

Obesity and the risk of myocardial infarction in 27,000 participants from 52 countries: a case-control study

The Lancet

Volume 366, Issue 9497, November 11, 2005, Pages 1640-1649

Salim Yusuf, Steven Hawken, Stephanie Ounpuu, Leonelo Bautista, Maria Grazia Franzosi, Patrick Commerford, Chim C Lang, Zvonko Rumboldt, Churchill L Onen, Prof Liu Lisheng, Supachai Tanomsup, Paul Wangai, Fahad Razak, Arya M Sharma, Sonia S Anand

FROM ABSTRACT:

Obesity is a major risk factor for cardiovascular disease, but the most predictive measure for different ethnic populations is not clear.

We aimed to assess whether markers of obesity, especially waist-to-hip ratio, would be stronger indicators of myocardial infarction than body-mass index (BMI), the conventional measure.

We did a standardised case-control study of acute myocardial infarction with 27,098 participants in 52 countries (12,461 cases and 14,637 controls) representing several major ethnic groups.

We assessed the relation between BMI, waist and hip circumferences, and waist-to-hip ratio to myocardial infarction for each group.

Findings:

Waist-to-hip ratio and waist and hip circumferences were closely associated with risk of myocardial infarction even after adjustment for other risk factors.

Interpretation:

Waist-to-hip ratio shows a graded and highly significant association with myocardial infarction risk worldwide.

Redefinition of obesity based on waist-to-hip ratio instead of BMI increases the estimate of myocardial infarction attributable to obesity in most ethnic groups.

THESE AUTHORS ALSO NOTE:

Obesity increases the risk of cardiovascular diseases and diabetes.

Previous studies suggest that central obesity (especially the waist-to-hip ratio) is more strongly related to the risk of myocardial infarction than BMI (the conventional measure).

In this study, waist and hip circumferences were measured with a non-stretchable standard tape measure:

- 1) Waist circumference was measured over the unclothed abdomen at the narrowest point between the ribs and the iliac crest. **[Key]**
- 2) Hip circumference was measured over light clothing at the level of the widest diameter around the buttocks. **[Key]**

In this study, BMI was only slightly higher in myocardial infarction cases than in controls. In contrast, myocardial infarction cases had a "strikingly higher waist-to-hip ratio than controls, an observation consistent in all regions of the world."

With increasing BMI values, the risk of myocardial infarction increased. Patients in the highest BMI quintile (>28.2 in women or >28.6 in men) had a 44% increased risk of myocardial infarction compared with those with a BMI in the lowest quintile (22.7 in women or 22.5 in men).

In this study, waist circumference was strongly related to myocardial infarction risk. This persisted even after adjustment for BMI and height. The highest waist circumference (>97.4 cm [39 inches] women and >99.0 cm [39.6 inches] males) compared to the lowest quintile (<75.8 cm [30 inches] in women and <80.5 cm [32.2 inches] in men) was 77% greater to have a myocardial infarction.

[What is the measurement of your waist?]

"The risk of myocardial infarction rose progressively with increasing values for waist-to-hip ratio. This relation was consistent in men and women. These relations were much stronger than that between BMI and myocardial infarction."

The waist-to-hip ratio is consistently better than BMI for prediction of myocardial infarction.

The waist-to-hip ratio showed a significant association with myocardial infarction in all ethnic groups.

Abdominal obesity is better than BMI as a predictor of myocardial infarction in all ethnic groups.

DISCUSSION

The "waist-to-hip ratio shows the strongest relation with the risk of myocardial infarction worldwide." **[IMPORTANT]**

This waist-to-hip ratio was the strongest anthropometric predictor of myocardial infarction in men and women, across all age and ethnic groups, in smokers and in non-smokers, in those with or without dyslipidaemia, diabetes, or hypertension.

"Raised waist-to-hip ratio substantially increases the population attributable risk resulting from obesity by over three-fold compared with BMI. Thus the global burden of obesity has been substantially underestimated by the reliance on BMI in previous studies."

Both waist and hip circumferences are independently related to myocardial infarction.

Obesity is an increasing problem worldwide.

BMI shows only a modest relation with myocardial infarction overall in this study.

The waist-to-hip ratio has the strongest and most consistent relation to myocardial infarction in the ethnic populations studied.

“Waist-to-hip ratio was also better than waist circumference as a measure of risk.”

The prevention of cardiovascular disease, diabetes, and other obesity-related conditions requires that abdominal obesity be reduced. **[Important]**

“Waist circumference and waist-to-hip ratio are simple and crude surrogate measures for visceral obesity, which is probably the key determinant of metabolic abnormalities.”

This study shows that the “waist-to-hip ratio is the strongest anthropometric measure that is associated with myocardial infarction risk, and is substantially better than BMI. These results are consistent in both sexes, old and young individuals, in different regions, and in different ethnic groups.”

“Use of raised waist-to-hip ratio as the index of obesity instead of BMI increases the population attributable risk for myocardial infarction threefold.”

[Wow!]

In this study, a HIGH risk for myocardial infarction was:

WAIST / HIP RATIO	Men: > 1.0	Women: > 0.95
-------------------	------------	---------------

In this study, a MODERATE risk for myocardial infarction was:

WAIST / HIP RATIO	Men: 0.95 - 1.0	Women: 0.90 - 0.95
-------------------	-----------------	--------------------

KEY POINTS FROM DAN MURPHY

- 1) Obesity is an increasing problem worldwide.
- 2) Obesity increases the risk of cardiovascular diseases and diabetes.
- 3) Central obesity (a large waist) is more strongly related to the risk of myocardial infarction than is BMI.
- 4) For myocardial infarction risk, the waist-to-hip ratio measurement is consistent in all regions of the world and in all ethnic groups.

- 5) For myocardial infarction risk, the waist-to-hip ratio is a superior biological marker than the standard BMI.
- 6) Abdominal obesity is better than BMI as a predictor of myocardial infarction in all ethnic groups.
- 7) The "waist-to-hip ratio shows the strongest relation with the risk of myocardial infarction worldwide." **[IMPORTANT]**
- 8) Raised waist-to-hip ratio substantially increases risk of myocardial infarction resulting from obesity by over three-fold compared with BMI.
- 9) The prevention of cardiovascular disease, diabetes, and other obesity-related conditions requires that abdominal obesity be reduced. **[Important]**
- 10) "Waist circumference and waist-to-hip ratio are simple and crude surrogate measures for visceral obesity, which is probably the key determinant of metabolic abnormalities."
- 11) "Use of raised waist-to-hip ratio as the index of obesity instead of BMI increases the population attributable risk for myocardial infarction threefold."
- 12) The global burden of obesity has been substantially underestimated by the reliance on the BMI (body-mass index).

PRACTICAL APPLICATION FROM DAN MURPHY

While unclothed:

Measure around your abdomen (waist) between the ribs and the iliac crest.

For men, if the measurement is greater than 39.6 inches, you have a significant risk that you will have a myocardial infarction.

For women, if the measurement is greater than 39 inches, you have a significant risk that you will have a myocardial infarction.

Measure around your hips and butt at the widest point.

Make a **RATIO** of **ABDOMINAL MEASUREMENT / HIP & BUTT MEASUREMENT**.

For men, if the **RATIO** is greater than 1.0, you have a very significant risk that you will have a myocardial infarction.

For women, if the **RATIO** is greater than 0.95, you have a very significant risk that you will have a myocardial infarction.