

The metabolic syndrome

in developing countries

✉ Viswanathan Mohan and Mohan Deepa

The occurrence of the metabolic syndrome in various ethnic groups – including Caucasians, Africans, Latin Americans, Asian Indians, Chinese, Aboriginal Australians, Polynesians and Micronesians – has been confirmed in several epidemiological studies. In developing countries, the lifestyle changes resulting from industrialization and rural-urban migration involve decreased levels of physical activity and the increased intake of energy. As reported by Viswanathan Mohan and Mohan Deepa in this article, the consequent rise in rates of obesity has led to a huge increase in the numbers of people with the metabolic syndrome in developing regions.

Millions of people in developing countries are facing a double health burden that represents an unsettling modern-day paradox: the impact of the poverty-related diseases associated with infections and under-nutrition is being exacerbated by the emerging epidemic of the chronic non-communicable diseases that are associated with increasing affluence. The severe limitations on health resources in developing countries further compound the problems.

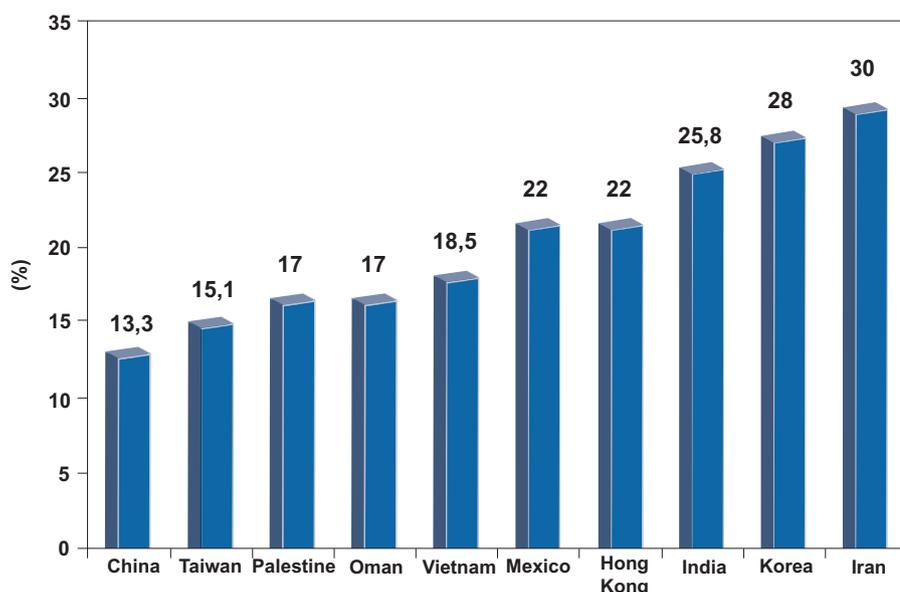
Over the past two decades, there has been a striking increase in the number of people with the metabolic syndrome in developing countries. However, precise figures for its prevalence are not available. This is due in part to the lack, as yet, of an internationally agreed definition for the syndrome. Different definitions have been drawn up by the World Health Organization (WHO), European Group for the Study of Insulin Resistance (EGIR), American Association of Clinical

Endocrinologists (AACE), US National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III), and recently by the International Diabetes Federation (IDF).

While most agree on the essential components of the metabolic syndrome – glucose intolerance, obesity, hypertension and dyslipidaemia – they differ in the cut-off points used for each of these, and the combinations of components used to define the syndrome. According to the latest IDF definition, central obesity, associated with insulin insensitivity, is an essential component. The metabolic syndrome arises in most cases as a result of the excessive accumulation of abdominal fat.

Waist circumference has been recognized as a good marker of abdominal fat and intra-abdominal fat, which has an even stronger metabolic impact.¹ Central obesity is most easily assessed by simply measuring the waist circumference. Because increased cardiovascular risk among Asian people occurs at a lower waist circumference compared with European populations, the WHO Western Pacific Region

Figure 1: Prevalence of the metabolic syndrome in developing countries



guidelines recommend lower waist circumference cut-off points to define central obesity for Asian populations – 90 cm or above for men and 80 cm or above for women.²

Cardiovascular risk among Asian people occurs at a lower waist circumference compared with Europeans.

Prevalence

Figure 1 shows the prevalence of the metabolic syndrome, based on published studies, in various developing countries. In these developing countries, the prevalence of the metabolic syndrome varies from 13% in China to 30% in Iran. In a survey in Singapore, the prevalence of the syndrome varied between the three major ethnic groups – from the Chinese at 15% and Malays at 19%, to the Indians at 20%.³ All these studies have used either WHO or ATP III criteria for defining the metabolic syndrome. In a large cross-sectional

survey on urban Asian Indians, the Chennai Urban Rural Epidemiology Study, the prevalence of the metabolic syndrome was found to be 23%, 18% and 26% using the WHO, ATP III and IDF definitions respectively.⁴

In an earlier population-based study, the Chennai Urban Population Study in Asian Indians, a significant difference in the prevalence of the metabolic syndrome was found within an urban environment: 19% in the middle-income group compared to 7% in the low-income group.⁵ In rural areas, prevalence of the syndrome remains considerably lower; people with a traditional lifestyle in rural communities engage in daily physical activity and consume less energy-dense foods.

Genes and environment

Although the prevalence of the metabolic syndrome varies widely due to variations in the definitions used, in some developing countries the figures approach those seen in

developed regions. With ongoing demographic changes and an aging population, the impact of the metabolic syndrome will be significantly greater in the developing countries.

The causes of the metabolic syndrome are likely to reflect a mix of genetic and environmental factors and the interactions between these. Recent studies confirm that genetic factors contribute to the concentration of the metabolic syndrome and its components within family groups. There is strong evidence that Asian Indians have a stronger genetic predisposition to diabetes than other ethnic groups.⁶

Cardiovascular disease

Recent reports indicate that the rates of cardiovascular disease and diabetes have risen sharply in developing countries. Indeed, cardiovascular disease is now a principal cause of death; by 2020, it will become the leading cause of death and disability worldwide.⁷ In developing countries, cardiovascular disease represents up to 75% of deaths from non-communicable diseases and already accounts for 10% of the developing world's burden of disability.

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Two-thirds of the global diabetes population live in the developing world; India and China are predicted to show the largest increases in terms of diabetes prevalence. Indeed, India is the world leader: according to WHO estimates, there are currently 35 million



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people with diabetes in India, a number that is expected to rise to 80 million by 2030.⁸ This will account for almost 15% of people with diabetes worldwide. The dramatic increase in the prevalence of diabetes and cardiovascular disease represents a massive health problem in developing countries.

Urgent need for prevention

Due to the increased risk of diabetes and cardiovascular disease in people with the metabolic syndrome, there is an urgent need for strategies to prevent the emerging global epidemic of this condition. The primary

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management goals of the metabolic syndrome are to reduce the risks of cardiovascular disease and diabetes. Lifestyle modifications, including regular physical activity and even modest weight loss, could reduce the prevalence of the syndrome. Thus, community-wide efforts to change health behaviours are vital to decrease the death and disability resulting from the metabolic syndrome in developing countries.

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