Commentary

The metabolic syndrome in China

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The metabolic syndrome is a cluster of abnormalities including obesity, dyslipidaemia, abnormal blood glucose and raised blood pressure [1]. Reaven drew attention to this syndrome, which he called syndrome X [2]. Its importance is increasingly recognized in recent years because it predicts cardiovascular disease and the development of diabetes [3–6]. The metabolic syndrome is heterogeneous, so no definition is entirely satisfactory. The World Health Organization (WHO) proposed a definition in 1998 [7]. In 2001, the third report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel) (NCEP-ATPIII) defined it in terms of waist circumference, blood pressure and blood biochemistry [8, 9]. In 2005, the International Diabetes Federation (IDF) made abdominal obesity a prerequisite in the definition [10]. The WHO definition is difficult to embrace because glucose tolerance tests and measurement of insulin sensitivity are seldom performed in clinical practice. In the USA, the revised NCEP and the IDF definitions are quite consistent, with 92.9% agreement [11]. In other ethnic populations, such as Asians, the new ethnic-specific waist circumference criteria may slightly increase the prevalence of the metabolic syndrome [12].

The metabolic syndrome has become quite controversial [13, 14]. Many cases of hypertension are unrelated to it. Its diagnosis in a diabetic is not clinically useful, because diabetes is a well-defined disease that is best treated by clinicians with a special interest in diabetes and with support from specialized centres. The metabolic syndrome can be perceived as having two stages. In the first stage, rather than drug treatment, lifestyle changes are indicated. The concept of the metabolic syndrome is useful here because weight control and regular exercise may prevent or delay the onset of hyper-

tension and diabetes. In stage two, the person has an abnormality in one or more components of the metabolic syndrome that requires specific drug treatment, such as antihypertensive, antidiabetic or lipid-lowering agents. This may arise not only because of an extremely abnormal single risk factor, but also because of a high overall cardiovascular risk. This is also a stage at which referral for specialist care should be considered.

China has a population of 1.3 billion. Its economy has grown rapidly and continuously in the last two decades. In a country that had witnessed war, revolution, famine and rationing, food is now readily available and sold in open markets. It is easier to adjust to having more money than having more food. Babies born in an era of famine may be metabolically adapted to it and more prone to develop the metabolic syndrome when food is abundant. Thus, it may be construed that China is undergoing a large-scale natural experiment in which the 'predictive adaptive responses' of the population to a nutritionally poor early environment is counter-productive for health, despite and possibly due to increased prosperity [15].

In a study of a large professional population in Beijing, the prevalence of the metabolic syndrome was 13.2% [16]. In a nationally representative sample of 15 540 Chinese adults aged 35–74 years in 2000–2001, the age-standardized prevalence of the metabolic syndrome, defined according to NCEP guidelines, was 9.8% in men and 17.8% in women [17]. The age-standardized prevalence for being overweight [body mass index (BMI) = 25] was 26.9% in men and 31.1% in women. The prevalence of the metabolic syndrome and being overweight was higher in northern than in southern China and in urban than rural residents. The metabolic syndrome is common in the elderly, mainly because of the rise in prevalence of hypertension and diabetes with age. China is facing the problem of an ageing population.

The effort to control population growth, e.g. through the one child policy on the one hand and increasing longevity on the other, results in a shift in the age distribution of the population. This will increase the prevalence of the metabolic syndrome and the incidence of cardiovascular disease. The increased prevalence of the metabolic syndrome is also seen in other Chinese populations and other parts of Asia, currently being 11% in Korea and 29% in India [18–21]. Such figures are becoming comparable to those in the USA [22, 23].

In Asian populations, the increases in Type 2 diabetes and the metabolic syndrome are thought to be due to increasing obesity. In caucasians, a BMI of >30 is obese and that of >25 is overweight. Many Asians may not look obese and have BMIs that fall within the normal range for caucasians, but it is recognized that many Asian populations have a greater tendency to develop diabetes at modest levels of BMI and waist circumference [24–26]. Thus, in Asia, a lower cut-off for overweight is used [27–29]. However, BMI does not reflect adiposity, nor does it describe the distribution of fat. The waist circumference might be a better measure of abdominal or central obesity. There is some debate as to whether or not the waist–hip ratio is better than the waist circumference alone in predicting cardiovascular risk [30]. In Chinese, the waist circumference adds additional risk information to that of BMI and may therefore enhance cardiovascular risk stratification [31].

Abdominal obesity has been postulated as the leading modifiable cause of cardiovascular disease in Asia [32]. Obesity is at the centre of the metabolic syndrome and needs to be treated as seriously as hypertension and diabetes. Treatment of obesity not only reduces body weight, but also waist circumference, body fat percentage, blood pressure, plasma glucose and lipid levels [33]. Lifestyle changes have been shown to prevent diabetes [34]. The United States Food and Drug Administration has currently approved five drugs for the treatment of obesity, orlistat and sibutramine being the most widely used. Rimonabant, a selective cannabinoid-1 receptor blocker, has been shown to reduce body weight and improve cardiovascular risk factors in obese patients [35]. As people cannot change their dietary habits easily, drugs might be needed. An emerging problem in China is the adulteration of health food with pharmaceuticals. As natural herbs are probably not very effective in weight control, some brands of slimming pills sold as health foods contain sibutramine, ephedrine, phentermine and even ‘fen-phen’ (the combination of fenfluramine and phentermine now banned because fenfluramine can cause valvular heart disease) [36] and find their way to Hong Kong and probably other parts of the world.

To combat the epidemic of obesity, it may be more important to change dietary habits at the community level, to encourage the consumption of foods that are low in glycaemic load [37] and index, and high in fibre. Glycaemic index is a measure of how much the food raises the blood glucose compared with glucose itself, which has a glycaemic index of 100 by definition. Foods with high glycaemic indices cause a high blood glucose peak, stimulate insulin secretion, which then causes hunger a few hours later. Polished rice, the staple food in southern China, is low in fibre and has a glycaemic index ranging from 50 to 94 [38]. Congee, popularly believed to be a healthy food item, can cause a particularly high peak in plasma glucose [39]. The Chinese diet has a low fat content [40], yet Chinese populations have a very high incidence of impaired glucose tolerance [18]. In the Hong Kong Cardiovascular Risk Factor Prevalence Survey-2 cohort, one-third of those over the age of 65 years had diabetes (unpublished data). A nutritional survey of the same cohort showed that the intake of rice and pasta was high in diabetics of normal body weight [41]. Thus, in much of Asia obesity and insulin resistance are not due to excess fat in the diet but to the imbibing of carbohydrates in excess of energy needs. The Harvard Healthy Eating Pyramid puts rice at the top [42] whilst the old Food Guide Pyramid put rice at the base [43]. We are now advised to eat brown and wild rice instead of white rice [44], but nearly all Chinese restaurants still serve white rice only.

The WHO now recommends moderate physical activity on most days of the week [45]. Visitors to China in recent years would be surprised to find that bicycles have been replaced by motor cars. China is now a major car manufacturing country and exports cars to Europe. The drop in physical activity in Chinese is a concern and, although it may be a sign of growing affluence, it also presages the metabolic syndrome and cardiovascular disease.

China is in a position to halt or reverse the increase in the metabolic syndrome. The government is famous for getting things done. China may want to catch up with Britain and America in many things, but hopefully not obesity or the metabolic syndrome.

Conflict of interest

None declared.

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