

Duration and timing of exposure: effects of socio-economic environment on adult health

Chris Power

Introduction

Public health policy in the UK has set its sights on the reduction of health inequalities, inequalities which are recognised to be the outcome of broader inequalities in life chances and living standards. Research has established that exposure to socio-economic disadvantage both in early life and in adult life increases the chances of poor health in adulthood. But many questions remain. In particular, little is known about whether the impact of socio-economic conditions on adult health varies with the *timing* at which adversity occurs, or with the *duration* for which individuals are exposed. We also know little about the extent to which favourable or adverse circumstances at one life stage can modify those experienced at another stage. Our project therefore studied the relationship between the socio-economic environment at several life stages and adult health. It is based on the 1958 British birth cohort, where children have been followed up from birth to age 33.

The project addressed four questions:

- do socio-economic conditions at different life stages vary in their impact on health in early adulthood? That is, does timing matter?;
- can favourable socio-economic conditions in adulthood compensate for disadvantage in early life, and conversely, can unfavourable adult conditions offset advantages gained in early life?;
- does duration of exposure to favourable or adverse socio-economic conditions affect the risk of poor health in early adulthood? That is, do risks for adult health accumulate?;
- do socio-economic conditions in early life influence adult health primarily through their effect on education?

We used information on social class to indicate socio-economic conditions at four ages: at birth and age 16 (based on father's occupation) and at ages 23 and 33 (based on the subject's own occupation). A lifetime socio-economic score (SES) was obtained by adding the social class values (1 for highest class to 4 for lowest class) across the four ages. This gave a lifetime SES ranging from 4 (for those always in the highest social class) to 16 (for those always in the lowest class).

Timing of exposure and health in adulthood

At age 33, 12% of men and women reported poor health¹. Social class at each age, that is at birth and at ages 16, 23 and 33, was significantly associated with poor adult health. Cross-classification of social class at consecutive life stages suggested a cumulative effect, with disadvantaged circumstances in adulthood offsetting to some extent a favourable start in childhood, while conversely, improved adult SES was seen to compensate, but not entirely, for disadvantage experienced in early life. This cumulative pattern of risk was confirmed in an analysis of all four ages simultaneously: social class at birth was associated with adult health even after allowing for social class in early adulthood (ages 23 and 33). Conversely, class at age 33 had an additional influence to

social class at earlier ages. The effects of social class on adult health were similar for each life stage, suggesting that timing was not a major factor, although an exception was seen at age 16 in men which was not significant after allowance for social class at birth and early adulthood.

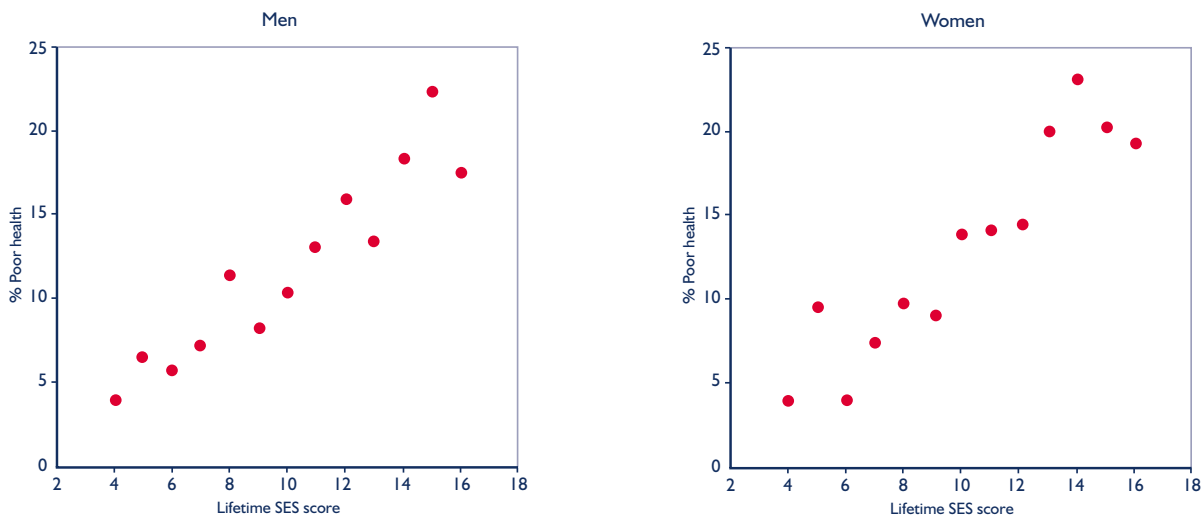
Duration of exposure and health in adulthood

The cumulative effect on adult health is demonstrated most strikingly with the lifetime summary measure of conditions from birth to age 33 (see Figure 1). Only 4.1% of men with the best lifetime circumstances had poor health at age 33, compared with 17.6% of those with the worst circumstances. The comparable range for women was 3.9% to 19.4%. We estimated that each unit increase in the lifetime SES measure increased the odds of poor health by 15% in men and by 18% in women. Thus, each step up the class ladder from classes IV&V to I&II at each age reduced the probability of poor adult health. Chronic exposure to poor socio-economic conditions therefore had an especially detrimental effect, suggesting that health risks are influenced by duration of exposure to particular socio-economic environments.

In further analyses we showed that level of education was also strongly associated with poor health at age 33. However, the effects of education and lifetime SES were to a large extent independent of each other. This implies that the lifetime SES effect does not merely reflect the well-established association between education and health. Lifetime SES provides a cumulative measure of socio-economic conditions which is at least as important as education in relation to self-rated health in early adulthood.

Our study therefore suggests that duration of exposure to socio-economic conditions has a strong predictive effect on health in early adulthood. By using four time points, our study emphasises that, at least for self-rated health, a finer gradation of risk emerges with increasingly refined lifetime SES scales and that no particular life stage predominates. Furthermore, as most previous work

Figure 1: Poor health¹ at age 33 and cumulative socio-economic circumstances (birth to age 33)



Copyright 1999 by the American Public Health Association

has been confined to male samples, with few exceptions, less is known about lifetime SES influences on health among women. In the 1958 cohort, similar cumulative SES effects existed for both sexes in their early adulthood.

The persisting and cumulating effects of SES at different life stages could operate through alternative pathways involving, for example, physical characteristics acquired at an early age, or through educational achievement and social skills. Some studies of adult health consider these differing pathways. Evidence exists in the child development literature that both physical characteristics and educational achievement are themselves influenced by cumulative SES (or more precisely, duration of exposure measures) in early life. Thus, long duration of low family income was found to adversely affect an offspring's cognitive development at age 5, school achievement at age 12, adult earnings, and childhood stunting (low height for age). For each outcome, greater effects were evident for persistent poverty than for transitory poverty (except for childhood stunting when transitory poverty early in life was also important). This work highlights the importance of considering duration of exposure to economic hardship for 'outcomes' that in turn, either directly or indirectly, relate to adult health.

Our study could be interpreted as providing support for the "early life origins" of adult disease hypothesis, in that there was a persisting effect of SES at birth. However, the findings were not particularly supportive of differential timing effects, especially among women. Even for the ten year period during early adulthood, a separate contribution was observed for the two ages examined: that is, SES at age 23 was associated with later poor health after allowing for current (age 33) circumstances. This may be signalling that the time around labour market entry may also have long-lasting associations with later health, as has been shown previously for mortality.

Conclusion

In the 1958 birth cohort study, social class at four life stages predicted poor health at age 33. Duration of exposure to socio-economic conditions therefore appears to be an important factor to consider in the prediction of adult health. It should be noted that this analysis has focused on poor health only. An important next stage for lifecourse studies of health inequalities is to establish if such relationships depend on the adult health outcome, since there may be different lifecourse associations for different outcomes.

Nonetheless, our project has some important policy implications. Its finding - that disadvantage in infancy, in adolescence and in early adulthood all make a contribution to the chances of poor health in adulthood - suggests that long-term exposure to disadvantage is especially detrimental to health while improving socio-economic circumstances in adulthood can compensate, at least in part, for a disadvantaged start in life. Such findings lend support to programmes like *Sure Start* which aim to lift children heading towards long-term disadvantage onto more advantaged trajectories, and *Welfare-to-Work* which seeks to reverse earlier disadvantages by providing a ladder into paid work for young people and adults on welfare benefits.

This article is based on: Power C, Manor O, Matthews S. 'The duration and timing of exposure: effects of socio-economic environment on adult health.' *American Journal of Public Health* 1999, 89, 1059-65.

Notes

¹ this includes the percentage rating their health as "fair" or "poor".