Future trends in Cardio-Metabolic Disease: Lessons from Migrant Studies

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KEY FINDINGS

- **Immigrants to the UK are at a higher risk of different types of cardiovascular disease** (CVD) than UK nationals.
- This increased risk is likely to be due to different distributions of body fat, and in particular to organ fat deposits.
- There are particular disparities between South Asian and African Caribbean migrants.
- There are also **implications for early development amongst children of migrants**, particularly in terms of an increased likelihood of developing diabetes.
- Increase in CVD is accompanied by increased prevalence of NCDs generally, a double burden of over- and under-nutrition, and continued high levels of infectious disease.
- **Infectious disease can accelerate progression to NCDs**: a comprehensive approach to NCDs and global health is therefore important.

Introduction

This briefing note provides a summary of the discussions at a UCL Grand Challenge of Global Health seminar on future trends in cardiovascular disease (CVD), with particular reference to insights from migrant studies. The discussions focused on the findings from studies of immigrants on patterns of CVD incidences and causes; the reason for a greater prevalence of CVD amongst migrants; the implications for early development; and global policy concerns on CVD and non-communicable diseases (NCDs) more broadly.

Insights from migrant studies

Migrant studies have guided our understanding of the social determinants of disease. Studies recognising the importance of population factors on incidence of disease extend back to 1827-38 from a study of Madras and British troops. Research on immigrants in the UK has shown that immigrants to the UK were at higher risk of different types of CVD:

- **Prevalence of heart disease and stroke are highest amongst Indian, Pakistani and Bangladeshi** men and women;
- **Risk of mortality from a stroke is almost double amongst first generation African Caribbean migrants** living in the UK compared to UK residents;
- This is true even when incidence is low in resident countries.

These findings have informed ideas about behaviour and lifetime risk factors.

The SABRE study

SABRE (Southall and Brent Revisited) was a cohort of UK residents of European, Indian Asian and African Caribbean origin designed to investigate the question of risk factors for cardiovascular disease and diabetes between these populations. It found that:

- A fifth of people of European origin compared to half of people of Caribbean origin developed diabetes by age 80, compared to national average;
- The risk of diabetes was 3 times higher in people of South Asian origin and 2 x higher in people of African Caribbean origin, compared to those of European origin;

- The risk of CVD was 1.5 times higher in people of South Asian origin but only half as high in African Caribbean people – this showed that individuals from different ethnic backgrounds experienced risk to differing degrees.

Reasons for disparity between different ethnic groups

One hypothesis was that **fat distribution on different organs** (ectopic fat distribution) and fat profiling (lipid profiling) could be associated with differing levels of insulin resistance and explain the variance in ethnic differences as well as, to a lesser extent, gender differences. Analysis of multiple statistical outcomes (multivariable analysis) that adjusted for age and sex explained some, but not all, of the variation.

Analysis of **abdominal body fat** around the liver, pancreas and intestines (visceral adiposity) and of fat (lipid profiling) suggested these were more significant factors. **Abdominal body fat was greater amongst African Caribbean individuals and was a significant predictor of diabetes** in multivariable models.

Studies later then investigated differences attributed to differences in distribution in fat and in lean body mass, comparing organ (visceral) fat, thigh fat, and lean muscle. Whilst the evidence for this is not strong, there are apparent **differences in fat distribution from birth** between South Asian immigrants, in whom fat was primarily distributed amongst organs; and African Caribbeans, in whom fat was mainly distributed in lean muscle. One hypothesis is that these differences stem from cultural and historical differences, such as the need to deposit fat during repeated famines in South Asia compared to African Caribbean migrants developing metabolically active fat storage to cope with a high risk of infectious disease.

Implications for early development

This hypothesis also has implications for early development. In the US, birth weight is lower amongst African Americans than white newborns; the same trend has been observed for Indian compared to white British nationals. **Low birth weight impacts on the early structural development of children** to South Asian and African Caribbean immigrants, who are exposed to environments of higher energy consumption and fat intake than in their countries of origin.

The **children of migrants born in the UK could suffer the effects of development and degeneration earlier than their parents:** lower birth weights in this new host environment are exposed to different influences from an early age and are less physically prepared to fight infection. This puts the next generation at **greater risk of developing diabetes** compared to the overall population prevalence – for example, the Child Heart and Health Study in England (CHASE) observed the emergence of insulin resistance in children of African Caribbean and South Asian migrants, at age 9-10 years.

BACKGROUND

Non-Communicable Diseases – sometimes referred to as "chronic diseases"– account for more deaths than any other cause worldwide. Eighty per cent of these deaths occur in the world's poorest countries. NCDs include heart disease, lung disease, diabetes, cancer and mental illness. The Grand Challenge of Global Health NCD season is a series of events and exhibitions to highlight the global rise of NCDs which aim to challenge, provoke and inform. Each symposium is accompanied by a policy briefing summarising the key points of discussion.

Speakers

• Nish Chaturvedi – Professor of Clinical Epidemiology, UCL

Global policy concerns

There is a **marked increase in CVD**, at the same time as an **increased prevalence of NCDs** and the **double burden of over- and under-nutrition**. Furthermore, low and middle income countries are experiencing a noticeable increase in NCDs such as diabetes, heart attack and stroke amongst a background of persistent infectious disease such as HIV. These issues are interconnected, as **infectious disease can accelerate progression to NCDs** because it puts a high metabolic demand on immune systems.

There is a broad concern that **CVD in high income countries will detract attention from low income settings**. At the same time, **CVD may be under-prioritised in low income countries** where infectious disease ranks highest (for example in India, infectious diseases are the principal causes of disability-adjusted life years lost, but CVD is also on the increase). It is difficult to predict what will happen in the future, but experience shows that **siloed programmatic efforts against single disease ignore the connections between infectious disease and NCDs**; it is therefore important to adopt a comprehensive and inter-sectoral approach to NCDs and global health.

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