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Examining the Association Between Major Depressive Disorder and Coronary Heart Disease: A Structured Literature Review



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Abstract

Background: Cardiovascular Disease (CVD) is currently the number one cause of death globally and it is estimated that depression is the leading cause of disability throughout the world. This literature review is focused specifically on coronary heart disease, a subset of cardiovascular disease, which involves the blood vessels supplying the heart muscle. Objective: The aim of this literature review is to assess the evidence regarding the presence of preexisting cases of Major Depressive Disorder (MDD) as a factor for developing Coronary Heart Disease (CHD) among the middle aged and older adults in the United States. Methods: Keywords: "Depression" OR "Major Depressive Disorder" AND "Coronary Heart Disease" OR "CHD" AND "Older Adults" OR "Middle Aged Adults" were entered into the PubMed, Web of Science, PsycINFO, and Google Scholar databases. The results were reviewed after meeting the criteria of language, recency, location, and a sample population including middle aged and older adults. Results: Of the articles found, twenty two met the inclusion criteria and the twelve most relevant were evaluated. These studies determined that MDD does increase the risk of CHD among the middle aged and older population of the United States and may increase the likelihood of CVD mortality. Conclusion: There is extensive evidence demonstrating the association between MDD and CHD. However, further research is required to determine the specific underlying mechanism(s).

Introduction

There is increasing interest regarding the potential of Major Depressive Disorder (MDD) acting as a risk factor for Coronary Heart Disease (CHD) as they are both estimated by the WHO to be in the top two conditions causing morbidity and mortality respectively [1][2]. According to the Centers for Disease Control and Prevention, CHD is responsible for killing over 370,000 Americans annually, thus accounting for over sixty percent of total annual deaths caused by heart disease in the United States. Since CHD predominantly affects the older population, the DALY measurement is relatively low compared to diseases that predominantly target younger populations. With such a large number of individuals requiring treatment for heart disease, the economic impact on the health care system is substantial. Individually, MDD is second in time lost from work and lost productivity, and it has been estimated to cost society \$44 billion per year with only CHD having a larger economic burden [3]. If MDD is associated with CHD the potential benefits of identifying a relationship could include an overall increase in GDP, as well as an increase in mental health awareness and funding for both research and clinical interventions.

Research Question

Does the presence of preexisting cases of Major Depressive Disorder reveal an increased risk for Coronary Heart Disease among the middle and older adult population of the United States?

Methods

The following keywords: "Depression OR Major Depressive Disorder AND Coronary Heart Disease OR CHD AND Older Adults OR Middle Age", were entered into the PubMed, Web of Science, PsycINFO, and Google Scholar databases. These keywords were used in various combinations to create a selection pool in which the further criteria of language (English), location (United States), a population including subjects of at least 50 years old, and recency (published in the last 15 years) could be applied. A combined total of 794 articles were found in the preliminary search, of which 772 were eliminated based on duplication of articles or not meeting the above requirements as determined by article title, language, location and date of publication. Of the remaining articles, 12 were deemed most pertinent to the research question and were analyzed in this literature review.

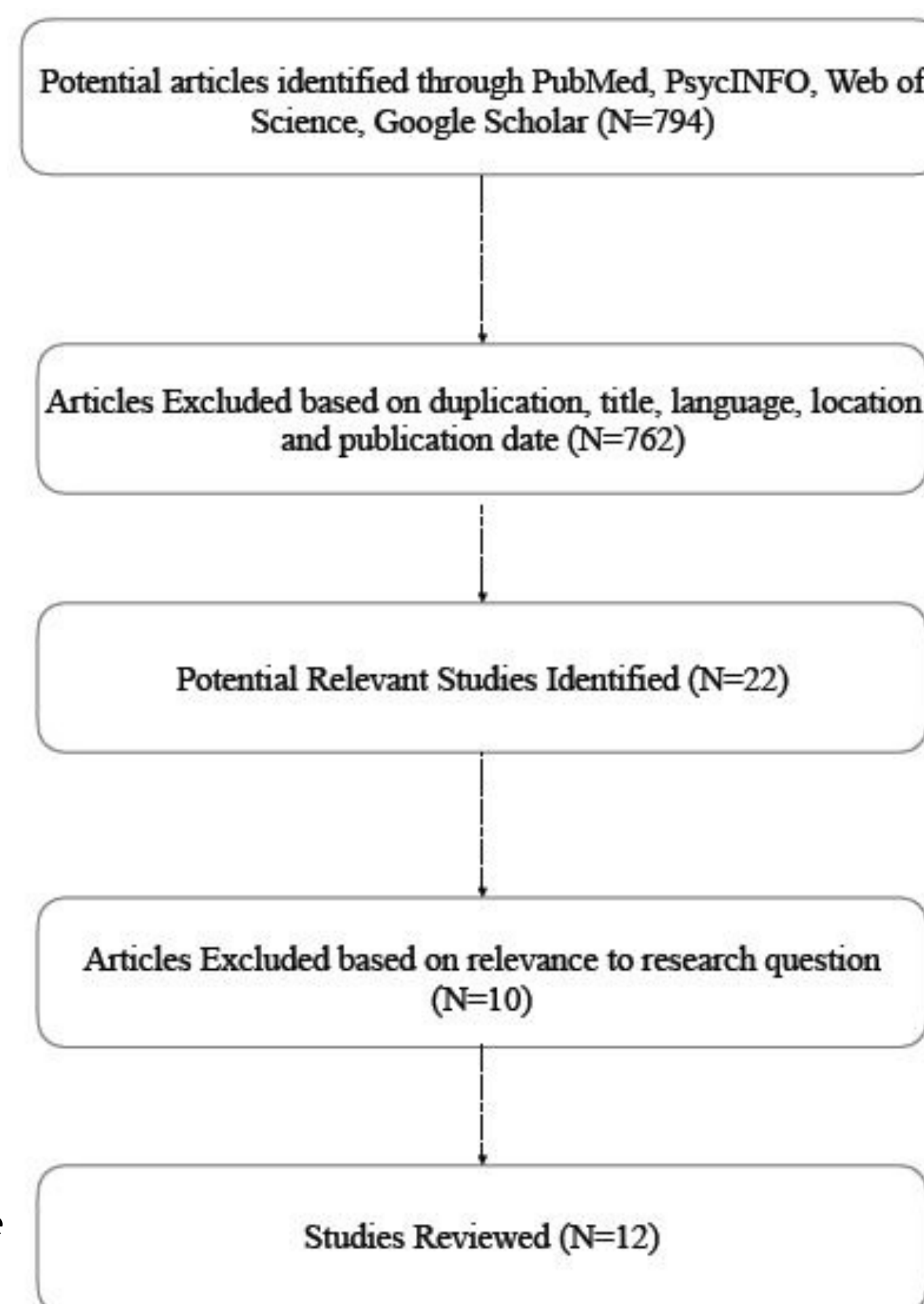


Figure 1. Flowchart of Article Selection Methodology

Results

Article	Methods	Sample	Results	
			Depression Increased the Risk of CHD	Depression Increased the Risk of Mortality
Xiang et al. (2015) [4]	Prospective Cohort	• 8597 adults • Average age of 56 years old	Yes	
Rice et al. (2010) [5]	Cross-Sectional	• 131 adults • Mean age of 66 years old	Yes	
Win et al. (2011) [6]	Prospective Cohort	• 5888 adults • ≥65 years old		Yes
Sin et al. (2015)[7]	Prospective Cohort	• 685 adults • Average age of 67 years old	Yes	
Smith-Frasure et al. (2005). [8]	Systematic review	• 21 etiologic, 43 prognostic, 79 review articles	Yes	
Brown, et al. (2011) [9]	Prospective cohort	• 2,728 adults • ≥60	Yes	Yes
Airyo et al. (2000) [3]	Prospective Cohort	• 4493 adults • Mean age for women was 72 and for men was 73	Yes	Yes
Barth et al. (2004)[10]	Meta-analysis	• 15 prospective cohort studies • Mean age ranged from 53.6-74.5	Yes	Yes
Whooley et al. (2008) [11]	Prospective cohort	• 1017 adults	Yes	
Ferketich et al. (2000) [12]	Retrospective cohort	• 5006 men • 2888 women • Mean age was 55.9 for men and 53.7 for women	Yes (for men and women)	Yes (for men only)
Egede et al. (2005) [13]	Prospective cohort	• 10,025 subjects • Mean age was 56.9	Yes	Yes
Todaro et al. (2003) [14]	Prospective cohort	• 2,280 men • Mean age was 60.45	Yes	

Table 1. Summary of the articles selected for this structured literature review.

Discussion

Findings

- The results of the literature review demonstrate that there is a clear relationship between preexisting cases of MDD and the risk of developing CHD.
- Additionally it was found in half of the studies reviewed that not only did MDD increase the risk of CHD but it also increased the risk of a fatal cardiovascular event.
- The implications that this finding could have on mental health in general, and depression specifically, is enormous as it could lead to an effective economical means of preventative medicine in respect to both depression and cardiovascular health.

Limitations

- Some studies lacked control over confounders like age, sex, education, diabetes, and physical inactivity, lifestyle, and comorbidity of other psychiatric conditions.
- Misclassification biased based on titles; may have incorrectly excluded relevant articles.
- Publication bias is quite possible as no articles were found with negative results.
- This structured review included articles in English from 2000-2015 which may have contained outdated information.

Contextualization

- The finding that there was an association between MDD and CHD was not in itself surprising. What was surprising was the degree to which the literature agreed on this correlation. Every single study reviewed all indicated that there was a positive correlation between MDD and CHD with many studies claiming that the relationship also increased the risk of cardiovascular related deaths due to MDD.

Conclusion

- There is an association between MDD and CHD
- Depression increases the risk of CHD
- Depression can increase the risk of mortality in people with CHD
- Although there is extensive evidence demonstrating a significant association between MDD and CHD, the specific underlying mechanism(s) are unknown. Research proposes that genetic factors, lifestyle behaviours (smoking, physical inactivity) or physiological adaptations from depression (increased inflammation, ANS dysfunction) may be contributing factors. However, further research is required in this area.

Future Research Recommendations

- Examine the underlying mechanisms of how MDD specifically increases the risk of CHD
- When implemented, current prevention and treatment strategies for depression are successful; however, more awareness of depression in elderly is needed.
- Conduct research on anxiety disorders and other related psychiatric conditions and their association with CHD.

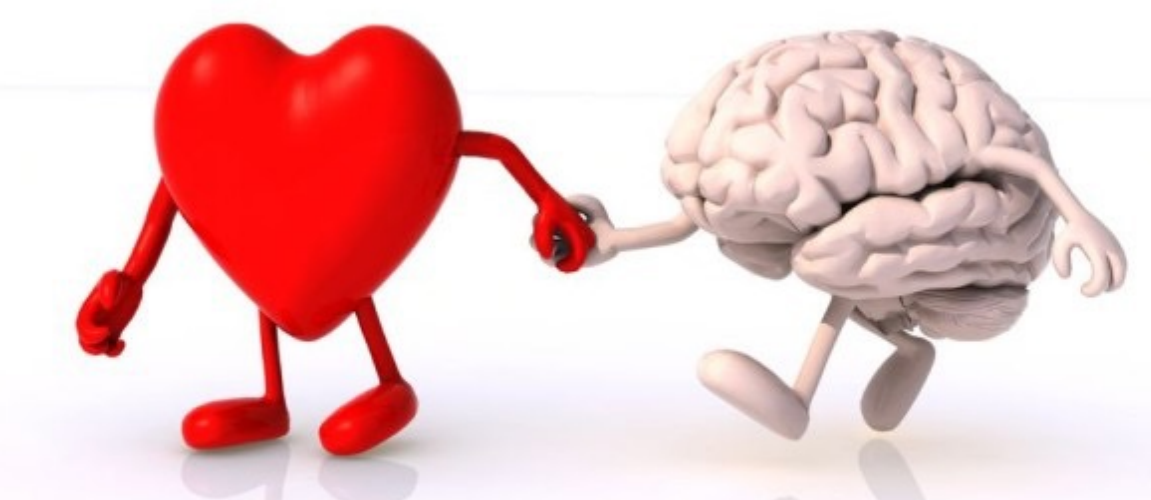


Figure 2. [15]

References

[1] Cardiovascular diseases (CVDs). (2015). Retrieved from <http://www.who.int/mediacentre/factsheets/fs317/en/>
[2] Depression. (2015). Retrieved from <http://www.who.int/mediacentre/factsheets/fs204/en/>
[3] Arora, A., Heath, M., Tangen, C., Redge, J., Guzman, M., Doss, A., & Furlong, C. (2000, May 11). Depressive Symptoms and Risks of Coronary Heart Disease and Mortality in Elderly Americans. Retrieved from <http://icic.ahajournals.org/content/102/5/773.short>
[4] Xiang, X., & Rao, R. (2015). Depression and onset of cardiovascular disease in the US middle-aged and older adults. *Aging & Mental Health*, 15, 1084-1092. Retrieved from <http://dx.doi.org/10.1080/1360/2015.1021773>
[5] Rice, M., Kessler, L., & Waldman, S. (2010). Sex-specific associations of depressive symptoms and cardiovascular risk factors in older adults. *Aging & Mental Health*, 14, 405-410. Retrieved from <http://dx.doi.org/10.1080/1360/2010.528580>
[6] Win, S., Frank, K., Egan-Naras, C., Gutierrez, J., Kuo, W., & Degenstein, R. (2011, March 15). Depressive symptoms, physical inactivity and risk of cardiovascular mortality in older adults. *The Geriatrics Society*, 58, 9-15. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3044493/>
[7] Sin, N.L., Yeh, K., Wilton, M.A., (2015). Depressive symptoms, cardiovascular disease severity, and functional status in older adults with coronary heart disease: the heart and soul study. *Journal of the American Geriatrics Society*, 53, 9-15. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC444934/>
[8] Frasure-Smith, N., & Lesperance, F. (2005). Reflections on Depression as a Cardiac Risk Factor. *Psychosomatic Medicine*, 67, 519-525. Retrieved from <http://dx.doi.org/10.1097/PSY.0b013e3180303588>
[9] Brown, J. M., Stewart, J. C., Stump, T. E., & Calahan, C. M. (2011). Risk of coronary heart disease events over 15 years among older adults with depressive symptoms. *The American Journal of Geriatric Psychiatry*, 19, 721-729. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3145556/>
[10] Barth, J., Schemm, M., & Herrmann-Lingen, C. (2004, November 1). Depression as a risk factor for mortality in patients with coronary heart disease: A meta-analysis. Retrieved from <http://dx.doi.org/10.1093/aje/kw111>
[11] Whooley, M. A., de Jonge, P., Vittinghoff, E., Ors, C., Moser, R., Carney, R. M., ... Blumenthal, W. S. (2008). Depressive symptoms, health behaviors, and risk of cardiovascular events in patients with coronary heart disease. *The Journal of the American Medical Association*, 299, 2739-2746. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2603588/>
[12] Ferrelletto, A. K., Schwarzbum, J. A., Frid, D. J., & Moeschberger, M. L. (2000). Depression as an Antecedent to Heart Disease Among Women and Men in the NHANES I Study. *JAMA Internal Medicine*, 160, 1261-1268. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC338580/>
[13] Egede, L. E., Nietert, P. J., & Zheng, D. (2005). Depression and all-cause coronary heart disease mortality among adults with and without diabetes. *Diabetes Care*, 28, 1339-1345. Retrieved from <http://dx.doi.org/10.2337/dia.2004.0300>
[14] Todaro, J. F., Shen, B. J., Nairn, R., & Sirois, A. (2003). Effect of negative emotions on frequency of coronary heart disease (The Normative Aging Study). *The American Journal of Cardiology*, 92, 901-906. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC148444/>
[15] 2013. Why Depression and Heart Disease Might be Connected. [Image]. Retrieved from <http://naturalknowledge247.com/depression-and-heart-disease/>