Obesity in Hong Kong - Risk and Burden

Dr. Gary TC KO

MBChB, MD, FRCPI, FHKCP, FHKAM
Vice President, Hong Kong Association for the Study of Obesity (HKASO)

Introduction

Obesity is now a global concern not only in adults but also among children and adolescents. With increasing personal affluence and changing lifestyle characterised by increased food intake and reduced physical activity, obesity has become an epidemic not only in developed countries but some developing areas as well. Obesity is a chronic disease due to its associated increase in the risk of morbidity and mortality. Apart from the associations with cardiovascular diseases, hypertension, diabetes and dyslipidaemia, obesity has also been implicated in the development of degenerative bone diseases, obstructive sleep apnoea, gallbladder diseases and some cancers such as colorectal malignancy. The rapid surge of diabetes, especially in the Asian Pacific Region, is closely associated with escalating obesity prevalence.

General vs. Central Obesity

Body Mass Index (BMI), defined as body weight in kilogram divided by body height in metre squared, has been used for measuring obesity for more than 20 years. The World Health Organization (WHO) in 1995 defined overweight as BMI ≥ 25-29.9 kg/m² while obesity as BMI ≥ 30 kg/m². However, these definitions are based on data obtained mainly from Caucasian populations and do not apply readily to Asian populations such as the Chinese. In 2000, the World Health Organization Western Pacific Region (WHO-WPR), International Association for the Study of Obesity (IASO) and the International Obesity Task Force (IOTF) jointly proposed a revised definition of obesity for non-Caucasian populations. In this joint proposal, BMI cut-off levels for overweight and obesity in Asians were redefined as ≥ 23 kg/m² and ≥ 25 kg/m² respectively. However, this modification had been criticised to be too radical such that the definition of obesity was dramatically decreased by 5 kg/m² (from 30 to 25 kg/m²). In 2004, a WHO expert consultation was held in Singapore. They concluded that Asians generally had a higher percentage of body fat than white people of the same age, sex and BMI, and that the proportion of Asian people with risk factors for type 2 diabetes and cardiovascular diseases was substantial even below the existing WHO BMI cut-off point of 25 kg/m² for overweight. They released a report that suggested retaining the traditional BMI cut-off levels for overweight (≥ 25 kg/m²) and obesity (≥ 30 kg/m²) but added 23.0, 27.5, 32.5 and 37.5 kg/m² as points for public health action. For Asian populations, BMI at 27.5 kg/m² or higher was regarded as representing high risk.

Prevalence

General Obesity

It is difficult to compare data concerning the prevalence of obesity among different populations when different parameters and definitions are used. In the 90’s, the prevalence of overweight (BMI≥ 25 kg/m²) in Hong Kong Chinese was around 35% and for obesity (BMI≥30 kg/m²), 5%. The respective figures of obesity were as high as 30% in Europe and US. Similarly, in Hong Kong Chinese, the mean WC was only 80 cm in men and 82 cm in women. For Asians, these WC cut-off values are modified to ≥ 90 cm in men and ≥ 80 cm in women.

Vague was the first to describe that obesity which predominates in the upper body is more associated with hypertension and glucose intolerance compared to obesity which predominates in the lower body. To measure abdominal obesity, waist circumference (WC) alone and/or waist to hip ratio (WHR) are most commonly used. The measurement of WC should be made at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest while hip circumference is the maximum measurement, in a horizontal plane, around the buttocks posteriorly and the symphysis pubis anteriorly. Standardisation of the levels at which WC and hip circumferences should be measured is important since large variations in the ratio can result from small variations in the measurement sites. Some reports have shown that WC correlates better than WHR with intra-abdominal adipose area as measured by Computerised Tomography Scan or Magnetic Resonance Imaging. Nowadays, many authorities are using WC alone to evaluate central obesity.

Central obesity, indicated by increased WC, is a proven marker for future clinical events. There is general consensus that WC measurements can be used to supplement BMI to stratify health risks in the general and diabetic populations. According to both the International Diabetes Federation (IDF) and National Cholesterol Education Program (NCEP) guidelines, central obesity is a key parameter in the diagnosis of the metabolic syndrome, which is associated with 2 to 5 fold increased risks of diabetes, cardiovascular diseases and/or mortality. Among Caucasians, central obesity is defined as a WC ≥ 102 cm in men and ≥ 88 cm in women or WHR ≥ 0.90 in men or ≥ 0.85 in women. For Asians, these WC cut-off values are modified to ≥ 90 cm in men and ≥ 80 cm in women.

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In 2005, using the WHO-WPR 2000 criteria with BMI ≥ 25 kg/m² as the cut-off for obesity, the age-standardised prevalence of obesity in Hong Kong Chinese were 31.0% in men and 18.8% in women\(^\text{15}\). The figure in men was comparable to that of many western countries such as England (24.9%), Finland (14.9%) and USA (31.1%) (with obesity defined as BMI ≥ 30 kg/m²) for the same year period of 2001-2006\(^\text{16}\). By contrast, the rate of obesity in Hong Kong women was lower than that reported in USA (33.2%) and UK (25.2-26.0%), comparable to New Zealand (22.1%), and higher than some European countries such as Italy (9.1%) and Finland (13.5%)\(^\text{16}\). Using the same BMI cut-off (≥ 25 kg/m²), Hong Kong has one of the highest prevalence of obesity amongst various Chinese communities (Mainland China: 16.7% in men, 15.4% in women; Taiwan: 22.3% in men, 19.9% in women)\(^\text{17}\).

**Central Obesity**

In the period between 1987 and 1992, WHO had conducted a cardiovascular risk survey (MONItoring trends & determinants in Cardiovascular diseases [MONICA] Project) among 26 countries with measurements of WC in 32,000 subjects\(^\text{18}\). The mean WC in men in Beijing was 83 cm only, which was around 10 cm less as compared to those in European countries. Mean WC values in the latter varied from 91 cm in Italy to 98 cm in German and Czech. Interestingly, for WC in women, it was 80 cm in Beijing and slightly higher than that in Australia and Switzerland (78 cm), and much lower than Spain (87 cm) and Czech (91 cm) (see Table 1).

In 2007, an international survey collected information on WC from 168,000 people in 63 countries (International Day for the Evaluation of Abdominal obesity [IDEA] Study)\(^\text{19}\). The study showed the mean WC of Asians (China Mainland, Hong Kong, Taiwan and South Korea) was 86.5 cm in men and 80.2 cm in women. Compared to the data from the MONICA Project, the WC of the IDEA Study in men increased by 3.4 cm and remained static in women. Besides, WC markedly escalated to 99.1 cm in men and 89.0 cm in women among Australians. Most European countries also showed similar deteriorating trends in both genders (Table 1).

There is no population-based national health survey on the problem of obesity in Hong Kong. Comparing data from a local working population survey done in the early 90’s and a health promotion campaign conducted in 2002, the rate of general obesity (BMI ≥ 25 kg/m²) increased from 30% to 35% in men and dropped from 28% to 22% in women, while similar figures for central obesity were more alarming with an increase from 12% to 27% in men and a static state in women (27-29%)\(^\text{20}\). Taken together, these figures suggested a worsening problem of central obesity in Hong Kong. In light of the confirmed prognostic significance of central obesity to predict diabetes, metabolic syndrome, cardiovascular and all cause mortality, they point to a looming epidemic of obesity-associated chronic diseases in our population.

**Implication**

One of the WHO reports estimated that globally 35 million people died from chronic diseases every year and 1 billion people were estimated to be obese. In China, 558 billion US dollars of national income was estimated to forego in the next 10 years as a result of chronic diseases such as diabetes and obesity\(^\text{21}\). In Hong Kong, obesity and related conditions occupied ~15% of all admissions and the related expenditure showed a 47% increment in 5 years’ time\(^\text{22}\). Obesity attributes a significant proportion of the costs on various diseases. This was estimated to be 10-20% for diabetes, hypertension or dyslipidaemia in Hong Kong Chinese.

Body weight is mainly determined by caloric intake, energy expenditure and basal metabolic rate. Although obesity is occasionally a presenting feature of an endocrine or metabolic disorder, in the majority of subjects, obesity is a consequence of energy imbalance due to excessive energy intake and (relatively) inadequate energy expenditure. Increased food intake, in particular, dietary fat, is the main cause of excessive energy input while reduced energy expenditure is usually due to a sedentary lifestyle with inadequate physical activity. While the search for the obesity genes continues, education on lifestyle modification with particular emphasis on a balanced diet and regular physical activity remains the cornerstone of weight reduction programmes at both the primary and secondary preventative levels.

**Table 1. Data on waist circumferences from the MONICA Project (1987-1992) 18 and IDEA Study (2007)\(^\text{19}\)**

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MONICA Project, MONItoring trends & determinants in Cardiovascular diseases; IDEA Study, International Day for the Evaluation of Abdominal obesity Study
## References

16. IOTF. International Obesity TaskForce (IOTF) prevalence data: Global obesity prevalence in adults.