Reviewer's report

Title: Waist circumference: as an indicator of risk for type 2 diabetes and cardiovascular disease

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Reviewer: Cia-Hin Lau

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This study aimed to determine the predictive value of waist circumference as a clinical indicator for type 2 diabetes mellitus (T2DM) and cardiovascular disease (CVD) among middle-aged Finnish men (n=196). They found that waist circumference #94cm (with 84.4% sensitivity and 78.2% specificity) is a reliable diagnostic test to identify individuals with increased risk of future development of T2DM and CVD. The result of this study is useful for early diagnosis of T2DM and CVD in the daily clinical practice.

Among middle-aged Finnish men current study is the first to assess the optimal cut-off points of waist circumference in order to identify individuals with increased risk of T2DM and CVD. Because of the well-established association between waist circumference and T2DM/CVD, an experiment assessing the cut-off points of waist circumference makes scientific sense. In fact, the optimal cut-off values of waist circumference vary across different ethnicities. Most of the methodology appears appropriate. Findings are clearly presented and the discussion places them well in the context. However, several issues are concerned, and the followings are suggested:

1) Unclear reference measure for ROC analysis. Were T2DM (FINDRISC) and CVD (The Modified North Karelia project risk index) Risk Scores used as gold standard in the ROC statistical modelling? Compared with other existing tests/methods (e.g. IDF criteria), are these risk scores most well-validated as gold standard to identify individuals with increased risk of T2DM and CVD? A reliable gold standard is important to ensure the accuracy of predictive values calculation (e.g. area under ROC curve, sensitivity and specificity values).

2) According to the IDF definition for metabolic syndrome, European men with waist circumference of #94 cm are considered having abdominal obesity. The waist circumference cut-off point demonstrated in this study was in agreement with the IDF diagnostic criteria for abdominal obesity. However, among middle-aged Finnish men current study demonstrated that measurement of waist circumference alone has two-fold higher risk of metabolic syndrome compared with the IDF criteria. Measurement of waist circumference alone may overestimate the risk of MS, and hence T2DM and CVD. Other metabolic risk factors such as blood pressure, cholesterol and glucose levels should be taken into account. Please add some discussion on optimal cutoff points (e.g. sensitivity and specificity values) of waist circumference for diagnosis of

3) Why exclude women? If authors are assessing the predictive value of waist circumference as an indicator of risk for T2DM and CVD, both men and women should be included.

4) Why restrict study population to those aged 40-55?

5) As the authors acknowledge, the study is small and may underpowered. The sample sizes will affect the sensitivity and specificity calculation, and hence optimal waist circumference cut-off points for T2DM and MS. More numbers of samples are required to draw reliable conclusions.

6) For statistical comparison purposes, sensitivity and specificity (area under ROC curve) of other indicators of adiposity (e.g. body mass index, waist-to-hip ratio and waist-to-height ratio) should be assessed and evaluated.

7) Known confounding factors including BMI, metabolic risk factors, medical treatment, diet and/or physical activity should be included as covariates in statistical modelling (e.g. multivariate logistic regression).

8) Please briefly discuss on these closely related articles in order to improve the scientific/clinical impact of the manuscript:

**Level of interest**: An article whose findings are important to those with closely related research interests

**Quality of written English**: Acceptable

**Statistical review**: Yes, and I have assessed the statistics in my report.

**Declaration of competing interests**: 
I declare that I have no competing interests