

Obesity

Waist circumference action thresholds revisited



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Although obesity is now acknowledged to be the major risk factor for type 2 diabetes, and a significant risk factor for coronary heart disease (CHD) in those with established diabetes, the measurement of obesity remains a serious obstacle to diagnosis and treatment.

Previous research has suggested that waist circumference (WC) may be a more accurate method for determining CHD risk than body mass index (BMI). While risk is continuous and intervention levels are arbitrary, Lean et al (1995) suggested that a WC of 102cm for men and 88cm for women without diabetes were action levels at which weight loss is indicated. Despres and colleagues (1995) developed this further, and suggested that the predictive value of WC is further enhanced by metabolic measurements such as serum triglyceride levels. However, there has been a widespread reluctance to develop the use of such measurements – in part because of a desire for more evidence.

The study by Zhu and colleagues, abstracted here, adds further weight to the argument in favour of the tape measure. The authors undertook a sensitivity and specificity analysis for different WC and BMI cut-offs for predicting CHD risk factors in 9019 men and women. They suggest that WC 90 cm (men) and 83 cm (women), equivalent in risk to BMI 25, are action levels at which no further weight should be gained. By contrast, WC 100 cm (men) and 93 cm (women), equivalent in risk to

BMI 30, are levels that demand weight loss. The headline result, however, is that WC is a better predictor of CHD risk than BMI. The presence of obesity-related metabolic risk factors was more closely associated with WC than BMI, and WC had a higher sensitivity than BMI in predicting risk. Based on BMI cut-offs at 25 and 30, some people needing weight loss would be missed. However, BMI was more specific, so that risk prediction based on WC might lead to a few people being advised to lose weight unnecessarily.

For anyone interested in preventing and treating obesity, this paper prompts further reflection on whether to use WC measurements in clinical practice. This has most relevance to preventive medicine in primary care – an important issue at a time when the population is becoming increasingly obese. However, confirmation by additional prospective studies remains important, and data are needed also on non-white ethnic groups who are at higher risk at lower levels of adiposity.

Analyses of the predictive value of WC in a 'secondary prevention' setting, i.e. those with established type 2 diabetes, CHD or other risk factors, would also be useful from the perspective of the diabetic clinic. But don't hold your breath over this – in all probability, the same, if not lower, action thresholds will be identified in those with diabetes.

Despres JP, Lemieux I, Prud'homme D (2001) Treatment of obesity: need to focus on high risk abdominally obese patients. *British Medical Journal* **322**: 716–20

Lean MJ, Han TS, Morrison CE (1995) Waist circumference as a measure for indicating the need for weight management. *British Medical Journal* **311**: 158–61

AMERICAN JOURNAL OF CLINICAL NUTRITION

Waist circumference predicts CHD risk better than BMI

Readability	✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 Current WC risk thresholds are based on associations with body mass index (BMI). This study aimed to determine the relation of WC to obesity-related risk factors and to derive comparable risk thresholds for WC and BMI.

2 Odds ratios (ORs) for 9019 subjects were identified for cardiovascular disease (CVD) and diabetes risk factors for BMIs of 25 and 30 for men and women, respectively.

3 WCs with the same ORs for these risk factors were then identified, and the WC- and BMI-based cut-offs for identifying obesity-associated risks were compared.

4 At BMIs of 25 and 30, ORs were 1.19 and 2.37 for men and 1.56 and 3.16 for women, respectively. The corresponding ORs for WC were 90 and 100cm for men, and 83 and 93cm for women.

5 In conclusion, WC is more closely linked to CVD risk factors than is BMI.

Zhu S, Wang Z, Heshka S et al (2002) Waist circumference and obesity-associated risk factors among whites in the third National Health and Nutrition Examination Survey: clinical action thresholds. *American Journal of Clinical Nutrition* **76**: 743–49

Obesity, CHD risk factors and diabetes in Chinese adults

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓

1 In the past 10 years, type 2 diabetes and coronary heart disease (CHD) have reached epidemic proportions in China, although only a few Chinese meet the WHO criterion for obesity.

2 The relationship of excess weight to CHD risk factors, and the probability



of developing type 2 diabetes, were assessed in 2856 and 629 adults, respectively.

3 Risk factors increased with increasing body mass index (BMI): hypertriglyceridaemia and hypertension risk doubled at a BMI of 23.0–24.9, and trebled at a BMI of 25.0–26.9.

4 Increasing waist measurements predicted a 10-fold increase in hypertension and a 3–5 times increased risk of diabetes. Suitable waist circumference cut-off points were 85cm for men and 80cm for women.

5 Hence, small increases in BMI, and particularly in waist circumference, predict a substantial increase in the risk of diabetes and CHD, especially hypertension, in Chinese adults.

Li G, Chen X, Jang J et al (2002) Obesity, coronary heart disease risk factors and diabetes in Chinese: an approach to the criteria of obesity in the Chinese population. *Obesity Reviews* **3**: 167–72

Continued on page 43

Continued from page 34

AMERICAN JOURNAL OF CARDIOLOGY

Obesity promotes CHD risk factor clustering

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

- The extent of coronary heart disease (CHD) risk factor clustering in overweight people, and its influence on the risk of myocardial infarction and coronary mortality, were investigated.
- The overweight group comprised 1309 men and 739 women who were initially free of cardiovascular disease. The obese group at risk comprised 375 men and 356 women.
- Being overweight occurred in isolation of CHD risk factors in 22%

Obesity—a new risk factor for carpal tunnel syndrome?

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

- Research identifying risk factors for carpal tunnel syndrome (CTS) have presented contradictory data with possible confusion bias among the most consistent risk factors.
- This study aimed to identify independent risk factors for CTS and analyse the strength of association of these factors.
- An epidemiological study was performed in a population of 791 CTS patients and 981 controls who

A gene-environment interaction causing type 2 diabetes

Readability	✓✓
Applicability to practice	✓✓
WOW! factor	✓✓✓✓

- Insulin receptor substrate 1 (IRS-1) gene polymorphisms have been identified in type 2 diabetes patients, but it is not known how these contribute to the development of diabetes.

of men and in 16.4% of women. Being obese occurred in isolation in only 12.8% of men and 9% of women.

- Clusters of ≥ 2 risk factors occurred in 56% of obese men and in 62.4% of obese women, a frequency exceeding that in slim subjects.
- Compared with obese men without risk factors, those with ≥ 3 factors had a 2.07 age-adjusted relative risk of developing CHD, and obese women had a 10.9 relative risk.
- Being overweight and obese promotes clusters of CHD risk factors that greatly influence their impact. Global risk assessment can thus identify high-risk overweight candidates for CHD who most urgently need correction of associated risk factors.

Kannel WB, Wilson PWF, Nam B-H, D'Agostino RB (2002) Risk stratification of obesity as a coronary risk factor. *American Journal of Cardiology* **90**: 697–701

CLINICAL NEUROPHYSIOLOGY

were undergoing nerve conduction studies and electromyography.

- Results confirmed that female gender, obesity and age are independent risk factors for CTS.
- Diabetes mellitus may also be a weak risk factor, particularly among women. A prospective study with diabetic patients is needed to establish the association between diabetes and CTS.

Becker J, Nora DB, Gomes I et al (2002) An evaluation of gender, obesity, age and diabetes mellitus as risk factors for carpal tunnel syndrome. *Clinical Neurophysiology* **113**: 1429–34

This study examined the interaction between obesity and IRS-1 gene polymorphisms by inducing obesity in heterozygous IRS-1 (IRS-1^{+/-}) knockout mice by gold-thioglucose (GTG) injection.

- GTG administration induced obesity and insulin resistance in IRS-1^{+/-} and wild type (WT) mice.
- Obese IRS-1^{+/-} mice were more insulin-resistant and had larger islets than obese WT mice, but the insulin sensitivity of lean IRS-1^{+/-} mice was similar to that of lean WT mice.

DIABETES, OBESITY AND METABOLISM

Orlistat-induced weight loss improves glycaemic control

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓

- The most important modifiable risk factor for type 2 diabetes is excess body weight. Overweight patients with type 2 diabetes have a reduced response to antidiabetic therapy.
- This multicentre, randomised, placebo-controlled study investigated the effects of orlistat on body weight, glycaemic control and cardiovascular risk factors in 383 overweight patients with type 2 diabetes allocated treatment with orlistat or placebo.
- After one year, patients treated with orlistat plus diet achieved 50% greater weight loss than those treated with diet alone, and 51.3% compared with 31.6% lost >5% weight.
- In the orlistat-treated group, HbA_{1c} was 0.5% lower at one year. LDL cholesterol was also reduced to a greater extent in the orlistat-treated group.
- Treatment with orlistat was well tolerated, apart from a higher incidence of mild and transient gastrointestinal events.

Hanefeld M, Sachse G (2002) The effects of orlistat on body weight and glycaemic control in overweight patients with type 2 diabetes: a randomized, placebo-controlled trial. *Diabetes, Obesity and Metabolism* **4**: 415–23

JOURNAL OF ENDOCRINOLOGY

These results suggest how a gene-environment interaction involving insulin resistance and obesity might lead to type 2 diabetes, and support theories on the pathogenesis of human diabetes.

Shirakami A, Toyonaga T, Tsuruzoe K (2002) Heterozygous knockout of the IRS-1 gene in mice enhances obesity-linked insulin resistance: a possible model for the development of type 2 diabetes. *J of Endocrinology* **174**: 309–19

‘Being overweight and obese promotes clusters of CHD risk factors that greatly influence their impact.’

‘Orlistat-induced weight loss led to improved HbA_{1c}, fasting glucose and post-prandial glucose levels and a greater reduction in LDL cholesterol.’

‘Polymorphisms in the IRS-1 gene may interact with risk factors such as obesity to increase the risks of diabetes.’