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Systematic Review

The impact of social isolation on cardiovascular disease in the elderly: a systematic review

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Abstract
Social isolation can increase mortality and most likely have an impact on health. The impact of social isolation and loneliness on health and well-being is recognised globally as a public health problem. Social isolation can be experienced at any age, especially in the elderly. The purpose of this study was to determine the effect of social isolation on the occurrence of cardiovascular disease in the elderly. This study is a systematic review. Article searches are conducted through databases: PubMed, Science Direct, and Google Scholar with the keywords used in article searches are as follows "Social isolation" AND "cardiovascular disease" AND "elderly". Article selection is done using a PRISMA flow chart. Results: From the results of searching articles in databases obtained as many as 1460 articles that have a relationship with the research theme. Then the article's results were adjusted to the study system used and obtained 565 results that were included in the study system criteria. Then from the 565 articles were re-selected by considering the predetermined inclusion criteria and obtained the results of 10 articles. Conclusion: Social isolation has been shown to be associated with increased risk of cardiovascular disease in older adults. Despite limitations in study design and measurement, these findings underscore the importance of addressing social factors in maintaining the health of older adults.

Keywords: cardiovascular; elderly; social isolation

1. Introduction

Social isolation is an objective state in which individuals have a limited social network and engage in minimal interaction (WHO, 2021; Luo & Hendryx, 2022). It is also interpreted as a condition where individuals deliberately withdraw from social engagement and interpersonal relationships. This tendency often manifests through various signs, including expressionless facial features, persistent sadness, low energy levels, reduced eye contact, and an overall reluctance to interact with others or participate in their surroundings.

When not addressed appropriately, social isolation can lead to psychological disturbances such as hallucinations (Hendrawan & Puspasari, 2025). This condition is particularly prevalent among the elderly and is increasingly recognised as a pressing public health concern (Aris, 2024). As Andini and Kusumawati (2025) noted, social isolation often stems from adverse social experiences and repeated failures in interpersonal interactions. It is also identified as one of the negative symptoms associated with schizophrenia.

Loneliness tends to be more frequently experienced by certain demographic groups, particularly women, individuals aged 50–65 years, those who are unmarried, reside in rural areas, have limited social engagement, and suffer from severe depressive symptoms (Abella et al., 2017). This emotional state can significantly affect both physical and psychological well-being, manifesting in various forms such as a sense of emptiness, feelings of being neglected, depressive moods, diminished life satisfaction,

lack of motivation, and disruptions in social relationships (Hernandez et al., 2023; Utami & Milkhatun, 2020).

During the COVID-19 pandemic, social isolation and loneliness have emerged as significant public health issues, particularly among elderly individuals with mental health disorders (Challa et al., 2023; Just et al., 2023). Social isolation has been linked to an increased risk of physical inactivity, which can result in cardiac atrophy, diminished peripheral vascular function, arterial stiffness, and the development of cardiovascular diseases (WHO, 2021). Similarly, loneliness contributes to elevated vascular resistance, higher blood pressure, increased risk of recurrent stroke, and has been associated with obesity. Moreover, loneliness has physiological consequences, including heightened activity of the hypothalamic-pituitary-adrenal (HPA) axis, weakened immune response, activation of pro-inflammatory gene expression, and a greater likelihood of premature mortality (Bouhaben & Arroyo-pardo, 2022).

Cardiovascular disease (CVD) is the leading cause of death in the world, including in Indonesia, and its prevalence is highest in the elderly (Zakaria et al., 2022; WHO, 2021; Rachmawati et al., 2025). CVD encompasses a broad spectrum of conditions, such as coronary artery disease, stroke, hypertension, congenital heart defects, and rheumatic heart disease (Naryanti et al., 2024). Perceived social isolation has been identified as a psychosocial stressor that activates various biological and psychological mechanisms, thereby increasing vulnerability to CVD and elevating the risk of premature mortality. Given these concerns, this study aims to examine the impact of social isolation on the incidence of cardiovascular disease in the elderly.

2. Research Methods

This research was conducted using a systematic review approach. Relevant articles were sourced from three major databases: PubMed, Science Direct, and Google Scholar. The article selection was guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart to maintain a high standard of methodological accuracy. The search employed the following keywords: "Social Isolation" AND "Cardiovascular Disease" AND "Elderly". The initial search yielded 1,460 articles. After removing 895 duplicates, 565 articles remained for further screening. These articles were then assessed based on predetermined inclusion and exclusion criteria, including relevance to the topic, availability of full text, and methodological quality. Following this screening process, a total of 10 articles were deemed eligible and included in the final analysis

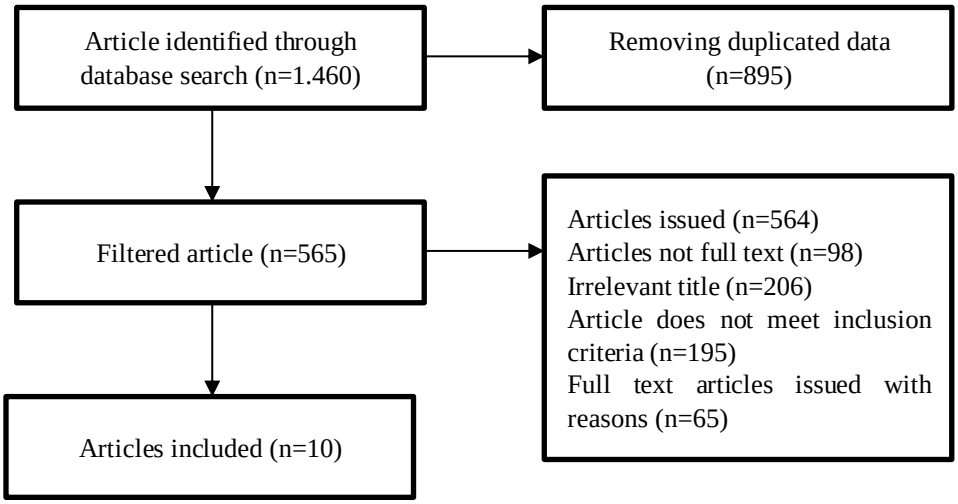

Figure 1. Prisma Flow Chart

3. Results and Discussion

The study seeks to evaluate the effect of social isolation on the development of cardiovascular disease in older adults. A systematic review approach was utilised to gather and analyse relevant data. A systematic review involves analysing and evaluating various sources, including books, articles, and journals. In this study, article searches were carried out across several databases, such as PubMed, Science Direct, and Google Scholar, yielded 1,460 articles related to the research topic. These articles were then filtered according to the review methodology, including 565 articles that met the study's criteria. After applying the predetermined inclusion criteria, 10 articles were selected for the final analysis.

Table 1. Summary Article

Author (Year)	Title	Result	Conclusion
Guo et al. (2023)	Evaluation of Social Isolation Trajectories and Incident Cardiovascular Disease Among Middle-aged and Older Adults in China: National Cohort Study	From 2015 to 2019, the total incidence of cardiovascular disease (CVD) events included 746 cases (450 heart disease and 336 strokes). The CVD incidence rates were 28.14, 34.81, and 35.26 per 1000 person-years for those with consistently low, fluctuating, and consistently high social isolation, respectively. Those with fluctuating (HR = 1.27) and high social isolation (HR = 1.45) had a higher risk of CVD events. For stroke, individuals with fluctuating (HR = 1.59) and high social isolation (HR = 1.75) had increased risk, but no such association was found for heart disease. The relationship between social isolation and CVD events was not influenced by factors like age, sex, smoking, or BMI, though it was significant for those with at least junior high school education (HR = 2.02, P = 0.03).	The findings indicate that fluctuations in social engagement and prolonged Social isolation are strongly linked to a higher risk of cardiovascular disease, particularly among middle-aged and older adults in China with a history of stroke. These results offer important contributions to existing evidence on the long-term effects of social isolation patterns on cardiovascular health. Moreover, the study emphasizes the importance of promoting social connectedness as a preventive measure to support cardiovascular well-being.
Naito et al., (2021)	Impact of social isolation on mortality and morbidity in 20 high-income, middle-income and low-income countries in five continents	An increased risk of stroke (HR: 1.23, 95% CI: 1.07–1.40) and cardiovascular disease (HR: 1.15, 95% CI: 1.05–1.25) was observed among individuals experiencing social isolation. To further explore its impact on mortality, 90-day case fatality rates following the onset of various clinical events—such as myocardial infarction, stroke, heart failure, cardiovascular conditions, cancer, pneumonia, COPD, and injuries—were evaluated. Among these, only stroke showed a notably higher case fatality rate in socially isolated individuals. This elevated mortality risk	The findings of this study highlight a clear association between social isolation and adverse health outcomes during midlife. Social isolation has been linked to elevated risks of both mortality and morbidity across various populations globally. Addressing this issue effectively requires the implementation of evidence-based interventions, including therapeutic strategies and lifestyle adjustments, as well

Author (Year)	Title	Result	Conclusion
		following stroke may help explain the overall increase in cardiovascular-related deaths linked to social isolation.	as initiatives aimed at strengthening social support networks.
Freak-Poli et al. (2021)	Social isolation, social support and loneliness as predictors of cardiovascular disease incidence and mortality	Poor social health was significantly linked to a 42% higher risk of developing cardiovascular disease (CVD) and a twofold increase in CVD-related mortality over a 4.5-year period. The impact was more evident among smokers, urban residents, and adults aged 70–75 years. While social isolation and low social support strongly predict CVD events, loneliness was not statistically significant. All indicators of poor social health were also associated with an increased risk of ischemic stroke.	In healthy older adults, social isolation and limited social support appear to be more significant predictors of cardiovascular risk than loneliness. Therefore, incorporating aspects of social health into future cardiovascular disease (CVD) risk prediction models is essential for improving their accuracy and effectiveness.
Golaszewski et al., (2022)	Evaluation of Social Isolation, Loneliness, and Cardiovascular Disease Among Older Women in the US	Women experiencing both high levels of social isolation and loneliness faced a 13.0% to 27.0% greater risk of developing cardiovascular disease compared to those with low levels of both factors. Notably, social support did not significantly influence these associations, as indicated by the interaction values for social isolation × social support ($r = –0.18$, $P = 0.86$) and loneliness × social support ($r = 0.78$, $P = 0.48$).	Social isolation and loneliness were each linked to a higher CVD risk in U.S. postmenopausal women. Furthermore, Women experiencing both social isolation and loneliness had an even higher risk of CVD compared to those who faced either factor individually. These results highlight the importance of addressing these common psychosocial issues in cardiovascular disease prevention efforts for older women, especially in the context of the COVID-19 pandemic.
Christiansen et al., (2021)	Loneliness, Social Isolation, and Chronic Disease Outcomes	The Cox proportional hazard regression analysis found that loneliness and social isolation were independently linked to higher risks of cardiovascular disease (CVD) and type 2 diabetes mellitus. However, no significant associations were observed between these factors and chronic obstructive pulmonary disease (COPD) or cancer. Furthermore, loneliness and social isolation had no combined effects on chronic diseases. Mediation analyses indicated that both loneliness and social isolation had indirect effects on CVD and type 2	Both loneliness and social isolation were independently associated with the development of cardiovascular disease (CVD) and type 2 diabetes mellitus over a 5-year follow-up period. Fundamental psychological and behavioral factors fully explain these associations.

Author (Year)	Title	Result	Conclusion
		diabetes mellitus, mediated by baseline psychological and behavioral factors.	
Wang et al. (2022)	Associations of face-to-face and nonface-to-face social isolation with all-cause and cause-specific mortality: 13-year follow-up of the Guangzhou Biobank Cohort study	People who lived alone had a higher risk of both all-cause mortality (Adjusted Hazard Ratio (AHR) 1.24; 95% CI 1.04–1.49) and cardiovascular disease (CVD) mortality (AHR 1.61; 95% CI 1.20–2.03) when compared to those with three or more household contacts, after adjusting for thirteen potential confounding factors. Those with no household contacts exhibited even higher risks, AHR was 1.60 for all-cause mortality and 1.91 for CVD mortality. Participants who had no contact via phone or letters showed an AHR of 1.27 (95% CI 1.14–1.42) for all-cause mortality, 1.30 (95% CI 1.08–1.56) for CVD mortality, and 1.37 (95% CI 1.12–1.67) for mortality from other causes. However, no significant association was found between involvement with clubs or organizations and the aforementioned types of mortality, nor was there any connection between the four types of isolation and cancer-related deaths.	In this cohort study, both forms of isolation— In-person and remote interactions were linked to a heightened risk of death from all causes and cardiovascular diseases (CVD) and other causes, though no significant association was found with cancer-related deaths.
Luo & Hendryx (2022)	Mediation analysis of social isolation and mortality by health behaviors	Older adults who experience social isolation may have a higher risk of overall mortality (HR = 1.33, 95% CI: 1.15–1.54), mortality specifically due to cardiovascular disease (CVD) (HR = 1.28, 95% CI: 1.01–1.62), and death from causes other than CVD or cancer (HR = 1.53, 95% CI: 1.22–1.90).	Social isolation is linked to a higher risk of overall mortality, CVD-specific mortality, and other health concerns. With the increasing evidence that social isolation is becoming more prevalent in society, it is crucial to recognise it as a significant public health issue, extending beyond traditional risk factors.
Cené et al., (2022)	Social Isolation and Incident Heart Failure Hospitalization in Older Women: Women's Health Initiative Study findings		This study indicates that social isolation is a separate risk factor for heart failure in older adult women, irrespective of other conventional cardiovascular risk factors. As a result, healthcare providers must include the assessment of social isolation during routine health screenings, particularly for the elderly. Furthermore,

Author (Year)	Title	Result	Conclusion
			community-focused interventions are essential to alleviate social isolation and improve cardiovascular health in this group.
Freak-Poli et al. (2021)	Social Isolation, Social Support, and Loneliness as Predictors of Cardiovascular Disease Incidence and Mortality	Social isolation was characterised by a lack of social connections, including factors such as marital status, religious involvement, and participation in community activities. The study included 44,174 postmenopausal women, who were followed from 1993 to 2018, with data analyses conducted on 36,457 participants. The findings revealed that 6.9% of the participants experienced social isolation, and 6.5% developed heart failure that required hospitalization. Women who experienced social isolation had a 23% higher risk of developing heart failure compared to those who were not socially isolated (HR: 1.23; 95% CI: 1.08–1.41). Notably, depressive symptoms did not significantly mediate this relationship, and the link between social isolation and heart failure was consistent across different age groups, races, and ethnicities.	This study demonstrates that, in healthy older adults, social isolation and low social support have a greater impact on the risk of cardiovascular disease (CVD) than loneliness. As such, social health factors should be incorporated into future CVD risk prediction models. Furthermore, community-based interventions aimed at enhancing social interaction and support among older adults may help lower the risk of cardiovascular disease and improve their overall well-being.
(Kraav et al., 2021)	The Effects of Loneliness and Social Isolation on all-cause, injury, cancer, and CVD mortality in a cohort of middle-aged finish men. A prospective study	The results showed that individuals with poor social health had a 42% increased risk of developing cardiovascular disease (CVD) and were twice as likely to die from CVD compared to those with good social health. Social isolation (HR 1.66; $p = 0.04$) and low social support (HR 2.05; $p = 0.002$) were significant predictors of CVD events, while loneliness did not show a meaningful association with CVD events (HR 1.4; $p = 0.1$). However, all aspects of poor social health were consistently associated with a higher risk of ischemic stroke.	Social isolation and loneliness are key contributors to the risk of mortality, including deaths caused by cardiovascular disease. Depression further amplifies the harmful effects of social isolation on health, highlighting the need for greater focus in healthcare to identify and address social factors that contribute to increased mortality risk. As a result, interventions focused on reducing social isolation and enhancing mental well-being are crucial in preventing cardiovascular disease and improving the overall quality of life for individuals at risk.

Lachaud et al. (2024) stated that social isolation refers to the lack of social connections, which can arise from limited social interactions, insufficient social resources, and minimal involvement in social and religious activities. Albasheer et al. (2024) add that such isolation is particularly concerning among the elderly, as it poses a significant health risk. This study explores how social isolation influences the incidence of cardiovascular disease in older adults across various regions. A lack of social connections can lead to feelings of emptiness and depression. According to Hernandez et al. (2023), individuals who maintain positive social relationships tend to be less affected by daily stressors, have a stronger sense of control, and exhibit lower levels of dependency.

Munawaroh et al. (2024) found that adults experiencing social isolation are more likely to suffer from cardiovascular events, with an adjusted hazard ratio of 1.10 (95% CI: 1.07–1.14; $p < 0.001$), and face an increased risk of death (aHR = 1.16; 95% CI: 1.08–1.18; $p = 0.001$). The findings of this study are consistent with their research, which also reported a high degree of heterogeneity among primary studies ($I^2 = 73\%$; $p < 0.001$). Social isolation is further linked to elevated blood pressure, poor physical health, and various mental health issues such as depression, suicidal behavior, and dementia. It also plays a significant role in the likelihood of rehospitalization within 90 days among patients with heart failure. Additionally, a meta-analysis covering 11 coronary heart disease studies and eight stroke studies revealed that individuals with poor social relationships had a 29% higher risk of developing coronary heart disease (pooled relative risk = 1.29; 95% CI: 1.04–1.59) and a 32% higher risk of stroke (pRR = 1.32; 95% CI: 1.04–1.68)

Freak-Poli et al. (2021) highlighted that individuals with poor social health have a 42% greater likelihood of developing cardiovascular disease (CVD). Among the elderly, those who experience social isolation are 1.66 times more at risk of developing CVD compared to those who are socially connected. Similarly, Lyu et al. (2024) found that the prevalence of social isolation increases with age and is consistently linked to deteriorating health conditions. Older adults who are socially isolated face health challenges that are five times more severe than those with adequate social interaction.

Cai et al. (2024) found that the link between loneliness, social isolation, and cardiovascular disease (CVD) was relatively weak, with an odds ratio close to 1, suggesting that the effect may lack clinical significance. Despite this, numerous epidemiological studies have indicated a connection between these psychosocial factors and the development of CVD, making interventions aimed at reducing loneliness and isolation still worth exploring, Supporting this view (Rezaei & Saghazadeh, 2022) reported that meta-analyses involving adults and older populations have shown a positive correlation between loneliness and both cardiovascular and metabolic disorders, highlighting its association with multiple comorbidities. Furthermore, social isolation has been identified as a potential risk factor for hospital readmission in CVD patients. Recent research by Adachi et al. (2022) has also emphasized the clinical relevance of social frailty—a condition characterized by a lack of adequate social support, participation, or resources—which has been linked to poor cardiovascular outcomes in elderly individuals.

White et al. (2015demonstrated that the link between social isolation and increased mortality is mediated by cardiovascular disease (CVD). A lack of social support has been identified as a significant predictor of cardiovascular health issues. Epidemiological studies have consistently shown that low social support contributes to the development of hypertension, coronary artery disease, and heart failure. Among individuals already diagnosed with hypertension or CVD, limited social interaction has been linked to the progression of coronary atherosclerosis, a higher incidence of cardiovascular events—such as myocardial infarction and stroke—and a two- to threefold increase in mortality risk. In addition, findings by Hegeman et al., (2018), revealed that elderly individuals experiencing loneliness had a significantly increased likelihood of developing CVD (adjusted OR = 1.13; 95% CI = 1.06–1.21; $p < 0.001$). This is supported by research from Stokes et al. (2021), which confirmed that loneliness is associated with a higher risk of heart disease (HR = 1.49; 95% CI = 1.13–1.96).

Sharma et al. (2021) reported that during the SARS-COV-2 pandemic, one in three individuals in the United States experienced feelings of loneliness due to quarantine measures and social distancing. This sense of isolation was linked to a greater incidence of cardiovascular disease (CVD) and increased use of healthcare services, Supporting this Amirudin and Yunitasari (2021) examined the association between loneliness, cardiovascular disease, and diabetes mellitus (DM) in the U.S. population, finding that loneliness was significantly related to cardiovascular events (OR = 1.10; 95% CI = 1.01–1.20) and DM (OR = 1.08; 95% CI = 1.00–1.16). Similarly, research by Julsing et al. (2016) indicated that loneliness among older adults is associated with an elevated risk of CVD (HR = 1.08; 95% CI = 1.00–1.17). Moreover, loneliness has been closely linked to a range of negative health outcomes, including depression, reduced physical function, limited physical activity, and cognitive decline. On a biological level, Abella et al. (2017) found that loneliness contributes to heightened vascular resistance, elevated systolic blood pressure, and increased levels of inflammatory markers, all of which may predispose individuals to cardiovascular disease.

Loneliness has been associated with various adverse health effects, including higher mortality and morbidity rates, unhealthy behaviors, and greater utilization of healthcare services. McCarthy et al. (2025) revealed through a meta-analysis of 70 studies that individuals experiencing loneliness have a 26% higher likelihood of premature death compared to those who do not feel lonely. In addition, loneliness is linked to an increased risk of developing cardiovascular conditions like coronary heart disease and stroke, along with metabolic syndrome, functional decline, dementia, and mild cognitive impairment. It also significantly impacts mental and emotional well-being, being closely linked to depression, anxiety, and suicidal ideation. Hawkley (2022) emphasized that loneliness contributes to increased hospitalization rates and longer hospital stays. As a result, several intervention strategies have been developed, focusing on providing social interaction, emotional support, skill development, and cognitive-behavioral therapies to help individuals manage and reduce feelings of loneliness.

4. Conclusion

The results show a strong connection between social isolation and the occurrence of cardiovascular disease (CVD) in older adults. Various studies reviewed have shown that older adults who experience social isolation often face multiple health challenges, with cardiovascular disease being one of the most prominent. Individuals who are socially isolated or experience loneliness often dwell on daily stressors, which may contribute to the onset of serious health conditions. Despite these findings, several limitations were identified in the research. The measurement of social isolation was largely subjective, and key factors such as economic status, existing comorbidities, and the level of social support were not consistently controlled. Additionally, most of the studies employed observational designs, This restricts the ability to establish a clear causal link between social isolation and cardiovascular disease. To address these gaps, future studies should adopt longitudinal or experimental research designs to better establish causality. Furthermore, there is a significant need to create and execute community-based programs designed to reduce social isolation among older adults, with ongoing evaluation to determine their effectiveness in improving cardiovascular health outcomes.

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