Investigating the Connection Between Social Determinants of Health in Women with Low Socioeconomic Status, Differing Education, and Cardiovascular Disease

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ABSTRACT:

Background: Cardiovascular disease (CVD) is a leading cause of death in women, with one in five experiencing symptoms annually. Despite its prevalence, women are often excluded from cardiovascular clinical trials, highlighting a critical gap in research. This paper explores the significance of the problem, emphasizing the need for more research, especially in the context of social determinants like stress, socioeconomic status, and race impacting women's cardiovascular health.

Methods: This scoping literature review using PubMed focused on studies conducted in the US after 2000, involving women over 18 years of age. Key search terms included health insurance status, socioeconomic status, education, and their relation to cardiovascular disease. Exclusion criteria ensured a targeted and relevant selection of studies for analysis.

Results: The review revealed significant associations between social determinants and cardiovascular health in women. Women with higher cardiovascular health scores exhibited better outcomes, emphasizing the role of education. Socioeconomic factors such as low income and education levels were linked to increased risks of CVD.

Discussion: The findings underscore the intricate interplay of socioeconomic disparities and depressive symptoms influencing women's cardiovascular health, emphasizing education as a protective factor. This study adds depth to existing knowledge, emphasizing the imperative for targeted interventions addressing education and socioeconomic disparities to enhance cardiovascular health in women. The nuanced relationship between mental health, educational attainment, and cardiovascular outcomes challenged conventional assumptions, highlighting the need for personalized approaches.

INTRODUCTION:

One in five women every year experience shortness of breath, pain in one arm, heartburn, and unusual fatigue, ultimately leading to a heart attack caused by their heart simply not getting enough oxygen [1]. An estimated 3,200,000 women suffer from a myocardial infarction, also known as a heart attack each year [2]. In addition to this, approximately 213,572 die of coronary artery disease each year, a disease that affects the heart, restricting its ability to send enough blood and oxygen to the heart muscles through the coronary arteries.

Being that it is such a life-threatening disease, it often leads to myocardial infarction and or strokes, as the arteries sometimes fill with plaques [2,3]. Interestingly enough, more women die and have heart attacks than men, making it the top cause of death for women worldwide [4]. Most importantly it is crucial to note that women are still not being included in many clinical trials regarding cardiovascular disease (CVD) and many of these trials do not report results based on gender, leaving a clear need for more research and attention toward the field of cardiology in women. [5]

One common determinant of a higher risk of heart disease in women is stress depression and physical inactivity. This paper will dig deep into the different social determinants of health, socioeconomic status, education, and health insurance status, in women and cardiovascular disease and how they affect the lifestyle of women, eventually causing heart failure and other cardiovascular diseases. This will emphasize the need for more clinical research in this field and act as an advocacy and awareness platform for young women to be aware of these determinants.

METHODS:

Search Strategy:

In this scoping literature review, PubMed was used to identify relevant articles. The key search terms used were (Health Insurance Status OR Socioeconomic Status OR education) AND (Cardiovascular Disease OR CVD OR myocardial infarction OR hypertension) AND (Women).

Inclusion and Exclusion Criteria

Studies included were conducted in the US, were limited to studies on participants over the age of 18, focused on women, and were completed after the year 2000. Studies were excluded if they were conducted outside of the US, involved participants under 18, or included non-biological women.

RESULTS:

In a study that examined the relationship between cardiovascular health (CVH) and the incidence of CVD in postmenopausal women, 99% of women with an ideal CVH had a high school education of more [7]. When comparing women with high CVH scores with those with the lowest CVH scores, women

with low scores had seven times the hazard of CVD [7]. Another study looked closely at how money and where women lived, specifically living quarters and living situation, affected their health when treating high blood pressure CVD [7].

In a study with 27,862 participants, 7.8% were among the lowest-income sites [8]. It was found that these participants were majority women, black, Hispanic, and had fewer years of education [8]. This 7.8% had greater all-cause mortality (hazard ratio [HR], 1.25; 95% CI, 1.10–1.41), heart failure hospitalizations/mortality (HR, 1.26; 95% CI, 1.03–1.55), end‑stage renal disease (HR, 1.86; 95% CI, 1.26–2.73), and were less likely to achieve blood pressure control (<140/90 mm Hg) (odds ratio, 0.48; 95% CI, 0.37–0.63) [8].

It was also found in a study that delved into the mental health of 341 African American women with hypertension, through a secondary analysis of a randomized clinical trial, that 57% of women with less than a high school diploma and women who smoked with chronic health conditions had a higher prevalence of depressive symptoms [9]. Women's depressive symptoms had a negative association with postsecondary education (adjusted odds ratio [aOR], 0.492; 95% CI, 0.249-0.968) and a positive association with the number of chronic conditions (aOR, 1.235; 95% CI, 1.046-1.460) and smoking (aOR, 1.731; 95% CI, 1.039-2.881) [9]. The following factors were associated with better depressive outcomes: having greater than a high school education (unadjusted OR, 0.492; 95% CI, 0.265-0.916; adjusted OR, 0.492; 95% CI, 0.249-0.968) and annual income between $20,001 and $40,000 (unadjusted OR, 0.479; 95% CI, 0.263-0.870, adjusted OR, 0.518; 95% CI, 0.275-0.974) [9]. Smoking (unadjusted OR, 1.761; 95% CI, 1.113-2.787; adjusted OR, 1.731; 95% CI, 1.039-2.881) and having multiple comorbidities (unadjusted OR, 1.199; 95% CI, 1.025-1.404; adjusted OR, 1.235; 95% CI, 1.046-1.460) was associated with increased risk of being depressed [9]. It was not found that there was a significant association between depression and age, annual income greater than $40,000, health insurance status, and drinking behavior [9].

Another study focused on atrial fibrillation (AF), a common heart rhythm issue affecting older individuals, particularly women [10]. Women with AF tended to have higher levels of financial, and traumatic life events, neighborhood stress, and lower everyday discrimination stress scores than women without AF [10]. Traumatic life event stress continued to be significantly associated with odds of AF in age-adjusted models [OR 1.37, CI (1.19-1.59), p <0.0001], as well as in fully adjusted models [OR 1.32, CI (1.12-1.52), p <0.0007] [10].

Lastly, a prevention program for community-based cardiovascular disease was implemented in rural communities and intervention sites reported high levels of fidelity (82%) and dose delivered (84%)

[11]. Overall reach was 2.6% and program classes were rated as effective (3.9/5) [11]. Participants were satisfied with their experience and reported benefits such as camaraderie and awareness of healthy eating and exercise strategies [12].

DISCUSSION:

In examining the relationship between social determinants of health and CVD in women, this literature review revealed compelling insights into the intricate interplay of factors influencing women's cardiovascular health. The findings underscored the importance of education as a significant determinant, with women having a high school education or less exhibiting a higher risk of CVD. Notably, 99% of women with an ideal CVH profile had a high school education or more, emphasizing the potential protective role of education in cardiovascular well-being. This suggests a link between educational attainment and overall health, emphasizing the need to address educational disparities to mitigate cardiovascular risks in women.

Additionally, this review shed light on the pervasive impact of socioeconomic factors, exemplified by the association between lower income, education, and increased risk of CVD. The disparities observed in health outcomes among participants from lower-income sites, predominantly women of Black and Hispanic backgrounds, underscore the urgency of addressing socioeconomic inequalities in cardiovascular health interventions. These results were expected to some extent, aligning with prior research, yet the magnitude of the associations emphasizes the critical need for targeted interventions addressing these disparities to alleviate the burden of CVD in vulnerable populations.

Surprisingly, despite the known relationship between mental health and cardiovascular outcomes, findings revealed a nuanced connection between depressive symptoms and educational attainment among women with hypertension. The studies illuminated the complex interplay of factors, showing a negative association between postsecondary education and depressive symptoms, but a positive association with the number of chronic conditions and smoking. This nuanced understanding challenges conventional assumptions and underscores the need for personalized approaches in addressing mental health within the context of cardiovascular disease.

Comparing these findings to current literature, our study provides nuanced insights into the multifaceted determinants influencing cardiovascular health in women. While some results align with existing knowledge, such as the impact of education and socioeconomic status, our exploration of the nuanced connections between mental health, educational attainment, and cardiovascular outcomes adds depth to the current understanding. Moving forward, these findings emphasize the imperative for targeted interventions addressing education and socioeconomic disparities to enhance cardiovascular health in women, ultimately advocating for more inclusive and tailored approaches in cardiovascular research and healthcare practices.

REFERENCES:

1. Mayo Foundation for Medical Education and Research. (2022, January 20). *How heart disease is different for women*. Mayo Clinic.
2. Bybee, K. A., & Stevens, T. L. (2013). Matters of the heart: cardiovascular disease in U.S. women. *Missouri medicine*, *110*(1), 65–70.
3. Mayo Clinic. (2022, May 25). *Coronary Artery Disease*. Mayo Clinic.
4. *Lower Your Risk for the Number 1 Killer of Women | Health Equity Features | CDC*. (2022, April 1).
5. *Women Not Represented in Research Equally*. (n.d.). Www.goredforwomen.org. Retrieved January 16, 2024, from https://www.goredforwomen.org/en/about-heart-disease-in-women/latest-research/women-not-represented-in-research-equally#:~:text=%E2%80%9CDespite%20some%20progress%2C%20women%20are
6. Centers for Disease Control and Prevention. (2023, May 15). *Women and Heart Disease*. Centers for Disease Control and Prevention. https://www.cdc.gov/heartdisease/women.htm
7. Foraker, R. E., Abdel-Rasoul, M., Kuller, L. H., Jackson, R. D., Van Horn, L., Seguin, R. A., Safford, M. M., Wallace, R. B., Kucharska-Newton, A. M., Robinson, J. G., Martin, L. W., Agha, G., Hou, L., Allen, N. B., & Tindle, H. A. (2016). Cardiovascular Health and Incident Cardiovascular Disease and Cancer: The Women's Health Initiative. *American journal of preventive medicine*, *50*(2), 236–240.
8. Shahu, A., Herrin, J., Dhruva, S. S., Desai, N. R., Davis, B. R., Krumholz, H. M., & Spatz, E. S. (2019). Disparities in Socioeconomic Context and Association With Blood Pressure Control and Cardiovascular Outcomes in ALLHAT. *Journal of the American Heart Association*, *8*(15), e012277.
9. Gabriel, A., Zare, H., Jones, W., Yang, M., Ibe, C. A., Cao, Y., Balamani, M., Gaston, M., Porter, G., Woods, D. L., & Gaskin, D. J. (2021). Evaluating Depressive Symptoms Among Low-Socioeconomic-Status African American Women Aged 40 to 75 Years With Uncontrolled Hypertension: A Secondary Analysis of a Randomized Clinical Trial. *JAMA psychiatry*, *78*(4), 426–432.
10. Westcott, S. K., Beach, L. Y., Matsushita, F., Albert, C. M., Chatterjee, N., Wong, J., Williams, D. R., Vinayagamoorthy, M., Buring, J. E., & Albert, M. A. (2018). Relationship Between Psychosocial Stressors and Atrial Fibrillation in Women >45 Years of Age. *The American journal of cardiology*, *122*(10), 1684–1687.
11. Sriram, U., Sandreuter, K., Graham, M., Folta, S., Pullyblank, K., Paul, L., & Seguin, R. (2019). Process Evaluation of Strong Hearts, Healthy Communities: A Rural Community-Based Cardiovascular Disease Prevention Program. *Journal of nutrition education and behavior*, *51*(2), 138–149.