Obesity in Singapore

J S Cheah,* *FAMS, FRACP, FRCPE*

The word obesity implies an excess of adipose tissue (fat) and not merely an excess of body weight. An increase in body weight may be due to fat (as in an obese person) or due to lean muscles (as in Hercules or in a body builder). Direct methods for measuring body fat (cadaveric studies and *in vivo* neutron activation analysis) are either impossible or too prohibitive in terms of costs and risks.[1] Indirect methods that are commonly used include densitometry, dilution techniques and dual energy X-ray absorptiometry (DEXA). Each of these methods has its own advantages and limitations. These techniques depend on the use of equations to calculate percentage body fat from the measured body parameters and such equations were developed for use mainly in the "normal" Caucasian population and based on certain assumptions.[1] Densitometry, using underwater weighing or more recently air-displacement, is a classical method, long regarded as a method of reference. Dilution techniques, for example deuterium oxide dilution, depend on the assumption that hydration of fat-free mass is fixed and constant. DEXA scanning has been found to be highly valid for bone mineral density but not as good for measuring percentage body fat. Varying body sizes could affect the accuracy of DEXA in the measurement of percentage body fat. There are also differences between machines and even between different models, rendering the standardisation of methodology difficult.[1]

For best and least-biased information, four-compartment methods, in which the variations in water content and mineral content in the fat-free mass are accounted for, should be used. The combination of techniques required makes this method expensive and not suitable for use in large epidemiological studies. Hence, indirect methods (predictive methods) are normally used for clinical assessment and in large population studies as they are affordable, easy to perform and require minimal equipment and manpower. The body mass index (BMI), defined as weight in kilograms divided by the square of height in metre, is one such method that is commonly used as a surrogate measure for percentage body fat. The BMI was first described in the 19th century by Quetelet. BMI is generally well correlated with percentage body fat and is a good indicator of level of risks.[2] Cut-off points for obesity, as defined by the World Health Organisation (WHO),[3] are based on BMI values but these cut-off points are based on the relationship between BMI and morbidity and mortality in Western populations and it may not be valid in other populations. Wang et al,[4] in a study in New York, found that Asians had a lower mean BMI but a higher percentage body fat than Caucasians of the same age and sex. Gurrici et al[5] reported that Indonesians had, for the same percentage body fat, a BMI about 3 units lower than Dutch Caucasians. In Hong Kong Chinese, Ko et al[6] reported that the normal upper limit for weight should be lowered to a BMI of 23.0.

In Singapore, Deurenberg-Yap et al[7] reported that in Singaporean Chinese, the risk for elevated risk factors increases with BMI and, in contrast to Caucasian populations, is already apparent at low levels of BMI; one possible explanation could be a different relationship between BMI and percentage body fat with the Chinese in Singapore having more percentage body fat at the same BMI compared to Caucasians.[7] Deurenberg-Yap et al[1] studied the relationship between percentage body fat and BMI in 291 Singaporean adults (Chinese, Malays and Indians); they used a four-compartment model to calculate the percentage body fat. They found that Singaporeans have higher percentage body fat at a lower BMI compared to Caucasians and differences in the BMI/percentage body fat relationship also exist among Singaporean Chinese, Malays and Indians. The differences can be explained by differences in body built. If obesity is explained as excess body fat rather than excess weight, the obesity cut-off point for Singaporeans should a BMI of 27 rather than 30. The lowering of the cut-off point for obesity would more than double the prevalence figures in Singapore.[1]

For the Asia-Pacific region, the Asia-Pacific Perspective[8] recommended that the normal BMI should be 18.5-22.9; a BMI of 23-24.9 is overweight; a BMI of 25-29.9 is Obese I and a BMI of 30 and above is Obese II.[8]

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* *Consultant Endocrinologist*
Department of Medicine, National University Hospital, Singapore
Visiting Endocrinologist
National Heart Centre, Singapore and Raffles Hospital, Singapore
Address for Reprints: Professor JS Cheah, Department of Medicine, National University Hospital, 5 Lower Kent Ridge Road, Singapore 119074.
E-mail: mdccjs@nus.edu.sg

In Singapore, the 1998 National Health Survey,[9] based on the WHO criteria[3] (normal weight: BMI 18.5-24.9; overweight: BMI 25.0-29.9; obese: BMI 30 and above) found that in adults (aged 18 to 69 years), 24.4% were overweight and 6.0% were obese; thus, 30.4% were above the normal weight. There were slightly more obese Singaporean females (6.7%) than Singaporean males (5.3%). Obesity was most prevalent in Malays (16.2%), followed by Indians (12.2%) and Chinese (3.8%). The ethnic differences were more pronounced in females than males. The highest proportion of obesity was found in the 50-59 years age group.[9]

Deurenberg-Yap et al[1] recommended that the cut-off point for obesity in Singapore should be lowered from a BMI of 30 to 27; this would increase the prevalence of obesity in females from 6.5% to 15.4% and in males from 5.2% to 17.3%. These figures are close to the prevalence of obesity in the United States of American (20% to 30% in adult men; 30% to 40% in adult women).[10] These higher prevalences of obesity in Singapore are more in line with the relatively high level of chronic degenerative diseases in Singapore and with their increased relative risk for cardiovascular risk factors at lower BMI levels.[7]

The treatment of obesity is often difficult and frustrating to the patient and doctor;[11,12] if weight loss is difficult, maintaining it is even more difficult. The patient's expectation has to be realistic; up to about 10% of loss of body weight can be expected with medical treatment. A prudent lifestyle (a hypocaloric diet low in fat and oil with regular exercise) reinforced by behavioural therapy (where possible) is the cornerstone of weight reduction. The recent introduction of anti-obesity drugs such as the intestinal lipase inhibitor Orlistat (Xenical)[12] and the post-prandial satiety enhancer Sibutramine (Reductil)[13] are helpful in the management of obesity.

Prevention is the best treatment of obesity. Education of the population is the key to prevention. Everyone, from the young to the old, has to be convinced to adopt a prudent and healthy lifestyle—a diet low in fat, oil and refined sugar and high in fibres, coupled with regular exercise.

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