Social inequalities in mortality: a problem of cognitive function?

Michael Marmot* and Mika Kivimäki

Department of Epidemiology and Public Health, University College London, 1–19 Torrington Place, London WC1E 6BT, UK

Online publish-ahead-of-print 14 July 2009

This editorial refers to 'Does IQ explain socio-economic differentials in total and cardiovascular disease mortality? Comparison with the explanatory power of traditional cardiovascular disease risk factors in the Vietnam Experience Study†', by G.D. Batty et al., on page 1903

Inequalities in health matter. The relationship between measures of socio-economic position and mortality is a strikingly consistent finding. It has been clear for some time that this relationship extends to cardiovascular mortality: a lower position in the social hierarchy is linked to higher mortality.1 It should give us pause. Much of medicine has to do with diagnosis and treatment of disease in individuals. This concern with individuals has been extended to prevention: use of the epidemiological data on risk factors as a basis for behaviour change or risk factor modification in individuals. Social inequalities in cardiovascular and other diseases suggest that we need to broaden our view. Action will require more than treatment of disease or of risk factors for disease in individual patients.

But what to do? Knowing that there is a strong link between socio-economic position and mortality is relatively easy, and the effect size is large. The much harder questions are why and what to do about it. As David Batty and colleagues argue,2 the two questions are linked: understanding why is important for planning action to address these inequalities in health.

When most people think about explanations for these social inequalities in health they think first of behaviours—smoking, diet, sedentary habits—and the consequent effect on risk factors. The study by Batty et al. confirms the importance of these risk factors in individuals. Nine cardiovascular risk factors—systolic and diastolic blood pressure, total and HDL cholesterol, body mass index (BMI), smoking, blood glucose, forced expiratory volume in 1 s (FEV1), and heart rate—accounted for ~40% of social inequalities in mortality,3 broadly consistent with findings from other studies. In the first Whitehall study, for example, we could ‘explain’ about a third of the social gradient on the basis of a slightly smaller list of risk factors.3 In the Whitehall II study, by adding in metabolic syndrome variables, fibrinogen, and height, we got the percentage explained up to ~60%.4

In the quest to understand the causes of health inequalities, this finding, of 40% explained, leads to two types of further question: why are there social inequalities in behaviours and risk factors, and what else could account for the social differences in mortality.

The Commission on Social Determinants of Health (which M.M. chaired) emphasized the conditions in which people are born, grow, live, work, and age as being fundamental to both understanding causes and taking action to redress health inequalities.5 In fact, we used the term health inequity to apply to those health inequalities that were judged to be avoidable. The failure to avoid them was unjust—hence inequitable. When we turned to health behaviours we borrowed Geoffrey Rose’s phrase: the causes of the causes. Smoking, diet, and lack of exercise are causes of disease. But what of the causes of these causes? Why do these unhealthy behaviours occur with greater frequency the lower one’s socio-economic position?

The answer to this first question was linked with the second type of question with which the Commission on Social Determinants of Health was also heavily concerned: not only why do people behave ‘badly’, but how do the conditions in which they carry out their lives lead to the unequal and unfair distribution of health? Within a country such influences may be seen, among other ways, as socio-economic inequalities in morbidity and mortality that are not explained by health behaviours and known risk factors.

Implicitly, if not explicitly, the study of Batty et al.2 addresses itself to this second type of question: what, apart from these recognized risk factors, could account for social inequalities in mortality? Their answer is intelligence, a factor that involves the ability to reason, solve problems, and learn. This continues the impressive work by Deary showing, in numerous studies, that intelligence predicts death.6,7 Like any good answer it leads to more questions. If, indeed, intelligence is important, what does it tell us, to pick up the authors’ justification, about both understanding and potential interventions?
We might think of three ways in which IQ could ‘explain’ the relationship between socio-economic position and mortality: (i) intelligence might lead to greater knowledge about how to pursue healthy behaviours; (ii) intelligence may ‘cause’ socio-economic position, i.e. more intelligence leads to more education, income, occupational prestige, and influences associated with higher position, rather than intelligence itself, decrease risk of disease; and (iii) intelligence may be a marker for something else, and it is that something else, early life exposures, for example, that leads to mortality. The analyses in the study of Batty et al. do not readily allow us to choose between these explanations. Nevertheless, it is worth reflecting on each of them, as their implications for action may be quite different.

If the first explanation is correct—intelligence itself is linked to good health, as in intelligent people knowing how to look after themselves—one might have expected much of the relationship between IQ and mortality to act through known risk factors. This does not appear to be the case. In fact, a recent analysis of a different US cohort confirms that IQ predicts mortality, but shows that this relationship is abolished when education and income across the life course are in the same model.

This leads to the second type of explanation. IQ only ‘explains’ the link between socio-economic position and mortality in so far as IQ is a determinant of social and economic success in life. It is hardly surprising that intelligence should be linked to education, or adult income, or occupational prestige. In the kind of societies in which most of us live we would worry if that were not the case. IQ, then, is one of the determinants of where someone ends up socially, the kind of job they do, the income they earn, the neighbourhood in which they live. It may be not the IQ per se that is linked directly to health, but the conditions of adult life to which IQ predisposes.

The third type of explanation recognizes that cognitive function in childhood, which correlates highly with cognitive function in adulthood, is influenced by biological and social conditions in early life which then track into adulthood. Is it possible that it is early conditions, ranging from fetal programming to parental interest in child’s education, that influence both IQ and subsequent risk of disease? In this type of explanation, although IQ is associated with both risk factors and disease in statistical analyses, it remains a bystander in the causal drama. All the action is from childhood and adulthood conditions to risk of disease and death.

Research to place IQ in the complex processes underlying social inequalities in mortality is challenging and there may be some of all three types of explanation operating. The fact that IQ drops out of the predictive model when education and income are included in the other American cohort suggests we are not looking primarily at a direct IQ effect. Social inequalities seem not to be a problem of genetic predisposition and deficient brain information processing at an individual level. The second and third explanations combined have much to recommend them and point to interventions at the societal level. There is ample evidence that childhood conditions have subsequent effects on disease. This may be, in part, a direct effect of early conditions on adult risk of disease; and a continuity through the life course. Clarity will come from evidence involving repeat measurements of both cognitive function and life course environmental influences.

Some observers have put forward the proposal that the only way to understand health inequalities is to examine the material conditions in which people live. This study on cognitive function makes clear that what happens in the mind, whether the influences come from the material world or the social, has to be taken into account if we are to understand how the socio-economic circumstances in which people live influence health and well-being.

Conflict of interest: none declared.

References