Coronary Disease and Drawbacks for Women: Literature Review

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Abstract: Men have significantly higher age-standardized rates of cardiovascular disease (CVD) than women do. This clarifies the reason why CVD has historically been viewed as a "man's problem." On the other hand, cardiovascular disease (CVD) is the primary cause of death for women globally and a major contributor to the loss of years of life adjusted for disability. Women are disadvantaged when it comes to CVD in a number of areas, and this is generally underrecognized. There is evidence that women receive less treatment than males in primary and secondary prevention. It has been demonstrated that failing to acknowledge the fact that women frequently experience heart disease differently from males might have negative effects. It has been discovered that female patients of male cardiac physicians fare worse than those of their male counterparts; female cardiologists do not exhibit this gender disparity. While males are the primary participants in CVD clinical trials, it is widely acknowledged that many medications have distinct effects on men and women. Women are more disproportionately at risk for cardiovascular disease (CVD) than males are due to diabetes, smoking, and possibly other risk factors. Additionally, women are more vulnerable to CVD due to unfavorable pregnancies and variables related to the female reproductive cycle. But research on women's health is biased toward breast cancer and mother and child health, which is maybe where the most progress has already been done in terms of public health. Therefore, it is necessary to reinterpret the term "women's health" to include all aspects of the life cycle and place a greater focus on CVD and other non-communicable diseases. When possible, sex-specific analysis of research data need to be the standard.

Keywords: cardiovascular disease, sex differences, women

1. INTRODUCTION

Most people have an image of a man with bad lifestyle choices when they discuss the social and medical issues around coronary heart disease (CHD). Undoubtedly, a man like that is probably headed for a heart attack or stroke, but the same could be said for a woman with comparable behaviors. However, the first thing that comes to mind when discussing middle-aged women's health concerns is breast cancer. Moreover, global grant funding for women's health and health research frequently focus on pregnancy experiences. Cardiovascular disease (CVD, primarily heart disease and stroke) is really the leading cause of death for women worldwide and in most developed nations, including the wealthiest and most impoverished. Globally and in high-income nations, CHD is the greatest cause of death for women; in low-income nations, it is only surpassed by lower respiratory tract infections, newborn illnesses, diarrhea, and malaria. Stroke is the second leading cause of death for women worldwide, coming in third in high-income nations and sixth in low-income ones, just behind congestive heart disease. These studies provide
a solid picture of the basic significance of CVD to women (and men) worldwide, despite the fact that they depend on how causes are classified and defined, are prone to errors in recording, and make assumptions when working with incomplete data in some countries. Also to be noted is the fact that breast cancer only ranks in the top 10 DALYs for high-income countries and kills fewer women than CHD or stroke. However, within this group of countries, lung cancer kills more women than breast cancer.

2. LITERATURE REVIEW

There is not much of distinction among males and females when it comes to lifelong CVD concerns. In fact, women may experience more CVD events than males because they typically live longer. In fact, since 1984, there have been more women than men in the USA who have died from cardiovascular disease. After adjusting for competing risk from non-CVD death, the remaining lifetime risk of CVD at age 55 was estimated using data from the Rotterdam Study [4]. For men, this was 67% (95% confidence interval 65 to 70%) while for women, it was 66% (64 to 69%). When CHD and stroke are separated, the study authors calculated that, relative to male mortality, there would be 102 fewer female deaths and 70 more female stroke deaths per 1000. Compared to men, women are more likely to experience their first CVD event 5–10 years later, and they are also more likely to get a stroke rather than a coronary heart disease (CHD). Therefore, even though women seem to have a natural advantage over men due to the later beginning of their CVD, the male disadvantage in CVD is mostly unfounded because women eventually catch up. Examples will be used to illustrate the scenarios in which women are at a cardiovascular disadvantage in the remaining sections of this article. This could be caused by biological variations in certain circumstances, but it could also be caused in other cases by the misconception that CVD is a "man's disease." It is widely acknowledged that endogenous oestrogen in women during their reproductive years of life postpones the onset of CVD [5]. The rate at which CVD increases with age at the menopause, however, appears to be the same, according to epidemiological data [2, 6].

For instance, there is no proof that the death rate from CHD increases in women between the ages of 45 and 55 or that the rates for men and women begin to converge at this point. Moreover, exogenous oestrogen has not been shown to have any general cardiovascular benefits in postmenopausal women in clinical trials [7]. As a result, women may overestimate their level of cardiovascular risk due to their mistaken sense of optimism about their degree of protection from CVD caused by oestrogen. Even while there are anecdotal reports in women's publications and social media that emphasize healthy lifestyles, many women can still be unaware of issues related to their risk of CVD. Furthermore, women could prioritize their family over males, which could be detrimental to their own health. The Canadian survey of women [8] provides evidence for these claims. It revealed that less than half of the participants acknowledged that smoking was a risk factor, less than 1/4 named high blood pressure (BP) or cholesterol as risk factors, and less than 1/3 identified four frequent symptoms of a heart attack in women. Sixty-two percent of individuals at high risk (based on medical history and risk factors) evaluated their risk as low to moderate, and sixty-five percent said they had the most impact on the health of their family. Similar to the broader public, physicians are susceptible to the false belief that cardiovascular disease (CVD) is mostly a male issue [9]. They might also harbor unintentional sexism. In an experiment with fictitious patients, American cardiologists were asked to rank the utility of angiography as "high" for women more often than for males. Their belief that women were less risk-tolerant than men was the basis for this implicit bias [10]. As was discovered in a sizable study of Australian general practice, where the adjusted odds of a woman being evaluated for CVD risk factors were 12% lower than for a man [11], such inherent
bias may show up in the underuse of screening for CVD risk. Results from patients with a history of CHD who were recruited from routine outpatient cardiology clinics in 11 countries across Europe, Asia, and the Middle East were given by Zhao et al. (2017) in the context of secondary prevention [12]. When age was taken into account, they compared how well each sex did in meeting guideline-based targets for total cholesterol, high-density lipoprotein cholesterol, low-density cholesterol, glucose, physical activity, obesity, and cardiac rehabilitation. They discovered that women performed worse than men in these areas. Men only performed worse when it came to controlling their blood pressure and quitting smoking (however, to put the latter result in perspective, smoking by women is uncommon in Asian and Middle Eastern countries). While lifestyle targets were more frequently met (34% of men and 32% of women), just 8% of men overall reached all treatment targets (the ratio was significantly lower for women, at 6%). While patients bear much of the responsibility for their own health behaviors, it is reasonable to assume that there is more that caregivers can do to raise patient knowledge and increase risk factor action, both generally and with regard to sex disparity. Additionally, there is evidence that a woman's post-CVD treatment may be insufficient compared to a man's, which could lead to disparities in risk factors for secondary prevention. For instance, according to US guidelines, patients who recover from a MI should take high-intensity statins, which are medications that decrease cholesterol. However, Peters et al. (2018) discovered that American women have been less likely than American males to obtain high-intensity statins since 2007 [13] among all patients prescribed statins. The researchers used data from two sizable health insurance systems. In this study population, within 30 days of receiving a prescription for a high-intensity statin, 9% (95% confidence interval 8 to 10%) fewer women than males filled the prescription. Because women frequently experience heart attacks differently than men do, and because traditional medical textbooks were created on the male paradigm of the disease, doctors may overlook heart attacks in women in the acute setting. In particular, women appear to be more likely than males to have anxiety, back, shoulder, or jaw discomfort, nausea, vomiting, and dyspnea as symptoms of MI. Additionally, they are more likely to experience mental anguish rather than physical exertion as the trigger for their MI.

According to a UK study, women were 37% more likely than males to have the wrong initial diagnosis upon hospital admission for any patient who had an ST-elevation myocardial infarction (STEMI) and 29% more likely to receive the proper diagnosis for patients who had a non-ST-elevated MI (NSTEMI) [14]. Misdiagnosis is a serious issue, especially in women, as evidenced by the fact that those who received the incorrect initial diagnosis had a higher chance of dying within a year compared to those who received the correct initial diagnosis (time to death was 10% shorter for misdiagnosed STEMI cases and 14% shorter for misdiagnosed NSTEMI, after adjustment) [15]. Women's survival was lower than men's after correcting for multiple confounding variables, regardless of the gender of the attending cardiac physician. Interestingly, among patients treated by men, female patients survive therapy less frequently than male patients, despite the fact that female physicians seem to perform similarly for female and male patients. The relative paucity of female cardiologists in many contexts exacerbates this problem, which is of great consequence in terms of potential life-savings for women, even though the variations in probability are negligible. Women's cardiology clinics have recently been established [9] to address these problems, albeit they are not yet widely dispersed. Women typically have lower survival rates and are more prone to experience recurring events among those who survive a MI and leave the hospital [16]. This can be explained by the fact that women are often older when they experience MI, highlighting the significance of accounting for age in these kinds of sex comparisons. However, similar age-adjusted survival following a MI shows that women have lost some of their natural advantage, which may be explained by women having worse secondary prevention care. This is in spite of the fact that women had an advantage in age-
specific CHD rates prior to a CHD event. Since experience has demonstrated that some medications differ in efficacy or safety between the sexes [17–19], the Food and Drug Administration of the United States has been encouraging reports of clinical trial findings by sex for more than 20 years. This has been acknowledged by the American Heart Association in 2016 [20]. These laws do not, however, apply everywhere, and even in the USA, there is no indication that women are now being recruited in cardiovascular studies at the same rate as males [19–22].

Expectedly, sex variations in the prevalence of traditional modifiable cardiovascular disease (CVD) risk factors, such as high blood pressure and cholesterol, smoking, diabetes, and overweight/obesity, will have a significant impact on sex differences in CVD (and other clinical) outcomes. It is impossible to make generalizations about this prevalence because it varies so widely throughout the world. Rather, one modern example will be provided. According to a recent review of nationwide surveys conducted among adults in the USA between 2001 and 2016 [23], women and men showed similar trends in terms of declining smoking and systolic blood pressure as well as rising rates of diabetes mellitus. Men, however, had bigger reductions in total cholesterol, while women saw greater increases in body mass index. Women were more likely than men to be fat, as was the case in a global research on obesity [24]. Several widely known cardiovascular risk factors (smoking [25], diabetes [26], atrial fibrillation [27], and low socioeconomic status [28]) were found to have a stronger relative effect on CHD in women than in men, while only total cholesterol had a stronger effect on CHD in men than in women [29]. These findings came from a systematic series of large-scale meta-analyses of various sets of cohort studies from general populations. No evidence was found to link a greater body mass index or blood pressure to a difference in sex [30, 31].

Once more, atrial fibrillation [27], diabetes [32], and smoking [33] clearly favored women, but the extra female relative risk for smoking was low (6%) and hardly statistically significant. The accompanying broad confidence interval indicates that there was inadequate information to properly quantify the effects of social deprivation on stroke [28]. There was no evidence of a sex difference in blood pressure [30] or total cholesterol [29]. Nevertheless, these assessments of stroke are limited in that the results for all stroke types together were not always able to differentiate between subtypes of stroke. Furthermore, sex-specific variations in the impact of body mass index on stroke have not yet been examined in this methodical set of meta-analyses. Diabetes has the strongest weight of evidence when it comes to disadvantages for women [34]. The aforementioned meta-analyses show that possessing this risk factor more than doubles the risk of coronary heart disease (CHD), with women at higher risk than males (44%). Similar, if somewhat less drastic, results were found for stroke: 27% of women are at higher risk than men. This may be brought on by the fact that women tend to be more obese when they are diagnosed with diabetes [36,37], and that women may receive less treatment than males to prevent the consequences of diabetes [35]. One common drawback of these meta-analyses is that the majority of the pooled data originated from published research that used a variety of techniques and covariate modifications. Age-specific sex differences could not be accurately summarized, even when they were all corrected for age. The fact that only relative risks might be pooled is another drawback.

Millett et al. (2018) examined sex differences in risk factor associations with MI in the UK Biobank (n = 471,988), avoiding these problems while still utilizing a sizable set of data [38]. On a relative basis, the disadvantage that women face from smoking and diabetes was verified, and there was also evidence of a disadvantage from high blood pressure. Although not statistically significant, the results for atrial fibrillation and low (as opposed to high) socioeconomic status went in the same direction (toward
women's relative disadvantage). When it came to relative hazards, gender inequalities persisted over time. Men were at higher risk than women overall for smoking, high blood pressure, and obesity/overweight, but not for diabetes. It is evident that factors related to the species' ability to reproduce are unique to women, as multiple factors have been linked to the development of CVD in the future.

There was also evidence of an increased risk of stroke and CHD with an increasing number of children, at least in those women who had any children, in this research and another using the comparable China Kadoorie Biobank [39]. The link between CVD and the number of children was found to be remarkably comparable in men in both biobanks, despite the fact that this phenomena was previously assumed to be produced by biological variables specific to women. This finding suggested that the causal elements were most likely societal in origin. This demonstrates how important it is to include male controls in studies on women's health wherever feasible. Specifically, it highlights a constraint when extrapolating conclusions from the Canadian study on women's cardiovascular literacy. Pre-eclampsia (PE) or gestational diabetes (GD) during an adverse pregnancy increase the mother's future risk of CVD. For instance, in the second Nurses Health Study, GD was linked to subsequent CVD after controlling for age, pre-pregnancy body mass index, and other variables [40]. The hazard ratio (95% confidence interval) for GD over no GD was 1.43 (1.12 to 1.81) for GD against no GD. One limitation of the majority of pregnancy research is that the information utilized usually comes from mother registries, which do not have information on traditional CVD risk factors before or after the pregnancy. For instance, PE might just be the result of a woman's innately high blood pressure. This calls into question the validity of claims regarding the extra (or "independent") character of GD and PE relative to traditional CVD risk factors. It also calls into question the reliability of incorporating GD and PE into a CVD risk score intended for general usage among women who do not currently have CVD. When evaluating the actual risk of CVD for pregnant women with a history of poor health, this is a fundamental constraint and may result in many of them not receiving medications that could save their lives. Men certainly experience CVD sooner in life and at a higher age-specific rate than women, but overall, the risks for both sexes seem to be comparable. Furthermore, as this article demonstrates, there are other domains in which women have been demonstrated to have a cardiovascular disadvantage. Finding these causative processes is a major difficulty in the study of sex differences. This could be due to biological, physiological, or behavioral differences. However, not all gender differences are undesirable; in fact, gender distinctions should be appreciated overall. Research is needed to eliminate health disparities based on sex. First, the disparities must be quantified and the issue areas must be determined. Unfortunately, women are still underrepresented in a lot of CVD research, which obviously makes these goals impossible to achieve. The lack of distinction between sex and gender is a shortcoming of this article. Broadly speaking, "gender" refers to the social or cultural distinctions between men and women, while "sex" generally refers to biological differences. For the sake of simplicity and because the majority of the material cited has not made this difference and has instead used the noun "sex" exclusively, "sex" alone has been used here without prejudice.

3. CONCLUSION

Diabetes is not a "disease of men." In fact, it is possibly the most significant illness affecting women worldwide. Its significance for women is not fully acknowledged, despite this. A fundamental shift in our perspective of women's health is necessary to close this disparity. The following four suggestions are crucial: A more comprehensive agenda for women's health is required, one that takes a lifecourse approach to women's health and integrates sexual and reproductive health with CVD and other non-
communicable diseases. Studies on cardiovascular disease (CVD) should involve a sufficient number of women (and more broadly). Given that approximately 50% of the population is female, it seems reasonable that responsible official bodies and journals should mandate that all research (save in extenuating circumstances) should report results by sex; studies of women’s health should include male controls. A sex-disaggregated approach should be taken to collecting, analyzing, and reporting CVD (and more generally).

REFERENCES


