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## Weekly Journal Scan

# Unhealthy lifestyles mediate only a small proportion of the socioeconomic inequalities' impact on cardiovascular outcomes in US and UK adults: a call for action for social cardiology

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Comment on 'Associations of healthy lifestyle and socioeconomic status with mortality and incident cardiovascular disease: two prospective cohort studies' published in the *British Medical Journal* (<http://dx.doi.org/10.1136/bmj.n604>).

### Key Points

- Data from two prospective cohort studies, the US National Health and Nutrition Examination Survey (NHANES) and the UK Biobank,<sup>1</sup> were analysed to evaluate the complex relations of lifestyle and socioeconomic status (SES) with mortality and incident cardiovascular disease (CVD). The two cohorts included 44 462 US adults aged 20 years or older and 399 537 UK adults aged 37–73 years, respectively.
- Socioeconomic status was defined using family income, occupation, or employment status, and education level in both groups, and health insurance in US participants. A healthy lifestyle score was derived using information on smoking, alcohol consumption, physical activity, and diet.
- Medical records were then used to track all-cause mortality (primary outcome) among both US and UK adults, as well as CVD mortality and morbidity in UK participants. Over an average follow-up of 9–11 years, US NHANES documented 8906 deaths and UK Biobank documented 22 309 deaths and 6903 incident CVD events.
- Among adults of low SES, age-adjusted risk of death was 22.5 [95% confidence interval (CI), 21.7–23.3] and 7.4 (7.3–7.6) per 1000 person-years in US NHANES and UK Biobank, respectively, and age-adjusted risk of CVD was 2.5 (2.4–2.6) per 1000 person-years in UK Biobank. The corresponding risks among adults of high SES were 11.4 (10.6–12.1), 3.3 (3.1–3.5), and 1.4 (1.3–1.5) per 1000 person-years.
- Compared with adults of high SES, those of low SES had consistently higher risks of all-cause mortality in both cohorts (hazard ratio, 2.13; 95% CI, 1.90–2.38, and 1.96; 1.87–2.06, respectively), and CVD mortality and morbidity in UK Biobank (2.25, 2.00–2.53 and 1.65, 1.52–1.79, respectively). Lifestyle factors only explained 3% (CVD mortality in UK Biobank) to 12% (all-causes mortality in US NHANES) of the excess risks.
- The socioeconomic inequity in all-cause mortality and the associations of lifestyles and SES with all-cause mortality were stronger in men than in women, and in younger than older adults in both cohorts (*P* for interaction <0.03).

### Comment

Disadvantaged SES is one of the strongest predictors of morbidity and premature mortality worldwide. However, global health strategies do not consider poor socioeconomic circumstances as modifiable risk factors. As matter of fact, low SES was not included in the WHO Global Action Plan for the Prevention and Control of Non-Communicable Diseases that planned to target seven major health risk factors for reducing premature mortality by 25% by 2025.<sup>2</sup>

A recent large multicohort study,<sup>3</sup> using data from more than 1.7 million individuals in 48 independent cohorts from seven countries, found that the independent association between SES and mortality is comparable in strength and consistency to those of six risk factors (tobacco use, alcohol consumption, insufficient physical activity, raised blood pressure, obesity, and diabetes). The data of the US NHANES and UK Biobank cohorts confirm the socioeconomic disparity in mortality and extend the findings to CVD morbidity and mortality, thus suggesting that a reduction of SES inequity in health is urgently needed.

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Socioeconomic status could affect individuals' access to different resources (knowledge, wealth, power, and advantageous social connections) and protective factors (healthy lifestyle and healthcare services).

Lifestyle factors are commonly viewed as plausible mediators between SES and health. Accordingly, a previous analysis of the UK Biobank<sup>4</sup> found that combinations of unhealthy lifestyle factors were associated with disproportionate harm in deprived populations. The question remains, then, whether and to what extent healthy lifestyles might alleviate the SES inequities in health, and why some lifestyle factors seem to be associated with greater harm in the context of socioeconomic deprivation.

In the US NHANES and UK Biobank cohorts,<sup>1</sup> the highest risks of mortality and CVD were seen in adults of low SES and with the least healthy lifestyles. Compared with adults of high SES and three or four healthy lifestyle factors, those with low SES and no or one healthy lifestyle factor had 2.1-fold to 3.5-fold higher risks of all-cause mortality and CVD. However, unhealthy lifestyles mediated a small proportion of the socioeconomic inequity in health in both US and UK adults; therefore, healthy lifestyle promotion, although essential, cannot fully reverse the impact of socioeconomic inequity on health.

This is an observational study, so it cannot establish causality; information on socioeconomic level and lifestyle was self-reported, so it may not reflect full accuracy although data were controlled for key personal characteristics and comorbidities, residual confounding cannot be ruled out. Two cohorts from databases of US and UK, which reflect western habits and high-income populations, have been analysed and the results might not apply to other populations and countries with different healthcare systems and SES. Nevertheless, strengths of the study included the large sample size from two well-established nationwide databases, and the results were similar after several stratified and sensitivity analyses, confirming their statistical robustness.

The results of this study show that social disadvantage and adverse conditions not only produce disproportionate harm because of greater exposure to unhealthy lifestyle factors; socioeconomic hardships could make the individuals more susceptible to the harmful impact of environment and lifestyle, associated with accelerated ageing, and increased mortality and CVD risk. Healthy lifestyles, which were associated with lower mortality and CVD risk in different SES subgroups, play an undiscussed important role in reducing disease burden. However, their promotion alone might not be sufficient to reduce the socioeconomic inequity in health, and other measures are required to address upstream social and environmental determinants of health, such as poverty, education, and access to medical advice and care.

Accordingly, in the longitudinal analyses on 22 194 participants in the Moli-Sani study,<sup>5</sup> participants of poor SES in childhood, but improving in both education and incomes in their adulthood, had lower risks of mortality, whereas health-related behaviours explained <10% of the association. The impact of these differences and the complex interplay between SES and health disparities have become even more evident during the COVID-19 pandemic.<sup>6</sup>

The current results suggest that SES adversities should be included as modifiable risk factors in local and global health strategies, policies, and health risk surveillance, thus representing a new avenue to improve cardiovascular prevention. Moreover, these findings call for interdisciplinary dialogue among Preventive Cardiology, Economics and Political Sciences to define a joint agenda for action.

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