International Journal of Cardiology 274 (2019) 379–380

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Editorial

Primordial prevention of cardiovascular disease: Several challenges remain

Bamba Gaye [a,*], Donald M. Lloyd-Jones [b]

[a] INSERM, U970, Paris Cardiovascular Research Center, University Paris Descartes, Sorbonne Paris Cité, UMR-S970, 75015 Paris, France
[b] Department of Medicine, Division of Cardiology, Northwestern University Feinberg, School of Medicine, Chicago, IL, United States of America

ARTICLE INFO

Article history:
Received 15 September 2018
Accepted 18 September 2018
Available online 21 September 2018

The concept of primordial prevention, preventing the development of cardiovascular risk factors, has been re-emphasized by the American Heart Association (AHA) which has developed a simplified 7-item tool (body mass index, smoking status, diet, physical activity, blood pressure, blood cholesterol and glycaemia) to help promote cardiovascular health (CVH) in the population [1] (Table 1). The AHA's goal was to increase overall CVH in the US population by 20% by 2020 while reducing death from cardiovascular disease (CVD) and stroke by 20%. This is of primary importance as several population-based cohort studies have reported substantial and progressive reductions in mortality and CVD events with higher CVH status [2]. Moreover, poorer CVH has been related to non-cardiovascular outcomes, such as depression, cancer and cognitive decline, highlighting the importance of maintaining an optimal level of CVH [2].

Unfortunately, the frequency of individuals with all 7 CVH metrics at ideal levels remains low, ranging from 0.3% to 12% around the world [2]. The understanding of potentially modifiable obstacles to the achievement and maintenance of ideal CVH into later life could help reverse this distressing picture.

In a recent article, Szlejf and colleagues [3] outlined the fact that psychiatric comorbidity was associated with poorer CVH in the ELSA-Brasil study, suggesting that these conditions may compromise the adoption of healthy cardiovascular risk reduction behaviors. The knowledge that depression might limit the ability to reach ideal CVH in geographically diverse populations is not new. As well discussed by Szlejf's [3], a cross-sectional analysis of the Reasons for Geographic and Race Differences in Stroke (REGARDS) study conducted on 20,093 US participants aged ≥45 years, reported that the number of health metrics at the ideal level, especially the health behavioral ones, was inversely related to the presence of depressive symptoms. The Paris Prospective study extended this investigation in a European context and obtained the same findings. However, Szlejf's study [3] benefitted from including a wide range of psychiatric symptoms (including anxiety disorder). Another key aspect of this study raises the question of gender differences associated between CVD and psychiatric disorders by showing that depressed and anxious women have lower CVH scores, with no evidence of association among men [3].

From a general perspective, a more "holistic" vision of primordial promotion of CVH has emerged from Szlejf's study [3]. First, the role of psychiatric disorders in CVH is significant. In recent focus seminars from the Journal of the American College of Cardiology, Fuster and colleagues launched an 8-part Focus Seminar series on the behavioral considerations that impact CVH and included psychological health as one of them [4]. But beyond Szlejf's important observations, it is also critical to understand and address several challenges that my hinder primordial prevention more broadly.

I) Identifying barriers to reaching ideal CVH

The prevalence of global ideal CVH is extremely low in community-based studies of middle-aged individuals conducted in the US, China and European countries [2]. In Latin America (back in the context of Szlejf's study [3]), the prevalence of 6–7 ideal CVH metrics is estimated at 4% in natives/mestizos from Ecuador (mean age 59 years (SD 13); 59% women); data from the Brazilian National Health Survey in 2013 ($n = 34{,}362$, mean age 44 years; 51% women) revealed a 0.4% prevalence of having 7 ideal CVH metrics [5]. Therefore, identifying potentially modifiable barriers to reach optimal CVH in individuals is a major public health challenge worldwide. Some factors such as poor awareness and lack of motivation, psychosocial factors, social disparities, difficult to modify environmental factors such as pollution have been suggested in the literature and merit more focus. These factors may be more or less important based on population characteristics and their interplay with local and regional environmental differences (in food supply, air quality, etc.), as well as population prevalences of risk factors. This question can be taken in an individual or population perspective as both are needed. If the focus is on psychological factors,

DOI of original article: https://doi.org/10.1016/j.ijcard.2018.06.037.
* Corresponding author.
E-mail address: bamba.gaye@inserm.fr (B. Gaye).

https://doi.org/10.1016/j.ijcard.2018.09.063

Table 1
Definition of cardiovascular health metrics (CVH).

CVH metric	Status	Definition
Diet	Ideal	4–5 components*
	Intermediate	2–3 components*
	Poor	0–1 component*
Physical activity	Ideal Intermediate	≥150 min/week moderate intensity or ≥75 min/week vigorous intensity or combination
	Poor	1–149 min/week moderate intensity or 1–74 min/week vigorous intensity or 1–149 min/week moderate/vigorous
		None
Body mass index	Ideal	<25 kg/m^2
	Intermediate	25–29.9 kg/m^2
	Poor	≥30 kg/m^2
Smoking	Ideal	Never or previous smoker + quit >12 months ago
	Intermediate	Previous smoker + quit ≤12 months ago
	Poor	Current smoker
Blood pressure	Ideal	<120/80 mmHg
	Intermediate	SBP 120–139 or DBP 80–89 mmHg or treated to goal
	Poor	SBP ≥140 or DBP ≥90 mmHg
Fasting plasma glucose	Ideal	<100 mg/dL
	Intermediate	100–125 mg/dL or treated to goal
	Poor	≥126 mg/dL
Total cholesterol	Ideal	<200 mg/dL
	Intermediate	200–239 mg/dL or treated to goal
	Poor	≥240 mg/dL

* Components (1): fruits and vegetables: ≥4.5 cups per day (2), fish: ≥two 3.5-oz servings per week (preferably oily fish) (3), fiber-rich whole grains (≥1.1 g of fiber per 10 g of carbohydrate): ≥three 1-oz-equivalent servings per day (4), sodium: <1500 mg per day and (5) sugar-sweetened beverages: ≤450 kcal (36 oz) per week. DBP = diastolic blood pressure; SBP = systolic blood pressure.

strategies will need to be more individualized and healthcare-based while on broad population primordial prevention then population level public health strategies can clearly work.

II) The growing elderly population

Ideal CVH is beneficial in reducing mortality and CVD events, even in the elderly [6]. However elderly subjects are characterized by a high prevalence of medication prescriptions for chronic disease including hypertension, dyslipidemia or type 2 diabetes, that are likely to influence the prevalence of ideal CVH (since requiring treatment to control a risk factor precludes having ideal CVH). Furthermore, comorbidities such as functional disability or depressive symptoms are highly prevalent in the elderly and have been related to CVH status, mortality and vascular events [7,8]. Therefore, strategic actions for elderly support in the community are needed. A first step to attain this goal could be to emphasize training of elderly people for self-monitoring and self-care and education of health care providers and family members.

III) Heterogeneity of the association between CVH and CVD across individual groups (i.e., sex and age groups) and across geographical settings

The overall associations between risk factors and overall CVD events is known to not differ substantially across geographic regions, as Salim's work has shown in the Interstroke and the Interheart studies [9]. However, the prevalences and severity of risk factors do differ in populations, which could lead to important differences in strategy for primordial prevention depending on the population.

To conclude, finding an optimal way to promote CVH in all populations, and finding the means to effect population and individual change to promote healthier lifestyles can no longer wait. This concerns all regions of the world, all segments of the population, and especially the most vulnerable living in the most deprived areas. Policies such as regulating the contents of high energy foods, like sugary drinks, subsidizing fruits, vegetables and whole foods to promote healthier diets, smoking bans, and increased tobacco taxation may be challenging but necessary.

References

[1] D.M. Lloyd-Jones, et al., Defining and setting national goals for cardiovascular health promotion and disease reduction: the American Heart Association's strategic impact goal through 2020 and beyond, Circulation 121 (2010) 586–613.
[2] A. Younus, et al., A systematic review of the prevalence and outcomes of ideal cardiovascular health in US and non-US populations, Mayo Clin. Proc. 91 (2016) 649–670.
[3] C. Szlejf, et al., Poorer cardiovascular health is associated with psychiatric comorbidity: results from the ELSA-Brasil Study, Int. J. Cardiol. 274 (2018) 358–365.
[4] L.D. Kubzansky, et al., Positive psychological well-being and cardiovascular disease: JACC health promotion series, J. Am. Coll. Cardiol. 72 (2018) 1382–1396.
[5] G. Velasquez-Melendez, et al., Ideal cardiovascular health prevalence in the Brazilian population - National Health Survey (2013), Rev. Bras. Epidemiol. 18 (Suppl. 2) (2015) 97–108.
[6] B. Gaye, et al., Ideal cardiovascular health, mortality, and vascular events in elderly subjects: the Three-City Study, J. Am. Coll. Cardiol. 69 (2017) 3015–3026.
[7] I.M. Kronish, A.P. Carson, K.W. Davidson, P. Muntner, M.M. Safford, Depressive symptoms and cardiovascular health by the American Heart Association's definition in the reasons for geographic and racial differences in stroke (REGARDS) study, PLoS One 7 (2012), e52771.
[8] F. Artaud, et al., Unhealthy behaviours and disability in older adults: Three-City Dijon cohort study, BMJ 347 (2013) f4240.
[9] S. Yusuf, et al., Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study, Lancet 364 (2004) 937–952.