Exposing 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, 772 were eliminated based on duplication of articles or not meeting the search, of which 794 articles were found in the preliminary search. The following 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]. According to the Centers for Disease Control and Prevention, CHD is responsible for killing over 170,000 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 GDR, 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.

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

<table>
<thead>
<tr>
<th>Article</th>
<th>Methods</th>
<th>Sample</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xiang et al. (2015)</td>
<td>Prospective Cohort</td>
<td>107 adults</td>
<td>Yes</td>
</tr>
<tr>
<td>Rice et al. (2010)</td>
<td>Cross-Sectional</td>
<td>131 adults</td>
<td>Yes</td>
</tr>
<tr>
<td>Win et al. (2011)</td>
<td>Prospective Cohort</td>
<td>888 adults &gt;65 years old</td>
<td>Yes</td>
</tr>
<tr>
<td>Sin et al. (2015)</td>
<td>Prospective Cohort</td>
<td>685 adults</td>
<td>Yes</td>
</tr>
<tr>
<td>Smith-Frause et al. (2005)</td>
<td>Systematic review</td>
<td>21 etiologic, 43 prognostic, 79 review articles</td>
<td>Yes</td>
</tr>
<tr>
<td>Brown, et al. (2011)</td>
<td>Prospective cohort</td>
<td>2,728 adults &gt;60</td>
<td>Yes</td>
</tr>
<tr>
<td>Airo et al. (2000)</td>
<td>Prospective Cohort</td>
<td>4493 adults</td>
<td>Yes</td>
</tr>
<tr>
<td>Barth et al. (2004)</td>
<td>Meta-analysis</td>
<td>15 prospective cohort studies</td>
<td>Yes</td>
</tr>
<tr>
<td>Moohey et al. (2008)</td>
<td>Prospective Cohort</td>
<td>1017 adults</td>
<td>Yes</td>
</tr>
<tr>
<td>Finkelnberg et al. (2003)</td>
<td>Retrospective cohort</td>
<td>5006 men &gt;2888 women</td>
<td>Yes</td>
</tr>
<tr>
<td>Egede et al. (2005)</td>
<td>Prospective cohort</td>
<td>10,025 subjects</td>
<td>Yes</td>
</tr>
<tr>
<td>Tidaro et al. (2003)</td>
<td>Prospective cohort</td>
<td>2,280 men &gt;60,45</td>
<td>Yes</td>
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</tbody>
</table>

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 of 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 bias 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.

References