

What Do We Know About Socioeconomic Status And Congestive Heart Failure? A Review of the Literature

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- **OBJECTIVE:** To examine and assess the available literature concerning the effects of socioeconomic status (SES) and congestive heart failure (CHF).
- **STUDY DESIGN:** We examined electronic databases, including: MEDLINE, EMBASE, Social Science Citation Index, Science citation index, the Cochrane Database, and Bandolier. We hand searched recent copies of appropriate journals and scrutinized lists of identified papers. The search terms we used included "heart failure," "cardiac failure," "ventricular dysfunction," "social class," "socioeconomic," "poverty," and "deprivation." Two reviewers independently examined and selected papers for inclusion. A standardized data collection form was used for data extraction.
- **OUTCOMES MEASURED:** We measured (1) prevalence; (2) differences in care (eg, use of diagnostic tests); (3) morbidity (eg, health care use); and (4) mortality.
- **DATA SOURCES:** We examined all English-language abstracts or papers concerning human research related to the subject of SES and CHF, including all clinical trials, reviews, discussion papers, and editorials.
- **RESULTS:** Only 8 clinical studies were identified that specifically examined aspects of the relationship between socioeconomic status and CHF. Key themes included increased hospitalization rates with increasing social deprivation; lower income inversely associated with being placed on a waiting list for transplantation; and that those of lower socioeconomic status had a greater severity of illness on admission.
- **CONCLUSIONS:** There is a paucity of generalizable high-quality research in this subject area. Crucial issues not addressed include the effects, if any, of socioeconomic status on the behaviors of health care providers. Further investigation, with a more holistic approach, is necessary to inform future intervention strategies aimed at reducing excess mortality from CHF.

key words Systematic review [non-MeSH]; congestive heart failure; social class; deprivation. (J Fam Pract 2002; 51:169)

The annual cost of inpatient treatment for CHF was close to \$8.9 billion in 1985; in 1991, it was estimated to generate 2.3 million hospital stays and 11 million outpatient visits that resulted in an annual cost of more than \$38 billion. This represents an estimated 5% of the total national expenditure for health care in the United States.² Current statistics indicate that 4.9 million US citizens are afflicted with this syndrome,³ and the impact on the individual patient cannot be underestimated with its approximate 60%, 5-year mortality rate.⁴

Social deprivation is associated with an increased burden of disease⁵ and with health inequalities.^{6,8} The link between socioeconomic inequalities and cardiovascular disease mortality is well-documented and forms a major public health problem in industrialized countries.⁹ However, much less is understood about the impact of socioeconomic status, specifically on CHF. Even if the risk-factor pattern for CHF is similar to that of coronary artery disease (CAD), a recent study has suggested that only one half of excess coronary mortality in the socially deprived is attributed to such uncorrected risk factors as smoking.¹⁰ Thus, at least 50% of the excess mortality associated with lower socioeconomic status in heart failure may not be explained by such comparisons. This figure may be even greater as CHF is secondary to CAD in less than 50% of cases.¹¹

The prevalence of CHF and mortality from the disease are reportedly higher in those with a lower socioeconomic status (SES).¹² However, little evidence exists to explain this observation. A greater comprehension of the influence of socioeconomic variables is crucial when developing effective and equitable primary prevention, detection, and treatment strategies for this major public health problem. In this study, we examined the existing evidence spotlighting SES and CHF and potential relevant inequalities in health care use or provision. In particular, we have focused on variables that have the potential to contribute to an SES bias and highlight priorities for future investigation.

■ METHODS

We searched the following electronic databases: MEDLINE, EMBASE, Social Science Citation Index, Science Citation Index, the Cochrane Database, and Bandolier, covering 1966 through 2000. The most recent copies of appropriate journals were also hand searched: JAMA, American Journal of Cardiology, Journal of the American College of Cardiology, British Medical Journal, New England Journal of Medicine, Annals of Internal Medicine, The Lancet, Circulation, Heart, European Heart Journal, and Cardiovascular Research. Search terms used were: "heart failure," "cardiac failure," "ventricular dysfunction," "social class," "socioeconomic," "poverty," and "deprivation."

Inclusion criteria were all English-language abstracts/papers concerning human research relating to the subject of both SES and CHF. All clinical trials, reviews, discussion papers, and editorials were examined. Excluded were papers discussing CHF in conjunction with "pediatrics," "protein energy malnutrition," "cellular and animal models," "thiamine" plus other vitamin deficiencies, "pregnancy," or "costs of heart transplantation." Two reviewers independently examined the reference list attained by these search methods and applied the aforementioned criteria to select papers for inclusion in this review. Both reviewers then independently studied the identified papers. We devised our own form of data collection to extract information from the identified papers. Information recorded included basic bibliographic details, type of paper (eg, a report of original research or review article), aims, study population, setting, subject selection criteria, outcome measures, and the study findings and conclusions. Where applicable, we also recorded the methodologic approaches used, as well as other factors that could affect the validity of the results, including effect modifiers. In view of the heterogeneity of the identified studies, a formal meta-analysis was deemed inappropriate. Instead, we have provided a narrative synthesis of the studies that summarizes their findings and highlights limitations, if any. We used the Oxford Centre for Evidence-Based Medicine Levels of Evidence¹³ to grade the studies.

■ RESULTS

We identified 91 papers, of which 27 met the previously defined inclusion criteria. Of these 27, 5 were review articles,^{4,16-19} 2 were reports,^{20,21} 1 was an editorial,²² and 19 were clinical studies.^{10,12,14,15,23-37} From these clinical studies, we identified only 8 that specifically identified aspects of the relationship between SES and CHF.

Of the 8 relevant clinical studies, 2 were abstracts^{12,14} and 6 were papers.^{10,15,34-37} **Table 1** summarizes the demographic and design characteristics of these studies. **Table 2** summarizes their outcome measures and key findings.

Given the relative paucity of clinical trials, the results of the abstracts are included here. The first abstract, by Sharma and colleagues,¹² used the US Survey (NHANES-11) database to determine the prevalence and mortality of CHF in a noninstitutionalized population. This involved 20,322 individuals in a population-based survey conducted between 1975 and 1980 and showed an increased relative risk (RR) for CHF in the low SES population (RR=2.33; P=.001).

The second abstract, by Philbin and associates,¹⁴ determined the relationship between SES and the risk of hospital readmission for CHF by conducting a retrospective review of 42,731 patients discharged alive with a primary diagnosis of CHF during 1995 from New York State Hospitals. They found that patients with readmissions had lower mean incomes than those who did not (\$32,902 vs \$33,757, P=.001). Although statistically significant, this difference is of questionable clinical or economic significance.

Some common themes emerged from the clinical studies. There was a focus on the frequency of admission and the relationship with SES. Philbin and colleagues' findings¹⁴ were echoed by Struthers¹⁰ and MacIntyre³⁵ and colleagues. The former found that the number of cardiac hospitalizations per patient varied from 0.71 in deprivation category 1 to 2 (most affluent) to 0.91 in category 5 to 6 (most deprived) (P =.007). In addition, the risk ratio for cardiac hospitalizations (for an increase of 1 category of social deprivation) was 1.11 (95% CI, 1.002-1.224). MacIntyre³⁵ found that the admission rate was 56% higher in the most deprived quintile compared with the most affluent quintile (P <.001) and deprivation increased the short-term case fatality rate (by 26% in men and 11% in women).

Another common theme was barriers to care suffered by those with lower SES. Coughlin and colleagues³⁴ showed that older age, lower income, and lack of private health insurance were inversely associated with having been placed on a waiting list for transplantation (P <.05). Factors significantly associated with not being put on the waiting list included old age, lower income, and a lack of private health insurance. Auerbach and associates³⁶ also showed that patients with a lower income were less likely to receive care from a cardiologist (adjusted odds ratio [AOR] = 0.65; 95% CI, 0.45-0.93) and were more likely to receive a cardiologist's care if they had a college education (AOR = 1.89; 95% CI, 1.02-3.51).

Severity of illness was another issue highlighted. Latour-Perez and colleagues¹⁵ found that those from a lower SES had higher simplified acute physiology scores (SAPS) on admission, indicating a higher severity of illness, SAPS 9 ± 5 compared with 7 ± 4 (P =.0052). However, their therapeutic intervention scores (TISS) were similar to the nondeprived population, 18 ± 11 compared with 18 ± 9 (P =.666). The TISS assigns values ranging from 1 to 4 for 57 medical and surgical interventions to measure the intensity of care during a 24-hour period. Similarly, Romm and associates³⁷ studied whether the CHF patient's initial status is the most significant relationship to outcome, as measured by activity and symptomatology. He found that those from a lower SES had greater symptom and lower activity scores (correlation coefficients -0.181 and 0.185, respectively, P >.05).

The validity and reliability of the findings for the 6 clinical trials^{10,15,34-37} are subject to a number of conditions, including their definition of CHF, the study design, the representativeness of the study population, patients being at a similar stage of CHF, the dropout rate, and potential sources of bias and confounding. The limitations of each study in relation to these factors are summarized in **Table 3**. The applied gradings, based on the Oxford Centre for Evidence-Based Medicine Levels of Evidence,¹³ indicate that current evidence is suboptimal. There are 2 points that merit emphasis because of their relevance to future research work—the lack of a definition of CHF and the exclusive focus on SES and hospitalized CHF patients.

None of the studies explicitly defined the category of CHF patients included in the study, with only 1 study (MacIntyre and colleagues³⁵) acknowledging their inability to define CHF because of a lack of information from discharge coding. Subsequently, as shown in some of the studies,^{15,35,37} it is difficult to establish the stage of CHF experienced by studied patients, therefore limiting the generalizability of findings.

Given that the majority of CHF patients are managed within the community,¹¹ the focus on SES and hospitalized CHF patients in all the reported clinical trials may indicate a relationship between SES and CHF; however, this may not be generalizable to the majority of CHF patients.

■ DISCUSSION

Much remains unclear about the influence of socioeconomic status on CHF. Linking this review with the wider SES and chronic disease literature indicates a number of ways in which socioeconomic deprivation may contribute to excess mortality in CHF and inequalities in health care. Six issues merit particular investigation.

Health care provider inequalities

There is some evidence that SES may influence individual health care providers' clinical management of CHF. Struthers and colleagues¹⁰ demonstrated an increased rate of re-hospitalization in those with lower SES that was independent of disease severity. Given that the subsequent length of stay was not influenced by social deprivation, the researchers suggested that an explanation of the re-admission rates purely in terms of co-morbidity and poor social support is flawed. Alternative explanations could include:

Primary care providers dealing with CHF in deprived areas have less time for intensive management within the community.

Primary care providers working in deprived areas may perceive that their patients have less capacity to understand and manage their own condition.

Patients within a deprived area may perceive that community medical resources are insufficient to manage them safely at home and "push" for admission.

These hypotheses are unproven, but merit investigation; they could potentially influence the day-to-day management of patients with CHF.

Risk factor inequalities

Half of the excess coronary mortality in the socially deprived may be attributed to uncorrected risk factors such as smoking.¹⁰ The risk factor pattern for CHF is similar to coronary heart disease³⁸ and includes clearly identified etiologies, such as hypertension, coronary artery disease, diabetes mellitus, valvular heart disease, and cardiomyopathies.^{11,19}

Several of these factors have a well-documented SES bias.^{39,40} Consequently, it seems plausible to assume that a proportion of the excess mortality in CHF in lower socioeconomic groups will be because of these SES-driven risk factors, but no definitive evidence for this exists.

Medication inequalities

Nonconcordance is viewed as contributory factor in a large number of CHF admissions.^{41,42} Nonconcordance has been at times assumed to be greater in the socially deprived and may contribute to morbidity. However, Struthers and colleagues¹⁰ found that at least regarding the impact of SES and acute admissions, nonconcordance with diuretics was independent of the association demonstrated.

The prescription of angiotensin-converting enzyme inhibitors for CHF is demonstrably lower in elderly patients admitted with this condition.⁴³ If there is a significant age bias regarding the prescription of drugs of specific benefit in CHF⁴⁴ it may well be that a SES bias also exists, reflecting a perpetuation of the inverse care law.⁴⁵ Further exploration of this subject is needed.

Access inequalities

An age-related bias in follow-up for patients admitted with CHF to a geriatric ward has been demonstrated, with more receiving follow-up by primary care rather than cardiology outpatients, compared with younger patients admitted to medical wards.^{44,46} A similar association may exist regarding SES and might partly explain the excess mortality in this group. A SES bias has been demonstrated in studies looking at re-vascularization rates for angina.^{47,48}

Socioeconomically deprived patients with coronary heart disease are less likely to be investigated or offered surgery despite their increased risk.⁴⁹ Only 2 CHF studies are directly comparable.^{34,36} The former looked at barriers to cardiac transplantation in end-stage CHF caused by idiopathic dilated cardiomyopathy. The latter examined factors associated with obtaining cardiologist care among patients with acute exacerbation of CHF.

In an acute situation, those from lower SES groups may access care differently from their more affluent peers. This has been demonstrated in asthma admissions where such patient groups are more likely to visit an emergency department than their primary care provider.⁵⁰ Other studies considering emergency admissions across all diseases^{23,51} demonstrated that those with a lower SES had an increased probability of being admitted via the emergency department. If the same effect is replicated for CHF, as seems probable, this could result in significant differences in the long-term management of these groups. Patients who primarily access emergency physicians when unwell will, by implication, be less exposed and responsive to long-term disease monitoring in primary care.

Social stress

There is an independent association between social deprivation and the prevalence of neurotic and psychiatric conditions.⁵² Thus, individuals and families with low incomes may have a reduced ability to cope with stressful events.⁵³ This could influence patient behavior in sufferers of CHF, perhaps explaining the readmission rates because of a reduced capacity in the individual to cope mentally with the illness. Further exploration of this variable in initial presentation and subsequent management is required.

Environmental factors

In exploring the relationship between cardiovascular disease and SES, the impact in utero of direct maternal deprivation⁵³ and adverse child and adolescent living conditions have been explored as potential etiologies. Similarly occupational risks,⁵⁵ educational bias, and genetic predisposition or selection have been examined. None of these effects have to date been examined specifically in relation to CHF.

Conclusions

Examining the remaining, as yet unproven contributions to the excess SES mortality in CHF is crucial. Risk factors are important, but to isolate these from a more global approach to coronary heart disease prevention seems futile. Key areas for future research in primary care should include:

Observing the effects of SES on health care providers' behavior regarding diagnostic thresholds, treatments offered, and referral patterns (both elective and acutely) toward patients with CHF.

Examination of the equity of access to secondary care and to relevant investigations, such as echocardiography in communities from different socioeconomic groups.

Exploration of the behavior of patients with CHF in terms of consulting patterns and triggers, compliance, and the role of social stress.

Examination of the support available in the community to patients with CHF and perceptions of this support.

A more holistic approach to the problems of social deprivation and CHF, as outlined above, is necessary to inform future intervention strategies aimed at reducing the excess mortality from CHF. Simply pursuing the traditional approach of targeting risk factors, though important, will miss significant opportunities for intervention.

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