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Is Achieving the American Heart Association's Life Simple 7 Goals Sufficient to Reduce the Burden of Atrial Fibrillation? No Simple Answers

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A decade has passed since the National Heart, Lung, and Blood Institute convened a panel to provide recommendations for the prevention of atrial fibrillation (AF).[1] In this landmark report, the panel listed investigating the role that engaging in healthy behaviors could have on AF prevention as a research priority. More than 2 decades ago, the Framingham Heart Study established age, hypertension, congestive heart failure, coronary artery disease, valvular heart disease, and type 2 diabetes mellitus as independent risk factors for the development of AF.[2] The past decade has witnessed steady progress in our understanding of the role of modifiable risk factors, such as obesity, obstructive sleep apnea (OSA), metabolic syndrome, and excess alcohol intake, in the pathogenesis of AF.[3] Emerging evidence strongly supports the concept of reducing the burden of AF by targeting modifiable risk factors, many of which are included in the American Heart Association's Life's Simple 7 (LS7) (ie, smoking, body mass index, physical activity, diet, total cholesterol, blood pressure, and fasting blood glucose).[4] Such an approach may dramatically stem the increasing tide of the AF epidemic.

Despite recent advances in catheter-based therapy for AF, response to antiarrhythmic and ablation therapy is highly variable. Although antiarrhythmic drugs remain first-line therapy for patients with symptomatic AF, ≈50% experience a recurrence of AF within 6 months and membrane active drugs are associated with serious toxicities.[5] The limited success of therapy for AF is related to the heterogeneity of the underlying electrical substrate and our failure to target therapy to the underlying mechanisms.[6]

The 2009 National Heart, Lung, and Blood Institute report spurred investigations that identified the contribution of conditions and behaviors that increase the risk for AF.[7–10] In this issue of *Journal of the American Heart Association* (*JAHA*), Garg et al[11] investigated the influence of cardiovascular health status, as defined by American Heart Association's LS7 factors, on the incidence of AF in 13 182 individuals without baseline cardiovascular disease or AF, who were followed up for a median of 25 years. Garg et al[11,12] assigned the sample into categories of poor, average, or optimal cardiovascular health, as defined by LS7 criteria. They then examined the relationship of LS7 scores and incident AF. After adjustment for baseline demographic and clinical covariates, LS7 scores predicted risk for incident AF. Individuals with average (hazard ratio, 0.59; 95% confidence interval, 0.51–0.67) or optimal (hazard ratio, 0.38; 95% confidence interval, 0.32–0.44) LS7 scores had a lower risk of developing AF compared with those with a poor score. More important, even a 1-point increment in LS7 score was associated with 12% lower risk for developing AF (hazard ratio, 0.88; 95% confidence interval, 0.86–0.89).

The report of Garg et al[11] builds on the body of literature supporting the critical role of optimal management of hypertension, diabetes mellitus, obesity, and tobacco use for the prevention of AF. Their approach had several strengths that add confidence to the results. The data were generated from the well-established Atherosclerosis Risk in Communities database,[12] in which rigorous standards were used for ascertainment of AF; they excluded those with AF associated with cardiac surgery. Individuals with preexisting cardiovascular disease were also excluded. The median follow-up of 25 years provided a sufficient amount of time for AF to develop and is longer than the follow-up of previous studies.[7,10] The finding that even a 1-point increment in the score lowered the risk for AF is meaningful for clinicians as they work with patients to set goals to improve cardiovascular health. Providing patients with the knowledge that addressing

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just 1 factor may reduce their risk of developing AF may provide the encouragement they need to initiate change.

Previous studies focused on clinical conditions, age, and sex as risk factors for incident AF.[7,13] In contrast, Garg et al[11] expanded the spectrum of risk factors to include physical activity and dietary intake. However, neither of these affected incident AF. One reason why physical activity and dietary intake did not reduce the incidence of AF may be because of limitations of the self-report instruments used. Including an objective measure of cardiorespiratory fitness, such as treadmill testing, may have produced different results for physical activity. Knowledge about the role that moderate physical activity plays in prevention of AF is incomplete, but evidence suggests that moderate aerobic physical activity and cardiorespiratory fitness are associated with incident AF.[9,14,15] There is stronger evidence on the benefit of physical activity and cardiorespiratory fitness for reducing progression of established AF[15] that lends credibility to the notion that engaging in moderate physical activity is an important component of a program to prevent AF.

The finding by Garg et al[11] that healthy diet scores were not predictive of AF incidence is consistent with prevailing literature. Although it has been suggested that eating foods high in antioxidants may modify inflammatory substrates for AF, the current evidence is inadequate to confirm that a particular type of diet reduces the risk for AF.[15] Nevertheless, following the dietary habits, such as those in the LS7, has the potential to positively influence management of other risks, such as hypertension, diabetes mellitus, and obesity.

OSA is an established risk factor for AF,[15] but it was not included as a covariate in the study by Garg et al.[11] Furthermore, it is also not included as a risk factor to be managed in LS7. The prevalence of OSA is increasing in line with the increasing obesity epidemic in the United States. Adding optimal management of OSA to that of hypertension and diabetes mellitus in the LS7 should be considered as 1 strategy to improve cardiovascular health. Future studies related to AF risk and prevention should address OSA as a risk factor.

Previous population studies have provided evidence to associate clinical, demographic, and some lifestyle choices with the incidence of AF. The time has come to ask where the next avenue of research for prevention of AF should focus. Are more population studies needed to determine risks for AF? Do we have enough evidence to begin to use the knowledge gained from population studies to design and evaluate interventions to modify AF risk factors? Recent reports describe the benefit of risk factor management for the recurrence of AF after ablation.[15] Yet, investigations to evaluate interventions to prevent AF are scarce. The Look Ahead Randomized Trial randomized 5067 participants with type 2 diabetes mellitus to receive diabetes mellitus education or intensive lifestyle interventions to promote weight loss and to increase/maintain physical activity; the trial also provided group and individual counseling and education over 4 years.[16] After 9 years, there was no difference in the incidence of AF between the diabetes mellitus education and lifestyle intervention groups.

Although additional randomized trials to evaluate the effect of risk factor management interventions on the incidence of AF have been recommended,[15] there are substantial methodological and funding challenges to conducting longitudinal intervention studies that require a large number of participants who are willing to commit to a long-term study. With these challenges in mind, the electronic medical record repositories may be of value in assessing response to risk factor modification. These can serve as an inexpensive and efficient complement to community cohort studies not only for the development of prediction models[17] but also prospectively evaluating AF risk factor modification. Furthermore, given that electronic medical records are integrated into clinical practice, prediction models could be incorporated into these systems to prospectively identify individuals at high risk for AF with the ultimate goal of developing individualized preventive strategies.

In the meantime, should clinicians wait for evidence from randomized studies before recommending risk factor management activities to their patients as a strategy to reduce risk for AF? Gorenek et al[15] agree that more investigation is needed but recommend that clinicians begin now to use current evidence to counsel patients about risk factor management. LS7 offers a meaningful framework for helping patients to set goals to improve cardiovascular health, but making behavior changes to achieve LS7 goals is not simple. We support recommendations[5,15] that call for investigations to identify socioeconomic, environmental, and clinical resources that need to be in place to help clinicians and patients to meet the cardiovascular health goals described in LS7.

In summary, we congratulate Garg and colleagues[11] on examining the relationship between the American Heart Association's LS7 score and incident AF in a large cohort of middle-aged participants without cardiovascular disease followed up over a median of 25 years. They affirmed that a higher LS7 score correlated with a lower risk of AF, and this effect was consistent in both whites and blacks. More important, even a 1-point increment in LS7 score was associated with 12% lower risk for developing AF. Although these findings are noteworthy and add to the existing literature supporting risk factor modification, further studies and innovative approaches are needed before risk factor modification will have a significant impact on the increasing epidemic of AF.

Disclosures

None.

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