditions. Our research and programs [15, 16, 21–26], along with that of others, have successfully demonstrated the (cost-) effectiveness of such programs in both clinical and community settings. These initiatives not only reinforce the scientific foundation of PA as a preventive and adjunctive therapeutic tool for chronic diseases but also provide individuals with CVD, CKD, and cancer survivors with access to long-term, effective, and healthier lifestyle strategies.

The holistic benefits of PA as a preventive and therapeutic measure against a range of chronic diseases cannot be overstated [27]. The integration of PA into treatment plans should be a priority for healthcare providers. Encouraging patients to adopt active lifestyles can lead to significant health improvements and reduce the healthcare costs of chronic diseases [24]. Despite these well-recognized benefits, efforts to promote global PA and integration in routine clinical care have been largely unsuccessful. Failure to recognize PA as a fundamental health priority has been identified as one of key factors, among others, contributing for this unsuccessful endeavor [28]. This issue should be addressed by all key stakeholders in public health and health management, especially as we continue to face challenges in providing the necessary resources to effectively promote PA for better health management. It is time to move from words to action.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Author Contributions

Alberto J. Alves and João L. Viana prepared, wrote, and approved the final manuscript.

References

1 Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. Br J Sports Med. 2020;54(24):1451–62. https://doi.org/10.1136/bjsports-2020-102955

2 Strain T, Flaxman S, Guthold R, Semenova E, Cowan M, Riley LM, et al. National, regional, and global trends in insufficient physical activity among adults from 2000 to 2022: a pooled analysis of 507 population-based surveys with 5.7 million participants. Lancet Glob Health. 2024. https://doi.org/10.1016/S2214-109X(24)00150-5.

3 Teixeira PJ, Marques A, Lopes C, Sardinha LB, Mota JA. Prevalence and preferences of self-reported physical activity and non-sedentary behaviors in Portuguese adults. J Phys Act Health. 2019;16(4):251–8. https://doi.org/10.1123/jpah.2018-0340

4 Magalhães JP, Hetherington-Rauth M, Rosa GB, Correia IR, Pinto GM, Ferreira JP, et al. Physical activity and sedentary behavior in the Portuguese population: what has changed from 2008 to 2018? Med Sci Sports Exerc. 2023;55(8):1416–22. https://doi.org/10.1249/MSS.0000000000003161

5 Santos AC, Willumsen J, Meheus F, Ilbawi A, Bull FC. The cost of inaction on physical inactivity to public health-care systems: a population-attributable fraction analysis. Lancet Glob Health. 2023;11(1):e32–9. https://doi.org/10.1016/S2214-109X(22)00464-8

6 Dibben GO, Gardiner L, Young HM, Wells V, Evans RA, Ahmed Z, et al. Evidence for exercise-based interventions across 45 different long-term conditions: an overview of systematic reviews. EClinicalMedicine. 2024;72:102599. https://doi.org/10.1016/j.eclinm.2024.102599

7 Perry AS, Dooley EE, Master H, Spartano NL, Brittain EL, Pettee Gabriel K. Physical activity over the lifecourse and cardiovascular disease. Circ Res. 2023;132(12):1725–40. https://doi.org/10.1161/CIRCRESAHA.123.322121

8 Oliveira NL, Ribeiro F, Silva G, Alves AJ, Silva N, Guimarães JT, et al. Effect of exercise-based cardiac rehabilitation on arterial stiffness and inflammatory and endothelial dysfunction biomarkers: a randomized controlled trial of myocardial infarction patients. Atherosclerosis. 2015;239(1):150–7. https://doi.org/10.1016/j.atherosclerosis.2014.12.057

9 Ribeiro F, Alves A, Teixeira M, Miranda F, Azevedo C, Duarte J, et al. Exercise training increases interleukin-10 after an acute myocardial infarction: a randomised clinical trial. Int J Sports Med. 2012;33(3):192–8. https://doi.org/10.1055/s-0031-1297959

10 Cornelissen VA, Onkelinx S, Goetschalckx K, Thomaes T, Janssens S, Fagard R, et al. Exercise-based cardiac rehabilitation improves endothelial function assessed by flow-mediated dilation but not by pulse amplitude tonometry. Eur J Prev Cardiol. 2014;21(1):39–48. https://doi.org/10.1177/2047487312460516

11 Dibben GO, Faulkner J, Oldridge N, Rees K, Thompson DR, Zwisler A-D, et al. Exercise-based cardiac rehabilitation for coronary heart disease: a meta-analysis. Eur Heart J. 2023;44(6):452–69. https://doi.org/10.1093/eurheartj/ehac747

12 Viana JL, Kosmadakis GC, Watson EL, Bevington A, Feehally J, Bishop NC, et al. Evidence for anti-inflammatory effects of exercise in CKD. J Am Soc Nephrol. 2014;25(9):2121–30. https://doi.org/10.1681/ASN.2013070702

13 Bishop NC, Burton JO, Graham-Brown MPM, Stensel DJ, Viana JL, Watson EL. Exercise and chronic kidney disease: potential mechanisms underlying the physiological benefits. Nat Rev Nephrol. 2023;19(4):244–56. https://doi.org/10.1038/s41581-022-00675-9

14 Baker LA, March DS, Wilkinson TJ, Billany RE, Bishop NC, Castle EM, et al. Clinical practice guideline exercise and lifestyle in chronic kidney disease. BMC Nephrol. 2022;23(1):75. https://doi.org/10.1186/s12882-021-02618-1

15 Viana JL, Martins P, Parker K, Madero M, Pérez Grovas H, Anding K, et al. Sustained exercise programs for hemodialysis patients: the characteristics of successful approaches in Portugal, Canada, Mexico, and Germany. Semin Dial. 2019;32(4):320–30. https://doi.org/10.1111/sdi.12814

16 Martins PM, Leal DV, Wilund KR, Ferreira MA, Viana JL. Intradialytic exercise is associated with lower mortality risk in hemodialysis patients: th-OR13. J Am Soc Nephrol. 2022;33(11S):5. https://doi.org/10.1681/asn.20223311s15a

17 Matthews CE, Moore SC, Arem H, Cook MB, Trabert B, Håkansson N, et al. Amount and intensity of leisure-time physical activity and lower cancer risk. J Clin Oncol. 2020;38(7):686–97. https://doi.org/10.1200/JCO.19.02407

18 Campbell KL, Winters-Stone KM, Wiskemann J, May AM, Schwartz AL, Courneya KS, et al. Exercise guidelines for cancer survivors: consensus statement from international multidisciplinary roundtable. Med Sci Sports Exerc. 2019;51(11):2375–90. https://doi.org/10.1249/MSS.0000000000002116

19 Ligibel JA, Bohlke K, Alfano CM. Exercise, diet, and weight management during cancer treatment: ASCO guideline summary and Q and A. JCO Oncol Pract. 2022;18(10):695–7. https://doi.org/10.1200/OP.22.00277

20 Sanft T, Harrigan M, McGowan C, Cartmel B, Zupa M, Li F-Y, et al. Randomized trial of exercise and nutrition on chemotherapy completion and pathologic complete response in women with breast cancer: the lifestyle, exercise, and nutrition early after diagnosis study. J Clin Oncol. 2023;41(34):5285–95. https://doi.org/10.1200/JCO.23.00871

21 Joaquim A, Amarelo A, Antunes P, Garcia C, Leão I, Vilela E, et al. Effects of a physical exercise program on quality of life and physical fitness of breast cancer survivors: the MAMA_MOVE gaia after treatment trial. Psychol Health Med. 2024;29(5):964–87. https://doi.org/10.1080/13548506.2023.2240074

22 Antunes P, Joaquim A, Sampaio F, Nunes C, Ascensão A, Vilela E, et al. Effects of exercise training on cardiac toxicity markers in women with breast cancer undergoing chemotherapy with anthracyclines: a randomized controlled trial. Eur J Prev Cardiol. 2023;30(9):844–55. https://doi.org/10.1093/eurjpc/zwad063

23 Viamonte SG, Joaquim AV, Alves AJ, Vilela E, Capela A, Ferreira C, et al. Cardio-Oncology rehabilitation for cancer survivors with high cardiovascular risk: a randomized clinical trial. JAMA Cardiol. 2023;8(12):1119–28. https://doi.org/10.1001/jamacardio.2023.3558

24 Viamonte SG, Tavares A, Alves AJ, Joaquim A, Vilela E, Capela A, et al. Cost-effectiveness analysis of a cardio-oncology rehabilitation framework compared to an exercise intervention for cancer survivors with high cardiovascular risk. Eur J Prev Cardiol. 2024:zwae181. https://doi.org/10.1093/eurjpc/zwae181

25 Capela A, Antunes P, Coelho CA, Garcia CL, Custódio S, Amorim R, et al. Effects of walking football on adherence, safety, quality of life and physical fitness in patients with prostate cancer: findings from the PROSTATA_MOVE randomized controlled trial. Front Oncol. 2023;13:1129028. https://doi.org/10.3389/fonc.2023.1129028

26 Lopes S, Mesquita-Bastos J, Garcia C, Bertoquini S, Ribau V, Teixeira M, et al. Effect of exercise training on ambulatory blood pressure among patients with resistant hypertension: a randomized clinical trial. JAMA Cardiol. 2021;6(11):1317–23. https://doi.org/10.1001/jamacardio.2021.2735

27 Noetel M, Sanders T, Gallardo-Gómez D, Taylor P, Del Pozo Cruz B, van den Hoek D, et al. Effect of exercise for depression: systematic review and network meta-analysis of randomised controlled trials. BMJ. 2024;384:e075847. https://doi.org/10.1136/bmj-2023-075847

28 Hallal PC, Pratt M. Physical activity: moving from words to action. Lancet Glob Health. 2020;8(7):e867–8. https://doi.org/10.1016/S2214-109X(20)30256-4