

WHY RESEARCH ON NONCOMMUNICABLE DISEASES IN INDUSTRIALISED POPULATIONS IS NOT ADEQUATE FOR DEVELOPING PUBLIC HEALTH POLICIES IN MODERNISING COUNTRIES

Why research on noncommunicable diseases in industrialised populations is not adequate for developing public health policies in modernising countries.

The primary determinants of non-communicable diseases such as obesity, type 2 diabetes, stroke, hypertension and heart disease used to be considered genes or adult lifestyle. These diseases also used to be considered a burden primarily in Western industrialised countries. Within the last decade, medical research into these diseases has been radically transformed by three realisations: first, that the majority of people worldwide suffering from non-communicable diseases are inhabitants of non-western countries; second, that these diseases are closely associated with the pattern of growth and development, shifting attention from adults to fetuses, infants and children; and third, that the processes of urbanisation, industrialisation and economic development in modernising countries are occurring much more rapidly than they did in western countries.

Research in Western populations has established that obesity and sedentary behaviour are key risk factors for the metabolic syndrome and cardiovascular disease. But the secular trends in height and weight, and the shift from physical activity to sedentary behaviour, occurred across the entire 20th century in these populations. Behaviour began to change after the consolidation of the industrial revolution, and was characterised by the emergence of new working practices, the introduction of a diet based on commercially prepared food products rather than home-grown foods, and the consolidation of technology in place of human labour as the primary source of industrial power. These factors are now often described as the “obesogenic niche”. For many, what is important about this niche is the mismatch between a calorically dense diet high in refined carbohydrate and the low demand for physical activity, exacerbated in

many cases by “work stress”. This view is however simplistic, for it ignores the fundamental power of the socioeconomic processes that are driving these behavioural changes. People are not voluntarily altering their diet and physical activity patterns, rather they are being obliged to do so by market forces and state policies.

Simplistically, one might attribute rapid increases in obesity and cardiovascular disease in modernising countries to the same alterations in diet and activity. If that were the case, epidemiological studies in Western industrialised populations would be quite sufficient for understanding the scenario around the globe. This view is completely unrealistic, and ignores the extraordinary speed with which the “nutrition transition” is occurring in modernising countries. The so-called ‘BRIC’ countries, Brazil, Russia, India and China, are undergoing modernisation so rapidly that changes that occurred over a century in Europe or America are being telescoped into a decade through the effects of economic globalisation.

In Europe, economic development induced secular trends in growth across the entire 20th century. Average height in the UK today is several inches greater than in the 19th century, but this trend was distributed over three or four generations. Unpublished data from India indicate a secular trend in childhood growth of substantially greater magnitude, with an increase in childhood obesity detectable with statistical significance within 2 years. Speeding up the secular trends that drive obesity is likely to drastically exacerbate the physiological costs paid by individuals, expressed in rocketing prevalences of type 2 diabetes and cardiovascular disease.

What occurred Western industrialised populations is not what is happening in the BRIC countries and others undergoing rapid modernisation. In India, many adults, including many women, still participate in harsh physical labour. Individuals who migrate from such a rural agri-

cultural setting to the city undergo profound changes in their work patterns, living conditions, dietary intake, and social environment. This pattern is evident in many global regions, but perhaps especially the BRIC countries where economic development has ‘caught fire’. There are no data from Western industrialised populations that can simulate such a rapid pace of economic development and its effects on human physiology.

Whilst data on behavioural change is essential to understand the vulnerability of physiology to development, the impact on physiology must also be investigated. There is an urgent requirement for data on growth, the underlying body composition (lean mass and fat mass) and physical activity patterns in diverse ecological settings. For too long, growth and obesity have been categorised on the basis of simple anthropometric measurements, either weight- or height-for-age, or weight for height expressed as body mass index (BMI). Such data is unable to address ethnic variability in physique, or trade-offs in the ratio of fat to lean that characterise different ecological environments. Those from the Indian subcontinent experience increased cardiovascular risk at much lower levels of BMI than western populations. This appears to be due to high levels of fat, and low levels of lean mass, for a given body weight. Catch-up growth, which is characteristic of countries such as India and Brazil where low birth weight is common, also alters the ratio of fat to lean. Relationships between body size and cardiovascular risk in one population do not therefore transfer to other populations.

Similarly, the majority of data on physical activity from Western environments relates to “leisure time”

behaviour, simply because subsistence and work rarely involve physical effort in the modern technology-dominated environment. Data on physical activity in modernising countries is likely to be very different, often reflecting high levels of energy expenditure on subsistence, work or travel. Public health interventions in the BRIC countries must target the lifestyles characteristic of their own populations, taking into account the kinds of behavioural change that accompany migration, urbanisation and local industries.

This message applies not just to researchers, encouraging them to investigate the aetiology of the metabolic syndrome in their local environment, but also to governments and funding agencies who are all too willing to assume that research from Western industrialised populations is sufficient for other global regions. Although there may be the same weight and height at age 10, the rapidly growing child of a small parent in Brazil is undergoing a very different process of development compared to a slowly growing child of a large parent in the United Kingdom. Understanding these differences is essential, if scientists are to contribute successful public health policies for reducing the burden of non-communicable diseases.

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