**Socioeconomic status and outcomes in heart failure with reduced ejection fraction**

As we are almost invariably reminded each time we open a research paper on the subject of chronic heart failure (CHF), the condition is increasingly prevalent and only likely to become so as our population ages (1). In the most recent iteration of the National Heart Failure audit, from 2015-2016, data from over 66,000 admissions to hospitals in England and Wales were included; soberingly, this number represents somewhere around 80% of the total for this condition recorded in the first diagnostic position (2). Thus, the societal burden associated with CHF is enormous, and growing. Similarly, the individual patient burden associated with a diagnosis of CHF is potentially high; this remains a condition associated with significant morbidity and mortality.

Assessing prognosis for patients with CHF is challenging. A number of risk scores have been developed largely for the estimation of all-cause survival, based upon combinations of clinical variables described in populations from clinical trials (3) or from large-scale meta-analyses (4). One variable missing from all risk-scores for assessment of prognosis in CHF is the influence of socioeconomic status, a factor which we believe to be relevant to the risk of development of many conditions, including cardiovascular disease. However the relationship of socioeconomic status with outcomes in cardiovascular disease is unclear; indeed, I previously reported no influence on survival, both all-cause and cardiovascular, of socio-economic deprivation after a first-ever hospitalisation for heart failure (5).

In the current issue of Heart, Witte and colleagues describe the relationship between socioeconomic status, as measured by the Index of Multiple Deprivation (IMD) (6. The reported observations make interested reading, with greater deprivation being associated with increased risk of death and hospitalisation due to non-cardiovascular events. Interestingly, the association between deprivation and risk of hospitalisation disappeared after adjustment for covariates, while the association with mortality (non-cardiovascular) remained.

What can we make of these observations? Considering the population studied, the authors confined their analysis to patients with left ventricular ejection fraction (LVEF) ≤ 45%, and prevalence of co-morbidities such as diabetes (approx. 25%) and COPD (approx. 15%) as might be expected. The population studied came from 1802 patients from 4 hospitals in the UK, the location of which we are not told, and there was a marked spectrum from the least to the most deprived quintiles of IMD score. With worsening IIMD score, patients were younger, with slightly better preserved renal function and blood pressure, narrower QRS duration on ECG, and similar ejection fraction across quintiles. Therefore, on the face of it, the cardiovascular risk profile for patients in
the more deprived IMD quintiles appears if anything better than for those in least deprived groups. Perhaps therefore we should not be particularly surprised at the lack of influence on cardiovascular survival of socio-economic deprivation? Indeed, it is notable that after adjustment for important covariates, the statistically significant univariate association between hospitalisation risk and IMD score disappeared, suggesting IMD score per-se is not the driver of risk of unplanned hospital admission. Table 1 in the paper (6) shows numerically greater prevalence of both diabetes and COPD in the most deprived quintile compared to the least, and while not reaching conventional statistical significance for diabetes, these observations are likely to be relevant.

However, delving a little deeper in to the observations, we can see that doses of diuretic, ACE inhibitor and beta-blocker (expressed as furosemide-, ramipril-, and bisoprolol-equivalent doses respectively) were apparently similar among IMD quintiles. However the authors do not tell us what proportion of patients were prescribed each of these drug classes at baseline. Moreover, it is perhaps of note that baseline heart rate was higher in the most deprived quintiles, and furosemide-equivalent doses over 1-year clearly differed across IMD groups, falling in the three least deprived, with no change or an increase in quintiles 4 and 5. One interpretation of these observations would be lower use of /efficacy of beta-blocker at baseline, and greater opportunity for diuretic reduction in the least deprived patients. These findings merit further exploration. Further, the inclusion of patients with LVEF in the range 40-45%, for whom there are no evidence-based guidelines regarding the prescription of “state of the art” therapies (to use the authors words), may be questionable, particularly as we have not seen baseline rates of prescription of such agents. On the other hand, it may be that the patients in this study were particularly well treated. The absence of information regarding prevalence of disease-modifying therapies at baseline makes it difficult to consider these issues in full.

Coming back to the issue of the link between socio-economic deprivation and outcomes in CHF. The current analysis suggests that the link is with non-cardiovascular outcomes, and is in keeping with previous work cited by the authors indicating similar findings in patients with coronary disease (7) and prior reports from the UK in CHF (5). However what the current report makes very clear is the strong association between deprivation as measured by the IMD and the risk of hospitalisation, and the number of days spent after admission; as the authors state “......deprivation per-se was associated with 19% more time spent in hospital by patients in the most deprived quintile”. It appears clear that patients in areas of high deprivation continue to be at risk of adverse outcomes, and that such outcomes may not relate directly to one major diagnosis, such as CHF. The authors of this paper have reminded us of this important issue in contemporary healthcare.
REFERENCES

1. The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC). European Heart Journal (2016) 37, 2129–2200
doi:10.1093/eurheartj/ehw128


