Examining the Effects of Social Isolation and Loneliness on Cardiovascular Health

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ABSTRACT:

Background

While many aspects of physical health, such as diet, exercise and sleep, have been well-researched, the impacts of one's mental health and well being are not yet largely understood. This study aims to provide insights into the effects of social isolation and loneliness on cardiovascular health to establish a clearer link between mental and physical wellbeing.

Methods

PubMed and Google Scholar were searched using key search terms, such as "social isolation" and "cardiovascular disease," and boolean operators. Exclusion criteria excluded studies that were more than a decade old, or that were review articles.

Results

The data collected in the experimental studies analyzed levels of social isolation and loneliness, mainly by using self-reported questionnaires. Broad trends included an increase in blood pressure, heart rate, and cortisol levels in participants experiencing prolonged isolation and loneliness.

Discussion

Among the five studies reviewed, the data showed clear trends between feelings of isolation and loneliness and an increase of CVD risk levels. This was due to factors such as increased heart rate, blood pressure, and higher stress levels in people subjected to feeling socially isolated and lonely, all of which can leave the body more susceptible to developing a CVD. The studies demonstrate how neglecting mental health can have adverse affects on one's physical state, and should be a healthcare priority.

INTRODUCTION:

According to the American Health Association, cardiovascular diseases, or conditions that affect the heart and blood vessels, have become one of the most common causes of death in our world today, accounting for approximately 19.91 million global deaths in 2021 [1]. This alarmingly high statistic highlights the prevalence of this growing issue in our society and the need for

action. In response, research has uncovered external factors, or social determinants of health, that may contribute to the risk of developing CVD. Interestingly, it has been found that the effects of social isolation and loneliness have a significant correlation with increased risk of CVD despite the two being seemingly unrelated at surface level [4-8]. Social isolation can be defined as a lack of social connection and interactions, while loneliness can be defined as the feeling of being alone even when surrounded by people [2]. The influence of social connection has been found to impact the development and progression of ailments such as coronary heart disease and stroke, [3] making it imperative to explore the connection between isolation and CVD further.

This literature review aims to dive deeper into the link between social isolation and CVD risk by compiling and synthesizing data from five experimental studies. The goal is to emphasize the harm loneliness could impose, not just on one's mental state, but on physical wellbeing as well. By examining the physiological impacts of loneliness on the heart, we can learn to prioritize initiatives regarding social interaction.

METHODS:

The studies in this literature review were identified by searching PubMed and Google Scholar using the following key search terms: "social isolation," "isolation," "loneliness," "cardiovascular disease," "cardiovascular illness," "cardiovascular health," and "experiment," combined with appropriate boolean terms when necessary.

The studies analyzed in this review needed to contain original research and experimental data with a wide range of population demographics. The studies also needed to have been written in English or have an English translation included. All studies must have been published within the last 10-15 years. Studies not available in English, published before 2010, or that did not contain original data, such as other reviews, were excluded.

RESULTS:

In our first study, Roddick et al. examined the impact of loneliness on cardiovascular health in women. Researchers used a sample of 316 healthy women ranging from ages 18-36. They measured the body's heart rate variability (HRV), which is a risk factor for CVD [4]. The results showed that, compared to the control group, participants who were exposed to a state of chronic loneliness experienced a significantly lower resting HRV, a risk factor for CVD [4]. Furthermore, the experimental group experienced reduced HRV reactivity when presented with a cognitively stimulating activity, which can also be detrimental to cardiovascular health.[4].

Secondly, Golaszewski et al. specifically analyzed older women when measuring the effects of social isolation on cardiovascular disease. The study included a sample of 7,825 women between ages of 65-99, and gathered data by measuring participants' level of social isolation and loneliness through validated questionnaires [5]. Risk for CVD was calculated for women with high loneliness and isolation scores compared to those with low social isolation scores, adjusting

for external factors ; the results showed that among all participants, women with both high social isolation and loneliness scores had a 13% to 27% higher risk of incident CVD than women with lower scores [5]. Measuring social isolation and loneliness scores separately, women reporting higher levels of social isolation had an 8% greater risk for CVD, and women with higher loneliness scores had an increased risk of 5% [5].

In our next study, Williamson et al. evaluated the effect of the stress created by social exclusion on cardiovascular health. The sample consisted of 81 young adults who were randomly assigned to either experience social inclusion or exclusion when playing a computer game, and subsequently underwent either an evaluative stressor or a control task [6]. The results indicate that the socially excluded participants who underwent the stressor showed increased cardiovascular responses, such as higher diastolic and systolic blood pressure, heart rate, and stress anxiety [6]. Participants who were socially included showed similar increases in anxiety levels but maintained a relatively stable blood pressure and heart rate when responding to the stressor [6].

Similar to the previous study, Steptoe et al. analyzed the association between social isolation and cardiovascular responses to acute stress in the body. Data was collected from a sample of 238 healthy middle- aged women and men aged 46-59 years, and social isolation was measured through adaptive questionnaires [7]. After controlling for external influences, the results found that diastolic blood pressure reactions to mental stress were positively correlated with higher loneliness scores among women but not in men [7]. Cortisol levels were measured through saliva and were also significantly correlated with increasing loneliness [7].

Finally, Chen et al. investigated the longitudinal trends of social isolation with incident CVD and CVD mortality [8]. The study included 18,258 participants between ages 38-73 who participated over the course of 2006 to 2013 [8]. Social isolation and loneliness were categorized into 4 different patterns: never, transient (lasting for a short time), incident (episodic), and persistent [8]. The results showed that, compared to never, persistent isolation was associated with a higher risk of incident CVD, with a hazard ratio (HR) of 1.17, and CVD mortality, with a HR of 1.53 [8]. Similarly, persistent loneliness significantly correlated with a greater risk of incident CVD (HR = 1.13) and CVD mortality (HR =1.52) compared to the never category [8].

DISCUSSION:

Both social isolation and loneliness can increase the risk of developing cardiovascular disease. When exposed to chronic loneliness, both resting HRV and HRV reactivity decrease [4]. A decrease in HRV indicates a lack of adaptability in the body and stressed autonomic nervous system, increasing the likelihood of developing cardiovascular diseases [9]. Other significant factors caused by loneliness and social isolation that contribute to CVD risk include elevated heart rate, blood pressure [6], and cortisol levels [7].

The data from these experimental studies support the hypothesis that experiencing social isolation and/or loneliness, especially for prolonged periods of time, can play a significant role in heightening one's risk of developing cardiovascular disease [4-8]. In addition, as shown by the wide array of demographics presented in the various studies [4-8], these findings are applicable to the vast majority of people, emphasizing the fact that the consequences of severe loneliness and isolation can affect almost anyone. However, some data showed differences in physiological stress responses between men and women experiencing loneliness, such as women being found to have higher diastolic blood pressure levels, not observed in men [7]. Conversely, other data indicated that increased social isolation correlated with higher diastolic blood pressure levels in all participants regardless of gender [6]. These results indicate slight differences between the influences of loneliness compared to social isolation.

These results are impactful as they highlight a risk factor of CVD that may initially be overlooked. While social connection and cardiovascular health may seem like two distinct concepts, this data provides key insight into the strong positive correlation between social isolation and/or loneliness levels, and the risk of CVD development. These studies reveal that a lack of social interaction can be far more detrimental to one's health than previously realized and can escalate into far more serious conditions.

Due to the fact that feelings of being socially isolated and lonely are difficult to objectively measure, most data in these experiments were self-reported measures, such as questionnaires. This is a limitation of this study, since the accuracy of these questionnaires is not always guaranteed, which could potentially affect the reliability of the data. This should be taken into account when using the findings presented in this study in further research. Additionally, future research is needed to verify the trends observed in these experiments, and to better understand the specific aspects of isolation and loneliness that contribute to an increased risk of CVD. Furthermore, research can be done to further explore the differences in physiological responses between genders. With so much emphasis placed on physical health, there remains much more to be explored and researched regarding the effects of one's mental health on their overall physical wellbeing.

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