92 aetiologic factors for heart failure: prevalence, co-occurrence, prognosis and potential for prevention in 170,885 incident HF cases

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Background: ESC and AHA guidelines identify 92 putative aetiological factors for heart failure, but primary prevention strategies for heart failure (HF) have had limited success. There are no previous studies systematically evaluating the potential for prevention among such a wide range of clinically manifest aetiologic factors.

Objective: To estimate for 92 (putative) aetiologic factors their prevalence, co-occurrence, preventability and impact on HF prognosis in incident HF.
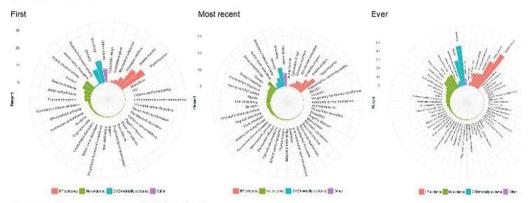
Methods: We identified 170885 individuals aged ≥30 years with incident HF from 1997–2017 using linked primary and secondary care electronic health records (EHR) in the UK (CALIBER). For each of the 92 factors we developed EHR phenotypes using ICD-10 diagnosis, Read, procedure and medication codes (total = 5961 codes). We conducted a literature review of trials of primary HF prevention across 92 factors.

Results: 35.6% of individuals with HF had ≥4 aetiologic factors recorded in the preceding 5 years. Of all new HF cases 71.5% had ≥1 of the 7 aetiologic factors with trial evidence of effective preventive therapy for HF; 12.9% had ≥1 aetiologic factor with effective preventive therapy for CVD and 15.6% had either no aetiological factor, or an aetiological factor with no evidence of preventive potential. 88/91 factors were represented. The commonest factors in the 5 years prior to HF diagnosis were hypertension (48.7%), smoking (46.6%), reduced physical activity (39.6%), stable angina (35.6%), obesity (29.4%), atrial arrhythmias (17.3%), unstable angina (16.9%), cancer (16.6%), myocardial infarction (15.9%), diabetes (15.2%), alcohol (14.9%) and severe anaemia (14.3%). Mortality at 1 year varied across all 91 factors (lowest: pregnancy-related hormonal disorder – 4.2%; highest: phaeochromocytoma – 73.7%).

Conclusion: We provide a systematic map of primary preventive opportunities for heart failure, demonstrate the high burden of co-occurring aetiologic factors and highlight need for trials tackling multiple aetiological factors.

Figure 1: Distribution of aetiologic factors in the 5 years before incident heart failure in 170885 individuals by evidence for preventive treatment

Factors with counts< 100 are excluded from this plot

Aetiologic factors of heart failure