JoAnn Grif Alspach

Editorial

Revisiting a Familiar but Lethal Cardiovascular Risk Factor: Sedentary Lifestyle

One of the themes for this issue reminds us of the continuing importance of managing cardiovascular risk factors. Our longstanding familiarity with these findings can sometimes lead to complacency that we already know about them and their role in cardiovascular health problems, some of which can take lives many years before their natural time of departure. One of those familiar risk factors is a sedentary lifestyle, often simply characterized as a life lacking exercise. We have known for many years that an occupational history of sedentary work together with a lifestyle history nearly devoid of physical exertion often coexist in patients who present to us with cardiovascular health problems such as hypertension as well as worrisome metabolic profiles, obesity, diabetes, and a myriad of related disorders. As a result, health care professionals may consider a "sedentary lifestyle" and "lack of exercise" as, more or less, 2 sides of the same coin that may gradually contribute to poor health.

In contrast to that rather vague role as a cardiovascular risk factor, however, an abundance of epidemiological research continues to underscore the "strong, independent and inverse association between physical activity and . . . mortality in apparently healthy individuals and diseased populations."[1(p924)] More recent studies suggest that, although physical exercise remains an important ingredient to sprinkle into any recipe for achieving cardiovascular health, the duration that one spends sitting is, by itself, a potentially lethal risk factor. In this editorial, I will first examine the influence of physical inactivity as a major, independent and lethal risk factor for heart disease and for mortality from any cause and then summarize some of the evidence and strategies for ameliorating its potentially harmful effects.

Physical Inactivity as an Independent Risk Factor for Heart Disease and Death

Too much sitting is a strong negative risk factor independent of physical activity. Even though we may consider a lack of physical activity as more or less equivalent to just sitting around, recent research[2,3] shows that too much sitting is associated with negative health outcomes on its own demerits, that is, quite apart from the influence of physical activity. Research has established that prolonged periods of sitting is associated with significant detrimental metabolic effects that include abnormal glucose metabolism, obesity, and development of metabolic syndrome[4] in addition to significantly higher cardiovascular morbidity, weight gain,[5] and premature death.[6,7]

For women over age 30, inactivity may be a greater risk factor for heart disease than smoking. In a study[8] designed to measure the

doi: http://dx.doi.org/10.4037/ccn2015797

relative contribution that the top 4 risk factors for cardiac disease in Australian women (high body mass index, smoking, high blood pressure, physical inactivity) make across a woman's lifespan, researchers determined that the most detrimental risk factor did not remain constant, but changed over time. Until age 30, the highest risk for heart disease in this population of Australian women was associated with smoking. After age 30 and extending to age 90, the greatest risk for heart disease was distinctively attributable to physical inactivity, which outweighed all of the other risk factors. Researchers observed that physical inactivity rose steadily in these women from 48% to 81% over ages 22 to 90 years. Combining the prevalence and relative risk data, the research team noted that for women between the ages of 22 and 27 years, "low" and "no" physical activity accounted for 47% of heart disease, rising to 51% for women 31 to 36 years old, before declining to 23.5% in the eldest women aged 85 to 90 years, suggesting that the greatest threats posed by inactivity strike at women in the prime of life. Differences in local lifestyle, diet, and social customs may make it difficult to know the extent to which these results for Australian women are comparable and applicable to women living elsewhere, but the top risk factors and pattern of steadily increasing sedentism over one's lifetime are undeniably familiar to women in many parts of the developed world.

In another large study of 334 161 European men and women followed for more than 12 years, Ekelund et al[9] examined the relationship between physical activity and all-cause mortality, noting that physical inactivity has consistently been associated with an increased risk for all-cause mortality independent of obesity (defined by body mass index). For this study goal, the investigators found that when compared to obesity, inactivity was twice as lethal as a risk factor for premature deaths.

A third and very recent meta-analysis of 47 studies designed to determine the association between sedentary time and a range of variable outcomes in adults independent of physical activity (hospitalizations, all-cause mortality, cardiovascular disease, diabetes, and cancer), Biswas and associates[10] in Toronto confirmed that prolonged sedentary time was independently associated with deleterious health outcomes regardless of physical activity. In that study, significant hazard ratio associations were found with all-cause mortality, cardiovascular mortality, cardiovascular disease incidence, as well as cancer mortality, cancer incidence, and type 2 diabetes incidence. As one might anticipate, hazard ratios associated with sedentary time and outcomes were generally more pronounced at lower compared to higher levels of physical activity, underscoring the inevitable outcome that the strong associations between sedentary behavior and all-cause mortality were greatest for those who exercised the least. As one might anticipate less, sedentary behavior was associated with chronic disorders and premature death even among those who exercised, further solidifying its stature as an undeniably persistent thorn that is not necessarily blunted by performing exercise.

As the stack of evidence attesting that sitting for prolonged periods can be hazardous to one's health and longevity accumulates, our understanding of the mechanisms for why and how sedentism poses these threats is rudimentary.[11] Ignoring or dismissing them will not make them go away, however, so finding strategies to mitigate the damage seems like a prudent next step.

Even Small Amounts of Physical Activity Offer Substantial Health Benefits

The Ekelund study[9] not only looked at the association between physical activity and mortality, but also considered whether those negative effects on life expectancy might be mitigated by improvements in physical activity. In contrast to the Biswas report[10] where exercise was not associated with improved health outcomes, Ekelund found that increasing physical activity via exercise—even by a fairly modest amount such as 20 minutes of walking daily—carries extremely effective health benefits. Although the impact of increasing physical activity was greatest for participants with normal body weight, whose all-cause mortality was reduced by 16% to 30%, beneficial effects were also enjoyed by those who were overweight. The authors projected that just adding a brisk, 20-minute walk to one's daily routine would relocate that individual from the "completely inactive" group at high risk of death to the "moderately inactive group," thereby cutting their risk of premature death.

Taking Breaks From Sedentary Behavior May Also Help

On the flip side of the physical activity/sedentary behavior coin, scientists who work with older adults disinclined to add rigorous exercise to their lives have approached the burdens related to sedentary living from an alternative perspective: rather than attempting to enjoin older adults to start performing physical exercises, aim at getting them to break up the duration of time they spend in sedentary behavior. A study of 215 adults between the ages of 54 and 94 years in Lisbon, Portugal, found a significant positive association between breaks in sedentary time and the person's composite physical functioning, suggesting this as an alternative strategy that may be useful in supporting the person's ability to maintain activities of daily living independently.[12]

For those who work with older patients about to be transferred or discharged (or family members, neighbors, and friends sitting too long at home), who may resist disruptions in their comfort or position, it is worthwhile to note that these breaks from sendentism need not be dramatic or particularly athletic—even fairly minor changes such as periodically standing up from a sitting or recumbent position, rocking back-and-forth from toes to heels, and alternately standing on tip-toes and returning to feet flat can all qualify as breaks from just sitting or lying still. The important aspect is that the breaks occur, preferably on a regular basis, for a few minutes every 30 minutes, during commercials in a television program, while talking on the telephone, or using some other trigger. Any activity that interrupts the sendentary posture should contribute to better health.

Taking a Walk in a Group Outside Can Help

A final strategy suggested for getting adults of all ages up and moving from their sedentary locations takes the form of walking groups. In their meta-analysis of 42 studies of outdoor walking groups representing 1843 participants, 76% of whom were women with a mean age of 58 years, Hanson and Jones[13] found that walking groups offered a broad spectrum of health benefits to participants, including those who reported health disorders ranging from obesity and diabetes, to arthritis and fibromyalgia, as well as dementia and behavioral health problems. The analysis revealed that walking groups were associated with statistically significant improvements (reductions) in mean systolic blood pressure, diastolic blood pressure, resting heart rate, body fat, body mass index, total cholesterol, and depression together with statistically significant increases in VO_2 max, the SF-36 (physical functioning) score, and 6-minute walk time. There were no notable adverse effects reported in any of the studies. In addition, the findings of this recent analysis were consistent with those from other meta-analyses on the efficacy of this program.

In addition to their obvious health benefits, walking groups were also credited with offering an attractive palette of enhanced features that make them especially attractive: low cost, accessible, high levels of adherence, low levels of participant attrition, low risk of negative side effects. Walking groups were also characterized by their participants as bestowing an array of social and psychological benefits such as social cohesion, which may encourage and sustain adherence as well as positive attitude toward physical activity, companionship, and shared experience.[13]

Closing

When it is time for education and discharge planning for your patients with cardiovascular health problems, and really for any patient in your care, make time to share this simple yet compelling recipe for better health and longevity:

- Sit less
- Stand more
- Strut your stuff longer and farther than you did yesterday
- Give yourself a better chance to live well and longer

And you do the same, critical care nurses, okay? CCN

JoAnn Grif Alspach, RN, MSN, EdD
Editor, *Critical Care Nurse*

References
1. Kokkinos P, Sheriff H, Kheirbek R. Physical inactivity and mortality risk. *Cardiol Res Pract.* http://www.hindawi.com/journals/crp/2011/924945/. Accessed February 10, 2015.
2. Van der Ploeg HP, Chey T, Korda RJ, Banks E, Bauman A. Sitting time and all-cause mortality risk in 222 497. *Arch Int Med.* 2012;172:494-500.
3. Proper KI, Singh AS, Van Mechelen W, Chinapaw MJM. Sedentary behaviors and health outcomes among adults: a systematic review of prospective studies. *Am J Prev Med.* 2011;40:174-182.
4. Healy GN, Dunstan DW, Salmon J, et al. Breaks in sedentary time. *Diabetes Care.* 2008;31:661-666.
5. Brown WJ, Williams L, Ford JH, Ball K, Dobson AJ. Identifying the energy gap: magnitude and determinants of 5 year weight gain in midage women. *Obes Res.* 2012;13:1431-1441.
6. Katzmarzyk PT, Church TS, Craig CL, Bouchard C. Sitting time and mortality from all causes, cardiovascular disease, and cancer. *Med Sci Sports.* 2009;41:998.
7. Van Uffelen JG, Wong J, Chau JY, et al. Occupational sitting and health risks: a systematic review. *Am J Prev Med.* 2010;39:379-388.
8. Brown WJ, Pavey T, Bauman AE. Comparing population attributable risks for heart disease across the adult lifespan in women. *Br J Sports Med.* May 8, 2014. Epub ahead of print. doi:10.1136/bjsports-2013-093090
9. Ekelund U, Ward HA, Norat T, et al. Physical activity and all-cause mortality across levels of overall and abdominal adiposity in European men and women: the European Prospective Investigation into Cancer and Nutrition Study (EPIC). *Am J Clin Nutr.* January 14, 2015. Epub ahead of print. doi:10.3945/ajcn.114.100065.
10. Biswas A, Oh PI, Faulkner GE, et al. Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: a systematic review and meta-analysis. *Ann Intern Med.* 2015;162:123-132.
11. Lynch BM, Owen N. Too much sitting and chronic disease risk: steps to move the science forward. *Ann Intern Med.* 2015;162(2):146-147.
12. Sardinha LB, Santos DA, Silva AM, Baptista F, Owen N. Breaking-up sedentary time is associated with physical function in older adults. *J Gerontol A Biol Sci Med Sci.* 2015;70(1):119-124.
13. Hanson S, Jones A. Is there evidence that walking groups have health benefits? A systematic review and meta-analysis. *Br J Sports Med.* 2015; 0:1-7. doi:10.1136/bjsports-2014-094157.