

Recommendations for Healthy Lifestyle for Cancer Prevention and Healthy Aging

Omer Kucuk^{1,2,3}, Viraj A. Master^{1,3}

Departments of ¹Urology, ²Hematology and Medical Oncology, Emory University School of Medicine, ³Winship Cancer Institute of Emory University, Atlanta, GA, USA

Lack of physical activity (PA) and unhealthy diet are known to increase the risk of chronic diseases such as cancer and cardiovascular disease (CVD). Adopting a healthy lifestyle could prolong life expectancy while reducing the premature mortality. PA has inverse association with the risk of all-cause-mortality (ACM), CVD and cancer, independent of dietary indicators [1]. A study by Inan-Eroglu et al. [1] found that compared to self-reported PA, device-measured PA may be more appropriate for detecting correlation of ACM, CVD and cancer risk with other lifestyle risk factors, including diet. Their results emphasize the crucial role of PA and a healthy diet in reducing the risk of chronic diseases and ACM. In their study, PA was objectively measured, providing a more complete account of activity levels, but diet was assessed through self-reported food frequency questionnaire covering a limited number of dietary items [1]. The relatively stronger association observed for PA highlights the potential underestimation of the true impact of diet due to measurement error [1].

Previous reports have shown that PA is a great strategy to reduce the risk of certain cancers [2,3]. However, the association is greater between CVD and PA, which may be in part due to the larger number of studies that were conducted in CVD. Another reason for the weaker association between PA and cancer may be due to heterogeneity of cancer and the presence of many factors, such as tobacco and infectious agents as causative factors and not all cancers are associated with lack of PA to the same degree. Perhaps we need to separately study each cancer type using device measured PA, rather than cancer overall because the mechanisms by which PA impacts cancer risk are differently influential by the cancer type.

Wilcox and colleagues [4] critically appraised the epidemiological data demonstrating shared risk factors for CVD and cancer, and the increased incidence of CVD in patients with cancer and vice versa. Calle et al. [5] estimated that

overweight and obesity in the United States could account for 14% of all deaths from cancer in men and 20% of all cancers in women. Obesity and physical inactivity independently contribute to the development of coronary heart disease (CHD) in women underscoring the importance of both maintaining a healthy weight and regular PA in preventing CHD [6]. The standardized scoring system assessing adherence to the 2018 World Cancer Research Fund/American Institute for Cancer Research cancer prevention recommendations assigned higher weight to dietary factors collectively than adiposity and PA, but they concluded that an alternative score assigning equal weights to the adiposity, PA, alcohol, and other dietary recommendations may better predict cancer associations [2]. Adopting a healthy lifestyle could substantially contribute to reduced premature mortality and prolonged life expectancy in US adults [7]. For example, in the Nurses' Health Studies, PA was associated with lower risk of death in patients diagnosed with breast cancer. Increased pre- to postdiagnosis PA equivalent to at least 1 to 3 hours/week of walking was found to reduce the risk of death [3].

Hippocrates (460-370 BC), the father of medicine, provided a written exercise prescription for a patient more than 2000 years ago. In 2007, the American College of Sports Medicine (ACSM), with endorsement from the American Medical Association and the Office of the Surgeon General, launched a global initiative to have physicians, healthcare professionals and educators promote exercise in their practice or activities (<https://www.exerciseismedicine.org/eim-in-action/>). In this initiative, termed Exercise Is Medicine (EIM), the ACSM recommended healthy adults perform 150 minutes of moderate exercise on weekly basis. EIM's goal is to make PA assessment and promotion a standard of clinical care for people and all abilities (<https://www.exerciseismedicine.org/eim-in-action/>).

In clinical practice, PA recommendations should be includ-

Received August 19, 2024, Revised September 19, 2024, Accepted September 19, 2024, Published on September 30, 2024
Correspondence to Omer Kucuk, E-mail: okucuk@emory.edu, <https://orcid.org/0000-0002-4755-0507>



This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Copyright © 2024 Korean Society of Cancer Prevention

ed at every clinic visit, giving patients a simple message easy to remember and easy to follow. Healthy behaviors such as walking regularly, moving extremities in sitting position, isometric exercises, doing squats and pushups safely, could be emphasized at each visit. Patients value these recommendations and do their best to adhere to them. Exercise would give them “most bang for the buck” for living healthy to old age and preventing chronic diseases such as cancer, heart disease and Alzheimer’s disease (<https://www.nccih.nih.gov/>) [8,9]. An easy way to emphasize the importance of exercise is to tell patients “If you don’t use it, you lose it” [10]. They understand the importance of this, and the presence of family members in the room makes this intervention even more effective by having a ripple effect on the entire family, friends and relatives, carrying the message to the entire population.

PA is necessary to maintain muscle mass which in turn is necessary for PA; one is not possible without the other. PA and muscle mass are very essential for metabolism and fitness, as well as psychological wellbeing. Maintaining muscle mass by doing PA on a regular basis would prevent weight gain, diabetes, hypertension, CHD, and cancer. Maintaining muscle mass would also make walking safer because it is easier to have physical balance and prevent falls, a major cause of morbidity and mortality in old age. Regular PA would prevent frailty and falls, and people would also feel better both physically and psychologically. Elderly people are prone to frailty, and frailty can accelerate aging by reducing PA. The main cause of frailty is sarcopenia, which develops over time due to a sedentary lifestyle. It is estimated that 1% of muscle mass is lost every year after the age 40 unless there is a concerted effort to use skeletal muscles, especially those that are important for mobility. However, sarcopenia is preventable by daily use of muscles with simple exercises. It is possible to maintain muscle mass at an advanced age with regular use of different muscles in the body with simple sustainable daily exercises. Daily PA should be a priority for men and women starting at middle age or earlier to prevent sarcopenia and frailty when they get older, because it is easy to prevent muscle loss with regular PA, but it is very difficult to regain back lost muscle mass.

Daily PA could include easy exercises that can be done anywhere, allowing safe use of different muscle groups to prevent sarcopenia, the single most important factor leading to frailty. Therefore, it is of utmost importance to maintain muscle mass for longevity, chronic disease prevention and healthy aging. The National Center for Complementary and Integrative Health focuses on PA, diet, nutritional supplements, stress reduction and complementary therapies for maintaining healthy lifestyle (<https://www.nccih.nih.gov/>). Healthy lifestyle, including PA and a plant-based diet as well as mind and body approaches, such as yoga, meditation, mindfulness-based stress reduction, good sleep and social activities incorporated in a daily routine is critical for cancer prevention as well as healthy aging (<https://www.nccih.nih.gov/>).

gov/).

Simple and sustainable healthy daily activities could result in a healthy, self-sufficient, physically and mentally active, and happy aging population without chronic diseases including cancer. The U.S. Department of Health and Human Services has published Physical Activity Guidelines for Americans (<https://health.gov/our-work/nutrition-physical-activity/physical-activity-guidelines/current-guidelines>), which provides the evidence supporting the recommendations (<https://health.gov/our-work/nutrition-physical-activity/physical-activity-guidelines/current-guidelines/scientific-report>), and the recommendations for older adults (<https://health.gov/our-work/nutrition-physical-activity/physical-activity-guidelines/current-guidelines/midcourse-report>).

In addition to daily PA, a healthy diet rich in vegetables and low in sugar and fat would prevent overweight and provide nutrients to maintain a healthy body and a healthy microbiome [10]. Numerous studies have demonstrated an inverse association between PA and healthy diet and risk of chronic diseases such as cancer and CHD [10]. Simple healthy food recommendations could be included in a way to reinforce healthy dietary behaviors. If the simple recommendations, easy to remember and easy to do, will be most effective. For examples a simple healthy diet message could be “eat a lot of vegetables, fruits and beans, and stay away from sweets and alcohol”. We need to show our patients simple ways to make sustainable and easy changes in their dietary habits. Giving this simple healthy diet message takes no more than a couple of minutes at each clinic visit. Langlais et al. [11] reported that men with prostate cancer consuming a diet that limits inflammation and insulin hypersecretion live longer. Studies have shown that healthy diet and, exercise can induce epigenetic changes, suggesting that gene expression profile associated with unhealthy lifestyle can be modulated by healthy behaviors [12].

It is also important to include stress reduction practices to achieve a healthier lifestyle. Stress reduction can be achieved with mind-body approaches such as meditation, yoga, tai-chi as well as, PA, music and social activities, and by promoting family and friendship ties and strengthening social support mechanisms (<https://www.nccih.nih.gov/>) [8,9]. Reducing health care disparities and racism would also decrease stress in the minority populations, which carry a disproportionate burden of cancer risk and mortality. It is important to reduce psychological stress associated with oxidative stress, inflammation and DNA methylation, which leads to epigenetic changes that can also be passed on to future generations [13,14]. Further research should aim to investigate the efficacy, mechanisms, and implementation strategies of integrative healthy lifestyle approaches for prevention of chronic diseases including cancer and achieving healthy aging.

FUNDING

None.

CONFLICTS OF INTEREST

No potential conflicts of interest were disclosed.

ORCID

Omer Kucuk, <https://orcid.org/0000-0002-4755-0507>

Viraj A. Master, <https://orcid.org/0000-0002-7251-142X>

REFERENCES

- Inan-Eroglu E, Ahmadi M, Biswas RK, Ding D, Rezende LFM, Lee IM, et al. Joint associations of diet and device-measured physical activity with mortality and incident CVD and cancer: a prospective analysis of the UK biobank study. *Cancer Epidemiol Biomarkers Prev* 2024;33:1028-36.
- Song R, Riseberg E, Petimar J, Wang M, Mucci LA, Wu K, et al. Different operationalizations of the 2018 WCRF/AICR cancer prevention recommendations and risk of cancer. *Br J Cancer* 2023;129:982-92.
- Fortner RT, Brantley KD, Tworoger SS, Tamimi RM, Rosner B, Farvid MS, et al. Physical activity and breast cancer survival: results from the Nurses' Health Studies. *JNCI Cancer Spectr* 2023;7:pkac085.
- Wilcox NS, Amit U, Reibel JB, Berlin E, Howell K, Ky B. Cardiovascular disease and cancer: shared risk factors and mechanisms. *Nat Rev Cardiol* 2024;21:617-31.
- Calle EE, Rodriguez C, Walker-Thurmond K, Thun MJ. Overweight, obesity, and mortality from cancer in a prospectively studied cohort of U.S. adults. *N Engl J Med* 2003;348:1625-38.
- Li TY, Rana JS, Manson JE, Willett WC, Stampfer MJ, Colditz GA, et al. Obesity as compared with physical activity in predicting risk of coronary heart disease in women. *Circulation* 2006;113:499-506.
- Li Y, Pan A, Wang DD, Liu X, Dhana K, Franco OH, et al. Impact of healthy lifestyle factors on life expectancies in the US population. *Circulation* 2018;138:345-55.
- Krivanek TJ, Gale SA, McFeeley BM, Nicastrì CM, Daffner KR. Promoting successful cognitive aging: a ten-year update. *J Alzheimers Dis* 2021;81:871-920.
- Rea IM. Towards ageing well: use it or lose it: exercise, epigenetics and cognition. *Biogerontology* 2017;18:679-91.
- Heymsfield SB, Shapses SA. Guidance on energy and macronutrients across the life span. *N Engl J Med* 2024;390:1299-310.
- Langlais CS, Graff RE, Van Blarigan EL, Kenfield SA, Neuhaus J, Tabung FK, et al. Postdiagnostic Inflammatory, hyperinsulinemic, and insulin-resistant diets and lifestyles and the risk of prostate cancer progression and mortality. *Cancer Epidemiol Biomarkers Prev* 2022;31:1760-8.
- Padovani M, Lavigne JA, Chandramouli GV, Perkins SN, Barrett JC, Hursting SD, et al. Distinct effects of calorie restriction and exercise on mammary gland gene expression in C57BL/6 mice. *Cancer Prev Res (Phila)* 2009;2:1076-87.
- Mohan A, Huybrechts I, Michels N. Psychosocial stress and cancer risk: a narrative review. *Eur J Cancer Prev* 2022;31:585-99.
- Pereira MA, Araújo A, Simões M, Costa C. Influence of psychological factors in breast and lung cancer risk - a systematic review. *Front Psychol* 2022;12:769394.