Socioeconomic Inequalities in Heart Failure

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KEYWORDS

- Heart failure • Socioeconomic status • Health care disparities • Health literacy

KEY POINTS

- Socioeconomic inequalities directly influence the incidence, management, and prognosis of patients with chronic heart failure (CHF).
- Socioeconomic status (SES) is a powerful independent predictor of CHF development and adverse outcomes. Low SES is associated with reduced access to care, decreased levels of knowledge, and reduced health literacy.
- Limited health literacy is associated with decreased knowledge about medical condition, poor medication recall, nonadherence to treatment plans, poor self-care behaviors, poorer physical and mental health, increased hospitalizations, and increased mortality.

BACKGROUND

Chronic heart failure (CHF) is defined as a functional or structural abnormality in the heart that impairs ventricular filling or ventricular ejection fraction, causing a mismatch between oxygen supply and metabolic requirements of peripheral tissues. CHF is a complex clinical syndrome representing the end stage of several cardiovascular pathologies and is characterized by typical signs and symptoms, such as dyspnea, peripheral edema, intolerance to exertion, and pulmonary congestion.[1,2]

Prevalence of CHF has systematically increased during the past decades.[2] Demographic changes due to an aging population, an increase in cardiovascular risk factors, and advances in pharmacologic therapy may explain the growing number of patients with CHF. In the United States, the estimated prevalence of CHF is 5.8 million cases and constitutes the first cause of hospitalization in elderly patients.[3]

In general terms, between 1% and 2% of the adult population of developed countries have CHF. The prevalence markedly increases with age, reaching as high as 10% for patients aged 70 years or older. Data on CHF incidence is scarce, but a conservative estimate of 5 to 10 per 1000 persons per year translates to 550,000 new cases of CHF each year in the United States alone.[3,4] The World Health Organization puts CHF within the 5 leading causes of death in adults worldwide. If the current epidemic growth of CHF does not change, by 2030 more than 8,000,000 deaths worldwide of the population aged 30 years or older will be caused by CHF.[5]

The impact of CHF on public health goes beyond its growing incidence and prevalence. Health costs

related to CHF put a considerable stress on health care systems, mainly due to repeated visits to emergency rooms and repeated hospitalizations.[4,6,7] At the same time, patients with CHF exhibit a severely impaired quality of life, which further deteriorates after each rehospitalization.[8] Several studies have shown that CHF predominantly affects lower-income, poorly educated people. More educated, higher-income people usually report lower morbidity from common chronic diseases (stroke, hypertension, dyslipidemia, diabetes). Physical and mental functioning is also better for the better educated; they are substantially less likely to report that they are in poor health, and less likely to report anxiety or depression.[9–12]

Socioeconomic status (SES) is a complex, multidimensional concept that involves several determinants of health. Several indicators have been used as surrogate markers for SES; their relative importance varies during different stages of the life course. Common indicators for SES are educational level, income, self-perceived social class, housing characteristics, employment relations, and health literacy, among others.[12] In developed countries, educational level, employment relations, and household income are strong predictors for death or rehospitalization in patients with cardiovascular diseases (CVD). However, their association with CHF is less certain.[13,14]

Most of these indicators evidence the underlying inequalities that link SES to health outcomes. Poorer, uneducated patients have less access to appropriate health care, and may not be able to understand the key information to establish self-care behaviors. The concept of health literacy comprises the abilities, knowledge, and management capacities of an individual regarding their pathology. Patients with low literacy often exhibit nonadherent behaviors and low use of preventive care with a higher number of visits to emergency rooms and an increased rate of rehospitalization.[9,15]

This review aims to assess the impact of SES inequities on CHF, focusing on the effect of income, education, and health literacy in CHF outcomes.

SOCIOECONOMIC STATUS AND HEART FAILURE

The association between low SES and coronary artery disease (CAD) is well known; however, the relationship between CHF and socioeconomic deprivation is far less understood. Low SES increases the risk of both CAD and CHF[16]; however, whether this reflects a direct association of SES and CHF or an indirect effect is not known. Both CAD and CHF share common risk factors; in fact, nearly 50% of patients with CAD will develop CHF.[12] Lower SES also relates to higher prevalence of type 2 diabetes in the middle years of life,[17] as well as hypertension.[18] These findings suggest that exposure to factors implicated in the causation of CVD, and ultimately CHF, is more common in deprived areas. This may explain the effect of low education level, which precedes the onset of most behaviors associated with increased CVD. Elementary school education is associated with increased risk of CHF in a representative US population sample with a population attributable risk of 9%.[16]

A recently published systematic review including 28 studies aimed to elucidate the association between CHF and SES. Main outcomes were incidence, prevalence, hospitalizations, mortality, and treatment of CHF. Socioeconomic measures included education, occupation, employment relations, social class, income, housing characteristics, and composite and area-level indicators. Lower SES was associated with increased incidence of CHF, either in the community or of people presenting to the hospital. The adjusted risk of developing CHF was increased by 30% to 50% in most reports for patients with lower SES. Readmission rates following hospitalization were likewise greater in more deprived patients. Although fewer studies examined mortality, lower SES was associated with poorer survival. The investigators concluded that "socioeconomic deprivation is a powerful independent predictor of heart failure development and adverse outcomes."[12]

EDUCATIONAL LEVEL AND OCCUPATION

Several studies have evaluated the association between CHF and educational level. Christensen and colleagues[19] followed a prospective cohort of 2190 patients from the Copenhagen City Heart Study, hospitalized for CHF. In this cohort, intermediate (8–10 years of education) and higher education (>10 years) were associated with an important decrease in the risk of CHF development (relative ratio [RR] 0.69, 95% confidence interval [CI] 0.62–0.78 and 0.52, 95% CI 0.43–0.63, respectively).

Similar findings were reported by He and colleagues[16] in the National Health and Nutrition Examination Survey I cohort. This study followed 13,000 subjects without CHF for 19 years. During the follow-up, 1400 patients were diagnosed and hospitalized due to CHF. Less than high school education conveyed an increased risk for hospital admission or death from CHF after a multivariable adjustment (RR 1.22, 95% CI 1.04–1.42; $P = .01$). In Sweden, Ingelsson and colleagues[20] followed a cohort of men aged 50 years or older. Among these subjects, those with a lower educational