Reviewer's report

Title: The prevalence of Metabolic Syndrome and Metabolically Healthy Obesity in Europe: a collaborative analysis of ten large cohort studies

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Reviewer: Altan Onat

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In this collaborative analysis on over 163,000 cohort participants in Europe, authors aimed primarily to determine the prevalence of metabolically healthy obesity (MHO), and also that of obesity and MetS. Ten cohorts of 7 countries served for this purpose. The prevalence of MHO was approximately 10%, ranging from 4.6% to 18% in the cohorts, while the prevalence of overall obesity was 17% (12% to 26%). Authors emphasized the variability in the prevalence of MHO.

This large but descriptive study, although pursuing a worthy primary aim, seems to have added little novelty to current knowledge because few variables have been collected. Following issues need further to be addressed.

1) Though the prevalence of obesity is strongly age-related, and participants’ age ranged widely from 18 to 80 years, prevalence values provided refer to the whole cohorts without considering a threshold (say 40 years), whereas cohorts’ age ranges vary widely.

2) The above-stated age-relatedness applies even more strongly to MetS and MHO. Providing the Fig. 4 A and B is insufficient to determine the variation in the prevalence, let alone the key characteristics in each gender. It is better that participants younger than 40 years are removed from the study, and focus rests on the remainder. Analysis may preferably be performed in two age groups.

3) Two studies predominate in size (the NL LifeLines and the HUNT2 survey) so that the remaining 8 cohorts make up less than one-quarter of the total sample. Since MetS and MHO prevail quite differently in the two large studies, authors might consider the advantages of presenting certain data of the remaining 8 cohorts in a combined fashion (such as those in Tables 1-3).

4) Omission of less strict criteria (which compound the plethora of data) and an approach as described in items 2 and 3 may allow focusing primarily on triglycerides (and on HDL-C) which are key apparent factors for MetS (please, consult also Onat A, J Clin Lipidol 2010; 4:89) and MHO, as well as on gender differences, and yet, not discussed at all. Non-fasting TG values are apparently harmonized for comparison.

5) Total lack of data on waist circumference is striking, given MHO is largely related to WC. It would be beneficial to add available data on WC, at least in Table 1. Is this issue reflected or explained by the divergence of MetS prevalence among obese subjects between CHRIS and DILGOM (40%-72% in
text; and 24%-33% in Table 3)?

6) The lack of data on smoking status is conspicuous and needs remediying, separately stratified to sex, due to its close relation to the examined topic (please see Onat A Atherosclerosis 2007; 193:380, Metabolism 2011; 60:499; [Polish women] Kwasniewska M, Menopause 2012; 19:194, and Rasouli, Diabetes Care 2013, 36:604 [the HUNT study].

7) Much of novel knowledge generated in the past decade in the fields of MetS and cardiometabolic risk has been provided by A. Onat, none of whose publications have been referred to (a few examples: Exp Opin Pharmacother 2011; 12;1887, Metabolism 2009; 58:963, Curr Pharma Design 2013 Apr 2 [Epub], Atherosclerosis 2002;165:285, Int J Cardiol 2010; 142:72, Nutrition 2010; 26:382, J Investig Med 2013; 91:27, Obesity 2012; 20:842, Curr Pharma Design 2012; 18:1465). This makes the Discussion little fruitful although the need to identify the underlying factors for MHO is stressed by authors.

8) The request to revise one-size-fits-all approach and to re-evaluate the concept that all obesity is bad is to be commended.

9) Reference 30 is not yet published. Please, refer to it in the text, removing from the reference list.

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

No competing interest.