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# Impact of Socioeconomic Status on Heart Failure

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## Abstract

Heart failure has emerged as a substantial health burden in the United States in the last few decades. This study examined the hypothesis that socioeconomic factors such as education level, social position, employment status, and poverty have a strong confounding influence on the risk for heart failure. To access relevant data, 12 published studies were retrieved from MEDLINE, Google Scholar, and Web of Science. A cross-sectional analysis of the identified studies confirmed that the four socioeconomic factors predisposed individuals to an elevated risk of heart failure-related complications. Despite their interdependencies, educational level, employment status, social position, and poverty independently confounded cardiovascular risk among individuals. Notably, individuals from households with low education were at a higher risk of these diseases. At the same time, households without employed family members were less likely to report cases of heart failure than those with low socioeconomic status. Additionally, individuals from disadvantaged backgrounds faced a greater risk for heart failure complications. The findings from this study found a strong association between socioeconomic status and heart failure risks.

**Keywords:** Socioeconomic status, Educational level, Poverty, Employment, Unemployment, Heart failure, Cardiovascular disease

## 1. Introduction

Socioeconomic factors significantly influence health outcomes by predisposing individuals to various diseases. Cardiovascular diseases are responsible for about 17.5 million deaths globally, accounting for 10% of the total mortality rate.<sup>5</sup> Cardiovascular disease is one of the health conditions closely linked with individuals' socioeconomic statuses.

Heart failure is one of the leading causes of death worldwide. In the United States, this condition is the number-one cause of death among patients diagnosed with chronic diseases. For many decades, hypertension, diabetes, obesity, and fatty foods were principal causes of heart disease in the United States.<sup>12</sup> However, socioeconomic status has gradually become the leading risk factor for heart failure incidences in the past two decades. This study reviewed published studies to understand the possible contribution of socioeconomic inequalities in heart failure in the United States.

### 1.1. Hypothesis

This study proceeded on the assumption that various socioeconomic factors are a strong confounding risk factor for heart failure. This study aimed to examine the assumption that low education status, poverty and unemployment were strongly correlated with incidences of heart failure.

## 2. Methods

This study chose MEDLINE and Web of Science, and Google Scholar as suitable databases for searching published studies on the link between socioeconomic factors and the prevalence of heart attack in the United States.

An inclusion criterion was designed to determine the sources that could be incorporated into the literature review. This criterion entailed English language primary studies examining the correlation between the socioeconomic factors and heart failure incidences in the United States. Factors determining socioeconomic status that were considered in the

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inclusion criteria include education, occupation, income, and insurance cover statuses. Other indirect measures of socioeconomic statuses such as marital statuses and housing conditions were included in the inclusion criteria. Study did not restrict the type of socioeconomic indicator for the inclusion of sources. Sources that focused on any indicators, such as population level, neighborhood, type of household, and gender, were eligible for inclusion.

Studies to be included were required to have a representative sample of a particular socioeconomic status. Besides, these studies were required to have well-defined criteria for describing socioeconomic categories. Such sources had to demonstrate that they contained limited reporting biases. Studies from regions characterized by a high prevalence of low socioeconomic statuses were given priority. Included studies were required to explore populations within the United States. Studies were excluded based on three critical criteria. Firstly, sources were excluded on specific populations like pregnant women, prisoners, people with disabilities, and children. Secondly, studies older than six years were deemed inappropriate for inclusion. Thirdly, studies focusing on racial, religious, or cultural groups were excluded.

The search process resulted in 960, 1002, and 1500 entries in MEDLINE, Web of Science, and Google Scholar, respectively. These sources were consolidated on Mendeley to strike out duplicates, reducing the total number to 1200. Remaining sources were analyzed further to determine whether they contained abstracts. 620 publications were eliminated from the list for either lacking abstracts or being non-empirical.

The remaining 580 publications were further analyzed using the established inclusion criteria. 150 sources were included in the list because they met the minimum threshold set out in the inclusion criteria. This remaining list was further scrutinized by scanning through their methods to determine those they could be excluded because of their less credibility. Consequently, 138 sources were excluded from the list because they were deemed less reliable because their methodologies exhibited significant flaws. Therefore, the remaining 12 sources were included in the systematic review for the current study.

Data from each of the 12 articles were extracted into a single spreadsheet utilizing Google Forms. This study employed statistical meta-analysis to analyze the obtained results from the explored studies.

### 3. Results

As summarized in [Table 1 \(Appendix\)](#), each reviewed literature found a strong correlation

between various socioeconomic determinants and heart failure.

Results from the reviewed studies confirmed a strong correlation between education status and the risk for heart failure. A study by Ref<sup>7</sup> examined the impact of educational status on heart failure outcomes among patients. The findings revealed that low education attainment was an independent predictor of adverse outcomes of patients undergoing evaluation of coronary artery disease. This outcome was consistent with those by a study by Ref.<sup>2</sup> Similarly,<sup>7</sup> study found a strong correlation between low education and risks for coronary heart attack.

The reviewed studies also confirmed a strong association between poverty and heart failure outcomes.<sup>13</sup> examined the effect of socioeconomic deprivation on coronary heart attack mortalities. The findings revealed that areas with high levels of socioeconomic deprivation, especially on income, education, and housing, were more likely to develop adverse outcomes.<sup>2</sup> evaluated the impact of social determinants on a heart attack in their study. The results indicated that poverty was the strongest confounding factor for heart failure amongst the other social determinants. The findings revealed that poverty was one of the common factors contributing to the lack of adherence to such medications. Subsequently, this behavior increases hypertension patients' probability of developing cardiovascular diseases.

Findings from the reviewed studies revealed that low socioeconomic background was adversely related to heart failure outcomes.<sup>8</sup> examined the impact of socioeconomic status on heart failure. The findings revealed that men were likely to develop diabetes mellitus than women.<sup>11</sup> designed a multi-cohort-based study to quantify disparities of cardiac problems between socioeconomic divides based on racial backgrounds. The findings by a study by<sup>10</sup> attributed these adverse outcomes to socioeconomic disparities. Notably, higher income was associated with lower heart failure risks than lower income.

Additionally, outcomes from the reviewed literature confirmed that employment status is a strong confounding socioeconomic factor in incidences of heart failure.<sup>10</sup> study also found that employment was associated with lower heart failure risks than unemployment. Additionally, psychological factors such as stress led to risks for heart failure. This outcome was consistent with<sup>2</sup> results. In their study,<sup>1</sup> aimed at quantifying the contribution of people's economic status, particularly the level of financial income, on heart failure.

The reviewed literature confirmed that other socioeconomic factors such as insurance cover,

socioeconomic position, and housing quality have a strong correlation with heart failure.<sup>9</sup> undertook a study to understand this correlation using the 2009–2013 Florida census data. The findings revealed that determinants such as poor housing and low socioeconomic position accounted for the majority of cardiovascular cases among African and Hispanic Americans in the state. At the same time, lack of insurance cover was found to be a strong confounding factor for heart failure issues.<sup>2,13</sup>

Outcomes from the reviewed literature revealed a strong correlation between social stress and adverse cardiovascular outcomes.<sup>3</sup> examined the effect of social stress on the risks of heart failure or other cardiovascular diseases using a convenience sample of 388 patients. The findings revealed that depression was associated with the risks of worsening cardiovascular diseases among the patients. This depression was more prevalent in low economic backgrounds.

#### 4. Discussion

The reviewed studies shed significant light on the effect of socioeconomic status on heart failure in the United States. These factors can be categorized into the following themes: the effect of employment status on heart failure risks, the effect of low socioeconomic status on heart failure risks, the effect of educational status on heart failure risks, and the effect of poverty on heart failure vulnerabilities.

##### 4.1. Education inequalities and risk of heart failure

Findings from this systematic study confirmed that low education levels were associated with higher incidences of cardiovascular diseases.<sup>2,7</sup> This evidence implies that education level is a strong predictor for the prevalence of heart failure in the United States. Consistently,<sup>2</sup> confirmed that lower education increased risks for cardiovascular diseases.

The study's findings are consistent with previously published literature, which supports the hypothesis that low education levels have adverse negative implications on people's health outcomes.

##### 4.2. The role of employment status on heart failure risks

The present study also sheds valuable light on the relationship between employment status and incidences of cardiovascular diseases in the United States. Notably, lack of employment was implicated with adverse health outcomes among household members. Data analysis confirmed the hypothesis that unemployment predisposes people to risks of

developing cardiovascular diseases.<sup>1,10</sup> Ref<sup>1</sup> found a significant disparity in the number of cardiovascular cases between households with employed and unemployed family members, with the latter experiencing more prevalence. Overall, this evidence confirms the present study's hypothesis that high unemployment rates are strong indicators for widespread risks for cases of heart failure.

##### 4.3. The impact of poverty on heart failure risk

A critical analysis of the data acquired in this study also confirms that high poverty rates are strongly correlated with risks of heart failure in the United States. In their study,<sup>2</sup> found that poverty was one of the key socioeconomic factors with a strong confounding influence on the rates of cardiovascular incidences in the United States. While factors such as education level, income status, and insurance coverage influenced health outcomes, the findings revealed that poverty had the greatest influence. Poverty, weak support systems, and food insecurity contribute to increased cases of heart disease patients' non-compliance to prescribed medication.<sup>6</sup>

Therefore, this evidence confirms the assumption that poverty increases the risks for people to develop heart failure complications.

##### 4.4. The effect of low socioeconomic background on heart failure

Additionally, the reviewed literature confirms the assumption that low socioeconomic background is strongly correlated with incidences of heart failure in the United States. Findings from the reviewed studies also revealed that low socioeconomic background was adversely related to heart failure outcomes. People from low socioeconomic status are susceptible to heart failure than those from affluent backgrounds.<sup>8</sup>

The impact of low socioeconomic status on heart failure is attributed to the adverse effects of the associated confounding factors. Poor communities are disproportionately affected by coronary artery disease and cerebrovascular disease of their high chances of working in potentially harmful industries.<sup>4</sup> Therefore, this evidence confirms that a low socioeconomic profile increases risks for people to develop cardiovascular diseases.

#### 5. Conclusion

Findings from the reviewed studies confirmed that socioeconomic factors such as education, employment status, socioeconomic position, and poverty

have a strong confounding influence on the risks of heart disease. Individuals from households with low levels of education are significantly vulnerable to this disease than those with high qualifications.

Additionally, the present study confirmed a strong association between unemployment and heart failure risks. Therefore, unemployment predisposes people to heart failure complications. Additionally, the current study confirmed a strong correlation between poverty and risks for cardiovascular diseases. Furthermore, the present study

confirmed that socioeconomic position influences the risks of heart failure. Individuals from communities with a low socioeconomic profile, are more vulnerable to this disease than the rest of society. Collectively, the study affirms that socioeconomic status is strongly correlated with risks for heart failure.

### Conflict of interest

I have no conflict of interest to declare.

## Appendix A

Table 1. Summary of Evidence from the Reviewed Publications.

Title of Source	Summary
Lawson, C. A., Zaccardi, F., Squire, I., Okhai, H., Davies, M., Huang, W., Mamas, M., Lam, S. L. P., Khunti, K., & Kadam, U. T. (2020). Risk factors for heart failure 20-year population-based trends by sex, socioeconomic status, and ethnicity. <i>Circulation Heart Failure</i> , 13 (2), 1–12. <a href="https://doi.org/10.1161/CIRCHEARTFAILURE.119.006472">https://doi.org/10.1161/CIRCHEARTFAILURE.119.006472</a>	The findings revealed that men were more likely to develop diabetes mellitus than women. Additionally, it revealed that people from low socioeconomic status were more susceptible to heart failure than those from affluent backgrounds.
Bulka, C., Daviglus, M., & Persky, V. (2019). Association of occupational exposures with cardiovascular disease among US Hispanics/Latinos. <i>British Medical Journal &amp; British Cardiovascular Society</i> , 105, 439–448. <a href="https://heart.bmj.com/content/105/6/439">https://heart.bmj.com/content/105/6/439</a>	Results indicated occupation was a strong predictor of developing cardiovascular diseases.
Abdalla, S. M., Yu, S., & Galea, S. (2020). Trends in cardiovascular disease prevalence by income level in the United States. <i>JAMA Network Open</i> , 3 (9), e2018150. <a href="https://doi:10.1001/jamanetworkopen.2020.18150">https://doi:10.1001/jamanetworkopen.2020.18150</a>	The results indicated a substantial increase disparities in cardiovascular disease between the richest and the poor population in the years covered. Notably, lower prevalence rates were reported in those populations from affluent backgrounds.
Niakouei, A., Tehrani, M., & Fulton, L. (2020). Health disparities and cardiovascular disease. <i>Healthcare</i> , 8 (65), 1–12. <a href="https://doi:10.3390/healthcare8010065">https://doi:10.3390/healthcare8010065</a>	The findings indicated that behavioral factors such as drinking are not related to heart failure. However, socioeconomic status was a significant risk. Additionally, psychological factors such as stress led to risks for heart failure.
Pepin, M. E., Ha, C. M., Potter, L. A., Bakshi, S., Barchue, J. P., Haj Asaad, A., Pogwizd, S. M., Pamboukian, S. V., Hidalgo, B. A., Vickers, S. M., & Wende, A. R. (2021). Racial and socioeconomic disparity associates with differences in cardiac DNA methylation among men with end-stage heart failure. <i>American Journal of Physiology</i> , 1–31. <a href="https://doi.org/10.1152/ajpheart.00036.2021">https://doi.org/10.1152/ajpheart.00036.2021</a>	The findings revealed that cardiac problems were significantly higher along racial lines. These differences were confounded by socioeconomic disparities, whereby those from low backgrounds were at a higher risk.
Stewart, A. L., Magnani, J. W., Barinas-Mitchell, E., Matthews, K. A., El Khoudary, S. R., Jackson, E. A., & Brooks, M. M. (2020). Social role stress, reward, and the American heart association life's simple 7 in midlife women: The study of women's health across the nation. <i>Journal of the American Heart Association</i> , 9 (e017489), 1–11. <a href="https://doi.org/10.1161/JAHA.120.017489">https://doi.org/10.1161/JAHA.120.017489</a>	This cohort study examined the association between social roles and heart failure risks using 2764 women in the united states.
Bahall, M., Legall, G., & Khan, K. (2020). Quality of life among patients with cardiac disease: The impact of comorbid depression. <i>Health Quality Life Outcomes</i> , 18 (189), 1–10. <a href="https://doi.org/10.1186/s12955-020-01433-w">https://doi.org/10.1186/s12955-020-01433-w</a>	Depression was associated the risks of worsening cardiovascular diseases among the patients. This depression was mostly associated with low economic backgrounds.

(continued on next page)

Table 1. (continued)

Title of Source	Summary
Melix, B. L., Uejio, C. K., Kintziger, K.W., Reid, K., Duclos, C., Jordan, M. M., Holmes, T., & Jessica, J. J. (2020). Florida neighborhood analysis of social determinants and their relationship to life expectancy. <i>BMC Public Health</i> , 20 (632), 1–12. <a href="https://doi.org/10.1186/s12889-020-08754-x">https://doi.org/10.1186/s12889-020-08754-x</a>	The findings revealed that determinants such as poor housing (among African and Hispanic Americans) and socioeconomic position are significant risk factors.
Donneyong, M. M., Chang, T., Jackson, J. W., Langston, M. A., Juarez, P. D., Sealy–Jefferson, S., Lu, B., Im, M., Valdez, B., Way, B. M., Colen, C., Fischer, M. A., Salsberry, P., Bridges, J. F. P., & Hood, D. B. (2020). Structural and social determinants of health factors associated with county-level variation in non-adherence to antihypertensive medication treatment. <i>International Journal of Environment Research</i> , 17 (6684), 6684. <a href="https://doi.org/10.3390/ijerph17186684">https://doi.org/10.3390/ijerph17186684</a>	The findings revealed that social determinant factors such as poverty, food insecurity, and weak support systems were strong confounding factors to hypertension, and potentially cardiac arrest risks.
Kelli, M. E., Mehta, A., Tahhan, A. S., Liu, C., Kim, J. H., Dong, T. A., Dhindsa, D. S., Ghazzal, B., Choudhary, M. K., Sandesara, P. B., Hayek, S. S., Topel, M. L., Alkholder, A. A., Martini, M. A., Sidoti, A., Ko, Y., Lewis, T. T., Vaccarino, V., Sperling, L. S., & Quyyumi, A. A. (2019). Low educational attainment is a predictor of adverse outcomes in patients with coronary artery disease. <i>Journal of the American Heart Association</i> , 8 (17), 1–10. <a href="https://doi.org/10.1161/JAHA.119.013165">https://doi.org/10.1161/JAHA.119.013165</a>	The findings revealed low education attainment an independent predictor of adverse outcomes of patients undergoing evaluation of coronary artery disease.
Ahmad, K., Chen, E. W., Nazir, U., Cotts, W., Andrade, A., Trivedi, A. N., Erqou, S., & Wu, W. (2019). Regional variation in the association of poverty and heart failure mortality in the 3135 counties of the United States. <i>Journal of the American Heart Association</i> , 8 (18), 1–9. <a href="https://doi.org/10.1161/JAHA.119.012422">https://doi.org/10.1161/JAHA.119.012422</a>	The results indicated that poverty was the strongest confounding factor for heart failure.
Theocharidou, L., & Mulvey, M. R. (2018). The effect of deprivation on coronary heart disease mortality rate, Bioscience Horizons. <i>The International Journal of Student Research</i> , 11, 1–6. <a href="https://doi.org/10.1093/biohorizons/hzy007">https://doi.org/10.1093/biohorizons/hzy007</a>	The findings revealed that areas with high levels of socioeconomic deprivation, especially on income, education, and housing were more likely to develop adverse outcomes.

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