

High-risk hearts: A South Asian epidemic

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Hearts' empath. Credit: oedipusphinx, the JWDban's photostream on flickr

(Medical Xpress) -- Cardiovascular disease (CVD) is the most common cause of death and disability worldwide. For South Asians, though, this global killer poses an even more sinister threat. Over the past three decades, the incidence of heart attacks and strokes among South Asians has risen steeply. Today, South Asians, even those living in other countries, are considerably more likely to die prematurely from the disease than any other group. Moreover, the increase appears to be unrelenting.

The identification of 'classic' [risk factors](#) such as blood fats, blood pressure, diabetes and smoking has contributed to a decline in CVD-related deaths in high-income countries. Although the same risk factors apply to South Asians, it seems likely that they may be affected by additional, as-yet-unrecognised, factors.

“The study of vascular disease among people living in South Asia has been comparatively neglected,” said Professor John Danesh, Head of the Department of Public Health and Primary Care. “South Asians number 1.5 billion people worldwide, yet until recently there have been few powerful studies tailored to evaluate the distinctive genetic, biochemical and lifestyle risk factors affecting this group.”

Now, two population studies jointly led by Professor Danesh and other researchers at the Department of Public Health and Primary Care hope to find some answers. With 35,000 participants, the Pakistan Risk of Myocardial Infarction Study (PROMIS) is the most powerful study so far to search for biological and other risk factors for CVD among Pakistanis. And, despite commencing only in January 2011, the Bangladesh Risk of Acute Vascular Events (BRAVE) study already exceeds any previous Bangladeshi study in scale.

“Pakistan is a country of 187 million people, yet fewer than 1,000 patients have been assessed in previous epidemiological studies of heart disease,” said Dr. Danish Saleheen, who jointly leads PROMIS. “When I was a medical student in Pakistan, infrastructure was lacking to conduct large-scale genetic investigations in that region. Moreover, there were not any instruments or studies that could specifically investigate lifestyle and dietary exposures which are very specific to South Asia in relation to conditions like heart attacks and [stroke](#).”

He began a project with colleagues in Pakistan to investigate what it might be about [South Asians](#) that makes them more vulnerable to the development of heart diseases. Were local dietary practices, such as the use of ghee as cooking fat, to blame? Or the many non-cigarette-based ways of consuming tobacco, including chewing, sniffing and ingesting? Or cultural habits such as marriage between first cousins? Or environmental influences such as contaminants in food and water?

After Dr. Saleheen moved to Cambridge in 2006 as a Cambridge Commonwealth Trust scholar, the study design was optimised, long-term funding was secured, and full-scale recruitment commenced under the joint leadership of Professor Danesh. It now recruits patients with heart disease, stroke or diabetes at a rate of 10,000 per year from 13 institutes across Pakistan through the Centre for Non-Communicable Diseases in Karachi, whose current Director is Dr. Saleheen.

The study is poised to yield a harvest of novel findings. For example, it has recently contributed to the discovery of nine genes for coronary artery disease and six separate genes for type 2 diabetes, with the findings published in Nature Genetics. Other detailed analyses are in progress with the support of more than £10 million in research funding from the US National Institutes of Health, Wellcome Trust and British Heart Foundation.

Perhaps where PROMIS will have its greatest potential impact will be the evaluation of local risk factors that can be modified. “We are beginning to identify distinctive factors which increase the risk of, or protect against, heart diseases,” said Dr. Saleheen. “For instance, consumption of ghee and indigenous types of tobacco, including ‘naswar’, increases the risk of [heart attack](#). Through PROMIS, we are now able to pinpoint the contribution of these factors in a more precise manner than ever before.”

Of all South Asian countries, Bangladesh probably has the highest rates of CVD and yet is the least studied. Dr. Rajiv Chowdhury, who is himself from Bangladesh, explained the severity of the situation: “In the late 1990s it was estimated that there would be a 100% increase in CVD across South Asia by 2020. But, when you look at Bangladesh, there has already been a 3,500% increase. In the global combat against CVD, Bangladesh is a country ‘missing in action’.”

Gates Scholar Dr. Chowdhury jointly leads the BRAVE study, which began seven months ago in pilot form in readiness for a subsequent large-scale study. Because of the astonishing rate at which patients are arriving at the National Institute of Cardiovascular Diseases in Dhaka, medical officers are recruiting three times as many patients as was anticipated, and the study will reach 1,000 by the end of this year.

“One important objective is to build an epidemiological resource – the first in Bangladesh – to be shared between the Bangladeshi and UK collaborators with equal intellectual partnership,” said Dr. Chowdhury, who jointly leads the study with Dr. Emanuele Di Angelantonio and Professor Danesh. “The biorepository will be used to test current and future hypotheses relating to potential risk factors to help shape local and global cardiopreventive policies.”

Dr. Chowdhury is certain that, as in Pakistan, crucial risk factors will be discovered: “Bangladesh has the highest rate of urbanisation and population density in South Asia, and is facing the worst threats of climate change globally. Factors associated with such extraordinary circumstances may have influenced the population’s massive shift in epidemiology towards increased CVD. Equally, it could be linked to suboptimal nutrition, widespread environmental contaminants such as arsenic in ground water and plants, or specific vulnerabilities in the genetic or metabolic make-up that have yet to be discovered.”

Provided by University of Cambridge

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