Waist hip ratio independently predicted death from cardiovascular and coronary heart disease in Australian men and women


Clinical impact ratings GP/FP/Primary care ****** IM/Ambulatory care ****** Cardiology ******

Do clinical measures of obesity predict death from cardiovascular disease (CVD) and coronary heart disease (CHD)?

**AETIOLOGY**

The study by Welborn et al found that WHR was the only anthropometric factor that was independently associated with both CHD and CVD mortality in a cohort of Australian men and women. Other features of the metabolic syndrome, including BP and triglycerides, were also independently associated with CHD mortality in men. This study primarily confirms previous reports of the adverse effects of central adiposity. However, several deficiencies in the analysis limit interpretation of the findings. Most notably, the authors have not performed a careful assessment of the biological pathways for each of the inter-related variables they entered into their models. The effect of obesity (either overall or central) on cardiovascular risk is partly mediated by hypertension, diabetes, hyperlipidaemia, and possibly cytokines produced by adipose tissue. After adjusting for these variables, the multivariate estimate for WHR represents its partial effect through additional pathways, not its overall effect.

The study measures did not include physical activity, nutrient intake, and medication use, which may all be potential confounders (not mediators) of the association between WHR and CHD or CVD mortality. The fact that the authors did not observe an association between traditional cardiac risk factors and each outcome might result from lack of power or misclassification bias. Finally, diabetes was classified by self report alone, which may have underestimated the true prevalence of the disease.

Most of the literature supports the finding that abdominal obesity is a stronger risk factor for cardiovascular disease than overall obesity. However, whether WHR is independent of traditional cardiac risk factors remains controversial and unanswered by this study.

Alka M Kanaya, MD
University of California, San Francisco
San Francisco, California, USA


**METHODS**


Setting: 9 metropolitan centres in Australia.

Participants: 9206 age and sex stratified participants 20–69 years old (mean age 43 y, 51% women) who completed a self administered questionnaire about previous CHD (angina or myocardial infarction) and diabetes mellitus; had >12 hours overnight fast; and were classified as current, previous, or non-smoker.

Risk factors: height, weight, waist circumference, waist hip ratio (WHR), systolic and diastolic blood pressure (BP), fasting plasma cholesterol and triglyceride concentrations, and self reported history of previous CHD or diabetes.

Outcomes: risk of CVD and CHD death.

**MAIN RESULTS**

Of the 473 participants who died from all causes (5%, mean age 61 y), 137 (1.5%) died from CVD, and 91 (1%) died from CHD. WHR was a strong and independent predictor of CVD or CHD death in both men and women (table). Previous CHD in men and women, current smoking in women, and diastolic BP and triglycerides in men were also risk factors for CVD or CHD death (table). Such traditional risk factors as low density lipoprotein, high density lipoprotein, and presence of diabetes were not found to be independent predictors.

**CONCLUSIONS**

Waist hip ratio independently predicted death from cardiovascular disease and coronary heart disease in Australian men and women.

**TABLE**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Outcomes</th>
<th>Multivariate hazard ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Men</td>
</tr>
<tr>
<td>Waist hip ratio</td>
<td>CVD death</td>
<td>1.60 (1.27 to 2.02)</td>
</tr>
<tr>
<td></td>
<td>CHD death</td>
<td>1.47 (1.10 to 1.96)</td>
</tr>
<tr>
<td>Previous CHD (angina or MI)</td>
<td>CVD death</td>
<td>2.64 (1.54 to 3.95)</td>
</tr>
<tr>
<td></td>
<td>CHD death</td>
<td>3.14 (1.86 to 5.29)</td>
</tr>
<tr>
<td>Current smoking</td>
<td>CVD death</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>CHD death</td>
<td>1.28 (1.04 to 1.57)</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>CVD death</td>
<td>1.27 (1.00 to 1.61)</td>
</tr>
<tr>
<td></td>
<td>CHD death</td>
<td>1.49 (1.03 to 2.15)</td>
</tr>
</tbody>
</table>

**Multivariate**

Data

The study measures did not include physical activity, nutrient intake, and medication use, which may all be potential confounders (not mediators) of the association between WHR and CHD or CVD mortality. The fact that the authors did not observe an association between traditional cardiac risk factors and each outcome might result from lack of power or misclassification bias. Finally, diabetes was classified by self report alone, which may have underestimated the true prevalence of the disease.

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University of California, San Francisco
San Francisco, California, USA


Risk of cardiovascular disease (CVD) and coronary heart disease (CHD) death in obese Australian men and women

*MI = myocardial infarction; BP = blood pressure. CI defined in glossary.

†Hazard ratios adjusted for age and refer to risk at 1 standard deviation above the mean for each variable.

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