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## **IQ explains some of the difference in heart disease between people of high and low socio-economic status**

A unique study looking at the difference in cardiovascular disease (heart disease and stroke) and life expectancy between people of high and low socio-economic status has found that a person's IQ may have a role to play.

Authors of the study published in Europe's leading cardiology journal, the *European Heart Journal* [1] today (Wednesday 15 July), analysed data from a group of 4,289 former soldiers in the USA. They found that IQ explained more than 20% of the difference in mortality between people from socio-economically disadvantaged backgrounds compared to those from more advantaged backgrounds. Importantly, this was in addition to the classical, known risk factors for heart disease, such as smoking and obesity.

Dr David Batty, who led the research, said: "We already know that socio-economically disadvantaged people have worse health and tend to die earlier from conditions such as heart disease, cancer and accidents. Environmental exposures and health-related behaviours, such as smoking, diet and physical activity, can explain some of this difference, but not all of it. This raises the possibility that, as yet, unmeasured psychological factors need to be considered. One of these is intelligence or cognitive function, commonly referred to as IQ. This measures a person's ability to reason and problem solve. IQ is strongly related to socio-economic status."

Dr Batty, an epidemiologist and Wellcome Trust Research Fellow at the Medical Research Council's Social and Public Health Sciences Unit, University of Glasgow (UK), and at the MRC Centre for Cognitive Ageing and Cognitive Epidemiology, University of Edinburgh (UK), and his colleagues were able to look at the relationships between IQ, socio-economic status and heart disease in the study of US former soldiers because, unusually, this group had this detailed information.

"We wanted to know what is it about low socio-economic status that gives you a higher risk of cardiovascular disease," explained Dr Batty. "In other words, how is socio-economic adversity getting 'under the skin' to cause people to have a reduced life expectancy or increased risk of cardiovascular disease? This is important to know so that we can actually try to do something about the problem."

Dr Batty found that, as expected, people on low incomes (in both early and mid-life), in jobs with low prestige and with less education, had an approximately two to seven-fold higher risk of dying from all causes and cardiovascular disease than people of a higher socio-economic status. "This confirmed what we already knew," he said. "However, when we took into account IQ, we found this explained approximately 50% of that difference."

A second analysis showed that taking into account nine known risk factors for heart disease (such as smoking and obesity) explained about 40% of the difference. The final analysis that adjusted for all three (age, known risk factors and IQ) explained between 63-65% of the

difference in deaths from all causes and heart disease between people with high and low socio-economic status.

“The difference between the second and third analyses showed that IQ alone explained a further 23% of the differences in mortality between the higher and lower ends of the socio-economic spectrum, in addition to the other, known risk factors,” said Dr Batty. “IQ wasn’t a magic bullet in this study, but this psychological variable had additional explanatory power on top of the classic variables such as smoking, high blood pressure, high blood glucose and obesity. It has partially explained the differences in death from heart disease and all causes.”

In an associated editorial [2], Professors Sir Michael Marmot (who leads the long-running Whitehall II study of London-based civil servants and who chaired the WHO’s Commission on Social Determinants of Health) and Mika Kivimäki, both from the Department of Epidemiology and Public Health at University College London (UK), suggest that there could be three possible explanations for Dr Batty’s findings: “(i) intelligence might lead to greater knowledge about how to pursue healthy behaviours; (ii) intelligence may “cause” socioeconomic position, i.e. more intelligence leads to more education, income, occupational prestige . . .; 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.” They speculate as to whether conditions in early life, ranging from foetal programming to parental interest in a child’s education might influence both IQ and subsequent risk of disease, and they suggest that a combination of the second and third explanations “have much to recommend them and point to interventions at societal level”.

They conclude: “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 socioeconomic circumstances in which people live influence health and well-being.”

Commenting on the public health implications of his study, Dr Batty and his colleagues write: “Our findings suggest that measured IQ does not completely account for observed inequalities in health, but, probably through a variety of mechanisms, may quite strongly contribute to them. This implies that efforts to reduce inequalities should continue to be broadly based, including educational opportunities and interventions directed at early life. . . . It may be that individual cognition levels should be considered more carefully when preparing health promotion campaigns and in the health professional–client interaction.”

Dr Batty said: “I think the public health messages on things like diet, exercise and smoking could be simplified. At present, the messages can be quite complicated, even contradictory, and they lack clarity. For instance, we often read about how some types of alcohol are good for you while others, or even the same ones, are not. These messages can be difficult to interpret, even by knowledgeable people.

“Secondly, efforts to reduce socio-economic inequalities should continue on a broad front. Initiatives aimed at raising living standards and education of the most disadvantaged families with children could potentially make a difference to those children’s health and well-being in

later life.”

(ends)

**Notes:**

[1] “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”. *European Heart Journal*. doi:10.1093/eurheartj/ehp254.

[2] “Social inequalities in mortality: a problem of cognitive function?” *European Heart Journal*. doi:10.1093/eurheartj/ehp264.

**Pdfs of both the full research paper and the editorial are available on request from Emma Mason or are available at:**

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