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Commentary

Saving women's hearts: Improving outcomes with prevention & policy

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Introduction

It has been over two decades since the beginning of the awareness campaigns of the risk of heart disease in women, beginning with "The Heart Truth@ Campaign" that was initiated in 2002 by the National Institute of Health (NIH)- National Heart Lung Blood Institute (NHLBI) [1]. Shortly after that, the Red Dress Movement[1] and Go Red for Women[2] started. Three sets of evidence-based guidelines from the American Heart Association (AHA) specific to cardiovascular disease (CVD) prevention in women were released in 2004[3], 2007 [4] and 2011[5]. These efforts were focused on increasing awareness of both the medical community and women as a strategy to address disparities in cardiovascular care, reducing cardiovascular mortality in women, and empowering women to understand their personal risk of CVD and the need for CVD prevention.

To measure success of these campaigns, the AHA tracked the awareness of women regarding knowledge of the leading cause of death for women. Early on, it appeared as if the efforts improved awareness in women over time, despite a persistent reduced effectiveness in women from diverse backgrounds[6–8]. Nonetheless, its effectiveness seems to have started to wane. The most recent survey published in 2021 demonstrated a significant loss in ground with only 44% of women in 2019 recognizing CVD as the leading cause of death in women [9], compared to the peak awareness achieved in 65% of women in 2009 [6]. A similar national survey by the Women's Heart Alliance published in 2017 had also revealed that 45% of women were unaware that CVD was the leading killer of women and also demonstrated that CVD was a top health concern for their women patients in only 39% of primary care physicians, with just 22% of primary care physicians and 42% of cardiologists who felt prepared to assess CVD risk in women [10]. The lost ground in women's awareness of their CVD risk is only further compounded by the healthcare community feeling ill-equipped to assess CVD risk.

Given this, it is not surprising that CVD remains the leading cause of death in women, accounting for 441,532 deaths of American women in 202,0[11]. Disturbingly, the strides made in reducing deaths due to CVD are being lost, with a continuous rise in cardiovascular mortality in the last decade [11]. A greater focus on CVD prevention in women is required to address these concerning statistics. This requires understanding both the sex and gender differences in CVD risks. The problem remains that women are less likely to be enrolled in cardiovascular clinical trials [12], and as a result, there is still limited awareness of sex-specific and gender-specific issues related to CVD prevention. A priority for the American Society for Preventive Cardiology must include CVD prevention directed at women. We need to develop concrete strategies to address CVD prevention in women. This will require directives in primordial, primary, and secondary CVD prevention.

Established gaps in secondary CVD prevention

There is a significant body of evidence supporting that once women have almost any form of CVD, they are less likely to be treated with secondary preventive therapies. Data that has been collected assessing adequacy of care after myocardial infarction continues to demonstrate gaps in the use of evidenced-based guideline directed medical therapies (GDMT) in women compared with men, both within 24 h of the myocardial infarction and also upon discharge [13–17]. Simple quality assessment of care in patients with atherosclerotic CVD have also demonstrated that being female was associated with a lower likelihood of use of high intensity statins [18]. Other cardiovascular conditions also have demonstrated gender disparities in care. Although numerous studies have demonstrated that women have better outcomes compared with men with transaortic valvular catheter replacement (TAVR) for aortic stenosis, currently women are less likely to undergo TAVR. Similar findings are seen with the use of implantable cardiac defibrillators with cardiac resynchronizing therapy (CRT-D), [19] despite strong evidence demonstrating a greater survival benefit when used in women compared with men[20,21]. Atrial fibrillation is also often inadequately treated in women, compared with men. Women with atrial fibrillation are less likely to be adequately anticoagulated [22], less likely to receive non-vitamin K oral anticoagulants [22], and less likely to receive rhythm control treatment including ablation procedures when compared with men [23,24]. There are also differences in management of men and women with advanced heart failure, with lower use of GDMT

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in women compared with men [25]. Additionally, women only received one-quarter of all left ventricular assist devices and hearts transplanted in the United States [26]. These are just some examples where there is gender bias in our secondary prevention approaches to cardiovascular care in women.

Strategies to improve secondary CVD prevention in women

Strategies to improved secondary CVD prevention in women require a multipronged approach. First, it is imperative we adhere to evidence-based guidelines in women. This means placing monetary values on assessments of quality metrics of care and link this to reimbursement [27]. Secondary, we need to use artificial intelligence (AI) to improve the care of all patients, regardless of sex, gender or race. AI that links to electronic health records and recognizes gaps in care may be one approach. Addition novel AI that identifies potential interventions or at-risk individuals may be another way to improve secondary CVD prevention in women. Third, it is important that we monitor and report data, on both a local (clinic/hospital) national level. It is also important that our health systems and payors endorse and implement standards of care and metrics that need to be achieved. Lastly, we need such data to be available, transparent, and reported. Potential implementation of these metrics into national ranking may result in improved secondary CVD prevention of everyone. (FIG. 1)

Established gaps in primary CVD prevention

Traditional CVD risk factors are used in our risk score estimates. Nonetheless, understanding of how specific risk factors affect women differently than men, is not always fully appreciated when using tools, such as the ASCVD Risk Score[28]. Additionally, current risk scores recommend incorporation of risk enhancers[29], some of which are sex specific[30], to be used to refine risk assessment in women[31]. Despite this, there remains a significant lack of knowledge of sex-specific risk factors, particularly an appreciation of adverse pregnancy outcomes and their association with future risk of CVD [32].

Nonetheless, the traditional risk score is less than ideal for risk assessment in women, particularly young women. Although it is possible to assess lifetime risk in those over the age of 40 years, it does not function in women below this age [28]. For younger women, lifetime risk is the best way of risk communication, particularly when sex-specific risk factors and risk enhancers are present in the absence of traditional CVD risk factors[31]. For primary prevention, our goal is to identify women at risk early and initiate lifestyle and/or medical therapies as soon as possible [33]. The current risk score tool also exclusively focuses on atherosclerotic CVD[28], and there is a need to establish a risk assessment tool that identify women at risk of any type of CVD.

Even when women are identified to be at risk for CVD, primary prevention efforts are not followed as often in women, compared with men [34]. This is particularly true for treatment of hypertension, dyslipidemia and diabetes mellitus [34–39].

Strategies to improve primary CVD prevention in women

Strategies to address improving primary CVD prevention require improved preventive screening efforts in women and addressing sex-specific risk CVD factors, which includes increasing awareness of adverse pregnancy outcomes that identify women at risk at younger ages. Ultimately improving the "Fourth Trimester" care of women [40] will better identify women at risk and also hopefully translate into initiating CVD risk reduction strategies. Additionally efforts need to be undertaken to reduce clinical inertia in treating established CVD risk factors and identify strategies to reduce the inequity in application of GDMT in primary prevention efforts. The greatest impact of all CVD risk factors is the adequacy of treatment of hypertension, which remains suboptimal in women. Addressing this, in addition to all risk factors is essential in reducing the burden of CVD in women[41]. Lastly, there should be consideration to refine current risk scores so that we are better able to utilize our tools in younger women and communicate lifetime risk of all forms of CVD (Fig. 2).

Established gaps in primordial CVD prevention

There continues to be an overt focus on treating CVD but less focus on primordial prevention of CVD. There is a significant body of evidence supporting the reduced risk of CVD when women adhere to a healthy lifestyle[42–45]. Nonetheless, there is little implementation of primordial prevention strategies, with less than 1% of the US population adhering to the "Life's Simple 7″ strategy set by the AHA [46], which preceded the recent "Essential 8″ recommendations and continues to show a low overall cardiovascular health status in both adults and children[47].

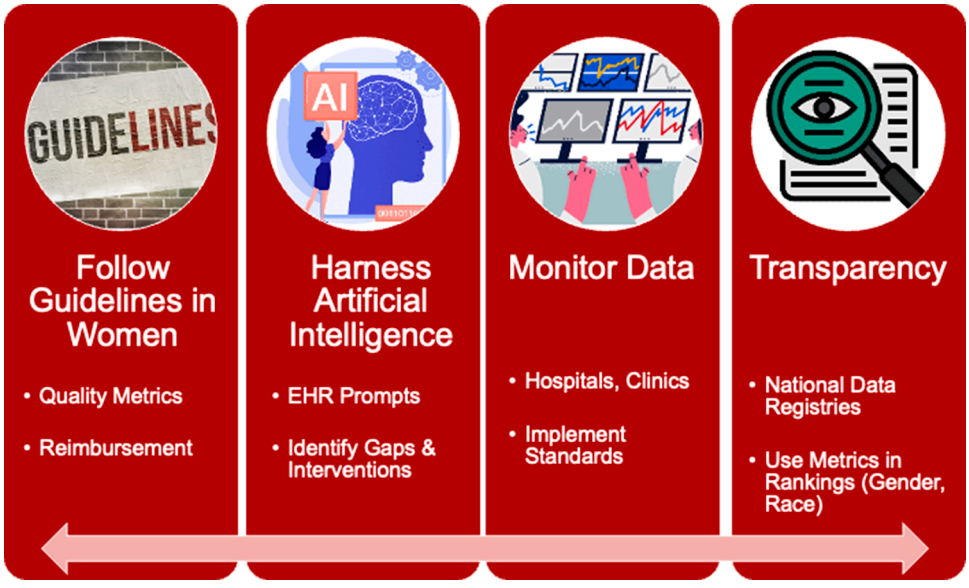

Fig. 1. Strategies to Improve Secondary CVD Prevention in Women.

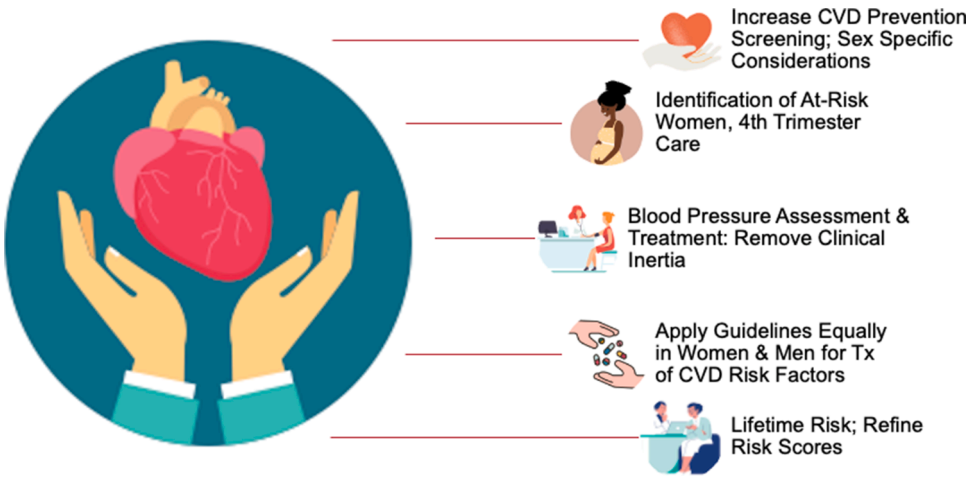

Fig. 2. Strategies to Improve Primary CVD Prevention in Women.
Legend: Tx= treatment; CVD= cardiovascular disease

Strategies to improve primordial CVD prevention in women

Strategies to improve primordial prevention in women are heavily dependent on access to optimal preventive care and public policy to improve the health and well-being of women. Social and policy changes are ultimately what will allow us to develop strategies for primordial prevention, but if policy efforts are implemented, it will be of particular importance to ensure that disadvantaged populations receive the benefits of any such efforts, given the enormous impact of social determinants of health on the development of CVD. Some strategies are not specific to women, including improving the walkability of neighborhoods, access to healthy foods and access to healthcare with preventive CVD screening for everyone. For women, specific attention to prevention programs that address frailty prevention are essential for older women. For younger women, standard and universal prenatal and postpartum care, with a high level attention in the fourth trimester[40], identifying sex-specific risk enhancers could improve the cardiovascular health of women in this country. Additionally, policies that have the ability to improve the population cardiovascular health should be implemented. This was exemplified by the "Smoke-Free" strategies towards tobacco use in public settings in many parts of the United States [48]. Additionally, policy to address the impending climate crisis are needed in order to improve the cardiovascular health of our nation[49]. (FIG. 3)

Fig. 3. Strategies to Improve Primordial CVD Prevention in Women.
Legend: CVD= cardiovascular disease

The role of advocacy, research and education for women's CV health

The issues related to CVD prevention in women require advocacy strategies in clinical care, research, and public health. Advocacy for our healthcare systems to prioritize CVD prevention and expand the prevention initiatives that were made accessible by the Affordable Care Act to include CVD prevention within the covered services for all women, similar to the provision of access to mammography. Regardless of the funding source, research must be inclusive and strategic to enroll women. This includes reducing barriers for women for enrollment into clinical trials. Considerations of ease and accessibility, such as virtual visits, limiting in-person visits, and implementation of technology that is utilized in telehealth may improve the enrollment of women into trials [50]. Education of women about their risk of CVD need to take advantage of social media platforms where women are, with targeted education to young women and women from diverse backgrounds. Consideration for education in different languages, and use of celebrities from diverse backgrounds could be strategies to improve the "Go Red for Women: movement. Rebranding the campaign regarding CVD in women should also be considered, moving away from the red dress to something that connects with all women and is able to better deliver a CVD awareness message [51].

Conclusion

Cardiovascular disease remains the leading killer of women. Although we have made significant strides in recognizing this risk, there are clear gender- and sex-based gaps that persist and hinder our preventive efforts. The continued "undering" of women- under recognition, under diagnosed, under treatment, and under study- need to be addressed by a multifaceted approach. This will include continued assessment of quality metrics, tying reimbursement to quality of care, increasing access to CV preventive care in women throughout their lifespan, and changing public policy to address this ongoing crisis.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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