



Systematic Review of Gender Based Studies of Diagnosis and Treatment of Cardiovascular Disease in Last 20 Years

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Abstract

Cardiovascular disease (CVD) encompasses a broad range of conditions. Coronary Artery Disease (CAD), commonly referred to as Ischemic Heart Disease (IHD), is the leading cause of death, morbidity, and mortality in the United State and women continue to have poorer outcomes than men. The causes of these discrepancies have yet to be fully elucidated. In this review, we reported gender-based studies of diagnosis, treatment, and outcome of CVD in the last 20 years.

Keywords: Cardiovascular disease; gender-based discrepancies; diagnosis; treatment

Introduction

Cardiovascular disease (CVD) is the major cause of death in the United State and other countries [1]. Age, ethnic, racial, and gender differences within CVD diagnosis and treatment have been well reported in several studies. Because men and women have different characteristics and predictive factors, decision-making based on the currently standardized frameworks and recommendations for clinical diagnosis and treatment tend to lead to poorer outcomes in women compared to men. In this paper, we present a short review of a few related works in gender-based CVD-related studies over the past 20 years.

Systematic Review in Last 20 years

In 1999, Kameneva MV et al. [2] reported that CVD mortality in men and menstrual women, particularly myocardial infarction (MI), is significantly higher than pre-menopausal women, which may be associated to the difference in age of red blood cells and the consequent differences in the structural features of menstrual and postmenopausal women. According to their results, men have

hematocrite, blood viscosity, RBC aggregation, and RBC rigidity higher than pre-menopausal women. Jeanine E Roeters van Lennep et al. [3], concluded that diabetes, high density lipoproteins, and triglyceride levels were found to have a greater effect on women's risk of coronary heart disease than men. They also found out that women and men show different responses to risk factors or to treatment in case of optimal treatment and prevention. In a research done by Edgar Argulian et al. [4], they suggested that women were more likely to experience coronary artery injury and bleeding problems than men, despite similar high angiographic and procedural success rates of PCI for both sexes. According to Regithz Zagrosek et al. [5], the increased prevalence of MetS in women over 40 years was 76% compared to 5 percent in men at the same age. In the cardiovascular risk associated with diabetes mellitus and hyperglycemia, the same gender difference was also observed.

In a study conducted by Kwok Leung Ong et al. [6], they suggested that sex hormones could be responsible for gender differences in coordination with blood pressure. Even though there

was higher diastolic blood pressure in men, higher systolic pressure was reported in women which is a greater risk factor for CVD. They found that women had more prevalence of cardiovascular risk factors such as central obesity, high total cholesterol, and low HDL than men. Giusepp Mercurio et al. [7] reported significantly higher mortality rates among women with diabetes compared to men of the same age and women were less likely to ask for medical help. According to their report, women of older age have the non-ischemic disease in patients with heart failure and have more severe symptoms of heart failure. By increasing the risk of a first acute myocardial infarction (AMI), smoking is more dangerous in younger women (< 50 years) than in men according to Maas AH et al. [8]. They also presented that Smoking also induces a down-regulation of estrogen-dependent vasodilatation of the endothelial wall in young premenopausal women that can contribute to more problems in CHD patients. G Penno et al. [9] found that while CVD was more common in men, women had a greater risk profile for CVD and worse outcomes for therapy. They concluded that women were less likely to receive pharmacological therapy for hypertension hyperglycemia and dyslipidemia than men. In an exclusive analysis of a national cohort of CVD, Salim S. Virani et al. [10] found women were less likely to take statins and high-intensity statins than men did. Also, significant facility-level variation in both statin and high-intensity statins used in female patients was observed.

Ramzi Y Khamis et al. [11] discovered that CVD diagnosis has been shown to be poorer since women with chest pain were less likely to perform ECG exercise and less probable to have coronary angiography. They stated that Females tend to experience CVD later in life and appear to be treated with less certainty than their male counterparts even when diagnosed. It has also been shown that women respond to antiplatelet agents differently from men, so residual platelet activity appears to be higher in them. According to Min Zhao et al. [12] report, women are worse at managing risk factors in CHD prevention. Results showed better regulation of blood pressure in women, but they had a poorer profile in glucose and lipid therapy target levels. Women tended to undergo less rigorous lipid-reduction therapy than men. Upon cardiovascular events, they were also less likely to take aspirin, ACE inhibitors, or statins. Niti R. Aggarwal et al. [13] suggested that considering advances in IHD mortality, it is still the leading cause of death among women. Compared to men, women are much less probable to be detected and involved in cardiac rehabilitation. Also, there are several non-traditional cardiac complications in women, including early menopause and menarche, gestational diabetes mellitus, and hypertension. In 2019, Amy Johnson et al. proved that women were more likely to die within one year of cardiac surgery and long-term follow-up than men. They also found that despite the fact that a higher mortality rate among women was correlated with remote MI, recent MI and previous PCI, there was a lower risk of death among men who had previous PCI [1].

Conclusion

The review of related works shows significant works and finding around risk factors and outcomes in CVD for men and women. But the causes of these discrepancies have yet to be fully addressed and require further research in this field of study to overcome poorer outcomes in women. Further detailed analysis is needed in order to design interventions and structures to minimize bias. The complication of pregnancy and other women-specific situations make it difficult to diagnose female patients with CVD in a timely manner.

References

1. Johnston A, Mesana TG, Lee DS, Eddeen AB, Sun LY (2019) Sex Differences in Long-Term Survival After Major Cardiac Surgery: A 524 Population-Based Cohort Study. *Journal of the American Heart Association* 8(17): e013260.
2. Kameneva MV, Watach MJ, Borovetz HS (1999) Gender difference in 20 rheologic properties of blood and risk of cardiovascular diseases. *Clinical Hemorheology and Microcirculation* 21(3-4): 357-363.
3. Roeters van Lennep JE, Westerveld HT, Erkelens DW, van der Wall EE (2002) Risk factors for coronary heart disease: implications of gender. *Cardiovascular Research* 53(3): 538-549.
4. Argulian E, Patel AD, Abramson JL, Kulkarni A, Champney K, et al. (2006) Gender Differences in Short-Term Cardiovascular Outcomes After Percutaneous Coronary Interventions, *American Journal of Cardiology* 98(1): 48-53.
5. Regitz Zagrosek V, Lehmkühl E, Mahmoodzadeh S (2007) Gender Aspects of the Role of the Metabolic Syndrome as a Risk Factor for Cardiovascular Disease. *Gender Medicine* 4 S162-S177.
6. Ong KL, Tso AW, Lam KS, Cheung BM (2008) Gender difference in blood pressure control and cardiovascular risk factors in Americans with diagnosed hypertension. *Hypertension* 51(4): 1142-1148.
7. Mercurio G, Deidda M, Piras A, Dessalvi CC, Maffei S, et al. (2010) Gender determinants of cardiovascular risk factors and diseases. *J Cardiovasc Med (Hagerstown)* 11(3): 207-220.
8. Maas AH, Appelman YE (2010) Gender differences in coronary heart disease. *Neth Heart J* 18(12): 598-602.
9. Penno G, Solini A, Bonora E, Fondelli C, Orsi E, et al. (2013) Gender differences in cardiovascular disease risk factors, treatments and complications in patients with type 2 diabetes: The RIACE Italian multicentre study. *J Intern Med* 4(2): 176-191.
10. Virani SS, Woodard LD, Ramsey DJ, Urech TH, Akeroyd JM, et al. (2015) Gender disparities in evidence-based statin therapy in patients with cardiovascular disease. *Am J Cardiol* 115(1): 21-26.
11. Ramzi Y Khamis, Tareq Ammari, Ghada W Mikhail (2016) Gender Differences in Coronary Heart Disease. *Heart* 102(14).
12. Zhao M, Vaartjes I, Graham I, Grobbee D, Spiering W, et al. (2017) Sex differences in risk factor management of coronary heart disease across three regions. *Heart* 103 (20): 1587-1594.
13. Aggarwal NR, Patel HN, Mehta LS, Sanghani RM, Lund berg GP, et al. (2018) Sex Differences in Ischemic Heart Disease: Advances, Obstacles, and Next Steps. *Circulation: Cardiovascular Quality and Outcomes* 11 (2): e004437.



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